~~DRAFT~~ REPORT
Draft Final

REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA

DACA 41-92-C-0023

Prepared for
Department of the Army
U.S. Army Engineers District
Kansas City District
Corps of Engineers
Kansas City, Missouri

~~February 1993~~
May 1993 (Revised 9/93)

Woodward-Clyde

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September 22, 1993
WCC Project 92KW030A

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U.S. Army Engineer District, Kansas City
ATTN: CEMRK-ED-TP (Mr. John M. Cichelli)
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Re: Transmittal of Draft Final Remedial Investigation Report
Revisions for Operable Unit No. 2 (Groundwater)
Former Nebraska Ordnance Plant, Mead, Nebraska
Contract No. DACA 41-92-C-0023

Dear Mr. Cichelli:

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Please do not hesitate to contact us should you have any questions.

Very truly yours,

David C. Conry
RI Task Leader

Robert F. Skach, P.E.
Project Manager

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ATTN: CEMRK-ED-TP (Mr. John M. Cichelli)
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Re: Transmittal of Draft Final Remedial Investigation Report
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Former Nebraska Ordnance Plant, Mead, Nebraska
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Dear Mr. Cichelli:

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Very truly yours,

David C. Convy
RI Task Leader

Robert F. Skach, P.E.
Project Manager

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U.S. Army Engineer District, Kansas City
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700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Re: Transmittal of Draft Remedial Investigation Report
for Operable Unit No. 2 (Groundwater)
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Dear Mr. Birchmeier:

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David C. Convy
RI Task Leader

Robert F. Skach, P.E.
Project Manager

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REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA DACA 41-92-C-0023

Prepared for
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U.S. Army Engineers
Kansas City District
Corps of Engineers
Kansas City, Missouri
May 1993

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REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA DACA 41-92-C-0023

Prepared for
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Kansas City, Missouri
May 1993

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LIST OF ABBREVIATIONS, ACRONYMS, AND TERMS

The following abbreviations, acronyms, and terms are commonly used in environmental reports, work plans, and guidance documents. Not all of these abbreviations, acronyms, and terms have been used in this document. They are listed here as an aid to the reader because they are in common use in the industry or are specific to the subject of this document.

Term	Definition
2-ADNT	2-Amino-4,6-dinitrotoluene
4-ADNT	4-Amino-2,6-dinitrotoluene
AFBMD	Air Force Ballistic Missile Division
ARARs	Applicable or Relevant and Appropriate Requirements
ARDC	Agriculture Research and Development Center of the University of Nebraska, formerly the University of Nebraska Field Laboratory (UNFL)
ASTM	American Society for Testing and Materials
ATSDR	Agency of Toxic Substance and Disease Registry
BFB	Bromofluorobenzene
bgs	below ground surface
BOD	Biochemical Oxygen Demand
BRA	Baseline Risk Assessment
CCC	Calibration Check Compound
CCL	CompuChem Laboratories, Research Triangle Park, North Carolina
CCS	Contract Compliance Screen
CDAP	Chemical Data Acquisition Plan
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFA	Continuous Flight Augers
CFR	Code of Federal Regulations. The CFR are published in numbered titles such as 40 CFR and numbered parts such as 40 CFR 280.
CHSO	Corporate Health and Safety Officer
CLP	Contract Laboratory Program. Protocol for chemical analysis and documentation promulgated by EPA for laboratories under contract to EPA or other laboratories used for CERCLA Sites.

Term	Definition
COC	Chemicals of Concern
CRDL	Contract Required Detection Limit
CRP	Community Relations Plan
CTV	Critical Toxicity Value
DCA	1,1-Dichloroethane
DCE	cis-1,2-Dichloroethene
DDT	Dichlorodiphenyltrichloroethane
DERP	Defense Environmental Restoration Program
DFTPP	Decafluorotriphenylphosphine
DNAPL	Dense, Non-Aqueous Phase Liquid
DNB	Dinitrobenzene
2,4-DNT	2,4-Dinitrotoluene
2,6-DNT	2,6-Dinitrotoluene
DoD	Department of Defense
DO	Dissolved Oxygen
Donohue	SEC Donohue, Inc.
DQO	Data Quality Objectives
ECD	Electron Capture Detector
EP	Extraction Procedure
ER	Electrical Resistive Logging Device
ESE	Environmental Science and Engineering, Inc.
FID	Flame Ionization Detector
FP	Field Protocols (CDAP, Part II)
FS	Feasibility Study
FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
GC	Gas chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometer
GFAA	Graphite Furnace Atomic Absorption
gpd	Gallons per day
GSA	General Services Administration
HI	Hazard Index
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HNu	Portable organic vapor analyzer using a PID manufactured by HNu Corporation.
HQ	Hazard Quotient
HSA	Hollow-Stem Augers

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Term	Definition
HSO	Health and Safety Officer
HTW	Hazardous/Toxic Waste
IAG	Interagency Agreement
ICP	Inductively Coupled Plasma Spectrophotometer
i.d.	inside diameter
IDL	Instrument Detection Limit
IDW	Investigation - Derived Waste
K	Hydraulic conductivity
K_d	Distribution coefficient
K_{oc}	Organic carbon partition coefficient
K_{ow}	Octanol-water partition coefficient
Law	Law Environmental, Albuquerque, New Mexico
LCS	Laboratory Control Sample
LCW	Laboratory Concentration Water, USEPA Contract Laboratory Program Method
Load Line	Bomb Load Line (No. 1, 2, 3, and 4)
LOAEL	Lowest-Observed-Adverse-Effect-Level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goals
mg/kg	Milligrams per kilogram (ppm by weight) equivalent to µg/g
mg/L	Milligrams per liter (ppm)
MRI	Midwest Research Institute, Kansas City, Missouri
MS	Matrix Spike
MSA	Method of Standard Additional
MSD	Matrix Spike Duplicate
MSL	Mean Sea Level
MTV	Mobility, Toxicity, and Volatility
MW	Monitoring Well (Groundwater)
NAPL	Non-Aqueous Phase Liquid
NCP	National Contingency Plan
NDEQ	Nebraska Department of Environmental Quality
NDOH	Nebraska Department of Health
NOAA	National Oceanic and Atmosphere Agency
NOAEL	No-Observed-Adverse-Effect-Level
NOP	Nebraska Ordnance Plant (Former)
NPL	National Priorities List
NRD	Lower Platte (North) Natural Resources District

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Term	Definition
NT	Nitrotoluene
OAC	Ordnance Ammunition Command
o.d.	outside diameter
ORP	Oxidation Reduction Potential
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OU1	Operable Unit 1 (Soils)
OU2	Operable Unit 2 (Groundwater)
OU3	Operable Unit 3 (Landfill and any currently unidentified disposal areas)
OVA	Organic Vapor Analyzer
OVM	Organic Vapor Monitor
Ortek	Ortek Environmental Laboratories
PA	Preliminary assessment
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene (also known as perchloroethylene)
PEM	Performance Evaluation Mixture
PES	Plains Environmental Services, Inc., Salina, Kansas
PHSO	Project Health and Safety Officer
PID	Photo ionization detector
POTW	Publicly Owned Treatment Works
ppb	Parts per billion (µg/kg and µg/L)
PPE	Personal Protective Equipment
ppm	Parts per million (mg/kg and mg/L)
PRG	Preliminary Remediation Goals
PVC	Polyvinyl Chloride
PWP	Project Work Plan
QA/QC	Quality Assurance/Quality Control
QAP	Quality Assurance Plan (CDAP, Part III)
QCRs	Quality Control Reports
RA	Remedial Action
RAGS	Risk Assessment Guidance for Superfund
RD	Remedial Design
RDA	Recommended Daily Allowance
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
Region VII	EPA Region VII
RfC	Reference Concentration

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Term	Definition
RfD	Reference Dose (Subchronic)
RI/FS	Remedial Investigation/Feasibility Study
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RPD	Relative Percent Difference
RRF	Relative Response Factor
RSD	Relative Standard Deviation
SARA	Superfund Amendments and Reauthorization Act of 1986
SCBA	Self Contained Breathing Apparatus
SDG	Sample Delivery Group
SF	Slope Factor
SHERP	Safety, Health, and Emergency Response Plan document
SI	Site Inspection
SOP	Standard Operating Procedure
SOW	Statement of Work, USEPA Contract Laboratory Program
SPCC	System Performance Check Compound
SPO	Sampling Plans and Objectives (CDAP, Part I)
SPT	Standard Penetration Test
SSO	Site Safety Officer
SVOC	Semivolatile Organic Compound
T	Transmissivity
TAL	Target Analyte List. EPA's list of hazardous inorganic compounds (see CDAP Part III)
TC	Toxicity Characteristics (Reference: 40 CFR 261.24)
TCA	Trichloroethane (all isomers)
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethene (trichloroethylene)
TCL	Target Compound List. EPA's list of hazardous organic compounds (see CDAP Part III)
TCLP	Toxicity Characteristic Leaching Procedure (Reference: 40 CFR 261-Appendix II, SW 846 Method 1311)
TCO	Total Chromatographable Organics
TCT	Twin City Testing
TDS	Total Dissolved Solids
THC	Total hydrocarbons (quantitated as diesel)
TIC	Tentatively Identified Compound

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Term	Definition
TKN	Total Kjeldahl Nitrogen
TNB	1,3,5-Trinitrobenzene
TNT	2,4,6-Trinitrotoluene
TOC	Total Organic Carbon
TOX	Total Organic Halides
TSS	Total Suspended Solids
UCL	Upper Confidence Limit
UN	University of Nebraska
USACE	U.S. Army Corps of Engineers
USATHMA	United States Army Toxic and Hazardous Materials Agency
USC	Unified Soil Classification System
USDA	United States Department of Agriculture
USDHHS	United States Department of Health and Human Services
USEPA or EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
UXO	Unexploded Ordnance
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
WC	Woodward-Clyde
WCC	Woodward-Clyde Consultants
WCFS	Woodward-Clyde Federal Services
WQ1	First set of general water quality parameters collected beginning with the first quarterly groundwater sampling event
WQ2	Second set of general water quality parameters collected beginning with the third quarterly groundwater sampling event
µg/L	Micrograms per liter (ppb)
µg/kg	Micrograms per kilogram (ppb by weight)

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0.1 INTRODUCTION

0.1.1 Purpose of Report

This report summarizes the Remedial Investigation (RI) of Operable Unit 2 (Groundwater) of the former Nebraska Ordnance Plant (NOP) near Mead, Nebraska (Site). Woodward-Clyde Consultants (WCC) conducted this investigation in conjunction with the U.S. Army Corps of Engineers (USACE), Kansas City, District under Contract No. DACA 41-92-C-0023. The investigation was conducted under the Interagency Agreement dated January 30, 1992 between the U.S. Department of the Army and the U.S. Environmental Protection Agency (EPA), Region VII, and the Nebraska Department of Environmental Quality. The former NOP was placed on the National Priorities List of Superfund Sites in August 1990 due to identified groundwater contamination and associated potential risk to human health or the environment.

The overall objective of the RI Report for OU2 is to evaluate the extent and nature of chemicals of concern in groundwater at the former NOP that can be attributed to past DoD activities. The Baseline Risk Assessment (BRA), which was submitted under separate cover, (WCC, 1993a) evaluated whether those chemicals are in concentrations that exceed the maximum contaminant level (MCL) or pose a risk to human health or the environment. Secondary objectives of the OU2 RI Report are to evaluate the nature and extent of soil contamination at three areas (the Administration Area, Atlas Missile Area, and the north end of Load Line 1) and to evaluate whether the concentrations of chemicals represent a possible source of chemicals in the groundwater.

0.1.2 Site History

The former NOP is located 1/2 mile south of Mead and 30 miles west of Omaha in Saunders County, Nebraska. The former NOP occupied 27 square miles and comprised an administration area, an ammonium nitrate plant, a bomb booster assembly plant, four bomb

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load lines, demolition grounds, a sewage treatment plant, analytical laboratories, a laundry, vehicle and equipment maintenance shops, and several square miles of bermed storage igloos and magazines located north and south of the load lines (**Drawing 1-3**).

During World War II, the production facilities were operated by the Nebraska Defense Corporation, a subsidiary of Firestone Tire and Rubber Company. During the interim period 1945 through 1949, production was terminated, decontamination procedures were implemented and the NOP was placed on standby status. Decontamination procedures included cleaning, flushing, and sweeping of floors, rafters, pipes, and ventilation systems, flushing of contaminated ditches, and removal and burning of contaminated soils. In the vicinity of the North and South Burning Grounds near the Landfill Area, 340,000 pieces of ordnance were reportedly destroyed in 1946, but exact areas are not recorded (SEC Donohue, 1992b). Tetryl boosters were destroyed at the Demolition Ground, which is located in the southwestern portion of the former NOP. The former NOP was reactivated in 1950 in order to produce weapons for the Korean Conflict. In 1956 the NOP was again placed on standby status.

In 1959 approximately 960 acres were transferred to the U.S. Army Reserve for training grounds; 2,000 acres were granted to the U.S. Air Force for a missile site; and 40 acres were transferred to the Department of Commerce. From 1959 to 1960, the Offutt Air Force Base Missile Site S-1 launch area (Atlas Missile Area) was built on 1,185 acres north of Load Line 4. TCE was used to degrease and clean pipelines used to carry liquid oxygen fuel for missiles. U.S. Army activities included Nike missile maintenance at the former heavy equipment garage north of Load Line 1. The U.S. Air Force also occupied 34 acres of the northern portion of Load Line 1 for use as a "Tech Area" (ESE, 1983). The silos were abandoned in 1964 and the Launcher Area and the Nike Area were transferred to the Nebraska National Guard.

In 1962 approximately 9,000 acres of the former NOP were purchased by the University of Nebraska for use as their Agricultural Research and Development Center (ARDC). An additional 600 acres were purchased in 1964 for the ARDC. The remaining 5,000 acres were purchased by private individuals and corporations. A fireworks company operated for approximately 20 years at the former bomb booster assembly plant (Bomb Booster Area)

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until 1989. Two commercial enterprises manufacture insulation board and processed styrofoam packing material at the former administration buildings (Administration Area).

The University of Nebraska currently owns the Landfill Area, which is reported to have been first used by the former NOP. The landfill consists of a series of trenches near the sewage treatment plant that are filled with solid waste and covered with soil. The University of Nebraska was reported to have buried low-level radioactive and infectious wastes at the Landfill Area (TCT, 1991).

0.1.3 Previous Investigations

Previous investigations were conducted by Environmental Science and Engineering (ESE) (1983), USACE (1987, 1989, and 1991), Twin City Testing (TCT)-St. Louis (1991), the U.S. Department of Health and Human Services (USDHHS) (1991), and SEC Donohue (1992b). ESE (1983) was acting for the U.S. Army Toxic and Hazardous Materials Agency, Assessment Division, TCT (1991) was acting for the U.S. Army Corps of Engineers, Huntsville Division, and SEC Donohue was acting for the U.S. Army Engineer District, Kansas City.

At the Administration Area, TNT was the only explosive detected and was only detected in 1 of the 38 soil samples collected (SEC Donohue, 1992b). Five soil gas samples contained TCE, 1,1,1-TCA and PCE at concentrations of 0.002 µg/L or less (Law Environmental, 1990).

At the Bomb Booster Area, where tetryl boosters were assembled, tetryl was detected in 28 of 112 soil samples. TNT was detected in only 3 soil samples (SEC Donohue, 1992b). PCE was detected in two soil gas samples at concentrations of 0.007 µg/L or less (Law Environmental, 1990). TCE was not detected in any of the soil gas samples.

At the Atlas Missile Area, TCE was detected in shallow (6 feet bgs) soil gas samples at concentrations of 9 µg/L or less (Law Environmental, 1990). TCE was detected in 7 of 44 soil samples with a maximum concentration of 33 µg/kg (USACE, 1991).

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At Load Line 1, explosive compounds were detected in 197 of 362 laboratory analyses of soil samples. Explosive analytes were detected mainly in ditches near the Amatol Screening and Amatol Pour buildings on the west side of the load line and near the East Cooling Building on the east side of the diamond-shaped (**Drawing 2-6**) area in the center of the load line. TNT was the most commonly detected explosive analyte having been detected in 160 of 362 samples with a maximum concentration of 132,800 mg/kg (SEC Donohue, 1992b). The highest concentration of PCBs detected on the Site, 2430 mg/kg, was found in a soil sample near a transformer pad at the south end of the load line.

No VOCs were detected in the soil gas survey covering the Dairy Farm, which occupies the southern portion of Load Line 1. TCE was found in two samples, however, in the grid extending from the former Air Force Ballistic Missile Division (AFBMD) Tech Area in the northern part of the load line to the former Nike Maintenance Area. TCE was detected in samples collected west of the Inert Storage Building at the north end of the load line. The only VOC detected in soil gas samples at the former Nike Maintenance Area was 1,1,1-TCA at 0.0001 µg/L in 3 samples (Law Environmental, 1990).

Load Line 2 explosive analyses had a higher frequency of detection than other areas. 185 of the 232 soil samples in which RDX was detected at the Site were at Load Line 2. The highest concentration of RDX was 23,270 mg/kg in a soil sample collected from a ditch draining the east side of the Amatol Pour Building. HMX was detected in 121 of the 358 soil samples collected at Load Line 2. The maximum concentration of HMX was 2,020 mg/kg. TNT was detected in 126 samples with a maximum of 176,000 mg/kg in a soil sample from a ditch south of the Amatol Screening Building (SEC Donohue, 1992b). No chlorinated VOCs were detected in the soil gas at Load Line 2 (Law Environmental, 1990).

At Load Line 3, TNT was detected in 107 of 257 soil samples with a maximum concentration of 29,700 mg/kg. RDX was detected in 8 samples, HMX in 2, and tetryl in 1 (SEC Donohue, 1992b). No VOCs were detected in soil sampled from 0 to 10 feet bgs at Load Line 3 during the Confirmation Study (USACE, 1989).

At Load Line 4, explosives were detected less frequently and at lower concentrations in soil samples than at the other load lines. TNT was detected in 24 of 144 samples with a

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maximum concentration of 131 mg/kg in a sample collected near the Amatol Pour building (SEC Donohue, 1992b). TCE was detected in 3 soil gas samples from Load Line 4 at concentrations of 0.006 µg/L or less (Law Environmental, 1990).

The Burning Grounds and the Proving Range are located near the landfill and the NRD Reservoir. RDX was the most commonly detected explosive and was detected in 16 of 122 soil samples with a maximum concentration of 1,700 mg/kg. HMX was detected in 8, TNT in 15, and tetryl in 2 of the 122 soil samples (SEC Donohue, 1992b). No explosives were detected in sediment and surface water samples collected in the NRD Reservoir, or in Johnson Creek downstream of the reservoir (USACE, 1991). TCE was detected in 7 soil gas samples collected in the Landfill Area at concentrations of 0.01 µg/L or less (Law Environmental, 1990). No explosives were detected in 2 soil samples collected at the Demolition Area, which is located in the southwestern portion of the Site (TCT, 1991), nor were any detected in surface water or sediment samples (USACE, 1989).

Fourteen shallow and eleven intermediate groundwater monitoring wells were installed and sampled during the Confirmation Study (USACE, 1989). TCE was detected in a water sample from an intermediate groundwater monitoring well near Load Line 2, and RDX and TNT were detected in the shallow well in the same cluster (USACE, 1989). In February 1989 the USACE sampled 24 water supply wells, including 2 supplying the town of Ithaca and 1 supplying the town of Memphis. Six wells supplying the ARDC, 4 wells supplying the City of Ashland, 3 wells supplying the City of Lincoln, and 15 additional water supply wells were sampled in March 1989. The only explosive analyte detected was RDX, which was detected in 6 of the private wells, the Memphis supply well, and 2 of the ARDC wells. TCE was detected in 2 domestic wells, a stock well on the same property as one of the domestic wells, and 2 of the ARDC wells. Concentrations of TCE in the domestic wells were 2.1 and 89 µg/L (USACE, 1989) and carbon filtration systems were installed by the USACE for the two residences served by these wells. Two irrigation wells at the ARDC were removed from service and carbon filtration systems were connected to the drinking water fountains at the ARDC Agronomy Building (USDHHS, 1991).

Five shallow, four intermediate, and four deep monitoring wells were installed during the OU1 RI, although sampling results were not reported (USACE, 1991).

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0.2 STUDY AREA INVESTIGATION

Phase I of OU2 RI was conducted by Woodward-Clyde Consultants from May to August 1992, under the oversight of the USACE-Kansas City District. The field work included the following:

- Drilling of 38 continuously sampled borings for installation of bedrock, intermediate or shallow groundwater monitoring wells; (a deep boring at MW-7 was abandoned because shale was encountered)

- Installation of 19 additional intermediate and 33 shallow groundwater monitoring wells

- Soil gas sampling at 6 feet and at the top of the fine sand (approximately 18 feet) at the Administration Area (66 samples), the Atlas Missile Area (237 samples), and Load Line 1 (130 samples)

- Soil borings for sampling unsaturated soil for VOC analyses at 10 percent of the soil gas sampling locations

- TCE analyses of groundwater headspace samples from the base of the fine sand unit and the base of the sand and gravel unit at the Administration Area (19 samples), the Atlas Missile Area (42 samples), Load Line 1 (27 samples), and the Platte River alluvial aquifer (8 samples)

- Analyses of saturated soil from borings for groundwater monitoring wells in order to characterize the soil-water distribution coefficients for TCE and RDX

- Hydropunch® sampling of groundwater for explosives from the Atlas Missile Area

- Hydropunch® sampling of groundwater for explosives and water quality in the Platte River alluvial aquifer

- Hydropunch® sampling of groundwater for VOC, SVOCs, pesticides, PCBs, and dissolved and total metals and cyanide at the Administration Area as a substitute for monitoring wells which were not allowed by the right-of-entry agreement

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- Groundwater sampling and analyses for VOCs, explosives, and water quality in all 39 existing and 89 new monitoring wells; analyses for SVOCs, pesticides, PCBs, dissolved and total metals and cyanide at the Administration Area and the Landfill Area; and analyses for gross alpha and gross beta radioactivity at the Landfill Area

- Slug testing of 10 wells

Phase II of the OU2 RI was conducted in November 1992 and involved additional soil gas and soil sampling at Load Line 1.

0.3 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The climate of Nebraska is characterized by wide seasonal variations in temperature and an average annual precipitation of 33 inches. Natural surface drainage at the former NOP is supplemented by excavated ditches which primarily drain into Johnson Creek in the northeast and Silver Creek in the southwest. The NRD reservoir, which is east of the landfill, was built in 1975 on Johnson Creek.

The former NOP is located in Todd Valley, an abandoned stream channel of the ancestral Platte River. The thickness of Pleistocene sediments at the Site ranges from approximately 81 feet near the landfill to 157 feet in the paleochannel between Load Lines 1 and 2. The bedrock beneath the Pleistocene sediments is shale in the northwest and sandstone in the southeast. The shale is the upper lithofacies and the sandstone the lower lithofacies of the Cretaceous Omadi Formation. The Omadi Formation rests unconformably on Pennsylvanian shales and limestones.

In a geologic and hydrogeologic study of the ARDC Piskin (1971) divided the Pleistocene sands and gravels of Todd Valley into two informal units. The lower sand and gravel unit is 17.5 to 72 feet thick and the upper fine sand unit is typically 50 feet thick but ranges from 12 to 77 feet thick. The upper unit is overlain by 4 to 23 feet of the Peoria Loess.

The sands and sandy gravels of the Platte River Valley, which are 39 to 49 feet thick, are not correlative to the sands and gravels of Todd Valley. Overbank silts and clays, 10 to 17 feet thick, overlie the Platte River alluvial sands.

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The hydrostratigraphy of the project area consists of three aquifers: the Omadi Sandstone aquifer, the Todd Valley aquifer, and the Platte River alluvial aquifer; and three aquitards: the Pennsylvanian shales, the Omadi Shale, and the Platte River aquitards. The Platte River aquitard consists of overbank silts and clays. Where the Omadi Shale is absent, the Omadi Sandstone and Todd Valley aquifers are in hydraulic communication and behave as a single aquifer without hydraulic barriers.

The water table surface of Todd Valley slopes toward the south-southeast at an average gradient of 12 feet/mile. East of Johnson Creek, the hydraulic gradient in the Platte River alluvial aquifer is south with a slight westerly component. A zone of discharge is located near Johnson Creek in the Platte River Valley in the southeastern portion of the study area. The NRD reservoir creates a local recharge zone, which creates increased hydraulic gradients near the Landfill Area.

The transmissivity of the Platte River alluvial aquifer was estimated through slug testing to be 1.4×10^4 GPD/ft. The hydraulic conductivity of the Todd Valley fine sand unit was estimated at 0.034 feet/minute and the Todd Valley sand and gravel unit was estimated at 0.08 feet/minute. The hydraulic conductivity of the Omadi Sandstone aquifer was estimated at 0.034 feet/minute, which is approximately two orders of magnitude greater than the hydraulic conductivity of a typical sandstone. This is probably due to the very weak cementation and high degree of sorting in the Omadi Sandstone.

Water supply wells for the City of Lincoln are located in the Platte River floodplain approximately 4 miles southeast of the southeast corner of the former NOP and are known as the Ashland well field. The water supply wells for the communities of Ashland and Memphis are also south of the former NOP. The water supply wells for the community of Ashland, however, are not part of the City of Lincoln's Ashland well field. These municipal wells are typically screened in both the Omadi Sandstone and the Pleistocene. Thirty-none irrigation wells are also located within the former NOP boundary. The Groundwater Well Inventory Technical Memorandum (WCC, 1992g) lists well locations, general construction details, use and ownership of wells in the immediate area east and southeast of the former NOP. Past investigations at the Site have identified domestic wells which are generally located south and southeast of the former NOP.

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The population of Saunders County is 18,285 and is 80 percent rural. Wahoo, population 3,510, is the county seat and the largest community (Bureau of the Census, 1990a). Areas adjacent to the former NOP are primarily used for growing corn with soybeans and sorghum of less but significant importance. Approximately 14 percent of the total area of Saunders County is under irrigation (Nebraska Agricultural Statistic Service, 1988). Retail and wholesale trade and services account for roughly half the jobs in Saunders County. The number of retail establishments declined 22 percent and the number of wholesale establishments decreased 38 percent between 1982 and 1987 (Bureau of the Census, 1987b). Saunders County has 18 manufacturing businesses, 4 of which employ more than 20 people (Bureau of Census, 1982).

According to U.S. Fish and Wildlife Service, one species of fish in Saunders County, the Plains topminnow, is a candidate for threatened and endangered status. The Bald eagle, Peregrine falcon, Interior least tern, and Piping plover are threatened and endangered, and the Ferruginous hawk and Loggerhead shrike are candidates for threatened and endangered status in Saunders County. The American burying beetle is also threatened and endangered.

0.4 NATURE AND EXTENT OF CONTAMINATION

Soil gas and groundwater analyses indicate that TCE was the most commonly detected VOC. TCE apparently is distributed in two plumes. Typically, TCE exceeded the MCL of 5.0 µg/L in groundwater samples in which it was detected. RDX was the most commonly detected explosive compound and was distributed within and downgradient of the load lines and the Burning Grounds/Proving Range. Compounds in addition to TCE which exceeded their respective MCLs in groundwater were 1,2-dichloropropane (one sample only), and nitrate plus nitrite (38 samples).

0.4.1 Soil Gas

At the Administration Area, TCE was detected in 12 soil gas samples, mainly east of the former administration buildings. The highest soil gas concentration was 74.5 µg/L (**Drawing 4-2**). At the Atlas Missile Area TCE was detected in 27 shallow (6 feet bgs) and 76 deep (18 to 24 feet bgs) samples, mainly in the central portion of the area between silos 2 and 3, with the highest concentration being 150 µg/L (**Drawing 4-4**). At the Load

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Line 1 Area, TCE was detected in 39 shallow and 55 deep samples, with the highest concentration being found in a deep sample at 707 ug/L (**Drawing 4-6**).

At the Administration Area, TCE was not detected in any of the 7 unsaturated soil samples (**Tables 6-1** and **6-2**). TCE was detected in 2 of the 24 unsaturated soil samples at the Atlas Missile Area and 2 of the 22 soil samples at Load Line 1, but was below the quantitation limit in all 4 samples.

0.4.2 Groundwater Headspace Screening

At the Administration Area, the highest concentration of TCE in groundwater headspace screening samples was 0.18 µg/L south of the administration buildings. Adjacent nodes to the southwest and southeast could not be sampled due to access restrictions.

In the Atlas Missile Area, the highest concentration of TCE in groundwater headspace screening samples was 1,200 µg/L north of Load Line 4. TCE was also detected in samples at the three grid nodes on the downgradient edge of the grid. In the Load Line 1 Area none of the groundwater headspace screening samples had a concentration of TCE greater than 5 µg/L, although TCE was detected in 9 of 15 shallow samples and 1 of the 11 deep samples.

0.4.3 Groundwater

At the Administration Area, limitations imposed by property owners on construction of monitoring wells prevented installation of three proposed groundwater monitoring wells. Hydropunch® samples from 4 locations were substituted for the monitoring wells. TCE, pesticides, or PCBs were not detected in groundwater monitoring well samples (**Table 6-4**) or in the "H2" Hydropunch® samples at the Administration Area (**Table 6-5**). The only explosive compound detected in monitoring well or Hydropunch® samples at the Administration Area was RDX at a concentration of 0.15 µg/L.

Based on the TCE groundwater headspace screening results, many monitoring well clusters were located where TCE concentrations were estimated to be below detection limits in order to characterize the extent. A perimeter of monitoring wells with TCE below detection limits

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encircle the TCE plume emanating from the suspected source at Load Line 1 and the TCE plume emanating from the suspected source at the Atlas Missile Area (**Drawings 4-10 through 4-12**).

At the Landfill Area, TCE was above the MCL in three monitoring wells with the highest concentration being 97 µg/L. RDX was detected in 9 of the 10 monitoring wells at the Landfill Area with a maximum concentration of 4.8 µg/L (**Table 6-6**). The MCLs for gross alpha and gross beta radioactivity were not exceeded in any samples.

In the Atlas Missile Area, the MCL for TCE was exceeded in 10 of the 28 groundwater monitoring wells. Four of these were shallow wells, three intermediate, and three deep (**Table 6-7**). The highest concentration was 1,800 µg/L in a shallow well north of Load Line 4. Three of the wells in which TCE was detected were in a monitoring well cluster on the east bank of Johnson Creek. TCE was not detected, however, in a cluster on the west bank of Clear Creek which is 1/2 mile east of Johnson Creek.

In the Atlas Missile Area, RDX was found in 11 groundwater monitoring well samples with a maximum concentration of 18 µg/L, and HMX was found in 12 monitoring well samples south of the Burning Grounds (**Drawings 4-14** and **4-15** and **Table 6-7**). No explosives were found in the farthest downgradient cluster. Ten Hydropunch® groundwater samples were analyzed for explosives, but RDX was detected only at two locations.

In the Load Lines 1, 2, 3, and 4 Area, TCE exceeded the MCL in 11 monitoring well samples with a maximum concentration of 300 µg/L in a monitoring well near Load Line 4 (**Table 6-8**). Five of these wells were in the Load Line 1 Area, one in the Load Line 2 Area, three in the Load Line 4 Area, and two in the Platte River valley on the west bank of Johnson Creek. The MCL for 1,2-dichloropropane was exceeded in one well near Load Line 3. RDX was detected in 24 samples and HMX in four in the Load Lines 1, 2, 3, and 4 Area. The highest concentrations of both compounds (98 µg/L for RDX and 45 µg/L for HMX) were found in one well near Load Line 2. No samples from monitoring wells contained any explosive compound without also containing RDX. RDX was found at every load line and also in two wells north of Load Line 1.

In the Platte River alluvial aquifer wells, no VOCs or explosives were detected (**Table 6-9**). TCE was not detected in the Hydropunch® groundwater samples from the Platte River alluvial aquifer and RDX was only found at one location.

No VOCs or explosives were detected in the groundwater monitoring well sample from the Bomb Booster Area.

0.5 CONTAMINANT FATE AND TRANSPORT

Contaminant fate and transport were analyzed to identify off-site areas potentially affected by contamination and to estimate contaminant concentrations in those areas. The fate and transport analysis was a multiple step procedure which consisted of screening the potential routes of contamination, discussing the persistence of the contaminants in terms of their physicochemical properties, and quantitatively simulating contaminant migration for the predominant transport mechanisms identified during the screening process. The analysis was simplified by considering fate and transport in only the lower part of the Pleistocene aquifer because the potential for increased transport distances is greatest based on the physical properties of the sand and gravel unit.

0.5.1 Contaminant Persistence

The physicochemical properties of selected chemicals were considered relative to the persistence of the chemicals in the soil and groundwater. Of the explosive compounds reviewed, TNT had the lowest mobility, tetryl had the greatest mobility, and RDX and 2,6-DNT fell in between. Biodegradation may potentially occur if sufficient supplemental nutrients and adapted microbial populations are available. Explosives will potentially persist in surface soils and slowly leach to the groundwater.

TCE is less sorptive and more soluble than either TNT or 2,4-DNT, but is more sorptive and less soluble than either RDX or tetryl. Dehydrohalogenation of TCE is accelerated in the presence of bacterial activity and can be significant under abiotic, anoxic conditions. TCE has a high vapor pressure which is indicative of a rapid volatilization rate. TCE will potentially persist in the subsurface and leach into the groundwater.

Numerous inorganic compounds naturally occur in the subsurface. The persistence of inorganic compounds is determined by water solubility, complexation, oxidation, precipitation, and sorption mechanisms. Inorganic compounds may potentially leach from soils to the groundwater.

0.5.2 Screening of Potential Routes of Contamination

An environmental screening assessment process for evaluation of contaminant fate was applied to the soil and groundwater contamination included in OU2. The screening process is illustrated on **Drawing 5-1**. The qualitative screening process provided initial direction and organization for subsequent quantitative analysis at the Atlas Missile Area (TCE), and Load Lines 1, 2, 3, and 4 (TCE and explosives). The analysis characterized the advective transport distances as 5 miles from the TCE sources and 7 miles from the explosives sources as shown on **Drawing 5-2**.

0.5.3 Contaminant Migration

A quantitative analysis was performed to characterize the off-site transport of contaminants using a computer model to simulate the processes of advection, dispersion, and retardation. TCE transport was simulated for sources at Load Line 1 and the Atlas Missile Area, TNT transport was simulated for sources at Load Line 1 and Load Line 2, and RDX transport was simulated for a source at Load Line 2. All simulations were made using physical parameters measured or estimated for the sand and gravel unit. Contaminant release mechanisms, dispersion coefficients, average linear groundwater velocity, and retardation factors were estimated prior to use in the computer model. Conservative or "worst case" assumptions were made for the release mechanisms including 1) initial groundwater contaminant concentrations were based on the contaminant solubilities and 2) ongoing release of contaminants to groundwater.

The release functions assumed during the groundwater transport simulations are summarized in **Table 5-2**. The dispersion coefficients were estimated from literature values, and the retardation factors were estimated using literature values for distribution coefficients and total organic carbon values measured during the remedial investigation (**Table 5-3**). The transport simulations are shown on **Drawing 5-3** and comparisons of the simulated

concentrations to the concentrations measured in groundwater samples during the remedial investigation are summarized in **Table 5-4** through **Table 5-8**. Some of the factors which caused discrepancies between the simulated and measured concentrations were the overestimation of the simulated initial concentrations at the source areas, the time required for the contaminants to enter the saturated zone was longer than what was assumed for the simulation, and the number of actual sources of contamination was greater than what was simulated. Additionally, a leaky silt and clay layer at the base of the fine sand is present in the eastern portion of the Site. Extent maps presented in Section 4.0 show that contamination may potentially be transmitted in the fine sand above the leaky silt and clay layer without vertically migrating to the two aquifer units below the layer. It was beyond the scope of the fate and transport analyses to simulate the impact of the leaky silt and clay layer. However, the validity of representing the off-site areas potentially affected by contamination and the characterization of the off-site contaminant concentrations by the nature and extent characterizations of Section 4.0 were confirmed by the simulations.

0.6 CONCLUSIONS

The nature, extent, and distribution of VOCs in groundwater correlate to the TCE source areas identified in previous investigations (Law Environmental, 1990 and USACE, 1991) and characterized in this investigation.

- The absence of TCE in the downgradient Administration Area monitoring well (cluster MW-48) samples or any of the "H2" Hydropunch® groundwater samples indicates that, although low levels of TCE contamination are present in the soil gas and groundwater headspace screening analyses, the Administration Area is not a source of TCE contamination in groundwater. Although restricted access prevented groundwater sampling in limited areas, these areas are cross-gradient of the areas of relatively higher TCE contamination and did not impact this conclusion.

- TCE was not detected in downgradient monitoring wells southeast and south of the Bomb Booster Area, suggesting that this area is not a source of TCE contamination in groundwater

- Soil gas results suggest that the Atlas Missile Area was the primary source of the TCE plume in the eastern part of the Site.

- The potential exists that the soils at the Atlas Missile Area are a continuing source of TCE to groundwater. However, the following information suggests that there is not a continuing source to groundwater:

  - TCE was not detected above quantitation limits in any of the OU2 unsaturated soil samples

  - site historical information and the estimated distribution of TCE in the groundwater suggest that a slug release of TCE to the groundwater occurred, therefore, negligible TCE would be available in the unsaturated zone for continuing release

- The former Nike Maintenance Area is not a source of TCE in groundwater

- Soil gas results suggest that the AFBMD Tech Area in the northern portion of Load Line 1 was the primary source of the TCE plume in the western part of the Site

- The potential exists that the soils at the AFBMD Tech Area are a continuing source of TCE to groundwater, however, the following information suggests that there is not a continuing source to groundwater:

  - TCE was not detected above quantitation limits in OU2 unsaturated soil samples

  - site historical information suggest that a slug release of TCE to the groundwater occurred, therefore, negligible TCE would be available in the unsaturated zone for continuing release

The nature, extent and distribution of explosives in groundwater correlate with the source areas identified through soil investigations in the OU1 RI (USACE, 1991 and SEC Donohue, 1992b).

- The results of laboratory analyses of soil samples (SEC Donohue, 1992b) indicate that the Bomb Booster Area and the Administration Area are not sources of RDX in groundwater, although RDX was detected in samples from monitoring wells MW-16C and MW-22B, which are downgradient of the Administration and Bomb Booster

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areas, and in the sample from Hydropunch® location H2-4, which is located at the Administration Area

- Although tetryl was detected in shallow soil samples collected in the Bomb Booster Area during the OU1 RI, the absence of detectable concentrations of tetryl in groundwater indicates that the former NOP is not a source of tetryl in groundwater

- The results from the OU1 RI (SEC Donohue, 1992b) support the results of the OU2 RI which indicate that Load Line 2 is the source of the highest concentrations of RDX and HMX in groundwater; that Load Lines 1, 3, and 4 are secondary sources of RDX; and that the Burning Grounds/Proving Range is a secondary source of RDX and HMX

- The results of the OU1 RI (SEC Donohue, 1992b) also support the results of the OU2 RI which indicate that Load Lines 1, 2, and 3 are the sources of the highest concentrations of TNT in groundwater

The results from the OU2 RI characterized the general extent of groundwater contamination resulting from past DoD activities.

- The soil gas survey at the Atlas Missile Area characterized the extent of the area through which TCE may have infiltrated through the vadose zone to groundwater (**Drawing 4-4**).

- The soil gas survey at Load Line 1 characterized the extent of the area through which TCE may have infiltrated through the vadose zone to groundwater (**Drawing 4-6**).

- The decrease of TCE concentrations with increasing depth, and the absence of TCE in monitoring well clusters (MW-32, MW-34, MW-35, MW-37, MW-41, MW-46, and MW-59) indicate that the general vertical and horizontal extent of the TCE plume from the Atlas Missile Area has been characterized (**Drawings 4-10 through 4-12**). A monitoring well cluster downgradient from MW-36 will be installed subsequent to the RI. Data from the monitoring well cluster will be used to refine the extent of the TCE plume. The refined estimated of the plume will be presented in the Feasibility Study and a technical memorandum.

- The presence of TCE in shallow wells MW-18C and MW-34B, but not in the intermediate wells (MW-18B and MW-43A), or the deep wells

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(MW-18A and MW-43D), may be due to a leaky silt and clay layer at the base of the fine sand unit at these cluster locations.

- The decrease in TCE concentrations with increasing depth, and the absence of TCE in downgradient monitoring well clusters (MW-10, MW-17, MW-29, MW-28, and MW-29), indicate that the horizontal and vertical extent of the TCE plume from the former AFBMD Tech Area has been characterized (**Drawings 4-10 through 4-12**)

- The decrease of the concentrations of explosives with increasing depth and the absence of any explosive analytes in downgradient monitoring well clusters (MW-10, MW-20, and MW-36 through MW-39) indicate that the general vertical and horizontal extent of explosives contamination has been characterized (**Drawings 4-14 and 4-15**). Two monitoring well clusters, one downgradient from MW-10 and one between (and slightly downgradient from) MW-20 and MW-37, will be installed subsequent to the RI. Data from the monitoring well clusters will be used to refine the extent of the explosives plume. The refined estimated of the plume will be presented in the Feasibility Study and a technical memorandum.

It cannot be concluded that the landfill is a source of contamination to groundwater because the contamination quantified in the Landfill Area wells is not discernible from the regional contamination associated with Load Lines 1, 2, 3, and 4; the Atlas Missile Area; and the North Burning Grounds.

The results of the environmental screening assessment process supported by the extent of contamination characterized in Section 4.0 indicate that there are no currently active transport mechanisms in groundwater at the Administration Area, the Landfill Area, and the Bomb Booster Area.

The estimated extent simulated in the fate and transport modeling for TCE and RDX in groundwater support the conclusion that the general extent of contamination has been adequately characterized by this investigation.

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Based on fate and transport analyses there was no evidence of the formation of any DNAPL at the Site. This conclusion is reinforced by the data indicating that the highest concentration of TCE in groundwater was reported at concentrations 1/600th of the TCE solubility.

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1.1 PURPOSE OF REPORT

This report summarizes the background, methods, results, and conclusions of the Remedial Investigation (RI) of Operable Unit 2 (OU2) of the former Nebraska Ordnance Plant (NOP) near Mead, Nebraska (Site). Woodward-Clyde Consultants (WCC) in conjunction with the U.S. Army Corps of Engineers (USACE) Kansas City District (CEMRK) under Contract No. DACA 41-92-C-0023 conducted this investigation in general accordance with the Interagency Agreement (IAG) effective January 30, 1992 under the Defense Environmental Restoration Program (DERP).

The IAG defines OU1, OU2, and OU3 as:

- Operable Unit 1 (OU1), consists of all soils contaminated by explosives at the former NOP, including but not limited to the soils at the Burning Grounds Area.

- Operable Unit 2 (OU2), includes all remaining identified contaminated media and contaminated areas of the Site not addressed in OU1 or OU3, consistent with the DERP, 10 U.S.C. § 2701 et seq and its implementing regulations. As such, OU2 includes, but is not limited to, the following specific trichloroethylene-contaminated areas if not addressed as part of OU1: the Atlas Missile Site, Maintenance Area, Bomb Load Lines, and Administrative Area. Contaminated groundwater will be investigated and remediated as part of OU2. In addition, groundwater monitoring wells will be installed at the perimeter of the Landfill during the OU2 Remedial Investigation.

- Operable Unit 3 (OU3), consists of the landfill located near the former sewage treatment plant at the former NOP (the "Landfill"), as well as any other currently unidentified waste disposal areas, consistent with the Army's responsibilities under DERP.

The RI was conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by Superfund Amendments and

Reauthorization Act of 1986 (SARA). A CERCLA RI is being conducted at the former NOP because the Site was placed on the U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) of Superfund sites in August, 1990. The Site was placed on the NPL due to identified groundwater contamination and associated potential risk to human health or the environment.

This RI Report meets requirements of the National Contingency Plan (NCP) in accordance with CERCLA to characterize contamination sources and migration. The Baseline Risk Assessment, which will assess risk to human health and the environment, will be submitted under separate cover. The RI follows CERCLA Guidance EPA/540/G-89-004 for conducting RI/FS activities at CERCLA sites and EPA/540/G-57/003 for the Data Quality Objectives (DQO) process.

Objectives, sampling locations, sampling methods, analytical methods, and quality assurance for the RI are outlined in work plans. The work plans for OU2 investigations at the former NOP consist of the following:

- Project Work Plan (PWP) (WCC, 1992e)
- Chemical Data Acquisition Plan (CDAP)

  Part I - Sampling Plans and Objectives (SPO) (WCC, 1992a and b)

  Part II - Field Protocols (FP) (WCC, 1992c)

  Part III - Quality Assurance Plan (QAP) (WCC, 1992d)
- Safety, Health, and Emergency Response Plan (SHERP) (WCC, 1992f)

Phase I sampling plans and objectives are described in Chapter A of the CDAP Part I and those for Phase II are described in Chapter B (WCC, 1992b).

The primary objective of the OU2 RI Report is to evaluate the extent and nature of chemicals of concern in groundwater at the former NOP that can be attributed to past DoD activities. Secondary objectives of the OU2 RI Report are to evaluate the nature and extent of soil contamination at three areas (the Administration Area, Atlas Missile Area, and the

north end of Load Line 1) in order to assess whether concentrations of chemicals are a possible source of chemicals in groundwater. The Baseline Risk Assessment (BRA) will assess whether those chemicals in the soil, not previously assessed in the OU1 Risk Assessment, are in concentrations which pose a risk to human health.

The PWP developed conceptual models which identified potential sources, release mechanisms, pathways, and receptors for the various contaminants. These conceptual models divided the Site by source and medium. Tasks were defined for the investigation of each source and medium.

The DQOs listed in the PWP defined the data needs, purpose, and rationale as to data needs, and collection methods to address data gaps. Each task had a specific set of DQOs. The overall approach was to complete the steps necessary to meet the task objective in the RI.

A feasibility study will be completed to evaluate potential remedial options.

1.2 REPORT ORGANIZATION

This report is generally organized according to the suggested outline in the EPA guidance for conducting an RI/FS (USEPA, 1988a), except that the BRA is not included. The BRA was submitted under separate cover (WCC, 1993a) following submission of the Draft RI Report.

Section 1.3 includes a history of the Site and the results of previous investigations for each area of the Site. Section 2.0, the Study Area Investigation, is structured similarly to the CDAP, Part I - Field Sampling Protocols. The descriptions of the investigations are organized by study area. The descriptions include location and quantity of samples and any deviations or elaborations not covered in the CDAP, Part I. Section 3.0 provides background data and information from literature sources on natural resources and demographics as well as geologic, hydrogeologic, and background hydrochemical data from the OU2 RI. Section 4.0 discusses the results of groundwater screening analyses, Hydropunch® groundwater analyses, soil gas analyses from Phase I and Phase II, and results of groundwater monitoring well analyses. Section 5.0 describes the persistence and mobility of selected contaminants and presents contaminant transport calculations and results.

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Section 6.0 summarizes sections 4.0 and 5.0, and contains the conclusions. Preliminary recommendations for remedial action objectives will be presented in the Remedial Action Objectives/Initial Screening of Alternatives Technical Memorandum (WCC, 1993b).

Tables include summaries of chemical analyses organized by study area and medium and are limited to analytes which were detected at least once in each study area and medium. Boring logs are in **Appendix A**, groundwater monitoring wells are in **Appendix B**, and downhole geophysical logs are in **Appendix C**. Complete results of all analyses including all analytes are included as tables in **Appendix D**. The Data Validation Report is summarized in Section 4.0 and is included as **Appendixes E** and **E-1**. Slug test data are presented in **Appendix F**, and the Field Audit Report is in **Appendix G**. Drawings include location maps without data, data maps, and extent maps, which show the extent of contamination and suspected source areas and selected data.

1.3 SITE BACKGROUND

1.3.1 Site Description

The former NOP is located about one-half mile south of Mead, Nebraska in Saunders County (**Drawing 1-1**). Mead is 30 miles west of Omaha, Nebraska and 35 miles northeast of Lincoln, Nebraska.

The former NOP included 17,258 acres in Saunders County. Currently, the land is owned by the University of Nebraska, Agricultural Research and Development Center (ARDC), U.S. Army National Guard and Reserves, U.S. Department of Commerce and private interests. The 1990 property distribution (Saunders County, 1990) is shown on **Drawing 1-2** and is as follows:

Property Owner	Acreage
University of Nebraska	9,518 acres
Private or Corporate	5,543 acres
Department of Commerce	40 acres
U.S. Military Weekend Training Facility	960 acres
Nebraska National Guard (including 1,185 acres of the Atlas Missile Site [Atlas Missile Area] and 12 acres north of Load Line 1).	1,197 acres

Areas within the former NOP which are a part of this investigation include: The Administration Area: Atlas Missile Area (Atlas Missile Site); Load Lines 1, 2, 3, and 4; Bomb Booster Area; and the Landfill (**Drawing 1-3**). The Platte River alluvial aquifer southeast of the former NOP was also investigated.

1.3.2 Site History

Construction contracts for the former NOP were awarded in December 1941. The Architect-Engineer service contract was awarded to Giffels and Vallet and the Construction contract to Metcalfe Construction Co., Hamilton Construction Co., and Kansas City Bridge Company. The Nebraska Defense Corp., a subsidiary of Firestone Tire and Rubber Co., was contracted to provide services during design and construction and to operate the former NOP (ESE, 1983).

At the finalization of acquisition in 1942, land was acquired in 176 parcels; 165 parcels were obtained from private landowners, 3 parcels from corporate entities, and 8 parcels from religious organizations or school districts (ESE, 1983).

The former NOP employed about 5300 men and women. Approximately 500 administration personnel worked 8:00 a.m. to 4:30 p.m. with a 30-minute lunch. The plant operated 6 days a week with three shifts each day except for the booster line which worked only the daily shift (ESE, 1983).

The former NOP obtained its water from 11 supply wells ranging in depth from 100 to 150 feet, with an average total usage of 873,611 gallons per day (Nebraska Ordnance Plant, 1944).

The former NOP was a load, assemble, and pack facility which produced bombs, boosters, and shells. The former NOP included four bomb load lines (1 through 4) (all lines were operational by January 1943), a bomb booster (tetryl) assembly plant, an ammonium nitrate plant (went on line March 1943 and production terminated May 1943), a demolition ground, sewage treatment plant, analytical laboratories, and storage and administrative facilities. Most of the raw materials used to manufacture the weapons at the former NOP were fabricated at other locations and shipped to the former NOP for assembly (ammonium nitrate

was produced at the former NOP during the first months of operation). Finished munitions, bulk explosives, and related ordnance materials and components were stored and demilitarized at the Site.

The production facilities were initially active during World War II. Nebraska Defense Corporation operated the former NOP from 1942 to 1945 and produced 90- to 22,000-pound bombs and boosters at the four load lines. These munitions were loaded with 2,4,6-trinitrotoluene (TNT), amatol (TNT and ammonium nitrate), tritonal (TNT and aluminum), and composition B (RDX and TNT). In 1945 the plant was placed on standby.

During the interim period 1945 through 1949, the former NOP production was completely terminated and released to the Ordnance Department after decontamination and shutdown procedures were completed. The former NOP at this time was used primarily for storage, reworking, and disposal of bulk explosives and munitions. Decontamination procedures included cleaning, flushing and sweeping of floors, rafters, pipes and ventilation systems, flushing of contaminated drainage ditches, and removal and burning of contaminated soil. Approximately 340,000 pieces of ordnance were destroyed at the North and South Burning Grounds near the Landfill Area in 1946 (SEC Donohue, 1992b). Tetryl boosters were destroyed at the Demolition Grounds, which are located in the southwestern portion of the former NOP.

In November 1946, the ammonium nitrate plant began production of grained ammonium nitrate under an emergency fertilizer production program. The contractor was the Emergency Export Corp., a subsidiary of Spencer Chemical Co. The production of ammonium nitrate was suspended in December 1949, and the plant was decontaminated in 1950 (ESE, 1983).

In 1950 the former NOP was reactivated in order to produce an assortment of weapons for use in the Korean Conflict. Munitions assembled included bombs, shells, rockets, Nike warheads, block cast TNT, supplementary charges, and boosters. In 1956 the former NOP was once again placed on standby status, and 640 acres in the eastern portion of the former NOP were transferred to the U.S. Air Force for a "Global Communications Building" (ESE, 1983).

The former NOP was declared in excess to Army needs in 1959 and all property was transferred to the General Services Administration (GSA) for disposition. Approximately 960 acres in the southeastern corner of the former NOP were transferred to the U.S. Army Reserve for training grounds; 1,460 additional acres were granted to the U.S. Air Force for a missile site; and 40 acres were transferred to the Department of Commerce (ESE, 1983).

The area acquired by the U.S. Air Force in July 1959 included 1,185 acres for use as a Launcher Area in the former ammonium nitrate storage area north of Load Line 4. Also included were 242 acres at the Administration Area; the heavy vehicle maintenance garage of the former NOP, which occupied 12 acres north of Load Line 1 and is also known as the Nike Area; and 34 acres of the northern portion of Load Line 1, which were intended for use as what is described in the transfer document as an "AFBMD Tech Area" (ESE, 1983).

The Offutt Air Force Base Missile Site (Atlas Missile Area) was built by the General Dynamics Corporation between 1959 and 1960. The Launcher Area consisted of three above-ground, coffin-type silos and a launch control building. According to a declaration collected by the U.S. Department of Justice from an employee of H.K. Ferguson, the mechanical and electrical subcontractor to General Dynamics, "H.K. Ferguson employees cleaned parts with TCE at a lab located on Load Line 1 at the NOP. H.K. Ferguson employees also used some TCE at the Atlas Missile Site to clean parts of the missile. In the lab H.K. Ferguson employees disposed of waste TCE in the sewer drains leading to the sanitary sewer systems; at the Missile Site (**Drawing 2-5**) they disposed of the waste TCE on the ground adjacent to the Site" (Koehler, 1992).

According to a declaration by the former Commander of the Strategic Missile Squadron responsible for the Atlas Missile Site, "The Air Force would never clean parts at the Missile Site with TCE; rather the parts were always cleaned at Offutt Air Force Base" (Hatch, 1992).

In August 1959, one month after being transferred to the Air Force, the Nike Area was returned to the U.S. Army for use as a "guided missile maintenance shop" (ESE, 1983).

In 1962 the U.S. Army transferred approximately 9,000 acres to the University of Nebraska for use as a field laboratory. Roughly 5,000 acres were sold to private individuals and

corporations. The Launcher Area (Atlas Missile Area) and the Nike Maintenance Area were transferred to the Nebraska National Guard for use as a training facility in 1964. The Administration Area buildings used by the U.S. Air Force, which included the laboratory for the former NOP, were excessed to private individuals. The University of Nebraska purchased the former Offutt Communications Annex, which is now known as the agronomy building (ESE, 1983).

The Landfill Area, which is believed to have been first used by the former NOP, is currently owned by the University of Nebraska. The landfill consists of a series of trenches near the sewage treatment plant that are filled with solid waste and covered with soil. Aerial photos dated June 23, 1949 show evidence of land filling in this area. The University is reported to have buried some low-level radioactive and infectious wastes at the Landfill Area.

Since closure, the former NOP has been used primarily for agricultural and livestock production and research. In addition, several commercial operations were conducted on former NOP property. Apollo Fireworks operated for a period of approximately 20 years at the former bomb booster assembly plant until production was terminated in 1989. At the former administrative buildings, two commercial enterprises have been in operation at various times (insulation board manufacturing and styrofoam packing material processing) and were leased by private individuals.

1.3.3 Previous Investigations

Previous investigations include an archives search by Environmental Science & Engineering (ESE, 1983); a soil, sediment, surface water, and groundwater investigation by the USACE (USACE, 1987 and 1989); a shallow (6 feet bgs) soil gas investigation by Law Environmental (1990); a soil remedial investigation by the USACE (USACE, 1991); an unexploded ordnance (UXO) survey and soil investigation by Twin Cities Testing (TCT) - St. Louis (TCT, 1991); a preliminary health assessment by the Agency of Toxic Substances and Disease Registry (ATSDR) (USDHHS, 1991); and a supplemental soil remedial investigation by SEC Donohue (SEC Donohue, 1992b). Previous investigations are summarized in the PWP, Section 3.1 (WCC, 1992e), except for the Supplemental RI/FS Former NOP Operable Unit 1 (SEC Donohue, 1992b), which postdated the PWP. The following sections summarize the results of previous investigations by study area, rather than

by investigation, as did the summary in the PWP. Refer to the PWP for a more detailed description of the scope of each investigation. This section is intended to summarize the results of all previous investigations for each area to characterize the source potential of each area of the former NOP.

1.3.3.1 Administration Area

Previous investigations at the Administration Area included a soil gas survey (Law Environmental, 1990) and soil sampling for explosives, metals, and PCBs (USACE, 1991, and SEC Donohue, 1992b). No PCBs were detected at the Administration Area (USACE, 1991). No soil samples exceeded the Preliminary Remediation Goals (PRGs) for RDX (6.1 mg/kg), TNT (22 mg/kg), TNB (14 mg/kg), 2,4-DNT (0.98 mg/kg), or 2,6-DNT (0.98 mg/kg) (SEC Donohue, 1992b). Chromium was found in concentrations greater than five times the background concentration (20.0 mg/kg) in one sample and lead was over five times background (13.0 mg/kg) in six samples in the drainage ditch associated with the former NOP laundry facility, which is in the southeast portion of the Administrative Area (USACE, 1991). Five soil gas samples had concentrations of TCE, 1,1,1-TCA, and PCE up to 0.002 µg/L. These samples were located southeast of the former Administration Area buildings (Law Environmental, 1990).

1.3.3.2 Bomb Booster Area

The Bomb Booster Area, where tetryl boosters were assembled, was the subject of a soil gas survey (Law Environmental, 1990) and soil investigations (USACE, 1991, and SEC Donohue, 1992b). PCE was detected at concentrations of up to 0.007 µg/L in two soil gas samples southeast of the Bomb Booster Area near Avenue A (Law Environmental, 1990). Soil samples located south of the Bomb Booster buildings did not contain any detectable concentrations of VOCs (USACE, 1991). Tetryl was detected in 28 of 112 laboratory analyses of soil samples collected during the OU1 RI. In contrast, tetryl was only detected in 9 other soil samples in the remainder of the Site. Tetryl was the only explosive compound which exceeded the PRG (2,800 mg/kg) in soil samples at the Bomb Booster Area. Two samples collected from 0 to 1 foot bgs had concentrations over the PRG with the highest concentration being 52,000 mg/kg. No samples below 1 foot exceeded the PRGs. TNT was detected in three samples and TNB was also detected in three samples.

RDX was detected in 5 of 99 field screening samples but was not detected in any of the 112 laboratory analyses of soil samples (SEC Donohue, 1992b).

1.3.3.3 Atlas Missile Area

Some of the highest concentrations of chlorinated VOCs were detected in shallow (6 feet bgs) soil gas samples on the west sides of the three silos at the Atlas Missile Area (Law Environmental, 1990). TCE was detected at concentrations of up to 9 µg/L. Total hydrocarbons were detected at four sampling locations. TCE was detected in 7 out of 44 soil samples collected near Silo 1, Silo 2, and north of the loop road in the ditch draining the area of Silo 3. The highest concentration of TCE was 33 µg/kg in the soil sample from 9 to 10 feet bgs near Silo 1 (USACE, 1991).

1.3.3.4 Load Line 1

Explosive compounds handled at Load Line 1 included TNT, tritonal (80 percent TNT and 20 percent aluminum powder), and Composition B (60 percent RDX and 40 percent TNT) (ESE, 1983). Explosive compounds were detected in 197 of 362 laboratory analyses (not including field screening samples). Explosive compounds were mainly detected in ditches draining areas around the Amatol Screening and Amatol Pour buildings and the East Cooling building. The Amatol Screening and Amatol Pour buildings are at the north end of the diamond area of each load line. The East Cooling Building is on the east side of the diamond area at each load line. Seventy-six laboratory samples exceeded the PRGs for at least one of the following: RDX, TNT, TNB, 2,4-DNT, and 2,6-DNT. The PRG for TNT (22 mg/kg) was exceeded in 62 samples, followed by TNB (31 samples), 2,4-DNT (19 samples), RDX (8 samples), and 2,6-DNT (1 sample). The highest concentration of TNT was 132,800 mg/kg in the ditch near the East Cooling Building (SEC Donohue, 1992b).

The highest concentration of PCBs detected on-site, 2430 mg/kg, was found in soil sampled near a transformer pad south of the Paint Storage Building which is at the south end of Load Line 1 (USACE, 1991). Lead was found in concentrations greater than five times the background concentration in two samples near the East Cooling Building, one sample near the Amatol Pour Building, and one sample near the Receiving and Painting Building. The

highest concentration of lead, 576 mg/kg, was found in the soil sample immediately above the sample containing the highest concentration of TNT at Load Line 1 (SEC Donohue, 1992b).

TCE was detected in four samples collected northwest of the Inert Storage Building with the highest concentrations at 99 µg/kg in a sample from 3.4 to 4.4 feet bgs. Other VOCs found in soil samples from 8 to 10 feet bgs near the former fuel storage area on the northeast side of the load line included 1,1,2,2-tetrachloroethane (26 µg/kg), 1,1,2-trichloroethane (11 µg/kg), bromoform (26 µg/kg), and trichloroethene (12 µg/kg) (USACE, 1991) . TCE was detected at 0.02 µg/L in a soil gas sample collected at 6 feet bgs near monitoring well MW-12A, which is located in the vicinity of the former fuel storage area (Law Environmental, 1990).

Soil gas surveys at 6 feet bgs were conducted on two grids: one extending from the former Nike Maintenance Area north of Load Line 1 to the northern portion of the load line, and the other covering the area of the Dairy Farm which is located in the southern portion of the Load Line 1. No VOCs were reported at the Dairy Farm (Law Environmental, 1990). At the north end of the Inert Storage Building, however, TCE was found at 4 µg/L in two samples. Other VOCs detected in soil gas include 1,1,1-TCA, PCE (0.00003 µg/L), xylene (0.1 µg/L), total hydrocarbons (2 µg/L), and toluene (<0.04 µg/L). 1,1,1-TCA was detected in three samples at 0.001 µg/L in the vicinity of the former heavy vehicle maintenance building in the Nike Maintenance Area. No TCE, however, was detected in the soil gas at the Nike Maintenance Area (Law Environmental, 1990).

1.3.3.5 Load Line 2

During the Korean Conflict, Load Line 2 was used to load 105-mm Howitzer shells with Composition B, which is 60 percent RDX and 40 percent TNT (ESE, 1983). RDX was detected in 185 out of 358 laboratory soil analyses from Load Line 2. Nearly half of the samples in which RDX was detected exceeded the PRG for RDX. In contrast, the PRG for RDX was exceeded in only 16 samples at the other 3 load lines. The highest concentration of RDX was 23,270 mg/kg in a soil sample from the ditch draining the Bomb Wash Pit, which is southeast of the Amatol Pour Building (SEC Donohue, 1992b). The highest concentrations of RDX and TNT in wipe samples at any of the load lines were found in the

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Amatol Pour Building at Load Line 2 (TCT, 1991). Bulk TNT in the form of chunks and pieces were reported at Load Line 2 (TCT, 1991).

Propellant cartridges and bag propellant were also produced at Load Line 2 (ESE, 1983). HMX is used as a propellant (Roberts and Hartley, 1992), and may have been used at Load Line 2. HMX was detected in 121 of 358 soil samples at Load Line 2, but was only detected in 4 samples at the other 3 load lines (SEC Donohue, 1992b). The highest concentration of HMX was 2,020 mg/kg, which is below the PRG for HMX. Explosives which exceeded PRGs include RDX (87 laboratory samples), TNT (33 samples), 2,4-DNT (17 samples) and TNB (39 samples). The highest concentration of TNT at the Site was 176,000 mg/kg in a sample from a ditch south of the Amatol Screening Building at Load Line 2 (SEC Donohue, 1992b).

No chlorinated VOCs were detected in the soil gas at a depth of 6 feet at Load Line 2. Some of the highest concentrations of total hydrocarbons in soil gas on-site were found at Load Line 2. Maximum concentrations of total hydrocarbons on the southeast side of Load Line 2 were 8 µg/L. The non-grid soil gas sample near monitoring well MW-13A, which is near the former fuel storage area, contained 0.02 µg/L of total hydrocarbons. Benzene and toluene were detected at 0.04 µg/L and 0.07 µg/L, respectively (Law Environmental, 1990).

Five soils samples contained concentrations of lead which were greater than five times the background concentration and one sample contained chromium at a concentration greater than five times background (SEC Donohue, 1992b).

TCE was detected in the intermediate monitoring well MW-5A, which is on the southeast side of the load line, during the Confirmation Study (USACE, 1989). RDX at 1,190 µg/L, TNT at 49 µg/L, and HMX at 60 µg/L were found in the shallow well MW-5B (USACE, 1989). MW-5B is screened at the base of the fine sand unit.

1.3.3.6 Load Line 3

Tritonal and TNT were the principal explosives used at Load Line 3 (ESE, 1983). Bulk explosives believed to be chunks and pieces of TNT were found in surface drainages at Load Line 3 (TCT, 1991). TNT was detected in wipe samples at the Amatol Screening and

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Amatol Pour buildings (TCT, 1991). TNT was found in more soil samples (107) and at higher concentrations (up to 29,700 mg/kg) at Load Line 3 than any other explosive analyte (SEC Donohue, 1992b). Thirty laboratory samples exceeded the PRG for TNT, 11 for 2,4-DNT, 10 for TNB, and 5 for RDX. The highest concentrations for both compounds were found in a soil sample from a ditch near the Amatol Screening Building (SEC Donohue, 1992b).

Six soil samples analyzed for metals contained concentrations of lead greater than five times the background concentration. Three were near the Amatol Screening Building and two were near the Painting and Receiving Building (USACE, 1991).

2,140 mg/kg of PCBs were found in a soil sample collected near a transformer pad west of the Inert Storage Building (USACE, 1991). No VOCs were detected in soil sampled from 0 to 10 feet bgs at Load Line 3 during the Confirmation Study (USACE, 1989). A soil gas sample from the former fuel storage area near monitoring well MW-14A, however, contained 0.02 µg/L total hydrocarbons (Law Environmental, 1990).

1.3.3.7 Load Line 4

Practice rockets with stick propellant and black powder were among the munitions produced at Load Line 4 (ESE, 1983). TNT, RDX, and HMX were all found in wipe samples from the Amatol Pour Building (TCT, 1991). Explosive compounds in soil, however, were at lower concentrations and were less widespread than at the other load lines. PRGs were exceeded in only three samples for TNT, two samples for 2,4-DNT, and one sample each for 2,6-DNT and RDX (SEC Donohue, 1992b). The highest concentration of TNT was 131 mg/kg in a soil sample collected near the Amatol Pour Building.

The Law Environmental (1990) shallow (6 feet bgs) soil gas survey did not identify a significant quantity of TCE at Load Line 4. TCE was detected in only two soil gas samples near the Animal Disease Research Area in the southern portion of Load Line 4 (0.002 and 0.006 µg/L) and in one sample northeast of Load Line 4 (0.001 µg/L). Total hydrocarbons were detected at 19 µg/L near the former fuel storage area. Tetrachloroethane (PCE) was detected in two samples at 0.0004 µg/L, and 1,1,1-trichloroethane (1,1,1,-TCA) was detected in five samples at 0.002 µg/L in the vicinity of the northern end of Load Line 4.

PCBs were detected in soil samples in two areas at 12.1 mg/kg and 0.13 mg/kg (USACE, 1991). Two soil samples had concentrations of lead greater than five times the background concentration (SEC Donohue, 1992b).

1.3.3.8 Burning Grounds and Proving Range

The former Burning Grounds and Proving Range are located near the Landfill and NRD Reservoir. The Burning Grounds comprise the North Burning Ground, which is adjacent to the Proving Range, and the South Burning Ground, which is now under cultivation. No unexploded ordnances were found at the North Burning Ground (TCT, 1991). Propellant grains for large caliber ammunition and small pieces of bulk explosives were found on the ground surface in the South Burning Ground (TCT, 1991).

No ordnance debris was found at the Proving Range, which was used for proof testing caps, fuses, and boosters (TCT, 1991). Denuded areas, however, were reported to contain bulk explosives (TCT, 1991). Soil samples collected by TCT (1991) at the Proving Range contained TNT, RDX, HMX, and, as might be expected in an area in which boosters were tested, tetryl. Soil samples collected by TCT (1991) at the Proving Range contained TNT (<0.06-127 µg/kg), RDX (<0.25-384 µg/kg), HMX (<0.25-158 µg/kg), and, as might be expected in an area in which boosters were tested, tetryl (<0.04-63.70 µg/kg). Total concentrations of explosives in the sample at the Proving Range were much higher (743 mg/kg) than in samples from the Burning Grounds (TCT, 1991).

Results from the supplemental OU1 RI, however, showed that 5 samples from the South Burning Ground exceeded the PRG for RDX, with the highest concentration being 1,700 mg/kg (SEC Donohue, 1992b). The same sample also contained 313 mg/kg of TNT, which is higher than the largest concentration of TNT reported from soil samples at the Proving Range. The laboratory sample exceeded the PRGs for TNB and 2,4-DNT. The only explosive which exceeded the PRGs at the Proving Range was TNT in three laboratory samples, and PRGs were not exceeded for any laboratory samples collected at the North Burning Grounds.

No explosives were detected in sediment and surface water samples collected in the NRD Reservoir and in Johnson Creek downstream of the reservoir. Sediment and surface water

sampled for metals did not exceed five times the background concentrations (SEC Donohue, 1992b).

A surface soil sample collected in the North Burning Ground had a concentration of zinc (278 mg/kg) in excess of five times the background concentration (43.8 mg/kg). Another sample collected from surface soil covering the landfill contained concentrations of mercury (3.0 mg/kg) and silver (71.4 mg/kg) which were over five times background (0.5 mg/kg and 10.0 mg/kg, respectively).

Two surface soil samples at the North Burning Ground and one each at the South Burning Ground and the Proving Range had detectable concentrations of toluene (SEC Donohue, 1992b). The sample at the Proving Range also contained 14 µg/kg of TCE.

Soil gas samples collected at 6 feet bgs during the Law Environmental (1990) investigation revealed concentrations of 1,1,1-TCA in five samples of up to 0.002 µg/L, TCE at 0.002 µg/L, toluene at 0.2 µg/L, benzene in three samples at 0.1 µg/L, and total hydrocarbons at 0.3 µg/L in the North Burning Grounds and Proving Range (refer to "North of Load Line 4" survey grid, Law Environmental, 1990). Seven samples collected on the grid for the Sewage Treatment Plant reported concentrations of TCE up to 0.2 µg/L and 1,1,1-TCA at 0.003 µg/L. Most of these locations were less than 1,000 feet south of the Sewage Treatment Plant.

Monitoring well MW-11A which is in the Proving Range downgradient of the North Burning Ground and upgradient of the South Burning ground and the Landfill, did not contain detectable concentrations of explosives in samples collected during the Confirmation Study (USACE, 1989).

1.3.3.9 Demolition Area

The Demolition Area, which is located in the southwestern portion of the Site near the ARDC feedlot, was used for the destruction of tetryl boosters (ESE, 1983). No unexploded ordnances (UXOs) were reported in the Demolition Area, but boosters and a fuse were found in the vicinity of feedlot and one unspecified ordnance related item was found at the roadside turnout on Highway 63 (TCT, 1991). No explosives were detected, however, in

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two soil samples collected in the Demolition Area (TCT, 1991) nor were any detected in surface water and sediment samples (USACE, 1989).

1.3.3.10 Groundwater

Previous groundwater investigations included installation of 14 shallow and 11 intermediate groundwater monitoring wells during the Confirmation Study (USACE, 1989) and installation of 5 shallow, 4 intermediate, and 4 deep monitoring wells during the OU1 RI (USACE, 1991). Monitoring well designations and completion details are discussed in Section 2.2.3. Composite groundwater samples were collected from clusters MW-1 through MW-10 and well MW-11A and analyzed for metals and explosives in September 1987 (USACE, 1989). Grab samples were also collected for VOCs analyses from these clusters. During the same sampling event, samples for total petroleum hydrocarbons were collected from shallow wells MW-12A through MW-15A (USACE, 1989).

What about metals?

RDX and TNT were detected in a composite sample from MW-5A and MW-5B by the quality assurance laboratory but not by the primary laboratory (USACE, 1989). Explosive compounds were not detected in samples from any of the other monitoring wells during this sampling event. TCE was the only VOC detected during the September 1987 sampling event and was detected only in the grab from cluster MW-5 (USACE, 1989). Discrete samples from MW-1A, MW-1B, MW-5A, MW-5B, and MW-9B were collected in September 1988 for explosives and VOC analyses. During this event, RDX and TNT were detected only in MW-5B. TCE was detected in MW-5A and chloroform was detected in MW-9B (USACE, 1989). Clusters MW-16 through MW-20 were installed during the OU1 RI but are not discussed in the report (USACE, 1991).

In February 1989 the USACE sampled 24 water supply wells, including two supplying the town of Ithaca and one supplying the town of Memphis. The samples were analyzed for pesticides, PCBs, VOCs, and explosives. Six wells supplying the ARDC, four wells supplying the City of Ashland, three wells supplying the City of Lincoln, and fifteen additional water supply wells were sampled in March 1989 and analyzed for VOCs and explosives. The only explosive compound detected was RDX, which was detected in six of the private wells (50, 52, 52A, 53, 54, 54A), the supply well of the town of Memphis, and two of the ARDC wells (IR-8, 11A). TCE was detected in two domestic wells (52A,

53), a stock well (54A), and two of the ARDC wells (UNFL IR-8, UNFL 6A). Concentrations of TCE in the domestic wells ranged from 2.1 to 89 µg/L (USACE, 1989). Carbon filtration systems were subsequently installed by the USACE for the residences supplied by these two wells. Two irrigation wells at the ARDC were removed from service due to potential contamination (USDHHS, 1991). A sample from the potable water supply wells at the ARDC agronomy building contained 92 µg/L of TCE (USDHHS, 1991). The two drinking water fountains at the agronomy building were subsequently connected to separate activated carbon filtration systems (USDHHS, 1991).

The OU2 RI was conducted in two phases. Phase I included soil gas sampling, soil sampling, groundwater headspace analysis, Hydropunch® groundwater sampling, borehole geophysics, and groundwater monitoring well installation and sampling. The groundwater headspace screening for VOCs provided information which assisted in locating the wells in the first phase. Phase II included soil and soil gas sampling at Load Line 1. The second quarterly (November 1992) groundwater sampling results will be included in the Quarterly Groundwater Sampling Report.

The OU2 RI was conducted by WCC from May to August 1992 under the oversight of the USACE - Kansas City District. The USACE provided a Keystone 50 drill rig, a Failing 1500 drill rig, and a crew for drilling continuously sampled borings for installation of intermediate and deep groundwater monitoring wells. The Winnek Companies of Tulsa, Oklahoma provided two to three drilling crews which used at various times a Failing 1250, Failing CF-15, and Gardner-Denver 500 drill rigs. The Winnek crews drilled continuously sampled borings for installation of deep, intermediate, and shallow monitoring wells and unsampled borings for intermediate and shallow monitoring wells. WCC provided two to three crews which operated at various times an Acker-AD2, CME-55, and CME-75 drill rigs. The WCC crews drilled unsampled borings for installation of intermediate and shallow monitoring wells, drilled borings for Hydropunch® samples, and collected unsaturated soil samples.

Thirty-eight continuously sampled borings were drilled for installation of twenty deep, sixteen intermediate, and one shallow monitoring wells (the extra boring at MW-7 was abandoned because shale was encountered). Fifty-two unsampled borings were drilled for installation of nineteen intermediate and thirty-three shallow monitoring wells. Groundwater samples were collected from all eighty-nine monitoring wells installed during the OU2 investigation and the thirty-eight previously installed monitoring wells.

Forty-eight deep and seven shallow groundwater samples for VOC headspace screening, and fifteen deep and five shallow groundwater samples for explosives analysis were collected

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from forty-eight Hydropunch® borings. Eight deep and eight shallow groundwater samples were collected from four Hydropunch® borings at the Administration Area for laboratory analyses of VOCs, SVOCs, pesticides/PCBs, explosives, and groundwater quality parameters.

what about metals?

Fifty-three unsaturated soil samples were collected from thirty-five borings for VOC analysis at selected soil gas sampling locations. Collection and analysis of four hundred thirty-three soil gas samples and collection and analysis of forty-seven Geoprobe® samples, as well as the analyses of fifty-five Hydropunch® groundwater samples, were performed by Plains Environmental Services (PES) of Salina, Kansas. Batheja Associates provided surveying services.

VOC, SVOC, pesticide, PCB, TOC, and gross α and ß samples were analyzed by CompuChem Laboratories (CCL) of Research Triangle Park, North Carolina. Explosives analyses were performed by Midwest Research Institute (MRI) of Kansas City, Missouri. Non-CLP water quality analyses were performed by Ortek, Inc. (Ortek) of Green Bay, Wisconsin. QA samples were analyzed by the USACE Missouri River Division (MRD) laboratory in Omaha, Nebraska. All analyses were performed in accordance with the CDAP Part III (WCC, 1992d).

Field equipment, drilling, and sampling were in accordance with the CDAP Part II (WCC, 1992c), which describes procedures for soil gas sampling (Section 2.2), unsaturated soil sampling (Section 2.4.2), shallow groundwater headspace screening (Section 2.3.1), deep groundwater headspace screening (Section 2.3.2), use of the Hydropunch® (Section 2.3.2) well installation and development (Section 2.5.1), geophysical logging (Section 2.5.2), monitoring well sampling (Section 2.5.3), slug testing (Section 2.5.4), and sieve analysis (Section 2.6). This section includes a brief description of the field procedures and any deviations from or elaborations to the field protocols contained in CDAP Part II.

Sample collection and well development field sheets were completed as required by Section 6.0 of CDAP Part II. Analytes, sample containers, preservation procedures, decontamination procedures, sample labeling, chain-of-custody, packaging and transportation were in accordance with sections 3.0, 4.1, 6.0, and 7.0 of the CDAP Part II. Borings for unsaturated soil sampling, Hydropunch® sampling, and well installation were logged on USACE Hazardous and Toxic Waste (HTW) log forms by a WCC geologist or engineer in

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accordance with WCC procedures, which are modeled after ASTM D2488-90 procedures. Boring logs and groundwater monitoring well installation reports are included in **Appendixes A** and **B**. Analytical results are discussed in Section 4.0.

Phase II of the RI included additional soil gas sampling and analyses by PES near Load Line 1 in November 1992, and the collection of unsaturated soil samples corresponding to 10 percent of the additional soil gas samples. The Sampling Plans and Objectives of Phase II are scoped in the CDAP Part I, Chapter B (WCC, 1992b).

The temporary field office for the investigation was a trailer located at the north end of Load Line 2. Water for drilling and decontamination was obtained from a hydrant connected to the Mead public water supply.

2.1 ADMINISTRATION AREA-SOILS

The objective of the soil gas survey and the unsaturated soil borings at the Administration Area was to evaluate the nature and extent of DoD related chemicals in the soil.

2.1.1 Soil Gas Survey

The soil gas survey at the Administration Area was designed to supplement a previous investigation by Law Environmental (1990). The previous effort involved collecting soil gas samples from depths between 5 and 7 feet bgs. The sampling grid was composed of 250-foot squares, but samples were usually collected from every other grid node, effectively creating a spacing of 353 feet between samples. The southwest portions of the former Administration Area were not investigated due to lack of property access on the Hengen property. Analytes for the Law Environmental investigation included TCE, TCA, PCE, benzene, toluene, ethylbenzene, xylenes, and total petroleum hydrocarbons.

Based on the results of previous studies, WCC prepared a survey grid that approximated the previous grid in spacing (270 feet) and location with the long axis oriented to the southeast in the estimated direction of regional groundwater flow. Two sampling depths were chosen: one with the top of the interval at 6 feet bgs and one in the fine sand unit immediately below the surficial loess (typically 18 to 20 feet bgs). Isopach maps of the loess were

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generated prior to sampling to estimate the depth to the bottom of the loess which is also the top of fine sand unit. The 6-foot sample depth was chosen to confirm and supplement the previous results from the Law Environmental investigation. The second depth was chosen to provide information concerning the vertical movement of VOCs, as well as lateral movement of VOCs in the upper portion of the fine sand unit.

The Phase I soil gas samples were collected and analyzed between June 17 and 24, 1992 by PES. Soil gas samples were analyzed for VOCs (**Table 2-1**). In areas where the VOC concentration exceeded the range of the GC (Gas Chromatograph), a smaller sample volume (0.5 cc) was collected and analyzed. At shallow locations where VOCs were detected, the probe rods were removed and replaced with clean rods and a detachable point and reinserted in the existing probe hole and pushed and/or hydraulically hammered with the Geoprobe® to the next sampling depth. The same rods were used for the shallow and deep samples if VOCs were not detected in the shallow sample. After the collection of soil gas samples, the rods were removed, and the probe hole was backfilled with granular bentonite.

A nine-digit sample identification number was designated for tracking and identification purposes. The first three characters identified the area from where the soil gas samples were collected (i.e., ADS for the Administration Area; ATL for the Atlas Missile Area, LL1 for Load Line 1); the next three numerical characters identified the sample location as shown on **Drawing 2-1** and the last three alpha-numerical characters identified the depth and type of sample collected. For example, sample identification number ADS-005-06G indicates that the gas soil sample was collected from the Administration Area at sample location 005 from a depth of 6 feet and the sampling medium is gas.

Due to limited access, only 33 locations were sampled and analyzed instead of the proposed 45 locations (**Drawing 2-1**). Locations ADS-29, ADS-33, ADS-34, ADS-35, and ADS-37 through ADS-44 were not sampled due to the presence of crops or the lack of right-of-entry. A total of 66 soil gas samples (2 samples at 33 locations) were collected and analyzed. With the low concentrations of analytes detected in the Administration Area and no historical indication of source activities, the locations not sampled are not a concern.

2.1.2 Unsaturated Soil Borings

Unsaturated soil samples for VOCs were collected and analyzed to provide soil data for comparison with soil gas data. Samples for SVOCs, pesticides, and metals were also collected because these analytes were not addressed in previous soil investigations at the Administration Area. Samples were collected for PCBs during the OU1 RI (USACE, 1991) and were also collected during the OU2 RI. The additional soil samples were collected at the same locations and intervals as representative soil gas samples (**Drawing 2-1**). The soil samples were distributed between soil gas locations at which TCE was not detected and those at which TCE was detected at various concentrations. The number of soil samples collected in the Administration Area corresponded to approximately 10 percent of the total soil gas samples collected.

Of the 66 soil gas samples collected at the Administration Area, TCE was detected in 12 samples. One soil sample each was collected at the location which exhibited the highest concentration in shallow and deep soil gas samples. Of the 54 soil gas locations at which TCE was not detected, soil samples were collected at 5 of the non-detect locations. Sample locations were chosen to provide areal coverage of the sampling grid.

A nine-digit sample identification number designed for tracking and identification purposes similar to the system discussed in Section 2.1.1 was used. For example, the sample identification number ADS-001-06B indicates that a sample was collected from the Administration Area, at sample location 001, from a depth of 6 feet, and the sampling medium was soil (where "B" indicates soil borings).

Soil borings were collected by a truck-mounted drill rig. The borings were drilled using 4-inch o.d. continuous flight augers (CFA) and 4.25-inch i.d. hollow stem augers (HSA). The samples were collected using a 2- or 3-inch stainless-steel split-spoon sampler.

The length of the split-spoon sample was measured and a discrete sample collected for VOC analysis. The remaining soil sample was composited in a stainless-steel bowl for analysis of SVOCs, pesticides, PCBs, and metals. Refer to **Table 2-1** for a complete list of analytes.

Upon completion of borings, the augers were removed and the borehole was backfilled with the soil cuttings mixed with granular bentonite because the borings were not greater than 20 feet deep. The top 2 feet were backfilled with granular bentonite only.

2.2 ADMINISTRATION AREA - GROUNDWATER

The objective of the groundwater investigation at the Administration Area was to evaluate the nature and extent of chemicals in the groundwater which may be associated with DoD activities.

2.2.1 Characterization of Hydrogeologic Units

The purpose of the characterization was to develop maps that show estimated elevations of the tops of the three major hydrogeologic units: the Pleistocene fine sand, the Pleistocene sand and gravel, and the Omadi Formation. These maps provide a means for estimating depths to sampling intervals at groundwater screening grid nodes.

Sampling depths were selected based on data from the following information:

- Boring logs of existing monitoring wells in the Confirmation Study Final Report (USACE,1989)
- Boring logs from a supplemental study conducted during the OU1 RI provided by the USACE
- Boring logs from Piskin (1971)
- Water levels collected from existing monitoring wells
- Boring logs generated during 1992 field activities

Information generated during field activities filled data gaps, and confirmed contacts between the loess, the fine sand unit, the sand and gravel unit, and the Omadi Formation. This information was used to characterize the hydrogeologic units in the Hydrogeologic Study Technical Memorandum (WCC, 1992h).

2.2.2 Groundwater Screening

The groundwater screening program was designed to identify potential monitoring well locations, and to provide information on the extent of VOC groundwater contamination. Eleven groundwater headspace screening samples were collected and analyzed by PES with their van-mounted GC for VOCs with TCE as the primary target analyte (**Table 2-1**). A summary of groundwater headspace sampling depths is in **Table 2-2**.

Groundwater screening samples were collected from two separate units. Shallow groundwater screening samples were collected at the base of the fine sand unit of the Pleistocene aquifer. (Refer to Section 3.0 for a detailed discussion of Site hydrostratigraphy.) A deep groundwater samples were collected from the base of the sand and gravel unit of the Pleistocene aquifer. The sample depths were estimated from an isopach map generated for the Hydrogeologic Study Technical Memorandum (WCC, 1992h).

The first two characters in the sample I.D. for the groundwater headspace screening samples denote the grid area location ("G1" denotes Administration Area, "G2" denotes Atlas Missile Area, and "G3" denotes Load Lines 1, 2, 3, and 4). The second three characters denote the grid node and interval ("I" for shallow and "J" for deep). The last numerical characters denote the sampling depth below ground surface (i.e., 70).

Groundwater screening samples were collected from the grid nodes shown on **Drawing 2-2**. The first shallow groundwater screening sample was collected at G1-25, the grid node nearest to the soil gas sampling location with the highest TCE concentration (ADS-005). Subsequent groundwater screening samples were collected at the nearest grid node along each axis. This process continued until a perimeter of grid nodes with TCE headspace concentrations below 0.05 µg/L encircled grid nodes with concentrations above 0.05 µg/L, or until property boundaries were reached where right-of-entry was restricted. The criterion of 0.05 µg/L was chosen instead of the quantitation limit for TCE (0.01 µg/L) because the quantitation limit for TCE in headspace gas is 100 times lower than the quantitation limit for TCE in groundwater (1 µg/L). This criterion provided a closer approximation of the extent of detectable concentrations of TCE in groundwater. Therefore, this criterion provided a more accurate location for groundwater monitoring wells, which were intended

to be located near the extent of detectable concentrations of TCE in groundwater from monitoring well samples.

Collection of deep groundwater screening samples at the Administration Area began at the grid nodes where analyses of shallow groundwater screening results were below 0.05 µg/L and continued until a perimeter of locations at which TCE was less than 0.05 µg/L encircled locations at which TCE was above 0.05 µg/L, or until property boundaries were reached where right-of-entry was restricted.

2.2.2.1 Shallow Groundwater Headspace Screening

Twelve shallow groundwater samples (two near location G1-14I) were collected on June 25 and 26, 1992 by PES beginning at grid node G1-25 which corresponds to the soil gas sampling location with the highest VOC concentration, ADS-005-18G **(Drawing 2-1)**. The probe met refusal at 33 feet bgs at location G1-14I, and a sample was collected at that depth. After moving to the southwest, sample G1-14SWI-44 was collected at 44 feet bgs. Samples could not be collected at locations G1-45 and G1-57 due to lack of right-of-entry.

Shallow groundwater samples were collected by pushing the steel rods down with the Geoprobe® apparatus, and hydraulically hammering the probe rods down to the bottom of the Pleistocene fine sand unit. Once the desired depth was achieved, the rods were pulled up approximately 1 to 3 feet to detach the drive point from the rods and allow infiltration of the groundwater through the bottom of the rods.

A new and clean polyethylene tubing (1/4-inch o.d.) was lowered down through the rods to the bottom of probe hole. The length of the tubing was measured to ensure that it would not get plugged up with sand and gravel. The other end of the tubing was connected to a vacuum pump (with a piece of silicon tubing). Vacuum (approximately 24 inches of mercury) was applied to lift the water column through the tubing. The tubing was pinched off and pulled out of the rods. A 40-ml vial was filled with approximately 20-ml of groundwater. After the groundwater sample was collected, the vial was placed in an oven and heated for 30 minutes at 60 degrees Celsius.

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After collection of the groundwater samples, the rods were removed, and the probe hole was backfilled with granular bentonite. The probe rods and sampling equipment were decontaminated after each sample collected. The used sampling tubing was discarded at the end of each sampling event.

2.2.2.2 Deep Groundwater Headspace Screening

Deep groundwater screening samples were collected by a WCC truck-mounted drill rig incorporating the use of the Hydropunch® sampling apparatus due to the depth limitation of the Geoprobe® (60 to 65 feet).

Seven deep groundwater screening samples were collected between July 12 and 24, 1992 from the grid nodes shown on **Drawing 4-7**. Samples could not be collected at locations G1-48 and G1-58 due to lack of right-of-entry.

The groundwater screening samples were collected by augering down to static water level with 4-inch o.d. continuous-flight augers (CFA). The CFA were removed and drilling resumed using hydraulic rotary drilling techniques with a 3.25-inch drag bit and bentonite drilling fluids down to 5 to 10 feet above the desired sampling depth. Following collection with the Hydropunch®, the sample was delivered to a PES van equipped with a GC for water headspace analysis. After collection of the groundwater screening sample, the borehole was grouted, via tremie pipe, from the bottom of the borehole to 5 feet bgs with Volclay® grout. The remaining 5 feet were backfilled to ground surface with soils on cultivated areas, and cement on noncultivated fields.

2.2.3 Monitoring Well Installation and Development

Five monitoring wells in two clusters (MW-47B and A, MW-48B, A, and D) were drilled and installed between August 4 and 13, 1992 to collect groundwater samples for chemical analysis in the Administration Area (**Drawing 2-3**). Three other clusters (MW-49, MW-50, and MW-51) were planned for the Administration Area, but were not installed due to property access restrictions because the property owner objected to construction of permanent structures (i.e., monitoring wells). As an alternative, the Hydropunch® was used to collect samples H2-1 through H2-4.

Monitoring wells were drilled in clusters, normally consisting of three wells per cluster (shallow, intermediate, and deep), with a suffix of "B," "A," and "D," respectively, added to the numerical listings to distinguish the zone of completion of the well.

The following table summarizes the well screening intervals and nomenclature for wells installed during the OU2 RI:

MW-"B"	Shallow	Bottom 10 feet of the Pleistocene fine sand
MW-"A"	Intermediate	Bottom 10 feet of the Pleistocene sand and gravel
MW-"D"	Deep	Upper 5 feet of the Cretaceous Omadi Sandstone (bedrock)

The designations for shallow, intermediate, and deep wells follow nomenclature used for monitoring well clusters MW-1 through MW-11, which were installed during the Confirmation Study (USACE, 1989). Monitoring wells MW-12A through MW-15A were assigned "A" (during the OU2 RI) although they are very shallow monitoring wells. Monitoring well clusters MW-16 through MW-20, which were also installed during the OU1 RI, follow a different designation system where shallow wells are designated by "C," intermediate wells are designated by "B," and deep wells are designated by "A."

The "D" well of each cluster was drilled using hydraulic rotary techniques prior to drilling the remaining wells. The borehole was sampled continuously with a Christensen 94 mm sampler barrel and/or 3-inch and 2-inch o.d. split-spoon samplers to the top of bedrock. Once bedrock was confirmed, the borehole was logged with downhole geophysical tools. Logging was conducted in an open, fluid filled borehole. Logging tools included natural gamma, spontaneous potential, and electrical resistivity. A temporary steel casing was installed by pushing and/or hammering the casing into competent bedrock with a 300-lb hammer to obtain a seal and minimize hydraulic communication between the sand/gravel and the bedrock. The inside of the casing was flushed with potable water and clean bentonite-based drilling fluids (Baroid Aquagel®) were introduced. Where shale was encountered, conventional bedrock coring techniques were followed using a 4 3/4-inch core barrel. The recovered sample core was logged by the WCC geologist/engineer. Where sandstone was encountered, the 94-mm Christensen sampler was used to improve recovery of the poorly

cemented Omadi Sandstone. The bedrock interval was logged geophysically prior to reaming.

A minimum of 5 feet was cored into bedrock and an additional 5 feet was cored if the recovered sample contained less than 5 feet of shale. If the second core run also contained more shale, and the combined core runs contained a shale interval at least 5 feet thick and no sandstone intervals at least 3 feet thick were encountered, then the borehole was backfilled with sand and topped with at least 2 feet of bentonite pellets to the top of bedrock. In the case of MW-47, an intermediate ("A") well was installed instead of a bedrock ("D") well. A minimum screening interval of 3 feet (typically 5 feet) of sandstone was required to install a bedrock well. In addition, the top of the screen interval had to be at least 3 feet below the top of the bedrock surface to provide sufficient depth for buffer sand and a seal across the bedrock surface.

The deep ("D") wells were constructed with 5 feet of 0.020-inch machine slot screen, and at least 1 centralizer. The intermediate ("A") wells were constructed with 10 feet of 0.020-inch machine slot screen, and a maximum of five centralizers. The shallow wells ("B") were constructed with 10 feet of 0.010-inch machine slot screen and one centralizer.

The grain-size distribution of the sand pack in the shallow wells was 20-40 and 10-20 in the intermediate wells. A 20-40 filter pack consists of sand which passed a No. 20 sieve (0.875 mm) but is retained by a No. 40 sieve (0.4125 mm). A 10-20 filter pack consists of sand which passes a No. 10 sieve (2.0 mm) but is retained in a No. 20 sieve (0.875 mm). The filter pack size for shallow and intermediate wells was selected by visual observation or by analysis of grain size **(Table 2-3)** in accordance with the CDAP Part II. The method prescribed for choosing the filter pack size in the CDAP is described by (Nielson, 1991) in the Practical Handbook of Groundwater Monitoring. Nielsen (1991) recommends that the 70 percent cumulative retained size (D_{70}) of the filter pack be 4 to 10 times the D_{70} of the formation material. The lower the multiplier is, the greater the filtering capacity of the filter pack. The typical construction of wells installed during the Confirmation Study (USACE, 1989) included a 0.010-inch screen slot size and a filter pack with a D_{70} of 0.35 mm, which provides a multiplier of roughly 1 to 3 for a typical sample from the fine sand unit and a multiplier of 0.5 to 2 for a typical sample from the base of the sand and gravel unit. A 20-40 filter pack, which has a D_{70} of 0.60 mm, was used for formation materials with a D_{70}

of less than 0.15 mm. This provides a multiplier of 4 or greater. A 10-20 filter pack, which has a D_{70} of 1.0 mm, was used where the D_{70} was between 0.15 mm and 0.275 mm, providing a multiplier range of 6.7 to 3.6. For formation material with a D_{70} of over 0.275 mm, a 4-8 filter pack, which has a D_{70} of 3.0 mm, was installed. A 4-8 filter pack consists of sand which passes a No. 4 sieve (4.75 mm) but is retained by a No. 8 sieve (2.25 mm). This provides a multiplier of 10.9 or less. Filter pack sizes in wells which were installed before grain-size analyses were available were chosen by visual examination of the formation material. A 10-20 sand was used for wells in the Omadi Sandstone. A seal of American Colloid Pure Gold® grout was installed above the sand pack up to within 10 feet of the ground surface. The remaining void was grouted with cement/bentonite grout up to 5 feet below ground surface. Soil cuttings generated during the advancement of soil borings and monitoring wells were placed on Visquene and screened on-site with a HNu meter. All HNu readings or soil borings and monitoring well cuttings were less than 5 ppm, therefore, the cuttings were disposed of adjacent to the boring.

Galvanized steel well protectors were installed over the well casing to protect the integrity of the wells. A 1-foot minimum layer of granular bentonite was placed on the outside of the well protector and inside the borehole. The remaining 4 feet of the borehole on the outside of the protector was backfilled with concrete and a concrete pad 3-foot by 3-foot by 4-inch was installed flush to the ground. Protective posts were installed at each corner of the square concrete pad to further protect the well. After completion the well protectors and protective posts were painted and the wells labeled.

The remaining wells in each well cluster were installed in the same manner as the deep well except that they were not sampled continuously. Instead, the borings were visually logged by the geologist/engineer using the soil cuttings in general accordance with ASTM 2488-90. Monitoring well construction details are summarized in **Table 2-4**.

Monitoring wells were developed after a minimum of 48 hours had elapsed after well installation. A small truck-mounted drill rig with a stainless-steel surge block apparatus was used for surging. The surge block was attached to 15 to 20 feet of steel pipe for added weight, and the pipe connected to the rig's wire line.

Well development consisted of a two stage cycle of surging and pumping: a snug fitting surge block was lowered to the screened interval and moved up and down in order to seat the filter pack, to remove fine sediments from the filter pack, and to return the aquifer to its natural yield capabilities. The surge block was brought up to the surface several times removing fine sediments and drilling fluids. Surging procedures normally ran for approximately 15 to 30 minutes after which time the surge block was removed and replaced with a stainless-steel submersible pump. The submersible pump was lowered down the well and alternately placed in the upper one-third and the lower one-third of the screened interval, and pumped until water clarity was observed. Flow rates were calculated to determine the amount of fluids removed.

Groundwater quality parameters (pH, temperature, and conductivity) were measured during the development process and were recorded on a well development field data sheet. After parameters stabilized, the pump was shut off, removed, and the surge/pump cycle was repeated.

The well was considered developed after the following criteria were met:

- A minimum of three times the volume of drilling fluids lost across the screened interval and the water lost during sandpack installation through the tremied pipe were removed
- Water quality parameters had stabilized and at least three consecutive sets of relatively consistent readings (within 10 percent) were obtained at volume intervals no less than one-half a well volume apart
- Water was visually observed to be clear

Table 2-5 presents the estimated volume of drilling fluids lost in the screen interval and the volume of water removed during development. Removed groundwater was discharged on the ground away from the well, adjacent private properties and from low drainage areas.

2.2.4 Groundwater Sampling

After well development, a site-wide groundwater sampling event was conducted on all the monitoring wells that were installed, as well as existing wells. The groundwater sampling

at the Administration Area was conducted on August 26, 1992. Purging and sampling were performed with a decontaminated stainless-steel submersible pump. The pump was lowered into the well and placed approximately 5 to 10 feet below static water level. Samples were collected for VOCs, SVOCs, explosives, pesticides, PCBs, dissolved metals and cyanide, total metals and cyanide, and water quality parameters. Refer to **Table 2-1** for a complete list of analytes.

A nine-digit sample identification character was developed to provide a format amenable to database tracking. The first three-character field contained an A, B, C, or D to identify the screen interval of the well and "MW" for monitoring well. The second three-character field contained the well cluster number preceded by a zero (i.e., 001 for cluster MW-1). QC samples are identified by 2 preceding the cluster number; i.e., 201 for cluster MW-1. QA samples for the MRD laboratory are identified by a 4 preceding the cluster number; i.e., 401 for cluster MW-1. The last three-character field identifies the month (01 for January, etc.) and the last digit of the year; i.e., 082 for August 1992.

2.2.5 Hydropunch® Sampling

Installation of monitoring well clusters MW-49, MW-50, and MW-51 at the Administration Area was prevented by property owner's restriction on access for construction of permanent structures. As a substitute for monitoring wells, groundwater was sampled with the Hydropunch® at locations H2-1 through H2-4 (**Drawing 2-4**). Samples were collected from two intervals, the "I" interval corresponding to the estimated depth of the base of the fine sand unit, and the "J" interval corresponding to the estimated depth of the base of the sand and gravel unit. In the field, certain samples were gravity filtered through a Baxter fluted qualitative (non-uniform pore size) filter paper in a decontaminated glass funnel. These samples, designated "F" in tabulation below, were filtered to remove suspended solids from the sample. If the suspended solids content of the sample was sufficiently high (greater than 5 percent), chemists from the analytical laboratory subcontractors informed WCC that the samples would be considered solid samples rather than aqueous samples and reported as µg/kg in lieu of µg/L. Total Metals samples designated "F" were filtered in the field using the Baxter filter paper. Dissolved Metals samples designated "F" were also filtered in the field using the Baxter filter paper followed by a 45 µ filter. Samples designated "NF" in the tabulation below, were "not filtered" in the field using the Baxter filter paper, however all

the Dissolved Metals samples, including those designated "NF," were filtered using a 45 μ filter. At intervals which are designated "F/NF" two samples were collected, and one filtered with the Baxter filter paper and one was not filtered.

Analytes	Sampling Interval							
	H2-1I	H2-1J	H2-2I	H2-2J	H2-3I	H2-3J	H2-4I	H2-4J
Explosives	F	F	F	F	F/NF	F/NF	F/NF	F/NF
VOC	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF
SVOC	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Pest./PCBs	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Diss. Metals	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Total Metals/ Cyanide	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Water Quality	F	F	F	F	F/NF	F/NF	F/NF	F/NF

Monitoring wells have man-made filter packs and are rigorously developed prior to groundwater sampling. Hydropunch® sampling does not involve man-made filter packs or well development. Therefore, the analytical results from the Hydropunch® samples and the monitoring well samples are not comparable in terms of representativeness. However, the Hydropunch ® is an effective tool for collecting data to assist in characterizing the extent of contamination in areas where permanent monitoring wells are not feasible.

Sixteen samples (two samples from each of two intervals at four locations) were collected from August 9 to 20, 1992 (**Table 2-2**). Samples ranged in depth from 55 to 62 feet bgs for the shallow interval and 115 feet bgs for the deep interval. VOCs, SVOCs, pesticides, PCBs, dissolved metals, total metals, and cyanide were analyzed by CCL. Explosives samples were analyzed by MRI and water quality samples were analyzed by Ortek. Sample volumes, containers, and analyses are the same as those for groundwater monitoring well sampling for the Administration Area.

The first three characters in the sample I.D. for Hydropunch® samples denoted the interval ("I" for shallow and "J" for deep) and "H2" for a non-grid sample at the Administration Area. The middle three numerical characters represent the sampling location and indicate whether the sample was filtered or unfiltered; i.e., "001" denotes a filtered "F" sample and

whether the sample was filtered or unfiltered; i.e., "001" denotes a filtered "F" sample and "601" denotes an unfiltered "NF" sample at location 1. The last three numerical characters represent the sampling depth below ground surface.

Separate boreholes were drilled to collect groundwater samples from the shallow and deep intervals. The field geologist or engineer logged the drill cuttings (**Appendix A**) in accordance with WCC procedures, which are modeled on ASTM D2488-90 procedures.

After samples were collected, the boreholes were grouted with Volclay® to within 5 feet of ground surface using a tremie pipe. The remaining 5 feet were backfilled with soil cuttings when located on cultivated land, and cement grout on uncultivated land.

2.3 LANDFILL AREA - GROUNDWATER

The objective of the groundwater monitoring wells installed around the perimeter of the Landfill was to evaluate the nature and extent of the chemicals in the groundwater which may be associated with Landfill disposal activities by DoD.

The geology and hydrogeology in the vicinity of the Landfill are rather complex due to the proximity to Johnson Creek, the NRD reservoir, the boundary between Todd Valley and the till uplands, and the relatively lower elevation of the valley surface. Sandstone was encountered at the top of bedrock at monitoring well locations MW-53 through MW-56. The objective of the investigation of the Landfill Area, however, was to evaluate the shallow and intermediate levels. Therefore, wells were not installed in the bedrock. The clay layer is approximately 1-foot thick and separates the fine sand unit from the sand and gravel unit. The bottom of the MW-52A well screen is approximately 2 feet above the bottom of the sand and gravel unit, and the top of the screen is approximately 3.5 feet above the clay layer. The bottom of the MW-52B well screen is approximately at the bottom of the fine sand unit, so the wells at cluster MW-52 are screened across approximately 3.5 feet of the same interval. The entire Pleistocene interval was not penetrated at MW-52 due to misidentification of a Pleistocene clay layer as Cretaceous shale. Bedrock structural contour maps and borings in the area of the landfill by Piskin (1971) misidentified the clay layer as Cretaceous shale, contributing to the misinterpretation at MW-52.

2.3.1 Monitoring Well Installation and Development

Five clusters consisting of two wells each (MW-52B and A, MW-53B and A, MW-54B and A, MW-55B and A, and MW-56B and A) were installed in the Landfill Area for monitoring purposes between June 24 and July 22, 1992 (**Drawing 2-3**).

The monitoring wells were installed in the intervals corresponding to the bottom of the fine sand for the shallow ("B") wells, and the bottom of the sand and gravel for the intermediate ("A") wells. The intermediate wells were drilled by hydraulic rotary methods and sampled continuously with 3-inch and 2-inch split-spoons and then geophysically logged. Based on the geologic borings for the intermediate wells, the shallow wells were installed by using hydraulic rotary methods without geologic sampling except for MW-52B and MW-54B which were drilled using HSAs. HSAs were used where feasible to minimize the volume of drilling fluids which needed to be removed during development. The field geologist/engineer logged the shallow boreholes through visual observation of the cuttings.

2.3.2 Groundwater Sampling

After well development, the landfill wells were sampled between August 24 and 27, 1992. The groundwater monitoring wells at the were sampled for VOCs, explosives, pesticides, PCBs, dissolved metals, total metals, cyanide, water quality parameters, and gross α and ß.

2.4 ATLAS MISSILE AREA AND LOAD LINE 1 - SOILS

The objective of the soil gas surveys and the unsaturated soil borings at the Atlas Missile Area and Load Line 1 was to evaluate the nature and extent of VOCs (primarily TCE) in the soil.

2.4.1 Soil Gas Survey

The soil gas samples were collected and analyzed by PES as outlined in Section 2.1.1.

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2.4.1.1 Atlas Missile Area Soil Gas Survey

The soil gas survey at the Atlas Missile Area was designed to supplement a previous effort by Law Environmental (1990). The previous effort involved collecting soil gas samples for analysis of DCE, DCA, 1,1,1-TCA, TCE, PCE, benzene, toluene, ethylbenzene, and xylene from depths between 5 and 7 feet. The sampling grid was composed of 250-foot squares with samples usually collected from every other grid node.

Based on the previous studies and results, WCC established a grid of approximately the same spacing (340 feet) as the previous soil gas grid (approximately 353 feet), and roughly oriented in the same direction (**Drawing 2-5**). Sampling depths were 6 feet below ground surface, and in the fine sand unit immediately below the surficial loess with the top of the interval approximately 18 to 24 feet bgs. A total of 237 soil gas samples (typically 2 samples per location) were collected and analyzed for TCE between May 19 and June 4, 1992. Samples were not collected from the fine sand unit at ATL-025 and ATL-027 due to saturated conditions, or in the loess at 6 feet bgs at ATL-118 due to tight soil conditions.

2.4.1.2 Load Line 1 Soil Gas Survey

The soil gas survey at the Load Line 1 Area was also designed to supplement the previous effort by Law Environmental (1990). The previous effort involved collecting soil gas samples for analysis of DCE, DCA, 1,1,1-TCA, TCE, PCE, benzene, toluene, ethylbenzene and xylene from between 5 and 7 feet bgs. The previous sampling grid was composed of 250-foot squares. Samples were collected from roughly every other grid node effectively creating a 353-foot spacing between samples.

Based on the results of previous studies, WCC established a grid survey for Phase I that roughly overlays the previous grid (**Drawing 2-6**). As in Phase I, the Phase II soil gas survey was designed to assist in identifying the potential source area. The sampling grid spacing was reduced in areas where it was suspected that the source may have been located. Grid spacing is closer (150 feet) in the vicinity of the former AFBMD Tech Area, a potential source area for TCE. Sampling depths were at 6 feet bgs, and in the fine sand unit immediately below the surficial loess (18 to 20 feet bgs). During Phase I, 129 soil gas samples (typically 2 samples per location) were collected and analyzed between June 4 and

14, 1992 at the Load Line 1 Area. During Phase II, 85 soil gas samples were collected at 34 locations between November 10 and 18, 1992. Phase II locations LL-66 through LL-73 and LL-75 and LL-76 provided closer spacing (150 feet) in the southern corner of the Phase I grid. Locations LL-74 and LL-77 through LL-94 extended the survey to the south. The grid spacing for locations LL-77 through LL-82, LL-84 through LL-93, and LL-95 through LL-99, where the soil gas concentration of TCE was anticipated to be higher, was reduced to 225 feet. The spacing between LL-74, LL-83, and LL-94, where the limits of TCE are anticipated, is 450 feet.

The vertical extent of TCE was evaluated in Phase II by collecting samples at 3 feet, 9 feet, 15 feet, and 21 feet bgs at three Phase I locations (LL-45, LL-46, and LL-48) and two Phase II locations (LL-69 and LL-72). The three Phase I locations had the largest concentrations of TCE among Phase I samples and the two Phase II locations had the highest concentrations of TCE among Phase II samples.

Tight soils prevented collection of soil gas samples at the 3-foot depth for locations LL-45, LL-46, LL-69, and LL-72 and at the 9-foot depth at location LL-46. Attempts were made to sample at 4 feet bgs and were successful at LL-69 and LL-72 but not at LL-45 and LL-46. Likewise, an unsuccessful attempt was made to sample at 15 feet bgs at location LL-45, and therefore a sample was collected at 16 feet bgs.

2.4.2 Unsaturated Soil Borings

The primary goal of the unsaturated soil samples was to provide analytical soil data for comparison with soil gas data. Soil samples were collected from 10 percent of the soil gas sample locations, as outlined by CDAP Part I, Chapter A, Section 4.1.2.2 and Chapter B, Section 4.1.2.1. The soil samples were distributed proportionately between soil gas sample locations at which TCE was not detected and those at which TCE was detected at low, medium, and high concentrations. Sampling procedures are discussed in Section 2.1.2.

2.4.2.1 Atlas Missile Area Unsaturated Soil Borings

Nine soil samples were distributed evenly between the 90 soil gas locations with TCE concentrations greater than 16 µg/L, between 5 µg/L and 15 µg/L, and less than 5 µg/L. Soil

samples were also collected from 15 of the 147 non-detect locations, and were chosen to provide adequate geographic coverage of the sampling grid (**Drawing 2-5**). The samples were analyzed for VOCs.

2.4.2.2 Load Line 1 Unsaturated Soil Borings

Of the 130 soil gas samples analyzed at Load Line 1 during Phase I, TCE was detected in 97 samples. TCE was detected in 51 of the 85 Phase II soil gas samples. Seventeen soil samples were distributed among locations with TCE soil gas concentrations greater than 100 µg/L (5 samples), between 10 and 100 µg/L (5 samples), and less than 10 µg/L (7 samples). Soil samples were also collected from 5 of the 67 non-detect soil gas locations to provide areal coverage of the sampling grid (**Drawing 2-6**). Soil samples were analyzed for VOCs by CCL.

2.5 ATLAS MISSILE AREA - GROUNDWATER

The objective of the TCE groundwater screening and monitoring well installation and sampling was to evaluate the extent of VOC compounds (primarily TCE) in groundwater related to a suspected source at the Atlas Missile Area. The characterization of subsurface hydrogeologic units is described in Section 2.2.1.

2.5.1 Groundwater Screening

A groundwater screening program was designed to identify potential monitoring well locations, and to provide information on the extent of groundwater contamination. Thirty-two groundwater headspace screening locations were sampled. Deep samples G2-03J-103, G2-04J-107, G2-09J-108, and all the shallow groundwater headspace screening samples from Grid 2 node locations (**Drawing 2-7**) were collected before the Draft Work Plan comments were issued and were only analyzed for TCE. The remaining groundwater headspace samples were analyzed for eight other VOCs in addition to TCE (**Table 2-1**). The analytical techniques are the same for analyzing soil gas. Although a wider range of VOCs may be present in shallow soils, previous investigations suggested that only TCE is widely distributed in the groundwater.

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Drawing 2-7 shows the Grid 2 node locations which were sampled to refine the preliminary estimates of the extent of TCE contamination. The preliminary estimate of the extent of the TCE contamination was made using the following information:

- The source of the TCE plume (the Atlas Missile Area)
- Regional groundwater gradients estimated from existing wells as given in the Confirmation Study Final Report (USACE, 1989), and the regional gradient map in Piskin (1971)
- The results of groundwater samples collected from existing well as given in the Confirmation Study Final Report (USACE) as well as results of supplemental sampling efforts by USACE (USACE, 1992)

The sample depths were estimated from isopach maps of the Peoria loess, the fine sand unit, and the sand and gravel unit which were generated prior to field activities.

2.5.1.1 Shallow Groundwater Headspace Screening

Nineteen shallow groundwater screening samples (G2-2I through G2-12I, G2-14I through G2-18I, and G2-20I through G2-22I) were collected and analyzed between May 15 and 20, 1992 by PES. Shallow groundwater screening samples were collected beginning at grid node G2-6 which is the node located immediately downgradient of the suspected source area at the Atlas Missile Area (**Drawing 2-7**). Subsequent groundwater screening samples were collected at the nearest grid node along each axis. This process was continued until a perimeter of grid nodes with TCE concentrations below 0.05 µg/L encompassed nodes at which TCE had been detected at concentrations at or above 0.05 µg/L. Shallow groundwater screening samples were collected from the base of the fine sand unit of the Pleistocene aquifer (48 to 60 feet bgs).

A water headspace sample from the tile sump on the Kresak property immediately adjacent to MW-36, labeled KTS-01-VOA, was also collected by WCC and analyzed for VOCs by PES. The tile sump is a collection basin for water drained from land north of the sump to facilitate cultivation. The sample was collected to compare surface water to shallow groundwater headspace samples. The tile sump is located immediately south of monitoring well cluster MW-36. Cluster MW-36 is shown on **Drawing 2-3**.

2.5.1.2 Deep Groundwater Headspace Screening

Deep groundwater screening samples were collected by a truck-mounted drill rig incorporating the Hydropunch® sampling apparatus.

Twenty-three deep groundwater screening samples (G2-2J through G2-4J, G2-8J, G2-9J, G2-12J, G2-14J, G2-18J, G2-20J through G2-22J, G2-25J through G2-27J, G2-30J through G2-32J, G2-34J through G2-39J) were collected between May 17 and July 22, 1992 from the grid nodes shown on **Drawing 4-8**. Collection of deep groundwater screening samples began at the grid nodes where the concentration of TCE in shallow groundwater screening samples was below 0.05 µg/L and continued until a perimeter of deep samples with TCE below 0.05 µg/L encircled the nodes at which TCE was at concentrations above 0.05 µg/L. The samples were collected from the base of the Todd Valley sand and gravel unit at depths ranging from 70 to 131.5 feet bgs, and from the base of the Platte River sand and gravel unit at depths ranging from 43 to 54 feet.

The samples were analyzed by a PES van equipped with a GC for water headspace analysis. After collection of the groundwater screening sample, the borehole was grouted with a tremie pipe from the bottom of the borehole to 5 feet bgs with American Colloid Pure Gold Grout®. The remaining 5 feet were backfilled to ground surface with soils on cultivated areas, and cement grout on non-cultivated areas.

Groundwater screening sampling locations and depths are summarized in **Table 2-2**.

2.5.2 Hydropunch® Sampling for Explosives

The objective of the Hydropunch® sampling for explosives was to characterize the extent of RDX contamination in the sand and gravel unit. According to previous studies, RDX was the most commonly detected explosive compound in groundwater at the former NOP. The other explosive analytes are typically associated with detections of RDX. Field screening of groundwater samples was not conducted because a practical, quantifiable groundwater screening technique was not available to the Project Team. Instead, the water samples for explosives were packaged and shipped to MRI Laboratories for analysis. Samples for explosives were collected from the sand and gravel unit at grid nodes G2-25, G2-26, G2-27,

G2-30, G2-31, G2-32, G2-34, G2-35, G2-36, and G2-39 (**Drawing 2-7**). In accordance with protocols in the CDAP Part I, Section 4.7.2.2, samples for explosives were not collected from grid node G2-29 because the groundwater screening algorithm for VOCs did not call for a sample to be collected from the sand and gravel unit at this location.

2.5.3 Monitoring Well Installation and Development

Twenty-five wells in 9 clusters (MW-40 B,A; MW-41 B,A,D; MW-42 B,A,D; MW-43 B,A,D; MW-44 B,A,D; MW-45 B,A,D; MW-46 B,A,D; MW-58 B,A; and MW-59 B,A,D) were drilled and installed downgradient and side-gradient of the Atlas Missile Area between May 31 and August 11, 1992 (**Drawing 2-3**). The wells were installed to characterize the extent of TCE and to facilitate estimation of TCE and RDX concentrations within the extent boundary. The wells were placed based on previous studies and groundwater screening results obtained during the investigation. MW-46 was planned to be east of Johnson Creek across the creek from the screening node with the highest TCE concentration to assist in characterizing the eastern edge of contamination. The CDAP Part I presumed that the highest TCE screening results might be near the Atlas Missile Launcher Area. The highest TCE screening result in deep groundwater headspace samples, however, was further south at G2-37 (east of Johnson Creek), requiring that MW-46 be located southeast in the vicinity of G2-37 to address the eastern edge of TCE contamination.

Saturated soil samples were collected to characterize the soil-water distribution coefficient (K_d) for RDX and TCE. Soil samples from the saturated zone were collected during the drilling of the deepest boring at each cluster; i.e., MW-40D, MW-43D, MW-44D, and MW-58A. The samples were collected from the approximate depth of screening of each of the planned wells in the cluster and from immediately below the water level in the Pleistocene fine sand. At location MW-58 shale was encountered and a deep (bedrock) well was not installed, therefore, a sample was not collected from bedrock. The samples were analyzed for VOCs, explosives, total organic carbon, and grain-size distribution. Grain-size distribution was analyzed according to ASTM Method D422 at the on-site testing laboratory in the field office in Load Line 2.

The deep boring of each cluster was drilled using hydraulic rotary techniques prior to drilling the remaining well(s). The monitoring well borings were drilled with either

hydraulic rotary techniques using a 7 5/8-inch tri-cone or were drilled to the water table with a 6-inch straight shoe sampling barrel and a churn rig before switching to hydraulic rotary. The borehole was sampled continuously with a Christensen 94-mm sampler barrel, a 7.625-inch soils barrel, a 8.25-inch soils barrel, or 3-inch and 2-inch o.d. split-spoon samplers down to top of bedrock. Once bedrock was confirmed, the Pleistocene interval was logged with downhole geophysical tools.

A temporary steel casing was installed by pushing and setting the casing into competent bedrock. Initially the casing was pushed by the drill rig. Later it was determined that hammering was preferable and after using a 140-lb. hammer, a 300-lb. hammer was deemed more effective. The casing was used to minimize hydraulic communication between the sand/gravel and the bedrock. The inside of the casing was flushed and clean drilling fluids were introduced. Where shale was encountered, conventional bedrock coring techniques were followed using a 4 3/4-inch core barrel. The recovered core sample was logged by the WCC geologist/engineer. Where sandstone was encountered, the 94-mm Christensen sampler was used due to better recovery in the weakly cemented Omadi Sandstone. Exceptions are borings MW-41, MW-42, MW-45, and MW-46 which were cored using a conventional core barrel in the early stages of the field effort. The bedrock interval was logged geophysically prior to reaming.

A minimum of 5 feet was cored into bedrock. An additional 5 feet were cored if the recovered sample contained less than 5 feet of shale. Criteria for determining whether to install a bedrock or an intermediate well are discussed in Section 2.2.3. Clusters at which the deep boring was converted to an intermediate well include MW-40 and MW-58.

Well installation and development are discussed in Section 2.2.3 and construction details are summarized in **Table 2-3**. The intermediate wells were generally constructed with 10 feet of 0.020-inch machine slot screen. Screen with a 0.010-inch slot size, however, was inadvertently installed in MW-46A. The shallow wells were constructed with 10 feet of 0.010-inch machine slot screen except for MW-59B, which was in coarse material and required a 0.020-inch slot screen.

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Either 20-40 or 10-20 sand was used in the shallow wells, and either 10-20 or 4-8 sand was used in the intermediate wells. Criteria for choosing filter pack size are described in Section 2.2.3.

2.5.4 Groundwater Sampling

After well development, a site-wide groundwater sampling event was conducted on all the monitoring wells that were installed in this investigation, as well as previously existing wells. The groundwater sampling was conducted from August 18 to August 26, 1992.

2.6 ATLAS MISSILE AREA GROUNDWATER: DNAPL

The DNAPL Study Technical Memorandum (WCC, 1993a) was prepared to evaluate the physical potential for the presence of TCE as a dense non-aqueous phase liquid (DNAPL) at the bottom of the Pleistocene sand and gravel unit in the immediate vicinity of the Atlas Missile Area.

Chapter A of CDAP Part I states that no further action is necessary if the evaluation indicates that the physical potential for the presence of DNAPL is "unlikely." The DNAPL Study Technical Memorandum indicated that the potential for the presence of TCE as a DNAPL is "moderate" and additional investigations of historical site use information and site characterization data may be conducted to provide data which will assist in characterizing whether the Site is a "DNAPL Site.

2.7 LOAD LINES 1,2,3, AND 4 - GROUNDWATER

The objective of the groundwater screening and the monitoring well installation and sampling was to evaluate the extent of TCE and RDX in the groundwater that may have resulted from former NOP operations at the load lines. The characterization of hydrogeologic units is discussed in Section 2.2.1.

2.7.1 Groundwater Screening

A groundwater screening program was designed to identify potential monitoring well locations, and to provide information on the extent of groundwater contamination. Sixteen groundwater headspace screening samples were collected and analyzed for TCE. Three of the deep samples (G3-02J-100, G3-15J-126, G3-16J-118) were collected after the Draft Work Plan comments were issued and were analyzed for 8 other VOCs (**Table 2-1**) in addition to TCE in response to these comments. Previous investigations suggest that TCE may exist in the vicinity of Load Line 1. The screening strategy employed the same algorithm used to investigate the Atlas Missile Area (Section 2.5.1). The investigation was designed to finalize the extent of contamination associated with a potential source in the northern portions of Load Line 1. Previous documents referred to this potential source as the Nike Maintenance Area, but the area is now identified as the Air Force Ballistic Missile Division (AFBMD) Tech Area, which occupied the northern portion of Load Line 1.

Drawing 2-7 shows Grid 3 node locations, which were located to provide information to refine the preliminary estimate of the extent of TCE contamination. The preliminary estimate of the extent of the TCE contamination was made using the following information:

- The source of the TCE plume (presumably the AFBMD Tech Area in the northern portion of Load Line 1)
- Regional groundwater gradients estimated from water levels listed in the Confirmation Study Final Report (USACE, 1989), and the regional gradient map in Piskin (1971)
- The results of groundwater samples collected from existing wells as given in the Confirmation Study Final Report (USACE) as well as results of supplemental sampling efforts communicated by USACE (USACE, 1992)

The sample depths were estimated from isopach maps of the Peoria loess, fine sand unit, and the sand and gravel unit which were generated prior to field activities.

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2.7.1.1 Shallow Groundwater Headspace Screening

Sixteen shallow groundwater samples were collected (G3-1I, G3-2I, G3-4I through G3-12I, G3-12I, G3-14I through G3-16I, and G3-19I) and analyzed between May 15 and 19, 1992 by PES (**Drawing 4-8**). Subsequent groundwater screening samples were collected at the nearest grid node along each axis. This process continued until a perimeter of grid nodes with concentrations of TCE below 0.05 µg/L encircled grid nodes at which contamination was detected at or above 0.05 µg/L. The samples were collected at the estimated base of the fine sand unit (ranging from 44 to 64 feet bgs). Groundwater headspace screening samples were analyzed for TCE.

2.7.1.2 Deep Groundwater Headspace Screening

Deep groundwater screening samples were collected by a truck-mounted drill rig incorporating the use of the Hydropunch® sampling apparatus. Sampling depths ranged from 95 feet to 130 feet bgs.

Eleven deep groundwater screening samples were collected (G3-1J, G2-2J, G3-4J, G3-5J, G3-7J, G3-8J, G3-12J, G3-13J, G3-15J, G3-16J, G3-19J) between May 16 and June 1, 1992 from the Grid 3 node locations (**Drawing 4-8**). Collection of groundwater screening samples at the Load Line 1 Area began at the grid nodes where analyses of shallow groundwater screening results were below 0.05 µg/L and continued until a perimeter of deep samples with TCE concentrations less than 0.05 µg/L encircled locations at which TCE was above 0.05 µg/L.

2.7.2 Monitoring Well Installation and Development

Forty-four wells in 18 well clusters (MW-9D; MW-21 B,A,D; MW-22 B,A; MW-23 B,A; MW-24 B,A; MW-25 B,A,D; MW-26 B,A; MW-27 B,A; MW-28 B,A,D; MW-29 B,A; MW-30 B,A; MW-31 B,A; MW-32 B,A,D, MW-33 B,A,D; MW-34 B,A,D; MW-35 B,A,D; MW-36 B,A,D; and MW-37 B,A,D) were drilled and installed in the vicinity of Load Lines 1, 2, 3, and 4 between May 18 and July 29, 1992 (**Drawing 2-3**). The wells were strategically placed downgradient and side-gradient based on previous studies and groundwater screening results obtained during the investigation. The wells were installed

to characterize the extent of TCE contamination and to estimate chemical concentrations within the extent boundary. The location of the wells also provided information concerning the nature and extent of explosives contamination.

Saturated soil samples were collected from MW-23A, MW-25D, MW-31A, MW-33D, MW-34D, and MW-45D to characterize the soil-water distribution coefficient (K_d) for RDX and TCE. Samples were not collected from MW-36D, and therefore samples collected at MW-45D were substituted. Deep wells were not installed at MW-23 and MW-31 because shale was encountered, therefore, samples were not collected from bedrock at these locations. The samples were analyzed for VOCs, explosives, total organic carbon, and grain-size distribution. Grain-size distribution samples were analyzed on-site.

The deep boring of each cluster was drilled using hydraulic rotary techniques prior to drilling the remaining wells. The borings were drilled with a 6-inch straight shoe barrel and a cable tool rig to the water table and then reamed and continued the boring with hydraulic rotary techniques. The borehole was sampled continuously with a Christensen 94-mm sampler barrel, a 8.25-inch soils barrel, or a 2-inch and 3-inch o.d. split-spoon samplers down to top of bedrock. Once bedrock was confirmed, the Pleistocene interval was logged with downhole geophysical tools.

A temporary steel casing was installed by pushing and setting the casing into competent bedrock with a 300-lb. hammer to obtain a good seal and avoid potential hydraulic communication between the sand/gravel and the bedrock. The temporary casing was pushed or hammered with a 140-lb. hammer in borings drilled in the early stages of the project before the 300-lb. hammer was found to be preferable. The inside of the casing was flushed and clean drilling fluids were introduced. Where shale was encountered, conventional bedrock coring techniques were followed using a 4 3/4-inch core barrel. The recovered core was logged by the WCC geologist/engineer. Where sandstone was encountered, the 94-mm Christensen sample barrel was used due to the better recovery it afforded in the weakly cemented Omadi Sandstone. Boreholes drilled by the USACE crew and MW-27, MW-31, MW-36, and MW-37, which were drilled by Winnek in the early stages of the project, were cored using a 4 3/4-inch core barrel. The bedrock interval was logged geophysically prior to reaming.

A minimum of 5 feet was cored into bedrock. An additional 5 feet were cored if the recovered sample contained less than 5 feet of shale. Criteria for determining whether to install a bedrock or an intermediate well are discussed in Section 2.2.3. Clusters at which the deep boring was converted to an intermediate well include MW-22, MW-23, MW-24, MW-26, MW-27, MW-29, MW-30, and MW-31.

The shallow and intermediate wells were installed using hydraulic rotary techniques except for the following which were installed using HSAs: MW-29B; MW-30B; MW-31B; MW-32B; MW-33B and A; MW-34B and A; and MW-35B and A. HSAs were used where feasible to minimize the volume of drilling fluids which needed to be removed during development.

The deep wells were constructed with 5 feet of 0.020-inch machine slot screen, and a minimum of 1 centralizer. The intermediate wells were constructed with 10 feet of 0.020-machine slot screen, and a maximum of 5 centralizers. The shallow wells were constructed with 10 feet of 0.010-inch machine slot screen.

The grain size of the filter pack in the shallow and intermediate wells was based on visual examination or grain-size distribution analyses of samples collected from the screened interval. Either 20-40 or 10-20 sand was used in the shallow wells and either 10-20 or 4-8 sand was used in the intermediate wells. Procedures for selecting the filter pack based on grain-size analysis are described in Nielson (1991) and discussed in Section 2.5.3. A seal of Pure Gold Grout® was installed above the sand pack up to within 10 feet of the ground surface. The remaining open void was filled with cement/bentonite grout to 5 feet below ground surface. Protectors for MW-36 B, A, and D were installed flush to the ground surface at the request of the property owner.

2.7.3 Groundwater Sampling

After well development, a site-wide groundwater sampling event was conducted on all new and existing monitoring wells. Each well was purged prior to sampling. Monitoring wells MW-1A,B; MW 2A,B; MW-3A,B; MW-4A,B; MW-5A,B; MW-6A,B; MW-7A,B; MW-8A,B; MW-9A,B,D; MW-10A,B; MW-11A; MW-12A; MW-13A; MW-14A; MW-15A; MW-16B,C; MW-17A,B,C; MW-18A,B,C; MW-19A,B,C; and MW-20A,B,C, which were

installed during the Confirmation Study (USACE, 1989) and the OU1 RI (USACE, 1991), were sampled for VOCs, explosives, and water quality parameters. The newly installed wells listed in Section 2.7.2 were also sampled and analyzed for VOCs, explosives, and water quality parameters. The groundwater sampling was conducted from August 19 to August 27, 1992.

2.8 PLATTE RIVER ALLUVIAL AQUIFER - GROUNDWATER

The objective of the Hydropunch® sampling and the monitoring well installation and sampling was to evaluate the extent of TCE and explosives in the groundwater east of Johnson Creek.

2.8.1 Monitoring Well Installation and Development

Two monitoring well clusters (MW-38 A,B and MW-39 A,B) were drilled and installed between August 4 and 22, 1992 downgradient of the estimated extent of the TCE contamination east of Johnson Creek (**Drawing 2-3**). The CDAP Part I originally called for installation of only bedrock wells at these locations, but the initial wells were installed as intermediate wells. Two bedrock wells were later installed at each cluster location. The intermediate ("A") monitoring wells were installed in the bottom 5 feet of the Pleistocene sand/gravel and the bedrock ("D") monitoring wells were installed in the upper 5 feet of the Omadi Sandstone. The Pleistocene interval was logged with downhole geophysical tools upon completion of drilling to the top of bedrock.

Intermediate wells (MW-38A, and MW-39A) were drilled with hydraulic rotary techniques and sampled continuously using a 8.25-inch soil barrel and 2- to 3-inch split-spoons. The wells were installed in the bottom 5 feet of the Pleistocene sand/gravel unit. The intermediate wells were constructed with 5 feet of 0.020-inch machine slot screen, and a maximum of five (5) centralizers. The filter pack was installed through a tremie pipe and potable water was used to wash the sand down to the desired depth.

The borings for deep monitoring wells MW-38D and MW-39D were drilled to the top of bedrock using hydraulic rotary techniques without sampling. A temporary casing was installed by advancing the casing into competent bedrock with a 300-lb safety hammer to

obtain a seal, and to minimize hydraulic communication between the two units (sand/gravel and bedrock). The bedrock was cored with a 3-inch i.d. core barrel.

The inside of the casing was thoroughly flushed with potable water and clean drilling fluids were introduced inside the casing. The bedrock was cored using the 94-mm Christensen sampler, which provided better recovery of the weakly cemented Omadi Sandstone than a conventional 4 3/4-inch core barrel. Bedrock coring techniques were followed in general accordance with ASTM D2113 procedures. The recovered core sample was logged by WCC geologist/engineer and the bedrock interval was logged geophysically.

2.8.2 Groundwater Sampling

Groundwater samples were collected from August 25 to August 27, 1992 during the site-wide groundwater sampling event. Samples were analyzed for VOCs, explosives and water quality parameters.

2.8.3 Hydropunch® Sampling

The objective of Hydropunch® sampling was to evaluate whether TCE or RDX were present in the unconsolidated materials east of Johnson Creek.

Groundwater samples were collected at five Hydropunch® locations (H-2, H-3, H-5, H-6, H-7) on the east side of Johnson Creek between June 11 and 25, 1992 at the intervals corresponding to the bottom of the fine sand of the Platte River alluvium, and the bottom of the sand and gravel of the Platte River alluvium (**Drawing 2-7**). Four samples from two other Hydropunch® locations (H-1 and H-4) were collected in the fine sand and the sand and gravel units of Todd Valley. These samples were grouped with the Platte River alluvial aquifer samples because they are non-grid samples with identical analytical parameters. These two sampling locations were also intended to evaluate whether TCE or RDX crossed a possible hydraulic boundary, the unnamed stream draining the central part of the ARDC.

Hydropunch® samples were collected using the same techniques used for the collection of samples for deep groundwater headspace screening as described in Section 2.2.2 of the RI.

A single borehole was drilled to collect the groundwater samples at each location. The WCC geologist/engineer logged the borehole from the drill cuttings. The shallow groundwater sample was collected prior to the deep groundwater sample. Groundwater samples were collected for VOCs and explosives analysis, and the samples for VOCs were delivered to the on-site PES van-mounted GC or to the PES laboratory in Salina, Kansas for headspace screening for VOCs. The water samples for explosives were shipped to MRI laboratories under chain-of-custody procedures by the sampling manager.

Upon collection of groundwater samples, the Hydropunch® boreholes were filled with Volclay® grout from the bottom of the borehole to 5 feet below surface using a tremie pipe. The remaining 5 feet were backfilled with soil cuttings in cultivated areas, and cement in noncultivated areas.

2.9 BOMB BOOSTER AREA - GROUNDWATER

2.9.1 Monitoring Well Installation and Development

Monitoring well MW-57B was installed downgradient from the Bomb Booster Area to monitor potential off-site releases which may have occurred during the NOP activities (**Drawing 2-3**). MW-57B was drilled and installed between June 28 and 30, 1992 using hydraulic rotary techniques. The borehole was continuously sampled using 2-inch and 3-inch o.d. stainless-steel split-spoon samplers and logged geophysically. MW-57B was completed in the bottom 10 feet of the Pleistocene fine sand.

2.9.2 Groundwater Sampling

MW-57B was sampled on August 23, 1992 and analyzed for VOCs, explosives, and water quality parameters.

2.10 OTHER FIELD ACTIVITIES

2.10.1 Domestic Well Sampling

Sampling of domestic wells was performed by the USACE concurrently but independently of this investigation, and this information is not included in this report. Groundwater monitoring wells KIR-1, KIR-2, KIR-3 were not sampled due to lack of right-of-entry from the property owner.

2.10.2 Well Inventory

A well inventory study was conducted to identify water supply wells in the vicinity and downgradient of groundwater contamination at the Site. A Well Inventory Draft Technical Memorandum was prepared and submitted to the USACE in October 1992 (WCC, 1992g).

To locate wells in the study area, the following information sources were consulted during the records search:

- U.S. Army Toxic and Hazardous Materials Agency, Assessment Division (USATHMA) Archives Search Report for the Former NOP. Report No. A017 by Environmental Science and Engineering, Inc. July 1983
- USGS Quadrangle Maps (Mead, Wann, Ashland East, and Ashland West)
- State of Nebraska Lower Platte River, North and South Natural Resource Districts' (NRD) well registration records (Lower Platte North NRD, 1992)
- Saunders County Plat Maps 1991-1992
- City of Lincoln Water System Well Records
- Community of Ashland and community of Memphis Water Systems well records and personal communications with employees of both communities

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- Personal communications with Allen Hightshoe, Ashland City Water Superintendent; Richard McManaman, Agriculture Research and Development Center, University of Nebraska; Kathy Older, U.S. Army Engineer District, Kansas City; and Clarence Olin, City of Lincoln Water Service

Nebraska Law, effective September 1957, required registration of all irrigation, commercial/industrial and municipal wells. The well registration listing and well logs from NRD provided information regarding location, construction details, and original ownership of the registered well. Ownership and location verification was updated using Saunders County plat maps (Saunders County, 1990).

The Well Inventory Technical Memorandum is summarized in Section 3.5.7.

2.10.3 Groundwater Level Program

A program was established to collect static groundwater measurements at monitoring wells to characterize seasonal changes in groundwater levels.

Water levels were measured in all monitoring wells which were installed and developed at the time of collection of water level measurements. Each water level round was performed on a single day to reduce possible affects from temporal fluctuations. Water levels were measured on the following days:

- June 10, 1992
- June 24, 1992
- July 8, 1992
- July 23, 1992
- August 5, 1992
- September 9, 1992
- October 14, 1992
- November 10, 1992

Water level measurements are discussed in Section 3.5.2.

2.10.4 Aquifer Testing

The objective of aquifer testing was to evaluate and characterize the hydraulic conductivity and transmissivity of the Pleistocene aquifer.

Aquifer hydraulic conductivity tests (slug tests) were performed in-situ at monitoring wells MW-21B,A,D; MW-26B,A; MW-46B,A,D; and MW-53A,B following the collection of groundwater samples. Slug testing was originally planned for monitoring wells MW-17, MW-19, and MW-20. Following installation of all the RI wells, a greater understanding of the variations of the Site hydrogeology was attained and the selection of wells for slug testing was re-evaluated. The selected wells represent greater coverage both in area and in hydrogeologic conditions. MW-21 provides a location at which sandstone is at the top of the Omadi Formation, and MW-26 provides a location with shale at the contact between the Pleistocene sediments and bedrock. Cluster MW-46 was chosen because it is in the Platte River alluvial aquifer. Cluster MW-53 is in the Landfill Area, which contains silt and clay layers.

A rise of head was induced by a 4-foot long, 1.5-inch diameter, PVC slug and a fall in head was induced by withdrawing the slug after 90 percent of the rise in head (compared to the initial static water level) had dissipated. Water level changes (fall/rise of head) were recorded using a data logger (Hermit) and a pressure transducer (10-50 psi). The pressure transducer was placed approximately 10 to 15 feet below static water level. The test was complete when water returned to static level. A rise in head was measured and recorded when the slug was removed from the well and water returned to static level.

The estimated hydraulic conductivities and test results are discussed in Section 3.5.3.

2.11 HEALTH AND SAFETY

Compliance with health and safety procedures described in the SHERP (WCC, 1992f) was audited on June 17, 1992 by the Project HSO and the WCC-Corporate HSO. Daily field reports describing compliance with the SHERP were prepared by the SSO and are in the project file.

2.12 QA/QC

The project QA Officer and/or the QA Officer's designee visited the Site on June 10 and July 7 through 10, 1992. A formal field audit was performed by the QA officer's designee on August 26, 1992, (**Appendix G**) during the site-wide groundwater sampling event. Audit activities included review of project files, oversight of field activities, inspection of sample preservation, documentation, labeling, and packaging for accuracy and completeness, and preparation of a report detailing field audit results, non-conformances and corrective action recommendations. As a result of the audit, the purge volume on the sample collection field sheet for MW-40A (140 gal) was corrected to reflect the volume observed as documented in the field book (320 gal). Also, the calibration documentation procedures for the HNu were modified. The auditor expressed concern regarding the collection of dissolved oxygen which was listed in **Table 2-3** of CDAP Part II, a generic list of field sampling equipment. The field parameters are listed in **Table 12-14** of CDAP Part I which does not include dissolved oxygen as a water quality parameter, thus explaining why it was not collected. The field audit referenced a CDAP requirement for formal exclusion zones for drilling activities. Staked and flagged exclusion zones were not considered necessary for the brief and limited decontamination activities associated with groundwater sampling. Daily QC monitoring was documented in daily field reports by the project QC officer, which are in the project file. Internal field QC checks including trip blanks, rinsates, field duplicates, and split samples processed by the MRD laboratory were collected in accordance with CDAP Part III (WCC, 1992d) and **Tables 4-1,** and **4-3** through **4-7** of the CDAP Part I (WCC, 1992a and b). Representatives of the USACE MRD visited the Site on August 7, 1992 to inspect field activities.

WCC performed a validation of analytical data packages based on criteria established in the CDAP Part III. The Data Validation Reports are summarized in Section 4.0 and the reports are included as **Appendixes E** and **E-1**.

2.13 STUDY AREA INVESTIGATION SUMMARY

Phase I of OU2 RI was conducted by WCC from May to August 1992, under the oversight of the USACE-Kansas City District. The field work included the following:

- Drilling of 37 continuously sampled borings for installation of bedrock or intermediate groundwater monitoring wells
- Installation of 19 additional intermediate and 33 shallow groundwater monitoring wells logged from drill cuttings
- Soil gas sampling at 6 feet bgs and at the top of the fine sand (approximately 18 feet bgs) at the Administration Area (66 samples), the Atlas Missile Area (237 samples), and Load Line 1 (130 samples)
- Soil borings for sampling unsaturated soil at 10 percent of the soil gas sampling locations selected for representativeness for VOC analyses
- TCE analyses of groundwater headspace samples from the base of the fine sand unit and the base of the sand and gravel unit at the Administration Area (19 samples), the Atlas Missile Area (42 samples), Load Line 1 (27 samples), and the Platte River alluvial aquifer (14 samples)
- Analyses of saturated soil from borings for groundwater monitoring wells to characterize the soil-water distribution coefficients for TCE and RDX
- Hydropunch® sampling of groundwater for explosives from the Atlas Missile Area
- Hydropunch® sampling of groundwater for explosives and water quality parameters in the Platte River alluvial aquifer
- Hydropunch® sampling of groundwater for VOC, SVOCs, pesticides, PCBs, and dissolved and total metals and cyanide at the Administration Area as a substitute for monitoring wells which were not allowed by the right-of-entry agreement
- Groundwater sampling and chemical analyses for VOCs, explosives, and water quality parameters in all 39 existing and 89 newly installed monitoring wells; analyses for SVOCs, pesticides, PCBs, dissolved and

total metals and cyanide at the Administration Area and the Landfill Area; and analyses for gross alpha and gross beta radioactivity at the Landfill Area

- Slug testing of 10 wells

Phase II of the OU2 RI was conducted in November 1992 and January 1993 and involved additional soil gas and soil sampling at Load Line 1.

3.1 METEOROLOGY

The climate of Nebraska is temperate continental characterized by wide seasonal variations (**Table 3-1**). Temperatures in a typical year at Wahoo (located 8 miles east of the former NOP) will reach over 90°F on 38 days and reach below 0°F on 12 days a year (NOAA, 1987a through 1991). Usually, January is the coldest and July the hottest month (NOAA, 1990). The growing season at the ARDC (between last freeze in spring and first freeze in fall) was 139 days in 1989 and 162 days in 1990 (NOAA, 1990, 1991). The average annual precipitation at Wahoo is 33.16 inches with the wettest month typically being June and driest being January (**Table 3-2**). Evaporation is greatest in July, the hottest month, except when excessive winds in June cause higher evaporation (**Table 3-3**). Winds are generally from the north-northwest during winter months and from the south during other months (NOAA, 1981).

3.2 SURFACE WATER HYDROLOGY (SEC DONOHUE, 1992b)

Johnson Creek (northeast portion of the Site), Silver Creek (southwest portion of the Site), and Clear Creek (southeast portion of Site) are the major Site drainages, leading to Salt Creek, a tributary of the Platte River. Salt Creek flows into the Platte River east of Ashland near the southeastern corner of Saunders County. The Platte River, which is located east of the Site, is the major regional drainage feature (**Drawing 3-1**).

Drainage for Todd Valley is chiefly southeastward through Wahoo Creek and its principal tributaries and into Salt Creek just north of Ashland. The relatively flat Todd Valley surface generally supports a poorly defined drainage pattern. Natural surface drainage at the former NOP was supplemented by man-made ditches. A ditch from Load Line 1 enters a system which drains to Silver Creek. Drainage ditches from Load Lines 2 and 3 originate in former high explosive storage areas (presently feed lots) located north of the load lines and pass through a former finished ammunition storage area (presently pasture land) south of the load

lines. Drainage from Load Line 4 ultimately enters Johnson Creek and drainage from the Burning Grounds enters Johnson Creek directly (**Drawing 3-2**).

The U.S. Department of Agriculture Soil Conservation Service authorized the construction of a dam on Johnson Creek (floodwater Retarding Structure 22-A) north of the former Sewage Treatment Plant. The construction of the dam was completed in 1975 and the resulting reservoir has a conservation pool of approximately 78 acres (areal extent). The flood water retaining structure was built to maintain flood control during a 100-year multi-day storm (flood) with a drainage area of 11,234 acres (17.5 square miles) and a flood pool of 300 acres. The reservoir was reported as fairly turbid and is not considered a very good sport fish lake, but bullhead catfish have been caught from the lake, along with other species of fish (SEC Donohue, 1992b). This reservoir is referred to herein as the NRD Reservoir.

3.3 GEOLOGY

This section is based on Piskin (1971) and the results of the OU2 RI. The continuously sampled geologic borings drilled during this investigation complemented and refined the conclusions of Piskin (1971), whose investigation was limited to archived grab samples of circulated drill cuttings. Piskin's study was limited to the ARDC, and the OU2 investigation extended into the areas of the former NOP beyond the ARDC and into the Platte River Valley.

3.3.1 Physiography and Topography

The former NOP is situated in the Dissected Tills Plains Section of the Central Lowlands Physiographic Province. The Dissected Till Plains Section characteristically shows a submature to mature topography with low, gently rolling hills and streams which meander on their floodplains. The rolling hills are made principally of till deposits which are mantled by loess. Both till and bedrock may be seen along the walls or bottom of stream valleys.

Todd Valley (**Drawing 3-1**) is an abandoned stream channel that had been the channel of the ancestral Platte River before its water was captured by a tributary of the Elkhorn River. Now it is a terrace 50 to 70 feet above the present Platte River floodplain. Todd Valley is

about 30 miles long and 6 to 8 miles wide, and extends in a southeasterly direction from near Cedar Bluffs to Ashland with a slope about 7 feet per mile. Todd Valley lies entirely in Saunders County. Elevations range between 1,100 feet and 1,300 feet (above mean sea level). On the east and west sides, loess-mantled till bluffs, 70 feet to 125 feet above the Todd Valley surface, limit the valley width. Sand Creek and Wahoo Creek in the west and Silver Creek in the central and eastern part drain the valley to the Platte River. Wahoo and Silver creeks flow near the southwest corner of the former NOP.

The Site is located in the southeastern one-third of Todd Valley. It is almost flat with a minor swell and swale topography which reflects the wind-modified surface of the loess mantle. Elevations range from 1,150 feet to 1,180 feet except in the southeastern part of the Site where elevations are 1,130 to 1,140 feet at the edge of the Todd Valley terrace and where Johnson Creek cuts through the terrace to below 1,100 feet.

3.3.2 Structural Geology

Generally, rock formations of Nebraska are nearly flat lying with a low westward dip. The major structural feature in eastern Saunders County is the Richfield Arch, a northwest trending structure beginning in southern Sarpy County and extending to near the community of Yutan, which is 4 miles northeast of the Site (Burchett, 1982). The top of the Precambrian System near the Platte River in southeastern Saunders County is at 100 feet below MSL, and is at 900 feet below MSL in southwestern Saunders County. Pennsylvanian units dip southwestward 20 feet per mile toward the Central Nebraska Basin. The Humboldt Fault Zone, a post-Permian, pre-Cretaceous feature, extends north from Kansas to Omaha, and is the nearest major fault zone.

3.3.3 Stratigraphy

3.3.3.1 Regional Stratigraphy

Bedrock in southeastern Nebraska generally consists of Cretaceous sandstones and shales deposited upon a Paleozoic erosional surface of Pennsylvanian shales and limestones (**Drawing 3-3**). The Cretaceous rocks strike northeast-southwest across the eastern portion of Nebraska and dip 10 to 12 feet per mile to the northwest. The rocks are primarily shales

and sandstones of the Dakota Group. The environment of deposition of the Dakota has been tentatively identified as deltaic (Piskin, 1971).

Bedrock is generally mantled with a variable thickness of Quaternary deposits. Up to 500 feet of unconsolidated sediments are present in pre-Pleistocene valleys in south-central and east-central Nebraska. Most Quaternary deposits are of Pleistocene age and consist of loess, sand dune, alluvium, till and glacial-fluvial, or preglacial sediments deposited over a southeasterly sloping post-Cretaceous erosional surface. North of the Platte River, the Pleistocene deposits overlie Tertiary and Cretaceous rock while south of the Platte River they overlie Cretaceous and Paleozoic rock.

The eastern portion of Nebraska was repeatedly invaded by continental glaciation during the Pleistocene. Glacio-fluvial and fluvial sands and gravels were deposited in front of the glacial ice in wide alluvial plains. Till, composed of non-stratified silty, sandy clay with gravel and some boulders, was deposited directly by glaciers. Till deposits formed north-northwest to south-southeast trending moraines. Loess, primarily silt, was deposited by winds laden with floodplain and outwash material. As a result of glaciation and the north-northwest to south-southeast trending moraines, topographic lows were filled and pre-glacial drainage systems were altered. Major streams which flowed eastward prior to glaciation tended to flow to the southeast after glaciation.

3.3.3.2 Site Stratigraphy

Bedrock beneath the Site consists of Cretaceous shales and sandstones of the Omadi Formation. The Omadi Formation is assigned to the Dakota Group, which is underlain by Pennsylvania shales and limestones. The complete thickness of the Omadi was not penetrated in Confirmation Study borings by USACE, but was penetrated by 19 test borings for irrigation wells drilled for the University of Nebraska Field Laboratory (now known as the ARDC) between 1963 and 1970.

The Omadi Formation ranges in thickness from 28 feet near a paleochannel described below in the western portion of the former NOP to 112 feet in the eastern portion near the boundary between the Todd Valley and the Till Uplands. The Omadi Formation can exhibit

abrupt lateral and vertical lithology changes between shale and sandstone. The formation has been divided into an upper shale and lower sandstone facies at the Site.

According to Piskin (1971) the lower sandstone lithofacies is fine- to medium-grained with some gravel at the base, and is typically weakly cemented. It is variable in color from tan, yellow brown, pale orange to orange brown and red. The sandstone facies may contain beds of shale which may be tens of feet thick but which usually have a thickness of less than 5 feet thick. The sandstone varies in thickness from 20 feet to 105 feet beneath the Site.

The upper shale lithofacies at the Site is a clayey noncalcareous shale with some interbedded silt and sand lenses. The shale lithofacies is believed to be relatively continuous over the northwestern portion of the Site with a maximum thickness of at least 52 feet. Piskin (1971) concluded that the shale facies is thinner in the eastern and southern portions of the Site and is absent at Load Line 4 and the Burning Grounds. Data collected during the Confirmation Study and the RI support this conclusion (**Drawing 3-4**).

The erosional surface of the Omadi Formation in the Todd Valley exhibits two shallow paleochannels trending southeasterly (**Drawing 3-4**). The paleochannel in the western part of the Site has a relief of about 40 feet, whereas the paleochannel in the eastern part of the study area has approximately 15 feet of relief.

Unconsolidated Pleistocene sediments overlie the eroded Cretaceous surface. Thickness of the Pleistocene sediments ranges from 81 feet near the landfill to 157 feet in the paleochannel between Load Lines 1 and 2 (**Drawings 3-5, 3-6, 3-7, 3-9, 3-10,** and **3-11**). These sediments consist of sands and gravelly sands deposited in a channel of the ancestral Platte River of Medial Pleistocene age, known as the Todd Valley. The Todd Valley was formed when the ancestral Platte River eroded pro-glacial alluvium and tills of Nebraskan and Kansan age. Preserved beneath the Till Uplands northeast of the Todd Valley is the fluvio-glacial David City Sand and Gravel which is a pro-glacial deposit. The David City Sand and Gravel is overlain by Nebraskan and Kansan tills, which are composed of a heterogeneous mixture of clay and silt with some sand and gravel (Reed and Dreeszen, 1965). These deposits were eroded before late Kansan time by the ancestral Platte River. In late Kansan time, the valley was filled with fluvio-glacial sands and sandy gravels of the Grand Island Member, which were deposited in an extraglacial environment. After erosion

during Yarmouthian time, which may or may not have eroded all of the Grand Island sands and gravels, the Crete Member of late Illinoian age was deposited. It is likely that the Crete Member is composed of reworked sediments of the Grand Island Member because the Illinoian ice sheet did not advance very far into Nebraska, and probably did not supply as much coarse alluvium as did the Kansan and Nebraskan ice sheets. Differentiation of the Crete Member and the Grand Island Member is very difficult. The fine-grained alluvium deposited on the Crete sands and gravels during retreat of the Illinoian ice sheet was probably eroded during Sangamonian time. Intense erosion occurred in Sangamonian time, followed by deposition of the Todd Valley Sand during medial Wisconsinan time. Although both the Todd Valley Sand and the undifferentiated Grand Island-Crete sand and gravels were both deposited in an extraglacial environment, the finer grain size of the Todd Valley sand may represent fine-textured alluviation during retreating ice. The Grand Island-Crete Members may represent coarse alluviation ahead of advancing ice (Reed, 1948).

During medial Wisconsinan time, Todd Valley and surrounding uplands were covered by the Peoria Loess. The stream flowing in the Todd Valley was pirated in later Wisconsinan time by a tributary of the ancient Elkhorn River to the Platte River channel. In the Platte River alluvial valley to the southeast of the Site, Pleistocene sediments are approximately 39 to 49 feet thick. The sands and sandy gravels filling the Platte River alluvial valley are probably Late Pleistocene and are not correlative with Medial Pleistocene Grand Island-Crete Members. The silts and clays overlying the Platte River alluvium are alluvial overbank deposits unrelated to the Peoria Loess.

Due to difficulty in differentiating and assigning ages to units, Piskin (1971) divided the alluvium of the Todd Valley into two informal units. The lower unit is generally fine to coarse sand with a trace of fine gravel at the top. Near the base the lower unit is medium to coarse sand with some gravel interbedded with layers of sandy gravel with traces of cobbles up to 5 inches in diameter. The lower unit ranges in thickness from 17.5 feet to 72 feet. The maximum thickness of 72 feet was in Boring MW-25D which is in the paleochannel in the western portion of the Site.

The contact between the lower sand and gravel unit and the upper sand unit is gradational. During the OU2 RI, the top of the lower unit was picked as the uppermost occurrence of fine gravel (ASTM scale, roughly equivalent to medium gravel in the Wentworth scale used

by Piskin). According to the boring logs and structural contours produced by Piskin (1971), Piskin picked the base of the upper sand unit as the uppermost occurrence of a trace of medium gravel (Wentworth scale, roughly equivalent to fine gravel on the ASTM scale) or 20 percent fine gravel (Wentworth scale, roughly equivalent to coarse sand on the ASTM scale), or the absence of fine sand (Wentworth scale). Piskin's criteria for identifying the contact between the fine sand unit and the sand and gravel unit, while similar to the method used during the OU2 RI, was apparently less well defined due to the larger intervals and nature of the samples available to Piskin.

The upper unit is approximately the stratigraphic equivalent of the Todd Valley Sand and ranges in thickness from 12 to 77 feet, although it is typically about 50 feet thick. The upper unit consists of fine to medium sand typically intercalated with layers of fine to coarse sand approximately 0.5 to 2 feet thick.

In the northeast portion of the Site, specifically the Landfill Area and the northeast portion of the Atlas Missile Area, silt and/or clay seams ranging in thickness from 6 feet to 17 feet are present in the lower unit or in between the upper and lower units. These layers of light brown clay and gray silt occasionally contain disseminated sand or gravel and layers of sand and gravel. Given the proximity of the Till Uplands and the edge of the Todd Valley, these layers may be Kansan or Nebraskan till. If these layers are till and not fine-grained alluvium deposited at the edge of the valley, then the sands and gravels beneath the clay and silt layers may be equivalent to the early Nebraskan age David City sand and gravel. The David City Member is eroded from the rest of the Todd Valley but may extend northeast beneath the Kansan and Nebraskan tills of the Till Uplands to the Platte River alluvium (Lugn, 1935).

The upper unit is overlain by Peoria Loess consisting of light brown silt with light gray mottling. The medial Wisconsinan loess covers the Todd Valley and the adjacent Till Uplands but is absent from the Platte River alluvial valley. Thickness of Peoria Loess in Todd Valley ranges from 50 feet at the north end of the valley to almost nothing near Ashland, although the thickness of the loess beneath the Site ranges from 4 to 23 feet.

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3.4 SOILS

Soils associations on the former NOP are typical of the area, consisting mostly of silty clay loam of eolian origin, which range from 5 to 20 feet thick across the Site. The major soil types are the Sharpsburg and Fillmore Soil Series and to an extent, the Butler Series, which were developed on the upper portion of the loess mantle (Peoria Loess). There are a few small areas of sand Ortello soils, however, found in sandy alluvium in drainage ways such as the southwest corner of the former NOP near Silver Creek and Sand Creek. Typical permeabilities of Site soils are reported to be low to moderate ranging from 7×10^{-5} to 1×10^{-3} ft/min (Piskin, 1971).

The most widespread soils at the former NOP are the Sharpsburg series. These well-drained soils occur on slight crests and swells and have a high capacity for retaining water. Butler and Fillmore soils found in depression and swales are subject to ponding and have slow to poor internal drainage. The Sharpsburg-Fillmore and Butler series soils are moderately to highly susceptible to frost action.

3.5 HYDROGEOLOGY

This section is based largely on Piskin (1971) and the results of the OU2 RI. Piskin's data was limited to the ARDC, but the OU2 RI extends to other areas of the former NOP and the Platte River Valley. Piskin's water levels were from water supply wells, which are commonly screened across both the Omadi Sandstone and the Todd Valley aquifers. The monitoring wells installed as part of this investigation, however, are screened in three distinct intervals. In addition, the monitoring well network has a greater areal extent and is more closely spaced than the irrigation wells available to Piskin.

Engberg and Spalding (1978) divided eastern Nebraska into four groundwater regions. These are the Platte River Valley, the Missouri River Lowland, the Northeast Nebraska Glacial Drift and the Southeast Nebraska Glacial Drift. Both the Northeast and Southeast Nebraska Glacial Drift regions can contain up to 200 feet of glacial and fluvial-glacial sediments overlying primarily Cretaceous bedrock; only the Southeast Drift and the Platte River Valley regions lie within Saunders County. The former NOP lies entirely within the Southeast Glacial Drift region.

3.5.1 Hydrostratigraphic Framework

In order to understand the hydrogeology of the project area, the geology was interpreted in terms of distinct hydrologic systems or hydrostratigraphic units (**Drawing 3-12**). These units behave as aquifers, which are conduits for regional groundwater flow and yield water to wells, or aquitards, which impede groundwater flow and do not yield water to wells in significant quantities. Another element of the hydrostratigraphic framework is the vadose zone, through which precipitation, surface water, irrigation water, and contaminants percolate to the water table. The hydrostratigraphy of the project area consists of three aquifers, the Todd Valley aquifer, Platte River Alluvial aquifer, and the Omadi Sandstone aquifer; and three aquitards, the Platte River aquitard, the Omadi Shale aquitard, and the Pennsylvanian aquitard.

The vadose zone in Todd Valley consists of soil, the Peoria Loess, and the unsaturated portion of the Todd Valley fine sand unit. The Peoria Loess is typically 16 feet thick but ranges from 4 to 23 feet thick at the Site. The thickness of the vadose zone in Todd Valley (depth below ground surface to water) ranges from 7 feet to 58 feet.

Piskin (1971) refers to the Todd Valley aquifer as the Pleistocene aquifer, which is the terminology used in the PWP (WCC, 1993b). In order to distinguish between the Pleistocene aquifers in the Todd Valley and the Platte River alluvial valley, the term "Todd Valley" aquifer is used here. The Todd Valley aquifer consists of the Todd Valley fine sand unit and the sand and gravel unit. The Todd Valley aquifer is hydraulically connected to the Platte River alluvial aquifer at each end and, to some extent, beneath the uplands lying between the Todd Valley and the Platte River Valley (Lugn, 1935). The saturated thickness of the Todd Valley aquifer, which ranges up to 100 feet (Piskin, 1971), is controlled by the shape of the erosional surface at its base and the elevation of the water table.

Part of the Platte River Valley occupies the eastern edge of the study area (**Drawing 1-3**). The coarse-grained alluvium in the valley comprises the Platte River alluvial aquifer. According to boring logs of monitoring wells, this aquifer has a saturated thickness of less than 40 feet within the project area. A layer of silt and clay approximately 10 to 17 feet thick overlies the coarse-grained alluvium in all Platte River Valley borings drilled for this study. This low permeability layer serves as an upper semi-confining unit to the Platte River

alluvial aquifer which impedes but does not prevent vertical flow beneath the aquifer and ground surface. The semiconfining layer is laterally continuous within the part of the Platte River Valley included in the study area although its lateral continuity beyond the study area is unknown.

The Omadi Sandstone aquifer consists of the Omadi Sandstone facies of the Omadi Formation, present in the subsurface throughout the project area and ranging from a few feet to approximately 100 feet in thickness. It is hydraulically connected to both the Todd Valley and the Platte River alluvial aquifers in the eastern and southern portions of the Site. However, in the northwestern portion of the former NOP it is generally confined and isolated by the overlying Omadi Shale aquitard which is up to 52 feet thick (Piskin, 1971).

Limestones and shales of Pennsylvanian age lie beneath the Omadi Formation. These rocks constitute an aquitard which is the lower confining layer of the Omadi Sandstone aquifer and the lower boundary of the Omadi/Pleistocene aquifer system.

Piskin (1971) recognized that the overburden and bedrock aquifers of Todd Valley effectively behave as one unconfined aquifer where the Omadi Shale aquitard is absent. However, there are local exceptions to this hydraulic continuity between the Todd Valley and Omadi Sandstone aquifers and within the Todd Valley aquifer. A layer of silt and clay approximately 20 feet thick divides the Todd Valley fine sand unit from the underlying fluvio-glacial sand and gravel unit in the area of the landfill and to the south of the landfill. (**Drawing 3-11**). This fine-grained alluvium is a low permeability layer which locally inhibits the vertical hydraulic continuity and semi-confines the sand and gravel unit in this area.

3.5.2 Head Distribution and Groundwater Flow Direction

Water level measurements in the new and existing monitoring wells were used to calculate the hydraulic heads in each of the aquifers at various locations in the study area. The hydraulic heads were then used to contour the groundwater surface at the different zones in the Cretaceous/Pleistocene aquifer system (**Drawings 3-13, 3-14,** and **3-15**). In each case the groundwater potentiometric surface was used to estimate the directions of groundwater

flow based on the principle that flow direction is from locations with high hydraulic head to locations with low hydraulic head, perpendicular to lines joining points of equal head.

The groundwater surface for the shallow ("B") wells (**Drawing 3-13**) is a combination of the water table in the Todd Valley aquifer and the potentiometric surface in the upper part of the Platte River alluvial aquifer. Hydraulic heads from intermediate-depth ("A") wells were used to construct the groundwater surface contours of the basal units of the Todd Valley and Platte River alluvial aquifers (**Drawing 3-14**). **Drawing 3-15** shows the groundwater surface of the Omadi Sandstone aquifer. The extent of this map is limited by the lack of data in the northwest part of the study area. Although MW-48D is screened in a sandstone, the well is approximately 2.5 miles from the nearest data point (MW-25D). Because of the large distances between data points, MW-48D was not used to estimate the groundwater surface shown on **Drawing 3-15**.

The water table surface in Todd Valley slopes toward the south-southeast at an average gradient of approximately 12 feet/mile (**Drawing 3-16**) as reported by Piskin (1971). Outside the influence of the NRD Reservoir the gradient of the groundwater surface ranges from a minimum of 10 feet/mile at the northwestern and southeastern limits of the study area to a maximum of 17 feet/mile within 3/4 mile of the edge of the Platte floodplain in the Johnson Creek watershed. Piskin (1971) reported a minimum of 10.9 feet/mile and a maximum of 13.6 feet/mile. The NRD Reservoir locally increases the (hydraulic) gradient of the groundwater surface in the upper portion of the Todd Valley aquifer to approximately 10 feet in 1,000 feet (50 feet/mile) between the dam and the landfill (**Drawing 3-15**).

The direction of groundwater flow in the fine sand unit of the Todd Valley aquifer is toward the south along the western edge of the study area (**Drawing 3-13**). Close to the Platte River Valley, groundwater in the Todd Valley aquifer flows southeastward, parallel to the Platte Valley. Although groundwater flow directions in the Todd Valley aquifer (**Drawings 3-13** and **3-14**) are similar to the orientations of the Paleochannel axes (**Drawing 3-4**) there is no evidence that they are locally altered by the Paleochannels themselves. Within the Platte River alluvial aquifer the southeastward hydraulic gradient does not continue east of Johnson Creek. Hydraulic heads in MW-45B and MW-46B (**Drawing 3-13**), and MW-46A, MW-45A, and MW-38A (**Drawing 3-14**) exhibit a southerly

hydraulic gradient with a slight westerly component. The westerly component probably results from local discharge in the vicinity of Johnson Creek.

In general, the groundwater surfaces of the intermediate and deep aquifer intervals (**Drawings 3-14** and **3-15**) closely resemble the groundwater surface in the shallow interval (**Drawing 3-13**). The low to negligible vertical hydraulic gradients over much of the area indicate there is good hydraulic continuity within and between the aquifers. This confirms that, in the absence of the Omadi Shale, the aquifers essentially behave as one aquifer system. Slight vertical gradients, both upward and downward, of up to approximately 5×10^{-3} feet/feet in monitoring wells in Todd Valley may be due to any of the following or a combination thereof: natural phenomenon, small measurement errors, or the effects of pumping local irrigation wells.

One exception to the generally low vertical gradients is at MW-44, where there is an upward hydraulic gradient of approximately 0.1 feet/feet between the Omadi Sandstone aquifer and the Todd Valley aquifer and between the Todd Valley aquifer and the Platte River alluvial aquifer. The boring log of MW-44D shows layers of clay above and below the sand and gravel of the Todd Valley aquifer, which act as aquitards, restricting vertical flow. The 3 feet of organic-rich sandy clay separating the Todd Valley and Platte River valley aquifers at the MW-44 cluster is a former soil zone marking the former ground surface at the edge of the Platte River valley. The boring log of MW-37D, which also penetrates all three aquifers, shows there is a layer of mottled sandy clay approximately 3 feet thick between the sediments of the Platte Valley alluvial aquifer and the sediments of the Todd Valley aquifer. It is likely that this is the same soil zone, and that it covers much of the eastward-sloping boundary between the Todd Valley aquifer and the Platte River alluvial aquifer. However, despite its likely continuity, this clay is not thought to be a significant barrier to regional groundwater flow across this aquifer boundary. Its most likely effect is to cause the local hydraulic gradient across the aquifer boundary to be greater than the hydraulic gradient within each aquifer, and groundwater would flow at the same rate through the clay as it would through the aquifers. The scale of **Drawings ~~3-~~13** and **3-14** is too large to show local hydraulic gradient effects. However, these drawings do not show any evidence of a relatively steep regional hydraulic gradient across the boundary between the Todd Valley aquifer and the Platte River alluvial aquifer. Therefore, it is unlikely that regional flow within and between these aquifers is significantly impeded by their shared boundary.

This steep upward gradient at MW-44 also suggests that this well cluster is located in a groundwater discharge zone (Toth, 1972). The groundwater level in all of the monitoring wells on the Platte River floodplain is close to the ground surface. (The groundwater level at MW-36 is above ground surface in all three wells in that cluster.) The Platte River floodplain at the southern end of Todd Valley has a history of waterlogging problems caused by a shallow water table, despite the landowners' attempts to artificially drain it. These are typical features of a groundwater discharge zone (Toth, 1972). The orientation of the groundwater contours and the evidence of discharge suggest that the groundwater which flows southeast through the Todd Valley aquifer and the Omadi Sandstone aquifer discharges to the surface through the leaky Platte Valley aquitard.

In the southwest corner of the study area the ground surface of the valley of Silver and Wahoo creeks is close to the elevation of the water table. Standing water is common at the northern edge of this floodplain. The orientation of the water table contours and the shallow depth of the water table suggest that some groundwater which flows south along the western edge of the study area discharges here. The USACE (1987) reported an upward vertical head gradient at MW-10, which is consistent with a groundwater discharge area (Toth, 1972). However, water levels from MW-10 measured for this study did not confirm an upward hydraulic gradient.

In the vicinity of the landfill the water table is significantly higher than the potentiometric surface of the sand and gravel unit. Hydraulic heads in MW-53B, MW-54B, and MW-56B (**Drawing 3-14**) are between 1.82 feet and 2.55 feet greater than hydraulic heads in MW-53A, MW-54A, and MW-56A (**Drawing 3-15**). Downward hydraulic gradients range between 0.03 feet/feet and 0.05 feet/feet at these well sites. A thick silt and clay layer separating the Todd Valley fine sand unit from the sand and gravel unit acts as an aquitard in this area, restricting vertical flow between the two aquifer units (**Drawings 3-10** and **3-11**). The downward vertical gradient extends as far south as MW-18, where the water table is 1.72 feet above the hydraulic head of the Omadi Sandstone aquifer (**Drawings 3-13** and **3-15**). The gradient at MW-18 is approximately 0.02 feet/feet, which is lower than at the landfill. Further south, at MW-43, the vertical hydraulic gradient is negligible.

Downward hydraulic gradients are increased, in part, from the continuous recharge of NRD Reservoir water to the Todd Valley aquifer. Locally, it raises the water table in the Todd

Valley fine sand unit but does not significantly affect the potentiometric surfaces of the sand and gravel unit or the Omadi Sandstone aquifer. This is due to the clay layer which exists between the fine sand and sand and gravel units in this area.

In summary, throughout most of the study area groundwater in the Todd Valley aquifer generally flows southeast along the trend of the valley itself. The groundwater flow direction and hydraulic gradient are similar in the underlying Omadi Sandstone aquifer. Groundwater discharge occurs along the western side of the Platte floodplain at the eastern edge of the study area, and along Silver Creek in the southwest corner of the study area. The NRD Reservoir in Johnson Creek watershed has resulted in an increase in the local recharge rate to the Todd Valley aquifer which is much greater than the natural recharge rate elsewhere in the study area which results in a locally elevated water table and increased hydraulic gradients.

3.5.3 Aquifer Properties

The rate of groundwater flow (and any contaminants therein) through an aquifer is largely dependent on the hydraulic characteristics of the aquifer. One of the most important properties of an aquifer is the hydraulic conductivity, K, which is a coefficient of permeability; i.e., an indication of how much water could be transmitted through a unit cross-section of the aquifer. K is dependent upon the grain size of the aquifer material, the degree of sorting, the roundness of the grains, the nature of their packing and the degree of cementation (Freeze and Cherry, 1979).

Another important property is the transmissivity, T, which is an indication of how much water could be transmitted through a unit thickness of the aquifer. The transmissivity is the product of the hydraulic conductivity and the aquifer thickness (Freeze and Cherry, 1979).

The storage coefficient of an aquifer is a dimensionless number which indicates how much water can be stored in or extracted from the aquifer. In unconfined aquifers, it is related mainly to the porosity, whereas in confined aquifers it depends primarily on the porosity as well as the compressibilities of the water and the aquifer (Freeze and Cherry, 1979).

Hydraulic conductivities and transmissivities of the aquifer units were estimated from slug tests performed on monitoring wells and from previous studies (**Table 3-6**). Three methods of slug-test analysis were used. The phenomenon of oscillating water levels during slug testing of several wells necessitated the use of the van der Kamp (1976) method of analysis to estimate T. This method takes into account these inertial effects, which are common in highly permeable confined aquifers. Bouwer and Rice (1976) developed a method for estimating K in unconfined aquifers which is also applicable in the case of leaky confined aquifers. This method of analysis was applied to all wells in which the water level did not oscillate during testing. The Cooper, Bredehoeft, Papadopulos method (1967) was used to estimate the transmissivity of the confined Omadi Sandstone aquifer which was not affected by inertial effects during slug testing.

Estimates of hydraulic conductivity and transmissivity from slug test data are reported to two significant figures for comparison purposes in the following text. However, these values are considered to be accurate to only one significant figure.

3.5.3.1 Platte River Alluvial Aquifer

Slug tests were performed on MW-46B and A, which are screened in this aquifer. Both wells were affected by oscillating water levels during slug testing (**Appendix F**) indicating that the aquifer is confined at this location. The semi-confining layer in this case is the Platte River aquitard (**Drawing 3-12**). T was estimated to be approximately 1.1×10^4 GPD/ft and 1.4×10^4 GPD/ft from MW-46A and MW-46B, respectively in each case. K was then estimated at a mean value of 0.036 feet/minute by dividing the transmissivity by the thickness of the Platte River alluvial aquifer taken from the boring logs (35.5 feet). It was assumed that the transmissivity of the underlying Omadi Sandstone aquifer did not contribute to the water-level response of MW-46A or MW-46B.

The storage coefficient of the Platte River alluvial aquifer could not be estimated from the slug tests. In confined aquifers, coefficients can range from 5×10^{-3} to 5×10^{-5} (Freeze and Cherry, 1979).

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3.5.3.2 Todd Valley Aquifer

Slug tests performed on MW-21A and MW-53A, which are screened in the sand and gravel unit, were affected by oscillating water levels (**Appendix F**). The boring log of MW-21D indicated strongly cemented layers of sand and gravel at 114.3 feet bgs, 1.7 feet above the screen of MW-21A, and a thin shale at the top of the Omadi Formation at 127.3 feet (**Appendix A**). Cemented layers are likely to have a significantly lower hydraulic conductivity than surrounding unconsolidated sand and gravel. Although they were not noted in the log of MW-21A, the cemented layers may be sufficiently continuous to confine the aquifer over the area of influence and the limited duration of a slug test. The oscillations noted during the slug tests indicate the presence of a relatively low permeability layer above the screened interval. Assuming that the thin shale at the top of the Omadi Formation, and a cemented layer of sand and gravel at 114.3 feet are the confining beds, the thickness of the confined interval is estimated to be 13 feet. The hydraulic conductivity estimate at MW-21A (0.08 feet/minute) was estimated from the slug test transmissivity and this thickness (**Table 3-4**).

Similarly, the boring log of MW-53A indicates a thick layer of silt beginning 4 feet above the screen. In order to estimate K, the effective thickness of the semi-confined interval in this well was assumed to be the vertical distance between the silt and the Omadi Sandstone; i.e., 17 feet. If the transmissivity of the Omadi Sandstone aquifer contributes to the water level response in MW-53A when slugged, T and K estimates from MW-53A may be too high. True values of T and K are likely to be less than or equal to 2.50×10^4 GPD/foot and 0.14 feet/minute, respectively.

MW-26A was screened through finer grained material than is typical of the sand and gravel unit. Therefore, the estimated K (0.0028 feet/minute) from the slug test of MW-26A is not representative of this unit elsewhere in Todd Valley (**Table 3-6**).

The estimate of K in this unit is approximately 0.08 feet/minute, from MW-21A. This value is close to the middle of the range of hydraulic conductivities estimated by Piskin (1971) for the full saturated thickness of the Todd Valley aquifer. It is slightly higher than the K estimates in the other aquifers beneath the Site (**Table 3-6**) reflecting the relatively coarse grain-size of this unit.

At location MW-21A, the sand and gravel unit is only 13 feet thick, which is much less than its mean thickness of approximately 35 feet in the other monitoring well borings. Using 13 feet as the thickness, the transmissivity of the sand and gravel unit is estimated to be 1.2×10^4 GPD/feet. Using the typical thickness of approximately 35 feet, the mean transmissivity of the sand and gravel unit is estimated to be 3×10^4 GPD/feet. This is approximately half the mean value estimated by Piskin (1971) for this unit combined with the Todd Valley fine sand unit.

The mean estimate of K from slug tests of the fine sand unit is 0.034 feet/minute (**Table 3-6**). This is very close to the estimated hydraulic conductivity of the Platte River aquifer and lower than that of the sand and gravel unit.

Piskin (1971) estimated the storage coefficient of the Todd Valley aquifer to be 0.145 where the aquifer is unconfined, based on a flow-net analysis. This storage coefficient value is reasonable for an unconfined aquifer. However, parts of an aquifer which are confined may have storage coefficients up to three orders of magnitude lower than that of the unconfined portion (Freeze and Cherry, 1979).

The average linear velocity of groundwater can be calculated from the hydraulic gradient, the hydraulic conductivity, and the porosity (Freeze and Cherry, 1979). The porosity of unconsolidated sand and gravel typically ranges from 25 percent to 50 percent and the porosity of an unconfined aquifer is approximately equal to the specific yield (Freeze and Cherry, 1979). The most conservative estimate of average linear velocity; i.e., the estimate of the highest possible average linear velocity, is calculated using this effective porosity, the steepest hydraulic gradient observed (17 ft/mile) and the largest estimate of K (0.14 feet/min, **Table 3-6**). A conservative estimate of average linear velocity is approximately 4 feet/day. If the aquifer is homogeneous with 25 percent effective porosity and K = 0.08 feet/min (MW-21A, **Table 3-6**), average linear velocity would be calculated to be approximately 1.5 feet/day throughout most of Todd Valley.

3.5.3.3 <u>Omadi Sandstone Aquifer</u>

The K values estimated from MW-21D (0.034 feet/minute) and MW-46D (0.053 feet/minute) are two orders of magnitude greater than the upper limit of the normal range for sandstones

reported by Freeze and Cherry (1979). However, the Omadi Sandstone is very weakly cemented and well sorted and therefore, these estimates are reasonable. Piskin's (1971) K estimates were based on consideration of grain size and degree of cementation. The K estimate of 0.034 feet/minute from MW-21D is very close to the middle of the range estimated by Piskin (1971). Although the K estimate of 0.053 feet/minute from MW-46D is slightly higher than Piskin's (1971) highest estimate (0.050 feet/minute), hydraulic conductivity estimates of the Omadi Sandstone similar to the estimate from MW-46D have been reported for the Omadi Sandstone aquifer at other sites (e.g., Wade, 1991). Therefore, the K estimate from the slug tests of the Omadi Sandstone are assumed to be representative of this aquifer.

The Omadi Sandstone aquifer is confined or semi-confined at the location of monitoring well MW-46D because the overlying aquifer is semi-confined. The estimate of transmissivity from slug testing of MW-46D is lower than the range of transmissivities estimated by Piskin (1971) **(Table 3-6)**. However, Piskin's (1971) transmissivity estimates were for the total thickness of sandstone in the Omadi Formation. The slug tests estimate transmissivities based on individual sandstone beds in which the wells are screened, which may be limited in thickness by shale beds below the screened interval. Piskin's estimates appear to be good approximations for the full thickness of the aquifer, despite being based on grain-size analyses rather than aquifer testing.

Hydraulic conductivity estimates for the Omadi Sandstone aquifer, based on both slug testing and Piskin's (1971) grain-size analyses, are very similar in magnitude to those for the Platte River alluvial aquifer and the upper part of the Todd Valley aquifer. Although the Omadi Sandstone is finer grained, it is better sorted and the grains are typically more rounded than the sands of the overburden deposits and it is weakly cemented. Therefore, a similarity in hydraulic conductivities is not unlikely.

In the Cooper, Bredehoeft, Papadopulos (1967) analyses of MW-21D and MW-46D, the storage coefficient could be varied to obtain a better fit to the observed water levels by using a storage coefficient in the typical range of confined aquifers rather than a storage coefficient in the typical range of unconfined aquifers. Although the sensitivity of the solution to the storage term was low, this is further evidence that the Omadi Sandstone aquifer is confined or semi-confined at both MW-21D and MW-46D. The storage

coefficient of the Omadi Sandstone aquifer was estimated to be 1×10^{-4}. In north-central Kansas, the Omadi Sandstone (known in Kansas as the Dakota Sandstone) is lithologically very similar to the Omadi Sandstone in eastern Nebraska. The storage coefficient of the aquifer in north-central Kansas was recently estimated from a pumping test to be 1.28×10^{-4} (Wade, 1991).

3.5.4 Infiltration

Piskin (1971) calculated the infiltration rate from 1962 data which he considered to be prior to extensive use of groundwater resources for irrigation. Piskin constructed a flow net from these data and estimated the rates of inflow and outflow across the flow net from the distances between flow lines, and from transmissivity and hydraulic gradient estimates. The infiltration rate was calculated by subtracting outflow (6.16×10^3 acre-foot/year) from inflow (4.87×10^3 acre-foot/year) and yielded a result of 2.3 inches/year or 5.88×10^8 gallons/year ($1.80\ 10^3$ acre-foot/year). Assuming a mean annual precipitation of 33.16 inches, the rate of infiltration is 6.9 percent of annual precipitation. Souders (1963) calculated the rate of infiltration using the same method as Piskin (1971), but assumed different transmissivities and obtained a result of 4 to 5 inches of infiltration per year, or roughly 12 to 15 percent of the mean annual precipitation. Souders (1963) also calculated infiltration by analyzing the discharge of Silver Creek and obtained a minimum infiltration rate of 1.3 inches/year.

3.5.5 General Hydrochemistry

Water in the Omadi Sandstone aquifer is locally brackish, and rich in sulfate, chloride, calcium, sodium, and magnesium (Piskin, 1971). The Todd Valley aquifer is freshwater with lesser amounts of sulfate, chloride, calcium, sodium, and magnesium. Total dissolved solids (TDS) concentration is higher in the Omadi Sandstone aquifer than the overlying Todd Valley aquifer (Piskin, 1971). Samples from wells penetrating both aquifers ranged from 418 to 860 mg/L with an average of 549 mg/L. TDS values of waters from wells which only penetrate the Todd Valley aquifer were between 230 mg/L and 457 mg/L with a mean value of 329 mg/L (Piskin, 1971).

Nitrate concentrations were reported to be greater in water samples from shallow wells than those from the Omadi Sandstone aquifer. The mean nitrate level of the upper aquifer was

7.9 mg/L with a maximum value of 23 mg/L (Piskin, 1971). Mixed water samples from water supply wells screened in both aquifers had a mean concentration of 2.3 mg/L (Piskin, 1971). The concentration of dissolved iron has a mean value of 260 µg/L in samples from wells penetrating both aquifers. The highest concentration found by Piskin (1971) was 1,300 µg/L.

Total concentrations of iron in background monitoring wells MW-47B and MW-47A (monitoring wells which are located upgradient of all known former NOP activities) were 1,840 µg/L and 1,310 µg/L, respectively. Aluminum was at a concentration of 416 µg/L in MW-47B and 168 µg/L in MW-47A. The values for manganese were 373 µg/L in MW-47B and 416 µg/L in MW-47A (**Table 3-7**).

3.5.6 Groundwater Usage

As reported by the Lower Platte North NRD (1985) all cities and towns in the lower Platte North District rely on groundwater for potable water. The 1983 estimated groundwater usage for Saunders County was 90,237 acre-feet or 58.3 billion gallons. Together, public water and rural domestic water supplies constituted approximately 40 percent or 23 billion gallons in 1983. Irrigation consumes the largest volume of groundwater. Most of the irrigation wells in the Southeast Region of the NRD are in the Todd Valley.

The Dakota aquifer (Omadi Sandstone aquifer) is used as a water source where Pleistocene sands are thin or where overburden consists primarily of till. Generally, wells which are screened in the Dakota sandstones are also screened in the overlying Pleistocene deposits. The towns of Memphis and Yutan utilize the Dakota aquifer for part of their water supply. Water quality (especially TDS) and well yields from Dakota aquifer wells are variable (Lower Platte North NRD, 1985).

The water supply wells of Lincoln, Nebraska are located in the Platte River floodplain approximately 4 miles southeast of the former NOP and 2 miles northeast of Ashland (**Drawing 3-17**).

Piskin (1971) calculated discharge due to pumpage at the ARDC by adding infiltration to inflow and subtracting outflow. The result of 5.12×10^2 acre-foot/year compares closely to

the pumpage rate of 6.29 x 10^2 acre-foot/year from pumping data for ARDC wells for the year 1970 (Piskin, 1971).

3.5.7 Groundwater Well Inventory Study

The Groundwater Well Inventory Technical Memorandum (WCC, 1992g) lists well locations, general construction details, use and ownership of the water supply and monitoring wells located in the immediate area east and southeast of the former NOP, as well as information on municipal water wells for Memphis, Ashland, and Lincoln (Ashland well field).

The study area of the well inventory begins north of the Administration Area and extends southeast approximately 13 miles to the southern most well in the Ashland well field (**Drawing 3-17**). Wells located to the east of the former NOP and wells located in the communities of Ashland and Memphis were also included in the survey.

A total of 110 active irrigation wells are located in the study area of which 39 are located within the former NOP boundary. The University of Nebraska is the owner of the greatest number of irrigation wells with 20 active wells, one replacement well, and 10 stock wells. Irrigation well depths range from 42 to 275 feet bgs with an average depth of 142.5 feet. Well casing diameters range from 4 to 9 inches. Pumping rates range from 400 to 1,200 gpm with an average rate of 850 gpm.

Fifty-two active municipal wells were inventoried. The City of Lincoln uses a well field consisting of 30 wells located northeast of the City of Ashland, known as the Ashland Well Field, as a municipal water source. Municipal well depths range from 31 to 178 feet bgs, with an average depth of 82 feet. Well casing diameters range from 5 to 30 inches. Pumping rates range from 200 to 3,000 gpm, with an average of 1,500 gpm.

Four commercial wells inventoried in the study area are owned and used by Mead Cattle Company's feedlot for watering livestock. One inactive commercial well is also reported on Mead Cattle Company property. Commercial well depths range from 120 to 220 feet bgs. Their average depth is 170 feet. Well casing diameters range from 6 to 7 inches. Pumping rates range from 350 to 700 gpm, with an average pumping rate of 500 gpm.

No industrial wells are registered in the study area.

Because registration of domestic wells was not required by the 1957 Nebraska Well Registration Law, no records are kept by state and/or local agencies. Past investigations at the Site have identified 16 domestic wells which are generally located south and southeast of the former NOP. Additional wells were also located during previous studies conducted by the State of Nebraska and Saunders County. Approximately 100 domestic wells are located within the study area. Domestic well depths range from 25 to 192 feet bgs with the average depth being 84 feet. Well casing diameters of the few wells for which they are reported range from 30 to 32 inches (ESE, 1983). Diameters of domestic wells, however, are typically much less, ranging from 6 to 8 inches.

A study conducted for the USATHMA (ESE, 1983) reports 13 former NOP water supply wells. Comparison of registered well status and location shows that one former NOP well has been registered as an active commercial well by Mead Cattle Company. The remaining 12 original and/or replacement wells identified by USATHMA study are: 1) registered as irrigation wells (former NOP water supply wells 7A and 10A), 2) nonregistered domestic wells used by the University of Nebraska ARDC (wells 6A, 8A, 9A, 10A), 3) a private well used to supply water to residences in the former Administration Area (well 1A), or 4) their status is unknown. The former NOP well depths range from 98 feet to 192 feet bgs. Their average depth is 140 feet. Well casing diameters are 30 to 32 inches. Pumping rates range from 415 to 700 gpm, with the average being 529 gpm.

3.6 DEMOGRAPHY AND LAND USE

3.6.1 Demography and Land Use of Saunders County

The Site is located in east central Saunders County approximately 1 mile south of Mead, 6 miles east of Wahoo, 2 miles east of Ithaca, 4 miles north of Memphis, 3 miles southwest of Yutan, 3 miles west of Wann, and 9 miles northwest of Ashland. Wahoo, population 3,510, is the county seat and the largest community in Saunders County.

The population trend in Nebraska since 1940 has been from rural to urban and has significantly affected the size of the population of Saunders County. The population of

Saunders County, 18,285, is 80 percent rural. Saunders County has experienced a net emigration since 1930 (Bureau of the Census, 1990d).

The population of Wahoo declined from 3,835 in 1970 to 3,510 in 1988, and the population of Ashland dropped slightly from 2,176 to 2,160. The populations of the smaller communities such as Mead (1988 population 510) and Ithaca (1988 population 120) have remained stable (Bureau of the Census, 1990a). The population density in rural areas (all of Saunders County excluding Wahoo) is 20 people per square mile.

The median age in Saunders County is 35 years (Bureau of the Census, 1990d) compared to 30 years for Nebraska (University of Nebraska Bureau of Business Research, 1982). The percentage of the population under 18 years of age in Saunders County, 28.5 percent, is the same as in the state as a whole.

As in other parts of the state, retail and wholesale trade and services account for roughly half the jobs in Saunders County (Bureau of the Census, 1990c). Agriculture and construction are more important employers in Saunders County than in the rest of the state whereas government employment is less significant. Employment in trade, services, and government is projected to increase, and employment in construction, manufacturing, and agriculture is expected to decline (Nebraska Department of Economic Development, 1992). Unemployment in Saunders County in 1990 was 2.7 percent (Bureau of the Census, 1990c), down from 3.1 percent in 1989 (Nebraska Department of Labor, 1989).

Areas adjacent to the former NOP are primarily used for agriculture. Trends in agriculture will aid in predicting future land use in the Site vicinity.

Seventeen percent of the population of Saunders County lives on farms. The number of farms in Nebraska dropped from 121,062 in 1940 to 63,768 in 1978, but the decline has lessened since then. The number of farms in Saunders County dropped from 1,842 in 1964 (the first year for which county statistics are available) to 1,471 in 1978, but only declined slightly to 1,417 in 1987. The acreage of the average farm in Nebraska has increased (Bureau of Census, 1987a). Farm income has not increased significantly since 1978 (USDA, 1989).

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Corn is the major crop in Saunders County with soybeans and sorghum of less but significant importance. Production of food grain and hay have declined while production of feed grain, especially sorghum, and oil crops has increased. Common fertilizers used in Saunders County include anhydrous ammonia, ammonium nitrate, and liquid nitrogen.

East central Nebraska is the second major producing region (after northeast Nebraska) for milk, hogs, sheep, and cattle on feed. The price of milk has remained stable and the price of cattle has risen since 1978 (Nebraska Agricultural Statistics Service, 1989) perhaps accounting, along with increased productivity, for the increase in acreage of pasture land at the expense of harvested cropland.

Approximately 400,000 acres, or 83 percent, in Saunders County were under cultivation in 1964. Approximately 36,000 acres were grassland (7 percent) and 9,000 acres woodland (2 percent) (USDA, 1965). In 1984, 70,000 acres were under irrigation or 14 percent of the total area of Saunders County. The number of acres under irrigation increased steadily from 1950 to 1985, but has remained stable since then. The number of registered irrigation wells in Saunders County was 634 in 1988 (Nebraska Agricultural Statistics Service, 1989). In Saunders County 2,678 households, or 35 percent, are supplied with water from private wells (Bureau of the Census, 1990b).

Major industries in Nebraska include food products, machinery, chemicals, and electronic equipment. Saunders County has 18 manufacturing businesses, 4 of which employ more than 20 people (Bureau of the Census, 1982). The number of retail establishments in Saunders County declined 38 percent between 1982 and 1987. Wholesale establishments decreased 22 percent in number in the same period (Bureau of the Census, 1987b). Mining in Saunders County is limited to a large sand pit and a large gravel pit south of Wann, 7 inactive borrow pits near the Nebraska National Guard Camp and the City of Lincoln well field, and several quarries about 2 miles east of Ashland. Saunders County does not produce oil or gas.

Recreation areas include Memphis Lake State Recreation Area, which is approximately 2 miles south of the former NOP. Camping, fishing, and boating facilities are available at the lake. Pioneer State Recreation Area is located south of Wahoo. No information is

available on facilities. Mahoney State Park is east of Ashland and offers camping and fishing (Nebraska Game and Parks Commission, 1990).

3.6.2 Site Land Use

Approximately 14.9 square miles of the former NOP are owned by the University of Nebraska ARDC (**Drawing 1-2**). Roughly 3.4 square miles (including the southeast portion of the former NOP, the former Atlas Missile Area, and the former Nike Maintenance Area) are owned by the U.S. Government and used by the Nebraska National Guard for training and heavy equipment maintenance. The Mead Cattle Company's feed lot occupies approximately 3.5 square miles north of the load lines. Roughly 5 square miles in the northern and east central portions of the former NOP are owned by other private interests. The former Bomb Booster Area was once used as a fireworks factory. The former Administration Area is currently occupied by cultivated fields, private residences, and Mid-America Industries, a manufacturer of foam products.

The ARDC uses some of the former load line buildings, igloos, magazines, and surrounding land for agricultural research. A dairy research facility is located at Load Line 1. Roughly one-half of the land at Load Line 1 is used for pasture, one-fourth is cultivated, and one-fourth is fallow. A residence is located near Load Line 1. The ARDC headquarters are at Load Line 2. Turf research plots occupy 10 percent of the land, 60 percent is cultivated crops, 10 percent is devoted to forestry, and the rest is fallow. Another private residence is located northwest of Load Line 2. Also located at Load Line 2 are an energy farm, the ARDC farm shop, a field day program center, an agricultural engineering research area, and a center-pivot irrigation research area. Approximately 25 percent of the land surrounding Load Line 3 is used for linear-move irrigation research, 20 percent is fallow, 20 percent is pasture research, 30 percent is used for plant pathology, and the rest is occupied by facilities which include the Behlen Observatory. The Disease Control Research Center is located at Load Line 4. Pasture occupies 75 percent of the land, 10 percent is cultivated, and the swine operations and herdsmen's residence occupies the remainder.

Land surrounding igloos and magazines are used for meteorology and climatology, forestry windbreak research, crop insect research, sheep and ruminant nutrition research, cattle pastures, beef cattle management research, a beef feed lot, a feed mill, beef physiology

research, swine research, lowland and floodplain plantings, center pivot irrigation research, warm and cool season grass pastures, an educational television transmitter station, and crops and soils research. The ARDC also owns property formerly used as the North Burning Ground and the Proving Range which are currently used for wildlife plantings, the former NOP landfill which was also used by the ARDC, and the former treatment plant.

3.7 ECOLOGY

3.7.1 Wetlands

According to the National Wetlands Inventory map for the Mead quadrangle (USFWS, 1991), the former NOP contains three principal drainages fed by several excavated drainages or natural tributaries (**Drawing 3-2**). Silver Creek also transverses the extreme southwest corner of the former NOP. One of the drainages begins near the Administration Area and passes along the west side of Load Line 1 and debouches onto the Silver Creek Floodplain. This drainage has been excavated along most of its route and is classified as seasonal. Another drainage extends from the Mead Cattle Company Property, along the west side of Load Line 3, and eventually flows into Clear Creek southeast of the former NOP. This drainage has been excavated, but is overgrown in several places and is seasonally flooded. Johnson Creek is the third major drainage. Johnson Creek flows from Mead, through the Administration Area, south of the former Ammonium Nitrate Plant, through the former Atlas Missile Area and into the NRD Reservoir. Above the reservoir, it is classified as a temporarily to seasonally flooded emergent palustrine system and below the dam it is classified as a seasonally flooded intermittent riverine system. After the creek reaches the Platte River alluvial valley, it is classified as an excavated, seasonal, palustrine system.

The NRD reservoir is the only water body classified as lacustrine on the former NOP. There are 77 smaller bodies of water, 44 of which are temporarily flooded, 23 which are seasonally flooded, and 10 which are semi-permanently flooded. Fifteen of the 77 are excavated, including the former sewage treatment pond ~~at~~ the Atlas Missile Area. Sixty of the 77 smaller bodies are in the southern part of the NOP.

3.7.2 Wildlife Resources

Of the approximately 50 species of fish identified in Saunders County, more than half are found in the Platte River or Salt Creek, a Platte River tributary near Ashland, but not in smaller streams in Nebraska (**Table 3-8**) (Morris, Morris, Witt, 1974). Only one species, however, the Plains topminnow (*Fundulus sciadicus*), is on the list of candidate species for threatened and endangered status (**Table 3-9**), and none are on the list of threatened and endangered species (**Table 3-10**) (USFWS, 1992). According to the Nebraska Fishery Resources Inventory (Nebraska Game and Parks Commission, 1972), the Platte River in Saunders County is considered a fishery resource of regional importance to anglers. Clear Creek, Wahoo Creek, and Silver Creek are of local importance, and Johnson Creek is considered non-productive because it is intermittent. Silver Creek is considered degraded because water withdrawal or pollution (the inventory does not state which) has reduced its potential for use as a fishery resource.

According to the Nebraska Wildlife Resource Inventory (Nebraska Game and Parks Commission, 1972) cropland is the dominant habitat type in Saunders County. In the Platte River valley, however, the major habitat is grassland. Deer are the only big game in Saunders County. Deer are scarce (less than 1 per square mile) except in the Platte River valley where the density is 4 to 8 per square mile. Upland game include pheasant, quail, and Cottontail rabbit. Pheasants are found at moderate densities (50 to 200 per square mile) except in the Platte River valley where they are at low densities (10 to 50 per square mile). Quail are considered scarce (less than 10 per square mile) in most of the county, but are found in low densities (10 to 100 per square mile) in the Platte River valley. Cottontail rabbits are found in low densities (10 to 100 per square mile) throughout the county.

Waterfowl, primarily ducks, winter in the Leshara and Morse Bluff area in the Dodge-Saunders Refuge along the Platte River from the Butler and Saunders county line to the Highway 92 bridge east of Yutan. The Highway 92 bridge is 4 miles northeast of the former NOP. More ducks are harvested in the Platte River valley south of the Highway 92 bridge than in any other area in southeastern Nebraska. Geese are also hunted in this area. (Nebraska Game and Parks Commission, 1972).

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No reptiles or mammals found in Saunders County are listed as threatened and endangered although Blanding's turtle and the Plains spotted skunk are candidate species (USFWS, 1992). Four birds found in Saunders County, the Bald eagle, the Peregrine falcon, the Interior least tern, and the Piping plover, are listed as threatened and endangered (USFWS, 1992). The Ferruginous hawk and the Loggerhead shrike are candidate species (USFWS, 1992).

The American burying beetle is listed as threatened and endangered and the Fritillary butterfly is a candidate for the list (USFWS, 1992). No plants found in Saunders County are listed, but the Western prairie fringed orchid is a candidate for listing as threatened and endangered (USFWS, 1992).

4.1 SOIL

4.1.1 Administration Area

4.1.1.1 Soil Gas

Sixty-six soil gas samples from the Administration Area were analyzed for VOCs with TCE as the primary analyte (**Table 4-1**). The extent of contamination illustrated on **Drawing 4-2** was based on the limits of the sampling locations. TCE was the most commonly detected analyte, having been detected in 1 shallow (6-foot) sample and 11 deep (18-foot) samples. The highest concentration of TCE was 74.5 µg/L from sample ADS-005-18G which is near the former NOP Analytical Laboratory, which was located southeast of the Administrative buildings. PCE was the second most commonly detected analyte with five deep samples and one shallow sample with detectable concentrations. The highest concentration of PCE was 0.27 µg/L in ADS-023-18G. Unlike TCE, which was found mainly in the eastern portion of the survey grid, PCE was found mainly in the southern portion, south and east of the former NOP Laundry which is in the southwestern portion of the Administration Area. Other VOCs detected in soil gas include cis-1,2-DCE (two samples); 1,1-DCA (one sample); 1,1,1-TCA (one sample); and toluene (one sample).

4.1.1.2 Unsaturated Soil

Seven unsaturated soil samples (approximately 10 percent of the soil gas samples) were analyzed for VOCs for comparison with the soil gas results **Table 4-2**. TCE, however, was not detected in any of the unsaturated soil samples. TCE was reported at 74.5 µg/L in the soil gas sample ADS-005-18G, however, no TCE was detected in the corresponding soil sample ADS-005-18B (**Table 4-3**). TCE was also detected in soil gas sample ADS-005-06G but not in the corresponding soil sample ADS-005-06B.

No pesticides, PCBs, explosives, or semivolatiles were detected above quantitation limits in any of the unsaturated soil samples from the Administration Area. No VOCs were detected which were not also detected in the associated blanks. Maximum concentrations of metals detected in soil are 16,700 µg/kg for aluminum, 108 µg/kg for barium, 5,130 for cobalt, 22.2 for copper, 22,600 for iron, 19.4 for lead, 5,380 for magnesium, 1,160 for manganese, 43.7 for nickel, 2,800 for potassium, 44.1 for vanadium, and 79.6 for zinc. None of these maximum concentrations exceeded 5 times the background concentration presented in the OU1 Supplemental RI Report (the criterion employed in the OU1 RI to assess a significance of a metals concentration in soils) (SEC Donohue, 1992b). But this is background?

4.1.2 Atlas Missile Area

4.1.2.1 Soil Gas

Two hundred and thirty-seven soil gas samples were analyzed for TCE. Results are summarized in **Table 4-4** and **Drawing 4-3** and the estimated extent of TCE in soil gas is shown on **Drawing 4-4**.

TCE was detected in 27 of the 119 shallow soil gas samples. The concentration of TCE was less than 0.1 µg/L in 18 of the 27 samples and less than 1.0 µg/L in 24 of the samples. The highest concentration was 22.2 µg/L in ATL-059-06G, which is located approximately 300 feet southwest of Silo 2. Most of the locations at which TCE was detected were in the center of the grid. Four samples along the periphery of the survey grid had detectable concentrations of TCE but none exceeded 0.05 µg/L.

TCE was detected in 76 of the 118 deep soil gas samples including 26 of the 27 locations at which TCE was detected in the shallow sample. The concentration of TCE exceeded 1.0 µg/L in 35 of the samples and exceeded 10 µg/L in 8 adjacent nodes between Silo 2 and Silo 3. The highest concentration of TCE in a deep sample was 150 µg/L in sample ATL-059-18G, which corresponds to the location of the highest concentration of TCE in shallow samples.

Soil gas with TCE concentrations greater than 10 µg/L were found in an area which begins west-southwest of Silo 2 and extends in a southeasterly direction to the south of Silo 3.

TCE was detected at higher concentrations in soil gas samples collected from the deep interval with respect to the shallow interval at each location within this area. It is suspected that contamination in that area is residual contamination from surface discharges of TCE. Though the locations of surface discharges are not known, it is suspected that the discharges occurred over smaller subareas located within the area with soil gas concentrations greater than 10 µg/L. The relatively large areal extent of the soil gas contamination is greater than the area of the surface discharges due to the potential for contaminated soil gas to migrate within the unsaturated zone away from the surface discharge. Low levels of TCE contamination detected in areas outside the immediate vicinity of the missile silos were not significant with respect to the identified source areas.

The Law Environmental (1990) soil gas survey, which encompassed approximately the same area, was limited to shallow sampling, 5 to 7 feet bgs. TCE was reported in similar concentrations in roughly the same areas by the Law Environmental survey as was found by the OU2 survey. The highest concentrations in both surveys were found within 500 feet of the west side of each of the 3 silos. Minor exceptions are concentrations of TCE greater than 1 µg/L south of Silo 2 found in the OU2 survey but not the Law survey, and concentrations of TCE over 1 µg/L found by Law southeast of Silo 3, but not found in similar concentrations by the OU2 survey.

4.1.2.2 Unsaturated Soil

Twenty-four unsaturated soil samples were analyzed for VOCs for comparison with soil gas data. TCE was reported below the quantitation limit (10 µg/kg) in soil samples ATL-059-06B (4 µg/kg) and ATL-059-18B (4 µg/kg) (**Table 4-5**). ATL-059-06B was the location of the highest concentration of TCE in shallow soil gas samples (22.2 µg/L) and the highest concentration in the deep soil gas samples (150 µg/L). TCE was not detected in any of the 22 soil samples even in eight locations where TCE was detected in the corresponding soil gas sample. The concentration of TCE in a corresponding soil gas sample was as high as 62.4 µg/L(ATL-060-18G), the soil gas sample associated with soil sample ATL-060-18B (ND).

Differences in concentrations of TCE in soil and soil gas are potentially related to the soil-soil gas distribution coefficient, differences in sampling method, the different media (soil and

gas) and differences in the detection limits for soil gas (0.01 µg/L) and for soil (10 to 13 µg/kg). Results from unsaturated soil and soil gas samples are compared in **Table 4-3**.

4.1.2.3 Saturated Soil

Saturated soil samples were collected from monitoring well borings MW-40A, MW-43D, MW-44D, and MW-45D to characterize the soil-water distribution coefficient (K_d) for RDX and TCE. The samples were analyzed for VOCs, TOC, and explosives (**Table 4-6**). TCE was not detected except in sample BMW-040-059, where TCE was estimated at 1 µg/kg, which is below the quantitation limit. RDX was not detected in any of the saturated soil samples from the Atlas Missile Area.

The average TOC value was higher in the samples collected immediately below the water table (432 mg/kg) than in samples from the base of the fine sand unit (268 mg/kg) or the base of the sand and gravel unit (347 mg/kg). TOC values in the Omadi Sandstone were much lower with an average of 87.2 mg/kg (**Table 4-6**). Calculations of K_d will be discussed in Section 5.0.

4.1.3 Load Line 1

4.1.3.1 Soil Gas

One hundred and thirty Phase I and eighty-five Phase II soil gas samples from the north portion of the Load Line 1 area were analyzed for VOCs with TCE as the primary analyte. Results are summarized in **Table 4-8** and **Drawing 4-5** and the estimated extent of VOCs in soil gas at Load Line 1 is shown on **Drawing 4-6**. TCE was detected in 52 of the 99 samples from the 6-foot interval. Eleven of the samples from 6 feet bgs were over 10 µg/L, and of these three were over 100 µg/L. The highest concentration of TCE in shallow soil gas was 270 µg/L in LL1-054-06G, which was west of the Inert Storage Building (**Drawing 4-5**), as were all the other samples above 10 µg/L. Other VOCs detected in shallow soil gas include cis-1,2-DCE (four samples, 0.1 to 0.4 µg/L), toluene (one sample, 3.5 µg/L), and PCE (one sample, 0.01 µg/L).

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The highest concentrations of TCE (4 µg/L) in the Law Environmental (1990) soil gas survey grid north of Load Line 1 were found north and west of the inert storage building. The highest concentrations of TCE in the shallow interval in the WCC survey were also found in the same area. The Law Environmental (1990) survey was limited to shallow sampling (5 to 7 feet bgs) and did not extend as far south as the WCC grid.

TCE was detected in 78 of the 99 deep (nominal 18-foot interval) soil gas samples ranging from 0.01 µg/L (the detection limit) to 707 µg/L. The concentration of TCE was greater than 1 µg/L in 38 samples, of which 25 had concentrations greater than 10 µg/L. TCE exceeded 100 µg/L in 12 samples, most of which were immediately west of the Inert Storage building. The highest concentration of TCE in the deep soil gas samples was 707 µg/L in LL1-048-16G. Toluene was detected in four deep soil gas samples and cis-1,2-DCE was detected in three samples. PCE and 1,1,1-TCA were each detected in two samples.

Deeper soil gas samples were collected at locations LL1-045, LL1-046, LL1-048, LL1-069, and LL1-072 to provide a vertical profile. TCE was detected at location LL1-045 at 6 feet bgs (26.8 µg/L), 7 feet bgs (38.5 µg/L), 16 feet bgs (357 µg/L), 17 feet bgs (505 µg/L), and 21 feet bgs (326 µg/L). TCE was detected at location LL1-046 at 6 feet bgs (1.22 µg/L), 15 feet bgs (225 µg/L), 16 feet bgs (410 µg/L), and 21 feet bgs (237 µg/L). The 16-foot sample at LL1-045 and LL1-048 and the 17-foot sample at LL1-046 correspond to the nominal 18-foot (deep) soil gas sampling interval used throughout the grid. Soil gas samples were not collected at 4 feet bgs and 9 feet bgs at location LL1-045 and 9 feet bgs at location LL1-046 because low gas permeability (in the loess) prevented collection of sufficient samples. TCE was detected at location LL1-048 at 3 feet bgs (25.9 µg/L), 9 feet bgs (1.56 µg/L), 15 feet bgs (437 µg/L), 16 feet bgs (707 bgs), and 21 feet (468 µg/L). TCE was not detected at location LL1-048 in the sample from 6 feet bgs. TCE was detected at location LL1-069 at 4 feet bgs (64.1 µg/L), 6 feet bgs (83.5 µg/L), 9 feet bgs (64.7 µg/L), 15 feet bgs (71.8 µg/L), 18 feet bgs (335 µg/L), and 21 feet bgs (142 µg/L). A similar vertical distribution of TCE concentrations was found at location LL1-072. TCE was detected at 4 feet bgs (15 µg/L), 6 feet bgs (21.3 µg/L), 9 feet bgs (14.9 µg/L), 15 feet bgs (93.6 µg/L), 18 feet bgs (168 µg/L), and 21 feet bgs (82 µg/L).

Soil gas with TCE concentrations greater than 10 µg/L were found in an L-shaped area with the short leg of the L running east-west across the north end of the load line and the long

leg extending north-south on the west side of the centerline of the load line before ending southwest of the former Receiving and Painting Building. TCE was detected at higher concentrations in soil gas samples collected from the deep interval with respect to the shallow interval at each location within the L-shaped area (with the exception of sample LL1-054-06G). It is suspected that contamination in that area is residual contamination from surface discharges of TCE. Though the locations of surface discharges are not known, it is suspected that the discharges occurred over a smaller subarea located within the area of high soil gas contamination. The relatively large areal extent of the soil gas contamination is greater than the area of the surface discharges due to the potential for contaminated soil gas to migrate within the unsaturated zone away from the surface discharge. Low levels of TCE contamination detected in areas outside the immediate vicinity of the AFBMD Tech Area were not significant with respect to identifying source areas.

Boring logs from nearby wells MW-22A and MW-23A indicate that the contact between the loess and the fine sand unit is at 15 feet and 23 feet bgs, respectively.

4.1.3.2 Unsaturated Soil

Twenty-two unsaturated soil samples from the Load Line 1 area were analyzed for VOCs. TCE was reported below the quantitation limit in LL1-054-06B and LL1-048-06B at 10 µg/kg and was not detected in any other sample. The soil gas sample corresponding to LL1-054-06B, LL1-054-06G, had a TCE concentration of 270 µg/L. The soil gas sample associated with LL1-048-06B, however, did not have TCE at a detectable concentration. TCE was not detected in 15 soil samples where TCE concentrations ranged from 0.15 µg/L to 707 µg/L in the corresponding soil gas samples. The only VOC other than TCE which was detected above quantitation limits but not found in the associated blank was acetone, a common laboratory contaminant which was detected in soil samples ranging from 12 to 53 µg/L. Results from unsaturated soil samples and their corresponding soil gas samples are compared in **Table 4-3**.

4.1.4 Load Lines 1, 2, 3, and 4 - Saturated Soil

Saturated soil samples were collected from monitoring well borings MW-23A, MW-25D, MW-33D, and MW-34D to characterize the soil-water distribution coefficient (K_d) for TCE

and RDX. The samples were analyzed for VOCs, TOC, and explosives (**Table 4-10**). Neither TCE nor RDX were detected in saturated soil samples from Load Lines 1, 2, 3, and 4. Acetone, a common laboratory contaminant, was detected in saturated soil samples MWB-059RE (450 µg/L), MWC-031 (72 µg/L), and MWB-033-083 (44 µg/L).

The average TOC value for the sand and gravel unit (224.5 mg/kg) was slightly higher than the average TOC value for samples from the water table (198 mg/kg) and the base of the fine sand unit (173 mg/kg). The TOC values from the Omadi Sandstone were 105 mg/kg in DMW-025-167, 106 mg/kg in DMW-033-117, and 2,990 mg/kg in DMW-034-124.

4.2 GROUNDWATER HEADSPACE SCREENING

As discussed in Section 2.0, the groundwater screening program was used to assist in locating those monitoring wells which were intended to primarily address TCE contamination. Screening algorithms presented in CDAP Part I were followed to generate data which were used to refine preliminary estimates of the extent of TCE contamination. Based on the refined estimates, the locations of the monitoring wells were finalized. To avoid confusion, only the extents of contamination characterized from the laboratory data are presented in Section 4.0. The impact of the screening data on those characterizations is discussed in Section 4.4.

4.2.1 Administration Area

4.2.1.1 Shallow Groundwater Screening

Twelve shallow groundwater headspace samples (two near location G1-14I) were collected by PES using a Geoprobe® and were screened in the field for VOCs. TCE was detected in four shallow headspace samples, cis-1,2-DCE in six samples ranging from 0.07 to 5.3 µg/L, and PCE in one sample at 0.01 µg/L. The highest concentration of TCE was 0.23 µg/L in G1-46I-64, which is located on the southwest side of the former Administrative Area. Although TCE was detected in IG1-046-064, adjacent nodes to the northwest (G1-45) and the southwest (G1-57) could not be sampled due to access restrictions. Results are summarized in **Table 4-11** and shown on **Drawing 4-7**.

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4.2.1.2 Deep Groundwater Headspace Screening

Seven deep groundwater headspace samples collected with a Hydropunch® were screened for VOCs. TCE was detected in 1 sample, G1-46I-131, at 0.18 µg/L. Adjacent grid nodes to the southwest (G1-58) and the southeast (G1-48) could not be sampled due to access restrictions. The only other VOC reported was cis-1,2-DCE at 0.9 µg/L in G1-14J-123. Results are summarized in **Table 4-11** and shown on **Drawing 4-7**.

4.2.2 Atlas Missile Area

4.2.2.1 Shallow Groundwater Headspace Screening

Nineteen shallow groundwater headspace samples were screened for TCE, which was detected in 10 samples, ranging from 0.01 µg/L at the detection limit to 1,200 µg/L. Three of the samples, G2-16I-63, G2-10I-63, and G2-11I-63 had concentrations over 10 µg/L; with the highest concentration, 1,200 µg/L, reported in G2-11I-63. Results are summarized in **Table 4-12** and shown on **Drawing 4-8**.

4.2.2.2 Deep Groundwater Headspace Screening

Twenty-three deep groundwater headspace samples were screened for TCE. In addition, four of the samples were collected before the Draft Work Plan comments were issued and were only analyzed for TCE. The remaining 19 samples were analyzed for eight other VOCs in addition to TCE. Of the 11 samples in which TCE was detected, 4 had concentrations exceeding 10 µg/L with the maximum concentration, 58.8 µg/L, reported in G2-37J-47. Two of these samples, G2-36J-43 (21.2 µg/L) and G2-37J-47 (58.8 µg/L), were located in the Platte River alluvial valley east of Johnson Creek and are on the downgradient edge of Grid 2. Other compounds detected include cis-1,2-DCE (10 samples ranging from 0.1 to 5.0 µg/L); 1,1,1-TCA (2 samples at 0.4 and 0.6 µg/L) and PCE (1 sample at 0.02 µg/L). Results are summarized in **Table 4-12** and shown on **Drawing 4-8**.

4.2.3 Load Lines 1, 2, 3, and 4

4.2.3.1 Shallow Groundwater Headspace Screening

Sixteen shallow groundwater headspace samples were screened for TCE, which was detected in 9 samples at concentrations ranging from 0.01 µg/L (the detection limit) to 0.23 µg/L. Only 3 of the samples, all located between Load Lines 1 and 2, had concentrations over 0.1 µg/L. The highest concentration was 0.23 µg/L reported in G3-10I-56. Results are summarized in **Table 4-13** and shown on **Drawing 4-8**.

4.2.3.2 Deep Groundwater Headspace Screening

Eleven deep groundwater headspace screening samples were screened for TCE. In addition, three of the samples were also analyzed for eight other VOCs. Only 1 deep groundwater headspace sample, G3-16J-18. had a detectable concentration of TCE (0.03 µg/L). One other compound, cis-1,2-DCE, was detected in two samples at 0.5 and 2.2 µg/L. Results are summarized in **Table 4-13** and are shown on **Drawing 4-8**.

4.3 GROUNDWATER

VOC results are shown on **Drawing 4-9**. The estimated horizontal extent of TCE in shallow groundwater monitoring wells is shown on **Drawing 4-10**, the extent of TCE in intermediate wells is on **Drawing 4-11**, and the extent of TCE in deep wells is on **Drawing 4-12**. The vertical extent of TCE is shown on **Drawings 4-17, 4-22,** and **4-25**. Explosive results are summarized on **Drawing 4-13** and the estimated horizontal extent of explosives in groundwater monitoring wells is shown for shallow wells on **Drawing 4-14** and for intermediate wells on **Drawing 4-15**. Explosives were only detected in four deep groundwater monitoring well samples. The vertical extent is shown on **Drawings 4-18** through **4-21, 4-23, 4-24** and **4-25**.

4.3.1 Administration Area

4.3.1.1 Monitoring Well Sampling Results

Monitoring wells MW-47B and A and MW-48B,A, and D were sampled for VOCs, SVOCs, explosives, pesticides, PCBs, dissolved metals, total metals, cyanide, and water quality parameters. Explosives, pesticides, and PCBs were not detected in any of the groundwater monitoring well samples from the Administration Area (**Table 4-14**). Maximum Contaminant Levels (MCLs) were not exceeded for any VOC or SVOC (**Table 4-15**). The only VOC above quantification limits was methylene chloride, a common laboratory contaminant, at 2 µg/L in MW-48A. The only SVOC above reporting limits was bis(2-ethylhexyl)phthalate in MW-47B and MW-48D, but in both cases it was also found in the associated blank sample. No MCLs or Maximum Contaminant Level Goals (MCLGs) were exceeded for metals (**Table 4-16**).

Monitoring wells MW-47A and MW-47B are the monitoring wells farthest upgradient from the former NOP. Therefore, these samples are considered representative samples of background groundwater chemistry. **Table 3-6** shows the concentrations of aluminum, iron, manganese, and nitrate plus nitrite (as nitrogen) in MW-47A and B. The background concentrations of these metals and water quality parameters are important because the SMCLs (MCL in the case of nitrate plus nitrite) for these constituents are exceeded in a few samples distributed throughout the Site. Most of the cases in which the total metals or nitrate plus nitrite exceed MCLs or SMCLs are less than twice the maximum concentrations in the background samples. According to EPA, "Criteria for determining significance [of concentrations of inorganics] should generally be two times the background concentration" (EPA, 1991d). This suggests that concentrations of metals reflect the regional groundwater chemistry. Likewise nitrate plus nitrite concentrations, which are highest in wells in the cultivated areas of the Platte River valley where floodplain soils are rich in organic matter, are probably related to regional agricultural and feedlot practices. The concentration of nitrate plus nitrite in MW-48D (36 mg/L) is less than 106 mg/L, which is twice the maximum concentration in the background sample, MW-47B.

The total concentrations of aluminum (210 mg/L in MW-48A, 230 mg/L in MW-48D), iron (1,030 mg/L in MW-48A, 1,430 mg/L in MW-48D), and manganese (303 mg/L in MW-48A,

309 mg/L in MW-48D) exceed the SMCLs but were less than the concentrations in background well MW-47B (**Table 4-14b**). None of these metals were reported at high concentrations (i.e., exceeding five times the background soil concentration) in soil samples collected at the former NOP during the OU1 RI (SEC Donohue, 1992b).

4.3.1.2 Hydropunch® Sampling Results

Installation of monitoring well clusters MW-49, MW-50, and MW-51 at the Administration Area was prevented by property owner's restriction on access for construction of permanent structures. As a substitute for monitoring wells, groundwater was sampled with the Hydropunch® at locations H2-1 through H2-4 (**Drawing 2-4**). Samples were collected from two intervals, the "I" interval corresponding to the estimated depth of the base of the fine sand unit, and the "J" interval corresponding to the estimated depth of the base of the sand and gravel unit. In the field, certain samples were gravity filtered through a Baxter fluted qualitative (non-uniform pore size) filter paper in a decontaminated glass funnel. These samples, designated "F" in tabulation below, were filtered to remove suspended solids from the sample. If the suspended solids content of the sample was sufficiently high (greater than 5 percent), chemists from the analytical laboratory subcontractors informed WCC that the samples would be considered solid samples rather than aqueous samples and reported as µg/kg in lieu of µg/l. Total Metals samples designated "F" were filtered in the field using the Baxter filter paper. Dissolved Metals samples designated "F" were also filtered in the field using the Baxter filter paper followed by a 45 µ filter. Samples designated "NF" in the tabulation below, were "not filtered" in the field using the Baxter filter paper, however all Dissolved Metals samples, including those designated "NF," were filtered using a 45 µ filter. At intervals which are designated "F/NF," two samples were collected, one filtered with the Baxter filter paper and one was not filtered.

Analytes	Sampling Interval							
	H2-1I	H2-1J	H2-2I	H2-2J	H2-3I	H2-3J	H2-4I	H2-4J
Explosives	F	F	F	F	F/NF	F/NF	F/NF	F/NF
VOC	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF	F/NF
SVOC	F	F	F	F	F/NF	F/NF	F/NF	F/NF

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Analytes	Sampling Interval							
	H2-1I	H2-1J	H2-2I	H2-2J	H2-3I	H2-3J	H2-4I	H2-4J
Pest./PCBs	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Diss. Metals	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Total Metals/ Cyanide	F	F	F	F	F/NF	F/NF	F/NF	F/NF
Water Quality	F	F	F	F	F/NF	F/NF	F/NF	F/NF

Monitoring wells have man-made filter packs and are rigorously developed prior to groundwater sampling. Hydropunch® sampling does not involve man-made filter packs or well development. Therefore, the analytical results from the Hydropunch® samples and the monitoring well samples are not comparable in terms of representativeness. However, the Hydropunch® is an effective tool for collecting data to assist in characterizing the extent of contamination in areas where permanent monitoring wells are not feasible.

No pesticides or PCBs were detected above quantitation limits. No SVOCs were detected above the quantification limits that were not also found in the associated blanks. Acetone and carbon disulfide (both common laboratory contaminants) were the only VOCs with concentrations above quantitation limits that were not also found in the associated blanks. Acetone was also found in four samples at 5 to 13 µg/L. Carbon disulfide was above the quantitation limit in three samples at concentrations of 1 to 4 µg/L. No MCLs or MCLGs were exceeded for any organic analyte. The only explosive reported was RDX in JH2-004-082 at 0.15 µg/L, which is the detection limit for RDX .

The SMCLs for aluminum (50 µg/L), iron (300 µg/L), and manganese (50 µg/L) were exceeded in all the Hydropunch® samples. The concentrations of aluminum and iron in 9 of the 12 Hydropunch® samples collected for total metals analysis were greater than twice the maximum background concentration in the background shallow well, MW-47B. The exceptions are the concentrations of total aluminum in samples IH2-001-082, JH2-002-082, and IH2-603-082.

Concentrations of total metals from samples gravity filtered through a decontaminated glass funnel and Baxter fluted qualitative (non-uniform pore size) pre-filter ranged from 263 to 13,200 µg/L for aluminum, 2,520 to 19,200 µg/L for iron, and 338 to 829 µg/L for

manganese. Concentrations of total metals from unfiltered samples from interval H2-3I, H2-3J, H2-4I, and H2-3J ranged from 276 to 93,600 µg/L for aluminum, 2,190 to 200,000 µg/L for iron, and 98 to 3,590 µg/L for manganese. The maximum concentrations for both pre-filtered and unfiltered total metals analysis of aluminum, iron, and manganese were in both samples from interval H2-4J. Concentrations of dissolved metals ranged from below detection limit (41 µg/L) to 5,140 µg/L for aluminum, 639 to 2,160 µg/L for manganese. The maximum concentration of dissolved aluminum, iron, and manganese were in the sample from H2-4J.

The concentration of dissolved lead in samples IH2-604-082 (113 µg/L) and JH2-004-082 (152 µg/L) and the concentration of total lead in samples JH2-004-082 (44.4 µg/L) and JH2-604-082 (70.8 µg/L) are greater than 15 µg/L. Lead was not detected, however, in the total metals analysis of sample IH2-604-082. The Action Level for lead is 15 µg/L.

The MCLs for arsenic (50 µg/L) and beryllium (4 µg/L) were exceeded in the dissolved metals sample JH2-004-082 (71.8 µg/L for arsenic and 10.7 for beryllium), and the total metals sample JH2-604-082 (114 µg/L and 20.8 µg/L, respectively). Laboratory documents state that the total metals sample for JH2-004-082 and JH2-604-082 were brown and cloudy. The total suspended solids (TSS) in the three samples that exceeded the MCLs for arsenic, beryllium, and lead ranged from 730 to 50,000 mg/L. The total suspended solids in the other nine Hydropunch® samples analyzed for metals ranged from 15 to 180 mg/L.

The concentrations of arsenic, lead and beryllium were not exceeded in any of the three monitoring wells in the cluster downgradient of the Administration Area (MW-48A, B, and D). Furthermore, arsenic and beryllium were not reported at high concentrations (i.e., exceeding five times the background soil concentration) in any of the soil samples collected at the former NOP during the OU1 RI (SEC Donohue, 1992b). Results are summarized in **Table 4-17B**.

4.3.2 Landfill Area

Samples from new Landfill Area monitoring wells (MW-52A, B; MW-53A, B, MW-54A, B; MW-55A, B; MW-56A, B) were analyzed for VOCs, SVOCs, explosives, pesticides, PCBs, dissolved metals, total metals and cyanide, water quality parameters, and gross alpha

and beta radioactivity. Pesticides, PCBs, and SVOCs were not detected above reporting limits or were found in the associated blank. TCE was above the MCL (5 µg/L) in MW-53A (8.0 µg/L), MW-53B (97 µg/L), and MW-56B (11 µg/L) (**Drawing 4-22**). TCE was also detected in MW-52A (3.0 µg/L) and MW-52B (1.0 µg/L) (**Drawing 4-22**). Other VOCs were detected above quantitation limits and not found in the associated blank, including total 1,2-DCE (10 µg/L) detected in MW-53B, cis-1,2-DCE detected in MW-52A, B, and MW-53B (2 µg/L), carbon disulfide detected in MW-53A (3 µg/L) and acetone detected in MW-55B (6 µg/L).None of these concentrations exceeded MCLs.

RDX and HMX were detected in MW-52B and A; MW-53B and A; and MW-56B. RDX was also detected in MW-54A, MW-55B and A, and MW-56A (**Drawing 4-13**). The highest concentration of RDX (4.8 µg/L) and HMX (1.9 µg/L) were in MW-53A (**Drawing 4-13**). No other explosive compounds were detected in the Landfill Area monitoring wells.

The concentration of aluminum (1,820 µg/L) and manganese (1,090 µg/L) in total metal (unfiltered) samples from MW-54B were greater than twice the maximum background concentration. The concentration of aluminum in the filtered sample was below the quantitation limit (41 µg/L) and the concentration of manganese was 6.0 µg/L. The boring log from well MW-54A shows a clay layer between 26.4 and 26.9 feet bgs, which is within the screen interval of MW-54B (24 to 29 feet bgs). Suspended clay may have contributed to the high total aluminum concentration in the sample from MW-54B. The concentration of nitrate plus nitrite (220 mg/L) in the sample from MW-52B was also greater than twice the maximum background concentration. Concentrations of nitrate plus nitrite exceeded the MCL in the sample from MW-62A (100 µg/L) and MW-56B (13 µg/L). Concentrations of nitrate plus nitrite were over 10 µg/L in 15 wells, 7 of which were shallow wells, 5 were intermediate wells, and 3 were deep wells.

In all samples analyzed for radioactivity, the MCL for gross beta (50 pCi/L) was not exceeded. The highest gross beta radioactivity was 10.21 pCi/L in the sample from MW-52A. Gross alpha radioactivity was detected in MW-54B and MW-56B, but the MCL (15 pCi/L) was not exceeded.

Results for the Landfill Area wells are summarized in **Table 4-18**.

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4.3.3 Atlas Missile Area

4.3.3.1 Monitoring Well Sampling Results

Monitoring wells in the Atlas Missile Area (MW-11A and clusters MW-18, MW-19, MW-40 through MW-46, MW-58, and MW-59) were sampled for VOCs, explosives, and water quality parameters. TCE was detected in 10 samples and exceeded the MCL in all 10. Those samples were: MW-18C (76 µg/L), MW-40B (1,800 µg/L), MW-40A (22 µg/L), MW-43B (46 µg/L), MW-44A (180 µg/L), MW-44D (7.0 µg/L). MW-45A (26 µg/L), MW-45B (99 µg/L), MW-45D (50 µg/L), and MW-58B (130 µg/L) (**Drawing 4-22**). The concentrations of all other VOCs were below MCLs. Other VOCs detected above quantitation limits and not detected in the associated blank were the following common laboratory contaminants: carbon disulfide (detected in 4 samples from 1 to 9 µg/L), toluene (detected in 4 samples from 1 to 30 µg/L), acetone (detected in 1 sample at 7 µg/L), and chloroform (detected in 1 sample at 15 µg/L).

Although TCE was detected in shallow wells MW-18C and MW-43B (**Drawing 4-10**), TCE was not detected in intermediate wells MW-18B and MW-43A (**Drawing 4-11**), or in deep wells MW-18A and MW-43D (**Drawing 4-12**). Layers of clay and silt at the base of the fine sand unit in the vicinity of these clusters may have prevented downward movement of TCE into the sand and gravel unit and the Omadi Sandstone. Refer to Section 5.0 for further discussion of the effect of these silt and clay layers on the transport of TCE.

Although the highest concentration of TCE in groundwater (1,800 µg/L) was in the sample from MW-40B, the nearest location where TCE was detected in soil gas (0.001 µg/L) was in a sample collected approximately 0.5 mile southeast of MW-40B (Law Environmental, 1990).

The only explosives detected were RDX (found in eleven samples) and HMX (found in three samples). RDX was detected in MW-11A; MW-18C, MW-42B,A, and D; MW-43B; MW-44B and A; and MW-45B, A and D. These wells are downgradient of the former Burning Grounds, the former Proving Range, and the Landfill, except for MW-11A, which is located within the former Proving Range and is downgradient of the North Burning Ground and upgradient of the South Burning Ground. HMX was detected in monitoring

wells MW-11A, MW-18C, and MW-43B. The highest concentration of RDX was 33 µg/L in MW-11A, and the highest concentration of HMX was 3.8 µg/L in MW-43B (**Drawing 4-23**). RDX was detected in 16 and HMX in 8 of the 122 laboratory analyses of soil samples collected at the Burning Grounds and Proving Range during the OU1 RI (SEC Donohue, 1992b).

Samples from MW-42B and A, MW-43B,A, and D; MW-44B,A, and D; and MW-46B had concentrations of nitrate plus nitrite greater than twice the maximum background concentration. The highest concentration of nitrate plus nitrite in the Atlas Missile Area monitoring wells was 590 mg/L in MW-46B. Concentrations of nitrate plus nitrite were over 10 mg/L in 15 wells, 7 of which were shallow wells, 5 were intermediate wells, and 3 were deep wells.

Analytical results are summarized in **Table 4-19**.

4.3.3.2 Hydropunch® Sampling Results

Explosives samples were collected from deep Hydropunch® locations G2-26, G2-27, G2-30 through G2-32, G2-34, and G2-39 VOC groundwater headspace screening samples from the deep Hydropunch® locations G2-25 through G2-27, G2-30 through G2-32, G2-34 through G2-36, and G2-39. RDX, the only explosive compound detected, was found in sample G2-30J-90 (0.28 µg/L) and G2-34J-43 (0.47 µg/L). Analytical results are summarized in **Table 4-20**.

4.3.4 Load Lines 1, 2, 3, and 4

Seventy-six monitoring wells (clusters MW-1 through MW-10, MW-16, MW-17, and MW-20 through MW-37, and wells MW-12A through 15A) were sampled for VOCs, explosives, and water quality parameters. TCE was detected above quantitation limits in 12 samples and was below the MCL in only 2. The samples which exceeded the MCL for TCE were MW-2B and A; MW-9B,A, and D; MW-12A; MW-21B; MW-23B; and MW-36B and A. Concentrations of TCE ranged from 1 µg/L (quantitation limit) in MW-33A to 300 µg/L in MW-9A, which is at Load Line 4 and is also downgradient of the Atlas Missile Area. A sample collected from MW-9B in September 1987 contained 742 µg/L of TCE

(USACE, 1989). Note that clusters MW-2, MW-12A, MW-21, and MW-23 are in vicinity of Load Line 1 and are in, or immediately downgradient of, the former AFBMD Tech Area.

The concentration of 1,2-dichloropropane in sample MW-14A (25 µg/L) was above the MCL of 5 µg/L. All other VOCs were not detected, were below quantitation limits, or were also detected in the associated blank, except for chloroform, PCE, acetone, toluene, and carbon disulfide. Carbon disulfide, a common laboratory contaminant, was detected above the quantification limit in eleven samples at concentrations ranging from 1 to 34 µg/L. Other common laboratory contaminants were also detected. Toluene (detected in five samples at 1 µg/L) acetone (detected in three samples at 6 to 16 µg/L), chloroform (detected in three samples at 3 to 26 µg/L), and PCE was detected in one sample at 3 µg/L, but was below the MCL.

The concentrations of nitrate plus nitrite in MW-36B (330 µg/L), MW-36A (510 mg/L), MW-36D (280 mg/L), MW-37B (110 mg/L), MW-37A (660 µg/L), and MW-37D (110 mg/L) were greater than twice the maximum background concentration. These six monitoring wells are the only Load Line 1, 2, 3 and 4 monitoring wells in the Platte River valley. The MCL for nitrate plus nitrite was exceeded in 10 of the other 70 Load Line monitoring wells, with a maximum value of 46 µg/L and 9 of these are shallow wells.

The most commonly detected explosive compound was RDX, which was detected in 24 samples at concentrations ranging from 0.16 to 98 µg/L, (at MW-5B which is at Load Line 2). HMX was detected in 4 samples at concentrations ranging from 0.94 to 45 µg/L and the sample from MW-5B had the highest concentration (45 µg/L). During the Confirmation Study (USACE, 1989), MW-5B was the only monitoring well in which RDX, TNT, and HMX were detected (at concentrations of 898, 48.8, and 60.0 µg/L, respectively). HMX was also detected during the Confirmation Study once at Load Line 1, twice at Load Line 3, once at Load Line 4, and eight times at the Burning/Proving Grounds. 121 of the 133 detections of HMX in laboratory analyses (not including field screening results) of soil samples collected during the OU1 RI were at Load Line 2 (SEC Donohue, 1992b). TNT and its degradation product TNB were detected in three and five samples, respectively. The highest concentration of TNT was 20 µg/L in MW-5B. The highest concentration of TNB was 2.2 µg/L in MW-2B. The sample from MW-5B also contained the only detection of 2,4-DNT at 0.97 µg/L, the only other explosive compound detected. More soil samples

exceeded the OU1 PRGs for TNT (22 mg/kg) and RDX (6.1 mg/kg) at Load Line 2 (120 total; 87 for RDX, 33 for TNT) than at Load Line 1 (70 total; 8 for RDX, 62 for TNT), Load Line 3 (35 total; 5 for RDX, 30 for TNT), and Load Line 4 (4 total; 1 for RDX, 3 for TNT). No samples from monitoring wells at the Site contained any explosive compounds without also containing RDX. RDX was found in wells MW-4B (Load Line 2), MW-5B (Load Line 2), MW-21B (Load Line 1), and MW-33A (Load Line 4), in the landfill, and also north of Load Line 1 in MW-16C and MW-22B.

Results are summarized in **Table 4-21**.

4.3.5 Platte River Alluvial Aquifer

4.3.5.1 Monitoring Well Sampling Results

Groundwater samples from monitoring wells MW-38A and D and MW-39A and D were analyzed for VOCs, explosives, and water quality. The only VOC detected, methylene chloride (a common laboratory contaminant), was also detected in the associated blank. The SMCL for Total Dissolved Solids was exceeded in the sample from MW-39D (630 µg/L). No explosives were detected in any of the wells. Analytical results are summarized in **Table 4-22**.

4.3.5.2 Hydropunch® Sampling Results

Fourteen groundwater samples (seven shallow and seven deep) collected with a Hydropunch® from the Platte River alluvial aquifer were analyzed for VOCs and explosives. The explosives samples were sent to MRI for laboratory analyses and the VOC samples were sent to PES in Salina, Kansas for headspace analysis using the same methods employed in the field. TCE was not detected in the headspace gas of any of the samples, although cis-1,2-DCE was detected in all but two of the samples at concentrations ranging from 0.2 to 6.5 µg/L. The highest concentration of cis-1,2-DCE was 6.5 µg/L in H-04J-95. No other VOCs were detected in the headspace analysis. RDX was the only explosive detected and was only found at location H-1. The concentration of RDX was 1.5 µg/L in sample H-01I-68 and 0.95 µg/L in sample H-01J-88.

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Analytical results are shown in **Table 4-23**.

4.3.6 Bomb Booster Area

The sample from monitoring well MW-57B was analyzed for VOCs, explosives, and water quality. Methylene chloride, a common laboratory contaminant, was detected in the sample from MW-57B but was also detected in the associated blank. No explosives were detected.

The concentrations of nitrate and nitrite as nitrogen in the sample from MW-57B, 57 mg/L, exceeded the MCL, (10 mg/L) but was less than twice the maximum background concentration. The level of Total Dissolved Solids (670 mg/L) was also above the SMCL, but less than twice the maximum background concentration. Analytical results are summarized in **Table 4-24**.

4.4 GROUNDWATER CONTAMINATION PLUMES

This section presents a summary of the analytical results organized by plumes of groundwater contamination. A plume consists of contamination (generally one specific chemical or a class of chemicals) from a single source or a group of similar sources. The direction of contaminant transport is generally dictated by the groundwater flow direction.

The plumes of groundwater contamination to be discussed are as follows:

- TCE plume with the suspected source at the Atlas Missile Area
- TCE plume with the suspected source at the AFBMD Tech Area
- Explosives plume with the suspected source at Load Line 1
- Explosives plume with suspected sources at Load Lines 2, 3, and 4, and the North Burning Grounds Area

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Historical site information does not suggest that there are sources of groundwater contamination other than the suspected sources listed above. The following summary of analytical results does not suggest that there are groundwater contamination plumes at the Site other than those listed above:

- SVOCs and pesticides/PCBs were not detected above the sample quantitation limits, or were found in the associated laboratory method blank samples

- Detected metals (total and dissolved)/cyanide concentrations were generally less than twice the maximum concentrations in the background samples, suggesting that the metals concentrations reflect regional groundwater chemistry

- Gross alpha and gross beta radioactivities were detected from samples collected from the Landfill Area, but the respective MCLs were not exceeded

Therefore, SVOCs, pesticides/PCBs, metals/cyanide, gross alpha and gross beta radioactivities are excluded from further discussion

Additionally, samples collected from monitoring wells in the Administration Area and the Bomb Booster Area did not have any significant detections of analytes. Therefore, monitoring wells located in the Administration Area and the Bomb Booster Area will not be discussed.

Contamination was detected in the Landfill Area well cluster upgradient of the landfill, MW-52, as well as other Landfill Area wells, MW-52 through MW-56. The level of explosives and volatile organic compound contamination quantified at the Landfill Area wells was generally no greater than the level of contamination quantified at the monitoring well clusters immediately upgradient and downgradient from the Landfill Area, MW-11 and MW-18, respectively. Review of **Drawing 4-9** shows that TCE concentrations in Landfill Area wells ranged from ND to 97 µg/L while the TCE concentrations in the nearby wells ranged from ND to 76 µg/L. Review of **Drawing 4-13** shows that RDX concentrations in Landfill Area wells ranged from ND to 4.8 µg/L while the RDX concentrations in nearby wells ranged from ND to 33 µg/L. Similar trends were reported for contaminants other than TCE and RDX. Additionally, the groundwater surfaces for shallow and intermediate

monitoring wells shown on **Drawings 3-13** and **3-14** indicate that the direction of groundwater flow from the landfill is towards MW-55 and MW-54. The level of TCE and explosives contamination in those two clusters is approximately the same or less than contamination in the other Landfill Area monitoring wells. Thus, the contamination quantified in the Landfill Area wells is not discernible from the groundwater contamination associated with Load Lines 1, 2, 3, and 4, the Atlas Missile Area, and the former Burning Grounds. The results from Landfill Area wells will be included in both the discussions for the TCE plume with the suspected source at the Atlas Missile Area and the explosives plumes with suspected sources at the load lines and the Burning/Proving Grounds.

Discussion of each plume will begin with the suspected source of the contamination. Information presented earlier in this report regarding the historical site use information and the soil gas and soil characterization data will be reviewed. Also, the direction of groundwater flow, which is indicative of contaminant transport direction, will be reviewed. The discussion of the extent of each plume will consist of a horizontal discussion and a vertical extent discussion. A "perimeter" of well clusters has been identified which surround the horizontal extent of contamination of each plume. Where applicable, groundwater screening results and the results of sampling with the Hydropunch® will be included in the discussion. Interior wells, (wells located within the perimeter of the plume) will be used to characterize the distribution of contaminant concentrations within the plume.

4.4.1 TCE Plume - Atlas Missile Area

4.4.1.1 Source Area

The Offutt Air Force Base Missile Site (Atlas Missile Area) was built by the General Dynamics Corporation between 1959 and 1960. As discussed in Section 1.3.2, historical site information (Koehler, 1992) suggests that TCE was released as ground spills and/or discharged into surface drainage features during the construction of the Atlas Missile facility during the period from 1959 to 1960. The exact locations, quantities, and dates of TCE disposal are not known.

Results of previous investigations at the Atlas Missile Area are discussed in Section 1.3.3.3. The soil gas results include TCE detected at concentrations of up to 9 µg/L in samples

collected at 6 feet bgs (Law Environmental, 1990). During the OU1 RI, TCE was detected in 7 out of 44 soil samples collected near the three missile silos and north of the loop road in the ditch draining the area of Silo 3. The highest concentration of TCE was 33 µg/kg in the soil sample from 9 to 10 feet bgs near Silo 1 (USACE, 1991).

Results of the OU2 soil gas and soil investigation are discussed in Section 4.1.2. The soil gas results are summarized in **Table 4-4** and shown on **Drawing 4-3**, and the estimated extent of TCE in soil gas is depicted on **Drawing 4-4**. Soil gas with TCE concentrations greater than 10 µg/L was found in an area which begins west-southwest of Silo 2 and extends in a southeasterly direction to the south of Silo 3. TCE was not detected above the quantitation limit (10 µg/kg) in the 24 unsaturated soil samples associated with 10 percent of the soil gas samples. Comparison between soil gas and soil results does not indicate a correlation between soil gas contamination and soil contamination. An associated methodology is not available to evaluate the transfer of TCE from soil gas to groundwater. Transfer of TCE from unsaturated soil to groundwater cannot be evaluated because TCE was not detected above quantitation limits in soil. Therefore, the OU2 soil data do not indicate a continuing source of TCE to groundwater. It is suspected that the areas of surface discharge of TCE are located in the region where the concentration of TCE in the soil gas is greater than 10 µg/L. The areas of surface discharge are suspected to be the historical sources of TCE to groundwater.

The site historical data and the Site characterization data discussed above indicate that the Atlas Missile Area was formerly a source of TCE to groundwater. The exact location of the source is unknown so the source area will be assumed to be located in the area where the TCE soil gas concentration is greater than 10 µg/L (**Drawings 4-3** and **4-4**). The north portion of the loop road is used to delineate the upgradient edge of the TCE plume.

4.4.1.2 Direction of Groundwater Flow

Groundwater head distribution and flow direction are discussed in Section 3.5.2. The groundwater surfaces, which are graphical representations of the gradients, are shown on **Drawing 3-13** through **Drawing 3-15**. The average groundwater gradient is 12 feet/mile with localized gradients being higher or lower. The gradient induces groundwater flow from the Atlas Missile Area towards MW-46 in a southeasterly direction. Groundwater flow is

in a southerly direction in the Platte River Valley. This includes the area of the confluence of Johnson and Clear creeks (MW-36, MW-38, MW-39, MW-44, MW-45, MW-46). The direction of groundwater flow was considered when characterizing the extent of TCE contamination with the suspected source at the Atlas Missile Area.

4.4.1.3 Extent of TCE Contamination

The horizontal extent of the TCE plume with the suspected source at the Atlas Missile Area is surrounded by the following perimeter of monitoring well clusters where TCE was not detected:

MW-1	MW-39
MW-7	MW-41
MW-8	MW-42
MW-11	MW-46
MW-19	MW-54
MW-35	MW-55
MW-37	MW-59
MW-38	

VOC results, including TCE, are presented on **Drawing 4-9**. The groundwater screening data shown on **Drawing 4-8** were also used to assist in the characterization of the horizontal extent of the TCE plume. Shallow groundwater screening locations where the concentration of TCE in the headspace gas was below detection limits or less than 1 µg/L which surround the horizontal extent include:

G2-2	G2-12
G2-3	G2-14
G2-4	G2-18
G2-7	G2-20
G2-8	G2-22
G2-9	

The justification for using screening locations where the detected concentration of TCE was less than 1 µg/L is that the detection limit of TCE in headspace gas is lower than the quantitation limit in groundwater. The choice of 1 µg/L was arbitrary because the correlation between the TCE concentration in headspace gas and the TCE concentration in groundwater is unknown. Deep (immediately above the bedrock surface) groundwater screening locations where the concentration of TCE in the headspace gas was non-detect or less than 1 µg/L which surround the horizontal extent include:

G2-2	G2-22
G2-3	G2-25
G2-4	G2-27
G2-8	G2-30
G2-9	G2-32
G2-12	G2-34
G2-14	G2-35
G2-18	G2-38
G2-20	

Shallow and deep (approximately the same interval as intermediate wells) samples collected with the Hydropunch® at H-1, H-2, H-3, H-4, H-5, H-6, and H-7 also surround the perimeter. The extent of the plume for shallow, intermediate, and deep groundwater is shown on **Drawing 4-10** through **Drawing 4-12**, respectively.

The distribution of TCE within the plume is characterized by the following well clusters located within the perimeter of the plume:

MW-9	MW-45
MW-18	MW-52
MW-36	MW-53
MW-40	MW-56
MW-43	MW-58
MW-44	

The justification for using screening locations where the detected concentration of TCE was less than 1 µg/L is that the detection limit of TCE in headspace gas is lower than the quantitation limit in groundwater. The choice of 1 µg/L was arbitrary because the correlation between the TCE concentration in headspace gas and the TCE concentration in groundwater is unknown. Deep (immediately above the bedrock surface) groundwater screening locations where the concentration of TCE in the headspace gas was non-detect or less than 1 µg/L which surround the horizontal extent include:

G2-2	G2-22
G2-3	G2-25
G2-4	G2-27
G2-8	G2-30
G2-9	G2-32
G2-12	G2-34
G2-14	G2-35
G2-18	G2-38
G2-20	

Shallow and deep (approximately the same interval as intermediate wells) samples collected with the Hydropunch® at H-1, H-2, H-3, H-4, H-5, H-6, and H-7 also surround the perimeter. The extent of the plume for shallow, intermediate, and deep groundwater is shown on **Drawing 4-10** through **Drawing 4-12**, respectively.

The distribution of TCE within the plume is characterized by the following well clusters located within the perimeter of the plume:

MW-9	MW-45
MW-18	MW-52
MW-36	MW-53
MW-40	MW-56
MW-43	MW-58
MW-44	

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Groundwater screening data were collected to assist in characterizing the extent of contamination prior to finalizing monitoring well locations. VOC samples collected from the Geoprobe® or the Hydropunch® are not comparable in terms of representativeness with monitoring wells because of the difference in construction procedures, development practices, and analytical procedures. The groundwater screening data collected at the following locations were used with caution to provide additional information when developing concentration contours:

G2-10	G2-31
G2-11	G2-36
G2-16	G2-37
G2-21	G2-39

G2-21 and G2-22 are located within the extent of contamination estimated from the perimeter of wells described at the beginning of this section. The shallow groundwater data from the two screening locations does not appear to be representative of actual conditions because the concentration of TCE was 0.01 µg/L at G2-21 and below detection at G2-22.

The highest area of TCE contamination characterized within the plume is in the vicinity of MW-40 which is downgradient from the suspected source area. TCE concentrations decrease both upgradient and downgradient of MW-40. This spatial distribution of concentrations suggests that a large quantity of TCE was released to the groundwater over a short time period. This "slug" type of release mechanism is consistent with site historical information which indicates that TCE was used during the short (1 1/2 years) period of missile silo construction.

The lack of contamination in the intermediate and deep monitoring wells at clusters MW-18 and MW-43 suggests that TCE contamination migration is occurring primarily in the fine sand unit, and vertical migration to the deeper units is being retarded by the silt and clay layers shown on **Drawings 4-11** and **4-12**.

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MECOEK 3419

4.4.2 TCE Plume - AFBMD Tech Area

4.4.2.1 Source Area

The U.S. Air Force acquired 34 acres of the northern portion of Load Line 1 (AFBMD Tech Area) from the U.S. Army in July 1959. As discussed in Section 1.3.2, historical Site information suggests that waste TCE was disposed in sanitary sewer drains (Koehler, 1992). The exact locations, quantities, and dates of disposal of TCE are not known.

Results of previous investigations at the AFBMD Tech Area are discussed in Section 1.3.3.4. The soil gas results include TCE detected at concentrations of up to 4 µg/L in two samples collected at the north end of the Inert Storage Building (Law Environmental, 1990). During the OU1 RI, TCE was detected in four soil samples collected northwest of the Inert Storage Building with the highest concentrations at 99 µg/kg in a sample collected from 3.4 to 4.4 feet bgs (USACE, 1991).

Results of the OU2 soil gas and soil investigation are discussed in Section 4.1.3. The soil gas results are summarized in **Table 4-8** and shown on **Drawing 4-5**, and the estimated extent of VOCs in soil gas at Load Line 1 is shown on **Drawing 4-6**. Soil gas with TCE concentrations greater than 10 µg/L was found in an area which begins at the north end of Load Line 1 and extends in a southwesterly direction to an area southwest of the former Receiving and Painting Building. TCE was not detected above the quantitation limit (10 µg/kg) in any of the 22 unsaturated soil samples associated with 10 percent of the soil gas samples. Comparison between soil gas and soil results does not indicate that there is any correlation between soil gas contamination and soil contamination. An associated methodology is not available to evaluate the transfer of TCE from soil gas to groundwater. Transfer of TCE from unsaturated soil to groundwater cannot be evaluated because TCE was not detected above quantitation limits in soil. Therefore, the OU2 soil data do not indicate a continuing source of TCE to groundwater. It is suspected that the areas of surface discharge of TCE are located in the region where the concentration of TCE in the soil gas is greater than 10 µg/L. The areas of surface discharge are suspected to be the historical sources of TCE to groundwater.

The site historical data and the site characterization data discussed above indicate that the AFBMD Tech Area was formerly a source of TCE to groundwater. The exact location of the source is unknown so the source area will be assumed to be located in the area where the TCE soil gas concentration is greater than 10 µg/L (**Drawings 4-5** and **4-6**). The north portion of the loop road is used to delineate the upgradient edge of the TCE plume.

4.4.2.2 Direction of Groundwater Flow

Groundwater head distribution and flow direction are discussed in Section 3.5.2. The groundwater surfaces, which are graphical representation of the gradients, are shown on **Drawing 3-13** through **Drawing 3-15**. The average groundwater gradient is 12 feet/mile with localized gradients being higher or lower. The gradient induces flow from the AFBMD Tech Area towards MW-24 in a southerly direction. The direction of groundwater flow was considered when characterizing the extent of TCE contamination with the suspected source at the AFBMD Tech Area.

4.4.2.3 Extent of TCE Contamination

The horizontal extent of the TCE plume with the suspected source at the AFBMD Tech Area is surrounded by the following monitoring well clusters where TCE was not detected:

MW-3	MW-24
MW-10	MW-25
MW-17	MW-26
MW-22	

COE 031569

MECOEK 3421

VOC results, including TCE, are shown on **Drawing 4-9**. The groundwater screening data shown on **Drawing 4-8** were used to assist in the characterization of the horizontal extent of the TCE plume. Shallow and deep groundwater screening locations which surround the horizontal extent include:

G3-1	G3-13
G3-4	G3-15
G3-7	G3-16
G3-8	G3-19
G3-12	

The extent of the plume for the shallow, intermediate, and deep groundwater is shown on **Drawing 4-10** through **Drawing 4-12**, respectively.

The distribution of TCE within the plume is characterized by the following well clusters located within the perimeter of the plume:

MW-2	MW-21
MW-12A	MW-23

4.4.3. Explosives Plume - Load Line

4.4.3.1 Source Area

The production facilities of the former NOP were initially active during World War II (all load lines were operational by January 1943). As discussed in Section 1.3.2, TNT, ammonium nitrate, aluminum, tetryl, and RDX were components of the munitions produced at the former NOP. During the typical load line process, explosives dust was washed from the interior of the load line building into numerous bucket trap sumps and an extensive drainage ditch system. Explosives spills inside the buildings were also collected in several bucket trap sumps and bomb wash pits and troughs. Concrete troughs or bomb wash pits of varying size appear to be settlement areas for the large amount of water used in the washing and cooling of bombs after production (SEC Donohue, 1992b). In 1945, the former

NOP was placed on standby and decontamination procedures were initiated. The decontamination procedures included cleaning, flushing and sweeping of floors, rafters, pipes and ventilation systems, flushing of contaminated drainage ditches, and removal and burning of contaminated soil. In 1950, the former NOP was reactivated during the Korean conflict. In 1956, the former NOP was once again placed on standby status and production of munitions was stopped permanently.

Results of previous investigations at Load Line 1 are discussed in Section 1.3.3.4. Explosives were detected in 197 of 362 laboratory samples (not including field screening samples). TNT was the most frequently detected compound (160 detections). Explosive compounds were mainly detected in ditches draining areas around the Amatol Screening and Amatol Pour buildings and the East Cooling Building. The former load line buildings are shown on **Drawing 2-6**. The highest concentration of TNT was 132,800 mg/kg in the ditch near the East Cooling Building (SEC Donohue, 1992b).

The site historical data and the Site characterization data discussed above indicate that Load Line 1 is source of explosives to groundwater. The exact location of the sources are unknown, however significant contamination was characterized in the vicinity of the diamond areas of Load Line 1 as discussed above. For the following characterization, the diamond area of the load line will be considered the source of the explosives plume.

4.4.3.2 Direction of Groundwater Flow

Groundwater head distribution and flow direction are discussed in Section 3.5.2. The groundwater surfaces, which are graphical representations of the gradients, are shown on **Drawing 3-13** through **Drawing 3-15**. The average groundwater gradient is 12 feet/mile with localized gradients being higher or lower. The gradient induces groundwater flow from Load Line 1 towards MW-24 in a southerly direction. The direction of groundwater flow was considered when characterizing the extent of explosives contamination with the suspected source at Load Line 1.

4.4.3.3 Extent of Explosives Contamination

The explosives plume from Load Line 1 has remained distinct from the explosives plume with the suspected source at Load Lines 2, 3, and 4, and the North Burning Grounds Area. The explosives plumes will be discussed in terms of the extent of RDX because RDX was detected in every groundwater sample in which explosives were detected.

The horizontal extent of the explosives plume with the suspected source at Load Line 1 is surrounded by the following monitoring well clusters where RDX was not detected:

MW-10	MW-25
MW-20	MW-26
MW-23	MW-28

Explosives results, including RDX, are shown on **Drawing 4-13**. The extent of the plume for shallow and intermediate groundwater is shown on **Drawing 4-14** and **Drawing 4-15**. Significant explosives contamination was not detected in deep groundwater.

The distribution of explosives within the plume is characterized by the following well clusters located within the perimeter of the plume:

MW-2	MW-21
MW-3	MW-24

RDX contamination was also detected in samples collected at MW-16 and MW-22 which are located upgradient from Load Line 1. Potential source areas for explosives have not been identified at the Bomb Booster Area or the Administration Area which are located upgradient from Load Line 1. RDX was not detected in laboratory soil samples collected at the Administrative Area and the Bomb Booster Area (SEC Donohue, 1992b). The concentrations quantified in samples collected from the shallow wells at MW-16 and MW-22 were 0.91 µg/L and 0.25 µg/L, respectively.

4.4.4 Explosives Plume - Load Lines 2, 3, and 4, and North Burning Grounds Area

4.4.4.1 Source Area

Historical Site information regarding explosives contamination at Load Lines 2, 3, and 4 is summarized in Section 4.4.3.1.

Approximately 340,000 pieces of ordnance were destroyed at the North and South Burning Grounds near the Landfill Area in 1946 (SEC Donohue, 1992b). During deactivation and decontamination of the NOP, explosive residues, and contaminated soil and sludge from the drainage ditches were removed and reportedly taken to the burning area (SEC-Donohue, 1992b).

Results of previous investigations at Load Line 2 are discussed in Section 1.3.3.5. Explosives were detected in 219 of 358 laboratory samples (not including field screening samples). RDX was the most frequently detected compound (185 detections) and TNT was the second most frequently detected compound (126 detections). Nearly one-half of the samples in which RDX was detected exceeded the PRG for RDX. In contrast, the PRG for RDX was exceeded in only 16 samples at the other 3 load lines. Explosives compounds were mainly detected in ditches draining areas around the Amatol Screening and Amatol Pour buildings and the Bomb Wash Pit north of the TNT Pour Building. The highest concentration of RDX was 23,270 mg/kg in a sample collected from a ditch on the east side of the Amatol Pour Building, and the highest concentration of TNT was 176,000 mg/kg in a sample from a ditch south of the Amatol Screening Building. That TNT concentration was also the highest concentration detected at the Site (SEC Donohue, 1992b).

Results of previous investigations at Load Line 3 are discussed in Section 1.3.3.6. Explosives were detected in 133 of 257 laboratory samples (not including field screening samples). TNT was the most frequently detected compound (107 detections). Explosives compounds were mainly detected in ditches draining areas near the Amatol Screening Building. The highest concentration of TNT was 29,700 mg/kg which was detected in one of the ditches mentioned above (SEC Donohue, 1992b).

Results of previous investigations at Load Line 4 are discussed in Section 1.3.3.7. Explosives were detected in 27 of 144 laboratory samples, the lowest frequency of detection for all four load lines. TNT was the most frequently detected compound (24 detections). Explosives compounds were mainly detected in ditches draining the east side of the Amatol Pour Building. The highest concentration of TNT was 29,650 mg/kg which was detected in the area of the Amatol Screening Building (SEC Donohue, 1992b).

Results of previous investigations at the Burning Grounds and Proving Range (**Drawing 4-13**) are discussed in Section 1.3.3.8. Explosives were detected in 30 of 122 laboratory samples. RDX was the most frequently detected compound (16 detections) and TNT was the second most frequently detected compound (15 detections). The highest concentration of RDX, 1,700 mg/kg, and the highest concentration of TNT, 313 mg/kg, were detected in samples collected from the South Burning Grounds.

The site historical data and the site characterization data discussed above indicate that Load Lines 2, 3, and 4, and the North Burning Grounds are sources of explosives to groundwater. The exact location of the sources are unknown, however significant contamination was characterized in the vicinity of the diamond-shaped areas of each load line as discussed above. For the following characterization, the diamond-shaped areas of the load lines and the burning/proving grounds will be considered the source of the explosives plume.

4.4.4.2 Direction of Groundwater Flow

Groundwater head distribution and flow direction are discussed in Section 3.5.2. The groundwater surfaces, which are graphical representations of the gradients, are shown on **Drawing 3-13** through **Drawing 3-15**. The average groundwater gradient is 12 feet/mile with localized gradients being higher or lower. Groundwater flows from Load Line 2 towards MW-32 in a southeasterly direction, and flow from Load Lines 3 and 4 are towards MW-35 and MW-36, respectively. Groundwater flows from the North Burning Ground towards MW-45 in a southerly direction. The direction of groundwater flow was considered when characterizing the extent of explosives contamination with the suspected sources at Load Lines 2, 3, and 4, and the North Burning Grounds.

COE 031574

4.4.4.3 Extent of Explosive Contamination

Groundwater contamination from suspected sources at Load Lines 2, 3, and 4, and the North Burning Grounds Area overlap to form a single explosives plume. The explosives plume will be discussed in terms of the extent of RDX because RDX was detected in every groundwater sample in which explosives were detected.

The horizontal extent of the explosives plume with the suspected sources at Load Lines 2, 3, and 4, and the North Burning/Proving Grounds Area is surrounded by the following monitoring well clusters where RDX was not detected:

MW-1	MW-28
MW-6	MW-30
MW-9	MW-36
MW-13A	MW-37
MW-14A	MW-38
MW-15A	MW-39
MW-20	MW-40
MW-26	MW-41

Additional groundwater samples were collected from approximately the same intervals as shallow and intermediate monitoring wells using the Hydropunch®, and the samples were submitted for laboratory analysis. The locations where RDX was not detected which surround the horizontal extent include:

H-1	H-5
H-2	H-6
H-3	H-7
H-4	

COE 031575

Samples for laboratory analysis of explosives were collected from the following deep groundwater screening locations. The locations where RDX was not detected which surround the horizontal extent include:

G2-26	G2-32
G2-31	G2-39

Explosive results are shown on **Drawing 4-13**.

The distribution of explosives within the plume is characterized by the following well clusters located within the plume:

MW-4	MW-35
MW-5	MW-42
MW-7	MW-43
MW-8	MW-44
MW-11	MW-45
MW-18	MW-52
MW-31	MW-53
MW-32	MW-55
MW-33	MW-56
MW-34	

RDX was detected in 35 of the 88 groundwater monitoring well samples associated with this plume. The concentrations ranged from 0.16 to 98 µg/L with the highest concentration in MW-5B.

The extent of the plume for shallow and intermediate groundwater is shown on **Drawing 4-14** and **Drawing 4-15**. Significant explosives contamination was not detected in deep groundwater.

COE 031576

4.5 DATA ASSESSMENT

The data assessment process provides information on potential analytical limitations of data based on regulatory or method specific QA/QC criteria. The review process may include assignment of data qualifiers (see **Tables 4-25, 4-26,** and **4-27** for a definition of data qualifiers) and generally provides a statement concerning data usability. Moreover, the ultimate goal is to ensure that data generated are scientifically valid, and legally defensible.

CompuChem Laboratories provided the level 1 QA/QC review as defined in the EPA Contract Laboratory Program (CLP) Statement of Work (SOW) and WCC completed the level 2 QA/QC data assessment which included a Contract Compliance Screen (CCS) and validation of data. One hundred percent of the VOCs, SVOCs, pesticides, and metals data were reviewed in a CCS and 12 percent of the VOC, SVOC, pesticides, and metals data were validated. The EPA CLP National Functional Guidelines for Data Review (USEPA, 1988c, 1990) were used as a guide for the CCS and data validation. Explosives data were validated by MRI per the CDAP, Part III.

The first part of the data assessment, the CCS, consists of reviewing analytical data summary sheets, instrument reports, raw analytical data for QA/QC parameters such as matrix spike (MS), matrix spike duplicate (MSD) results, detection limits, calibrations, Laboratory Control Samples (LCS), chain of custody forms, sample preparations, holding times, etc.

The second part of the data assessment, the data validation, is the systematic, structured process of evaluating, editing, screening, checking, verifying, and reviewing to assure that analytical data are in compliance with established criteria and are valid for the intended use. The purpose of the data validation is to evaluate whether laboratory performance and analytical data are in compliance with method requirements and project specifications for accuracy, precision, validity, and completeness. In addition to the CCS review, the data validation also consists of recalculating all laboratory data, standard calibration curves, detection limits, and carefully checking chromatograms and reconstructed ion chromatograms.

4.5.1 Data Validation

4.5.1.1 Phase I Data

The results of the Phase I data validation performed by WCC indicate that greater than 80 percent of the data are acceptable without any qualification. Of the 20 percent of the Phase I data with qualifiers, greater than 15 percent were qualified with J code only. Thus, 95 percent of the Phase I data are unqualified or J-coded, and are therefore usable. The degree of completeness as defined in the CDAP, Part III (Section 3.2.1.4) (WCC, 1992d) is more than 95 percent. Since greater than 95 percent of the Phase I data collected are usable, the overall quality objective for completeness was met.

All data qualified in the level 2 data assessment were the result of the CCS and the data validation did not directly result in the qualification of data. Findings of the Data Validation Report (**Appendix E** and **E-1**) are summarized below:

- **Sample Holding Times and Laboratory Preparations**

  Sample preparations, detection limits, reporting units, and analysis methods were correct as specified. Eight VOC samples exceeded holding times and should be qualified accordingly. All laboratory preparations were correct as specified. The correct analysis methods were followed.

- **Instrument Performance and Calibrations**

  Instrument (GC/MS) performance (tuning) was acceptable. The laboratory performed instrument tunings at the correct frequency (daily or every 12 hours) for VOC and SVOC analyses. Volatile and semivolatile compounds and inorganic analytes that did not meet criteria limits for initial and continuing calibrations were reported and should be qualified according to validation guidelines. Instrument performance checks for gas chromatographic analysis of pesticides were acceptable.

- **Laboratory Method Blanks**

  The majority of organic method blanks contained the common laboratory contaminants methylene chloride, acetone, and phthalate

compounds. Benzene, phenol, and 6 pesticide compounds were found in method blanks at a lower frequency. Over 100 positive sample results for one or more of the above compounds should be qualified not-detected (U) because of the laboratory method blank contamination. Inorganic method blanks contained aluminum, zinc, and sodium. These analytes should be qualified as not-detected (U) in appropriate associated samples according to validation guidelines.

- **Surrogate Recoveries**

  Surrogate compound recoveries were acceptable for all VOC analyses with the exception of one Trip Blank sample that should be qualified according to validation guidelines. One SVOC MSD sample analysis had low recoveries for surrogate compounds and should also be qualified accordingly. Thus, the laboratory demonstrated acceptable accuracy for VOC/SVOC organic analyses overall. Fifteen pesticide samples should be qualified because of low surrogate recoveries.

- **MS/MSD Analyses**

  MS/MSD analyses of VOC samples were acceptable with the exception of TCE which exhibited poor recovery and RPDs in two Sample Delivery Groups (SDGs). Surrogate performance for the analyses was acceptable and data do not require qualification.

  The SVOC MS/MSD analysis for two SDGs showed poor performance. A possible matrix effect was identified for one SDG and data were qualified. The laboratory appeared to have a preparation or procedural problem with the other SDG and data do not require qualification.

  Pesticides MS/MSD analyses were acceptable.

  MS data for metals failed criteria limits for 6 analytes in 5 samples and should be qualified accordingly.

- **Internal Standards**

  All internal standards for VOC and SVOC analyses met specified criteria and were acceptable.

- **Inorganic QA/QC**

  Inorganic data should be qualified because furnace post digestion spikes failed criteria limits for arsenic, lead, thallium, and selenium in 17 samples. In addition, in one sample arsenic should be qualified because of failed Method of Standard Addition (MSA) correlation coefficient criteria. The remainder of furnace atomic absorption QA/QC criteria were met for all inorganic analyses.

  Inductively Coupled Plasma (ICP) interference check samples were within control limits and acceptable. Samples that required ICP serial dilutions met criteria limits for recovery and percent difference.

  Precision for metals was demonstrated to be acceptable with duplicate analyses by the laboratory with the exception of 6 analytes, arsenic, iron, manganese, lead, copper, and zinc. These analytes were qualified in associated samples because of duplicate sample analyses that failed criteria limits for relative percent difference. Analytical accuracy was assessed using Laboratory Control Samples (LCS). All inorganic analyses met criteria for LCS recovery. Thus, the laboratory demonstrated acceptable accuracy for metals analyses.

- **Field Equipment Blank (Rinsate) and Travel Blanks**

  The majority of compounds found in equipment (rinsate) blanks were the common laboratory contaminants such as acetone, methylene chloride, toluene, phthalates, compounds commonly found in municipal drinking water (chloroform and bromodichloromethane) treated with chlorine, and carbon disulfide. A total of 5 rinsate samples contained carbon disulfide, with one sample containing 42 µg/L, resulting in 40 samples being qualified as not-detected. Toluene appeared in 6 rinsates resulting in 42 investigative samples qualified as not-detected for toluene. A total of 5 analytes was detected in the inorganic rinsate sample. Associated samples were qualified as not-detected for these specific analytes.

  Travel or trip blanks were clean overall. The effects of shipping the samples were negligible and did not have an effect on overall data quality.

- **Field Duplicate Sample Results**

  Precision shown for the groundwater duplicate samples is the result of the variability of analytical analyses, variability in collecting

environmental samples, compounds present as background contaminants, and analytical results close to the detection limit for several analytes. In addition, variability in soils duplicate results is the result of elemental heterogeneity found in soil matrices. This is not necessarily indicative of a sampling or laboratory precision problem. At µg/L and µg/Kg (parts per billion) concentrations, these factors are important and should be considered as contributors to the variance in field duplicate results.

- **MRI Laboratory Performance Summary**

  The review of the MRI explosives summary report showed that MRI followed their SOP defined in the CDAP. The correct preparation and analysis methods were used and specified quality control and quality assurance procedures were followed.

4.5.1.2 Phase II Data

One hundred percent of the soils Phase II investigative data (10 samples) were reviewed in a CCS by WCC using the EPA CLP National Functional Guidelines for Organic Data Review (USEPA, 1990). Results of the soil Phase II data assessment are presented in **Appendix E-1**.

All positive investigative VOC Phase II soil data (only the common laboratory contaminants methylene chloride and acetone were detected) should be qualified as not-detected (U) because of blank contamination. None of the soils data were qualified as unusable or rejected (R). Therefore, the overall data quality objective for completeness was met (as defined in the CDAP, Part III (Section 3.2.1.4) (WCC, 1992d) for the former Nebraska Ordnance Plant, Mead, Nebraska, November 1992, Phase II soil sampling event.

4.5.2 Data Usability

The data generated during the OU2 RI were reviewed and determined to be usable for their stated and intended purpose with minor exceptions. However, a recommendation is being made that some data be used with caution when interpreting the nature and extent of contamination since the data are used without any additional modifications or qualifications. These same data should be used with caution in the Feasibility Study (FS) and certain

limited data should not be used in the Baseline Risk Assessment (BRA). It is important to note that the primary contaminants of concern TCE, RDX, and TNT are not impacted and can be used as is.

Certain VOCs, SVOCs, metals, and pesticides data should be used with caution and further qualified as estimated values (J) or not detected (U or UJ). These cautions and qualifications are related to the following:

- Method blank contamination
- Instrument calibration
- Surrogate recoveries
- Matrix interferences
- Duplicate sample criteria
- Unacceptable matrix spike recoveries
- Unacceptable post digestion spikes
- Rinsate contamination
- Field blank contamination

As a result of this data assessment, the placing of qualifiers on these data as a result of data assessment does not invalidate the data but simply suggests that they be used with caution during subsequent analysis and manipulation.

The small amount of data which should be qualified as unusable are VOC data and include certain analyses for chloromethane, methylene chloride, acetone, 2-butanone, and 2-hexanone. The impact of this is also considered negligible because these are not compounds of concern and are quite frequently associated with laboratory contamination. Detection limits are considered unusable for these data because of instrument calibrations that failed specified criteria limits. The rationale for data qualification and a description of the data assessment process is included in the Data Validation Report (**Appendixes E** and **E-1**).

5.0
CONTAMINANT FATE AND TRANSPORT

The purpose of contaminant fate and transport analysis is to identify off-site areas potentially affected by contamination and to estimate contaminant concentrations in those areas. Contaminant concentrations, along with an estimate of the exposed populations of the off-site area will be used to estimate levels of exposure incurred as a part of the Baseline Risk Assessment. The fate and transport analysis will use information presented in earlier sections of this report concerning Site physical characteristics, contaminant source characteristics, and the nature and extent of contamination.

The fate and transport analysis begins with a discussion of the persistence of selected chemical classes identified in groundwater samples collected at the Site. The two components of contaminant persistence, chemical degradation, and contaminant mobility are discussed for explosives, VOCs, and inorganic compounds. The fate and transport analysis continues with the screening of potential routes of contamination. The screening process, outlined in USEPA (1988b), provides an initial direction and organization for the subsequent quantitative analysis as well as a consistent basis for fate and transport analysis. Contaminant migration will be quantitatively simulated for the predominant transport mechanisms identified during the screening process. The fate and transport analysis concludes with a quantitative analysis which incorporates factors identified in Section 5.1 and Section 5.3 affecting the transportation of the contaminants, such as sorption and solubility.

Section 5.0 will consider fate and transport in only the lower part of the Pleistocene aquifer. Groundwater transport simulation will be a two-dimensional analysis incorporating vertical averaging. Characteristics of fate and transport of the selected chemicals will be based on measured and estimated properties of the sand and gravel unit because the coarser-grained material has a greater hydraulic conductivity. Additionally, the hydraulic gradients for all three of the aquifer units are similar. Therefore, the potential for the highest groundwater flow velocities is estimated to be the greatest for the sand and gravel unit.

5.1 CONTAMINANT PERSISTENCE

This section presents a summary of the physicochemical properties of selected chemicals identified at the Site. A discussion of how these properties affect the persistence of the chemical class is also provided. The chemicals selected in this section represent the more prevalent compounds detected in soil, sediment, surface water, or groundwater at the Site.

Contaminant persistence is a medium-specific, relative indication of the decrease in concentration of a contaminant with time. Contaminant persistence consists of two components, chemical degradation and contaminant mobility. The degradation process is the breakdown of a chemical compound in the presence of sunlight, oxygen, chemical species, thermal influences, biological factors, or any combination of these factors. A low degradation potential indicates that a contaminant will have greater persistence in an environmental system. A high degradation potential indicates that a particular contaminant has a lower persistence.

Mobility is an indication of the movement of a solute with respect to the movement of the solvent in an environmental system (i.e. the rate of movement of a contaminant relative to groundwater in the saturated zone). An important factor used to characterize mobility in the saturated zone is the distribution coefficient, which is the affinity that a contaminant has for the aquifer matrix with respect to the groundwater. The greater the affinity for the aquifer matrix, the lower the mobility, and the greater the persistence of a contaminant in the saturated zone.

5.1.1 Persistence and Mobility of Explosives

This section discusses various factors of selected compounds detected at the Site that affect their persistence and mobility. Data for some compounds are unavailable while others, such as TCE and TNT, have been extensively studied. The general physical and chemical values are summarized in **Table 5-1**. Values used in the quantitative characterization of contaminant migration will be specified in Section 5.3.1

Processes affecting persistence and mobility include chemical processes (complexation/chelation, dehydrohalogenation, hydrolysis, ionization, oxidation/reduction,

and photolysis), phase change mechanisms (ion-cation exchange, precipitation/dissolution, sorption, volatilization), biological processes (biotransformation, bioaccumulation), and physical transport (diffusion, fallout, leaching, meteorological transport, and runoff). The degree to which these processes affect contaminants is dependent on the physicochemical properties of each contaminant, the medium, and environmental conditions.

In general, explosive compounds are generally susceptible to sorption and biotransformation, and, except for tetryl, are resistant to hydrolysis. Other general statements that can be made are that photolysis and biodegradation may occur at the surface and VOCs are more susceptible than explosives to biodegradation under aerobic conditions.

SVOCs are less mobile than VOCs due to lower water solubility. Most SVOCs are not readily susceptible to photolysis, hydrolysis, or oxidation, but are susceptible to biodegradation.

Inorganic compounds are susceptible to complexation, oxidation, precipitation, and sorption. Inorganic compounds are also characterized as having low mobility.

5.1.1.1 TNT (2,4,6-Trinitrotoluene)

TNT is subject to biological degradation and photolysis; however, depending on the rate of the degradation process, the chemicals may persist in environmental media for many years (Layton et al., 1986). Although TNT is more susceptible to photolysis than biotransformation, photolysis is only significant in surface soil and surface water. Fungi, aerobic bacteria, and anaerobic bacteria, which are capable of metabolizing TNT, have been reported in soils, muds, and fresh waters and their sediments (Burrows et al., 1989). Laboratory cultures supplemented with bacterial media have resulted in rapid TNT decreases of 100 mg/l or more (Burrows et al., 1989). Biotransformation rates and products have also been shown to be affected by pH level and oxygen concentration (Layton et al., 1986).

During a degradation study of pink water compounds (wastewater from TNT manufacturing) (Green and Kaplan, 1985) in soil, 4-amino-2,6-DNT (4-ADNT) and 2-amino-4,6-DNT (2-ADNT) were the primary microbial intermediates formed from TNT after soil columns were run continuously for 100 days (Greene, Kaplan, Kaplan, 1985). 2-ADNT and 4-ADNT

will undergo photolysis in surface water and are also susceptible to biotransformation under both aerobic and anaerobic conditions.

TNT has a relatively low to intermediate mobility in groundwater (Burrows et al., 1989). Based on a review of the available literature and the physicochemical properties of TNT, Spanggord et al. (1980) indicated that sediment adsorption would not likely be significant. Tucker et al., (1985), however, reported that adsorption in soil would be significant, based on experiments under a wide range of conditions. Cation exchange capacity and organic carbon content are the most critical environmental conditions affecting adsorption.

Adsorption and desorption appear to occur to the same extent. This suggests that, over time, continued leaching may remove TNT from soils. Oxidizing conditions decrease adsorption compared to reducing conditions. Reduction of TNT to 2-ADNT and 4-ADNT was observed during adsorption and desorption experiments. These products are more polar than TNT and have greater affinity for soil (Pennington, 1990).

5.1.1.2 RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)

Aerobic biotransformation has little, if any, effect on the presence of RDX in the environment. On the other hand, certain anaerobic sludge treatment systems with high supplemental nutrient levels were found to affect the reductive transformation of RDX. Methanol, formaldehyde, hydrazine, 1,1-dimethylhydrazine, and 1,2-dimethylhydrazine were the major products (Burrows et al., 1989). Aerobic biotransformation of RDX in environmental surface waters appears to be insignificant, and the significance of anaerobes in removing it from soils and standing water zones or bottom sediments is not clear (Burrows et al., 1989). It appears, however, that added nutrients are required and that microbial degradation will occur only where sediment microbial populations have adapted to mineralize RDX (Layton et al., 1986).

RDX is readily degraded photochemically. Several different pathways may be operative. Photolysis in water leads to the formation of nitrate, formaldehyde, and methylenedinitramine. Methylenedinitramine decomposes in water to form formaldehyde and nitrous oxide (Burrows et al., 1989). Formaldehyde is biodegradable both aerobically and anaerobically (Howard, 1990). Photolysis of RDX appears to increase with increasing

sunlight and ambient temperatures. Unlike TNT, the presence of decomposition products or humic substances does not accelerate the rate of photolysis (Layton et al., 1987). RDX is moderately adsorbed to soil and is considered mobile. Volatilization is not significant due to low vapor pressure. RDX has a low solubility and much of the RDX detected in wastewater from RDX production consists of undissolved particulates (Pal and Ryon, 1986).

5.1.1.3 2,4-DNT (2,4-Dinitrotoluene)

2,4-DNT has been shown to be biodegradable. 2,4-DNT is biotransformed more slowly and by fewer organisms than is TNT (Layton et al., 1987). A mixed culture has been developed that can grow on, and extensively degrade 2,4-DNT to carbon dioxide. Biotransformation involving nitro group reduction has also been observed (Burrows et al., 1989). DNT reduction products bind to humic materials as do the reduction products of TNT. The aromatic amine reduction products may undergo condensation reactions with carboxylate groups to form polyamides (Layton et al., 1986).

Photolysis of 2,4-DNT follows a similar course as TNT (Layton et al., 1986). Like TNT, rate enhancements for 2,4-DNT photolysis in natural waters has been observed and may be attributed to the action of humic acids as triplet sensitizers (Burrows et al., 1989). The presence of decomposition products also enhance the photolysis rate of 2,4-DNT. Photolysis occurs more rapidly under anaerobic conditions than aerobic (Layton et al., 1986).

2,4-DNT is moderately adsorbed to soils and is moderately mobile. It is not likely that DNT will be effectively immobilized via sorption to soils or sediments. Volatilization may be a significant environmental fate process due to a vapor pressure of 5.1×10^{-13} torr.

5.1.1.4 2,6-DNT (2,6-Dinitrotoluene)

Biodegradation of 2,6-DNT has been observed during laboratory experiments, however, supplemental nutrients appear to be necessary. The relative biodegradation rate of 2,6-DNT is approximately 3.7 times slower than for TNT (Layton et al., 1986).

The photolysis rate of 2,6-DNT is faster than of 2,4-DNT. The proposed photolysis mechanism is analogous to that of 2,4-DNT and TNT (Layton et al., 1986). The vapor

pressure of 2,6-DNT has been reported as 3.5×10^{-4} torr at 20°C, indicating that volatilization may be significant. 2,6-DNT is moderately mobile (Clement Associates, 1988).

5.1.1.5 Tetryl (2,4,6-Trinitrophenylmethylnitramine)

The environmental fate of tetryl parallels that of TNT because of the structural similarity of the two compounds. Tetryl, however, has a functional group (the methylnitroamino group) that is subject to hydrolysis. Also, because of this functional group, tetryl may bind to naturally occurring macromolecules, lipids, and proteins (Layton et al., 1986).

Tetryl in aqueous solution is completely photolyzed by sunlight in approximately 20 days. The major photolytic products are N-methylpicramide, nitrate, and nitrite (Burrows et al., 1989). Tetryl, unlike other explosives at the Site undergoes slow hydrolysis under environmental conditions (Burrows et al., 1989). The hydrolysis reaction increases with increasing pH (Layton et al., 1987). Specific information regarding other fate processes, such as biodegradation, was not found. It is reasonable to assume, however, that microbial action will reduce the nitro groups to amines (Layton et al., 1987). Tetryl's low distribution coefficient (Burrows et al., 1989) suggests that it is very mobile and may slowly leach to groundwater when released to soil. Volatilization from soil or water is not expected to be significant.

5.1.1.6 HMX (Octahydro-1,3,5,7-tetranito-1,3,5,7-tetrazocine)

Hydrolysis, oxidation, abiotic reduction, volatilization, sediment sorption, and bioaccumulation do not significantly affect HMX (Spanggord et al., 1982). Photolysis is the dominant transformation mechanism in aqueous environments. Aerobic biotransformation is also important in aqueous environments (Ryon et al., 1984).

Experiments showed that concentrations of HMX in soils decreased with depth from 20,000 ppm in the upper 10 cm to 150 ppm at 60 to 90 cm of depth (Ryon et al., 1984). The low solubility of HMX, 6.63 µg/L at 20°C, slows its migration through soil and produces low concentrations in groundwater (Ryon et al., 1984).

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5.1.1.7 TNB (1,3,5-Trinitrobenzene)

In the presence of nutrients and yeast extract, TNB was nearly completely degraded (Mitchell, Dennis, Burrows, 1982). One of the degradation products is 3,5-Dinitrobenzene (3,5-DNB). Extensive studies on the environmental fate of DNB has been conducted, but not on TNB. Studies of the effect of photolysis on TNB have been inconclusive. Studies on water contaminated with TNT and TNB showed an increase in TNB due to photodegradation of TNT into TNB.

5.1.2 Persistence and Mobility of Volatile Organic Compounds

5.1.2.1 TCE (Trichloroethene)

Oxidation of TCE has not been extensively researched because the available evidence suggests that organic degradation of chlorinated aliphatic compounds occurs under anoxic conditions (Olsen and Davis, 1990). Dehydrohalogenation of TCE is the removal of a chloride ion from one carbon ion simultaneously with the removal of a hydrogen ion from an adjacent carbon ion. Dehydrohalogenation occurs in the absence of bacterial activity with a half-life of 325 days (Cooper et al., 1987). The dehydrohalogenation half-life of TCE in soil in the presence of bacterial activity under field conditions is 230 days (Roberts, Schreiner, Hopkins, 1982). Hydrolysis of TCE occurs when a hydroxyl group replaces a chloride, although hydrolysis is not an important process in degradation of TCE.

TCE is weakly adsorbed to soils (Olsen and Davis, 1990) and is considered mobile. The irreversibility of adsorption and the difference in the rates of adsorption and desorption for TCE has been extensively studied, but not completely explained. The adsorption K_d value for an example provided by Mehren, Olsen, and Rector (1987) was 0.30 ml/g. The desorption K_d, however, was 2.0 ml/g. A possible explanation of this phenomenon is that portions of the substrata are accessible and that others (inner or poorly connected pores) are inaccessible. Desorption at accessible sites are governed by conventional equilibrium equations. Desorption from inaccessible sites are governed by first order rate equations (Karickhoff, 1984).

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Once released to the atmosphere, TCE has been reported to degrade to phosgene, dichloroacetyl chloride, and formyl chloride (Howard, 1990). The major degradation products of TCE released to groundwater have been reported to be isomers of dichloroethylene (DCE). The cis-1,2-DCE isomer was reported to be the major degradation product, whereas trans-1,2-DCE and 1,1-DCE are relatively minor products (Parson, et al. 1984).

5.1.2.2 Toluene

Toluene in near surface soil evaporates or undergoes microbial degradation. Toluene does not hydrolyze or photodegrade. Biodegradation in groundwater may be slow because at high concentrations toluene is toxic to microorganisms. Acclimated microbial populations may allow rapid degradation.

The K_{oc} value for toluene ranges from 37 (very mobile) to 160 (intermediate mobility) (Nathwani and Phillips, 1977). Infiltration of toluene depends on load, flow rate, soil characteristics, evaporation, and biodegradation.

5.1.2.3 Carbon Disulfide

If released on land, carbon disulfide will be primarily lost by volatilization. Comparison of adsorption by sterilized moist soil and unsterilized moist soil suggests that higher rates of "adsorption" in unsterilized soil is the result of microbial use (Bremner and Branwart, 1976). Adsorption time decreases with repeated dosing .

5.1.3 Persistence and Mobility of Metals

Metals are unique as chemical contaminants because they are also naturally occurring. Thus, metals exist in the environment at concentrations thought of as normal or background. The results of analyses (Section 4.0) revealed that numerous metals were detected at the Site.

Metals exist in solution as either free (uncomplexed) metal ions (e.g., Cd^{2+}, Zn^{2+}, Cr^{2+}), in various soluble complexes with organic or inorganic liquids (e.g., $CdSO_4$, $ZnCl^+$, $CdCl_3$),

or associated with inorganic or organic colloidal (McLean and Bledsoe, 1992). Metals may exist in soil under several conditions (Shurman, 1991):

- Occupancy exchange sites on specifically absorbed to inorganic soils constituents
- Associated with insoluble organic matter
- Present in primary or secondary minerals
- Precipitated mixed solids or pure solids (e.g., covalent compounds, hydroxides, oxides, salts)

The physicochemical properties of a salt are dependent upon the anion (e.g., chlorides, sulfates, carbonates, etc.) as well as the metallic cation. Although the identities of specific metal salts at hazardous waste sites are not usually known with certainty, generalizations may be made regarding the mobility and fate of these chemicals based on their compositions.

In general, inorganic compounds, including salts of metals, possess low vapor pressures that are basically unmeasurable. Thus, potential releases of metals to air through volatilization are not relevant for this class of contaminants. However, certain metals may exhibit affinities for soils through adsorption or ion-exchange mechanisms, and thus releases to air through fugitive dust emissions are possible. The adherence of metals to soil particles may also facilitate potential releases through surface runoff under conditions involving soil erosion (i.e., movement of soil particles off-site). Arsenic is an example of a metal that exhibits a significant affinity for certain soil types.

Fundamentally, the most important physicochemical property governing the mobility of metals is water solubility. The salts of metals may exhibit a wide range of water solubilities. Precipitation of salts of metals (e.g., Pb, Cd) with the anions prevalent in the groundwater at the Site (e.g., CO_3^{2-}) would inhibit the mobility of metals (McLean and Bledsoe, 1992).

The following sections discuss the environmental fate and transport of specific metals, transition metals, and metalloids. These include arsenic, cadmium, chromium, lead, and selenium.

5.1.3.1 Arsenic

Elemental arsenic (As) exists as a variety of compounds (arsenicals) which occur naturally or are synthetic. Naturally occurring arsenicals are found in soil, minerals, water, and food. Arsenic is the 20th most abundant element in the earth's crust with concentrations ranging between 60 and 188,000 parts per billion, depending upon the nature of the geological material in which the arsenic is entrained. It is found in the ores of copper, lead, cobalt, nickel, zinc, selenium, silver, and gold.

Arsenical compounds may undergo any of three general types of environmental reactions, including:

- Oxidation - reduction
- Methylation
- Hydrolysis

The transport of arsenic in soils is governed by adsorption/desorption processes. The colloidal fraction of soils, specifically clays, contain ferrous and aluminum oxides that readily adsorb arsenicals (Hingston, Posner, Quick, 1971). Thus, clay layers in soil effectively serve to retard the downward migration of arsenicals especially under oxidizing conditions favoring the formation of arsenate.

Methylation of arsenic may occur under both anaerobic and aerobic conditions and is generally attributed to soil microorganisms. In aquatic systems, phytoplankton are thought to be responsible for biomethylation reactions. The extent of methylation of arsenical compounds is oxygen-dependent. Anaerobic organisms produce dimethylated compounds, whereas aerobic organisms produce trimethylated compounds. Biomethylation represents a mechanism by which volatility of soil-borne arsenicals may be increased to the extent that release to air may occur. However, although biomethylation represents a relatively

important pathway in the environmental fate of arsenicals, quantitatively it produces relatively little impact on the air release of soil-borne arsenic.

The third general environmental reaction of arsenicals is hydrolysis. This reaction is relatively specific for the oxides of arsenic. The nature of hydrolytic reaction is dependent on the oxidation state of arsenic. Arsenic trioxide (A_2O_3) reacts with water to form arsenous acid, which, in turn, may yield three salts (ortho-, meta-, and phroarsenites). Arsenic pentoxide (As_2O_5) hydrolyzes in a slightly different manner in that initially three distinct acids (ortho-, meta-, and pyroarsenic acids) are formed. Each acid may then yield its respective salt. Arsenite formed by hydrolysis may subsequently undergo oxidation-reduction and/or biomethylation reactions.

In conclusion, the environmental chemistry of arsenic in soils favors the production of arsenate. Subsequently, the mobility of arsenates is limited by poor water solubility and high affinity for adsorption to clays. The low volatility of inorganic arsenic along with the tendency of adsorption to clays further limits the potential for air releases.

5.1.3.2 Cadmium

Cadmium exists in several oxidation states and readily forms a number of salts with varying degrees of solubility. The +2 oxidation state predominates in nature. Cadmium may be precipitated as cadmium carbonate or cadmium phosphate (McLean and Bledsoe, 1992).

In soil, sorption is an important fate and transport mechanism. Cadmium appears to have a selective adsorption affinity for oxides and/or hydroxides of iron, manganese, and aluminum. Soluble cadmium salts may be subject to hydrolysis at pH values encountered in the environment. Isomorphous substitution in carbonate minerals can also occur and results in reductions of aqueous cadmium concentrations.

5.1.3.3 Chromium

Chromium is found in various oxidation states ranging from +2 to +6. Only the trivalent (+3) and hexavalent (+6) forms are of biological significance. They are the most stable and common forms in the natural environment. The trivalent form of chromium is more

common in nature than the hexavalent form. However, the hexavalent form is of greater importance in industrial applications where dichromate is used as a powerful oxidizing agent.

Trivalent chromium readily forms precipitates with hydroxides, carbonates, and sulfides in soil. This property is a major mechanism for attenuation in soils along with adsorption to organic matter and clay minerals. Trivalent chromium salts are subject to hydrolysis, but subsequently precipitate as insoluble hydroxides, especially $Cr(OH)_3$.

Hexavalent chromium has been observed in deep groundwaters of the southwest at significant concentrations. It is not adsorbed to any significant degree by clays, ferric hydroxides, or ferric and manganese oxides, but may have some affinity for organic materials in soils and natural waters. These observations suggest that hexavalent chromium exhibits a greater mobility than many other heavy metals. However, as stated, environmental processes in soil ultimately result in the reduction of hexavalent chromium.

5.1.3.4 Lead

Lead salts characteristically exhibit poor solubility in water. As previously stated, lead chromate is insoluble in water. Lead oxide may exist as PbO, PbO_2, Pb_2O_4, or Pb_2O_3. The water solubilities of these forms vary and range from 2.3 mg/100 ml to insoluble. The quantities of lead released through the dissolution of lead oxide would, however, be subject to other processes that would attenuate the mobility of the ion.

In soil, lead may also precipitate as lead sulfide, lead phosphate, or lead carbonate (McLean and Bledsoe, 1992). Lead is also subject to adsorption, particularly on aluminum silicates. There is a great affinity between lead and organic matter in soil, and this process is more important in the fixation of lead in soil than either precipitation as the carbonate or sorption by hydrous oxides. Hydrolysis can be important at pH values greater than 5. Collectively, these processes attenuate the solubility, mobility, and bioavailability of lead. Benthic anaerobic microbes can methylate lead to form tetramethyl lead which is volatile and more toxic than inorganic lead.

5.1.3.5 Selenium

Selenium (Se) is naturally occurring, but a heterogeneously distributed element in the earth's crust and sedimentary rocks. It ~~is~~ seldom found in pure form and is more often associated within sulfide minerals or as selenides of silver, copper, lead, and nickel. Selenium compounds are found in soil, water, and air, as well as grains, cereal, and metal. Background concentrations of selenium in soil typically range from 0.1 to 2.0 mg/kg.

The environmental fate of selenium is influenced by its oxidation state and the associated chemical properties of its different forms. The common oxidation states of selenium are (-2), (+2), (+4), (+6), all of which may be found in soils under a variety of conditions. In alkaline, aerobic soils, selenates are the predominant chemical species. This form of selenium is highly soluble in water and exhibits low tendencies to sorb onto soil particles. However, in acidic soils, such as the surficial soils at the Site, selenium is present as the selenite anion which is firmly bound in iron oxides colloids. Other forms of selenium including selenides which are insoluble and relatively immobile in soil.

Inorganic selenium species can be methylated by microbes, soil fungi, and bacteria to organoselenides (such as dimethylselenide), resulting in the generation of volatile organic species which may be lost to the atmosphere from both soil and water surfaces. The oxidation of elemental selenium to selenite $(Se)_3^{-2}$ by microorganism activity has also been reported.

5.1.4 Summary of Contaminant Persistence

The persistence and mobility of the explosive compounds present at the Site are determined primarily by sorption, biotransformation, and photodegradation. Caution should be used when comparing K_d values for different compounds for two reasons: 1) different methodologies are available for computing K_d, 2) K_d is a function of aquifer properties which are by nature heterogeneous, and that heterogeneity will impact the K_d values spatially. TNT, the most strongly sorbing compound, has low mobility and a high affinity for soil versus water. RDX and 2,6-DNT are considered mobile compounds and tetryl is considered very mobile. Some biotransformation of TNT, RDX, and tetryl may occur. Biodegradation will probably not be significant, however, unless supplemental nutrients and

adapted microbial populations are available. Photolysis will be potentially significant only in surface waters. The compounds at the Site, therefore, persist in surface soils and slowly leach into the groundwater.

TCE is less sorptive and more soluble than TNT and 2,4-DNT, but is more sorptive and less soluble than RDX and tetryl. Unlike TNT, TCE has a greater affinity for soil during the desorption process compared to the adsorption process. Dehydrohalogenation of TCE is accelerated in the presence of bacterial activity, and can be significant under abiotic, anoxic conditions.

The fate and transport of inorganic compounds are determined primarily by water solubility complexation, oxidation, precipitation, and sorption mechanisms. These, in turn, are controlled by soil chemical interactions. Inorganic compounds, however, generally have relatively low potential for subsurface mobility.

5.2 SCREENING OF POTENTIAL ROUTES OF CONTAMINATION

The environmental screening assessment process for evaluation of contaminant fate in air, surface water, groundwater, soil, and biota, is outlined in USEPA (1988b). The screening assessment will be applied (as illustrated by **Drawing 5-1**) to the soil and groundwater contamination included in OU2. The screening process is a qualitative analysis of contaminant fate and transport which will provide initial direction and organization for the subsequent quantitative analysis by: 1) identifying the transport mechanisms, 2) qualitatively characterizing estimates of the rates of movements of contaminants, and 3) qualitatively identifying areas where contaminants may have been transported.

While Section 5.1 discussed the persistence of a number of compounds detected at the Site, the fate and transport analyses discussed in Section 5.2 and Section 5.3 will consider only the prevalent chemicals, TCE, RDX, and TNT. Further discussion of contaminant persistence will focus on the chemicals' properties of volatilization, solubility, and sorption.

The screening process will be used to characterize contaminant fate associated with a potential TCE source at the Atlas Missile Area, potential TCE and explosives sources at

Load Lines 1, 2, 3, and 4, potential contamination at the Administration Area, potential contamination at the Landfill Area, and potential contamination at the Bomb Booster Area.

5.2.1 TCE - Atlas Missile Area

Historical Site information (Koehler, 1992) suggests that TCE was released as ground spills and/or discharged into surface drainage features during the construction of the Atlas Missile facility during the period from 1959 to 1960. The exact locations, quantities, and dates of TCE disposal are not known.

As shown in **Table 5-1**, the vapor pressure of TCE is relatively high and therefore the volatilization rate is correspondingly high. The volatilization rate along with transpiration rates are indications of the potential for the transfer of TCE to the atmosphere over time. During the 33 year time period since the construction of the Atlas Missile facilities there has been significant potential for the volatilization of TCE from the surface or near surface soils. Similarly, the current potential for transfer of TCE to biota is minimal due to the effects of volatilization and transpiration. The current potential for atmospheric release of TCE is minimal in areas where TCE may have been spilled on surface soils because all volatilization would have occurred during the few years after any spill. The areas of drainage features which are potential surface TCE discharges areas may be characterized as relatively small in extent and relatively restricted in terms of access with regard to the total area of the Atlas Missile Area. It is anticipated that the potential exposure to TCE contaminated soil is minimal during agricultural activity (harvesting of volunteer grasses for hay) or military reserve training at the Atlas Missile Area.

The rate of movement of TCE in the groundwater was estimated by assuming that the TCE moves at the rate of the groundwater flow without dispersion, diffusion, or reduced (retarded) mobility. The regional groundwater gradient indicates that the prevalent direction for groundwater flow is to the south-southeast. A general characterization of the Darcy velocity, 0.3-foot/day, was calculated using the regional gradient of 12-feet/mile and the hydraulic conductivity 0.08-foot/minute (refer to Section 3.5 for hydrogeologic details). The effective porosity was estimated as 0.25 from an estimate of the specific yield of the sand and gravel unit presented in Piskin (1971). Specific yield is equivalent to the effective

porosity of an unconfined aquifer. The average linear velocity of groundwater, 2 feet/day, is given by the ratio of the Darcy velocity to the effective porosity.

For the purpose of qualitatively identifying the area where TCE may have been transported, a conservative assumption was made that the release mechanism was such that TCE entered the saturated zone at the beginning of the construction of the Atlas Missile facility (1959). The basis for this assumption is that TCE would be disposed directly into drainage features or on the ground surface and is immediately available to enter solution in surface water which percolates through the vadose zone to the saturated zone. Therefore, the period of TCE transport is 33 years, if transport has been continuing from 1959 until 1992. Multiplying the average linear velocity of the groundwater by 12,045 days (33 years), results in a transport distance of 5 miles (24,090 feet) in a linear, advective path in the general direction of the groundwater gradient with no dispersion or chemical interaction between the solute and the porous medium. The transport distance compared favorably to the extent of contamination as presented in Section 4.0. Samples collected from monitoring well clusters approximately 5 miles from the Atlas Missile Area (MW-36, MW-44, MW-45) contained TCE, while samples from clusters that are more than 5 miles downgradient of the Atlas Missile Area (MW-37, MW-38, MW-39, MW-46) did not contain TCE. In addition to monitoring wells, a review of the water well inventory (WCC, 1992g) indicates that there are numerous irrigation wells, domestic wells, and former NOP wells located in the area where TCE may have been transported as shown on **Drawing 5-2**. This area of potential TCE contamination also includes the NRD Reservoir and a portion of Johnson Creek immediately downstream from the reservoir.

5.2.2 TCE - AFBMD Tech Area

Previous investigations indicate that TCE may have been released as ground spills and/or discharged into surface drainage features during the operation of the AFBMD Tech Area located at the north end of Load Line 1. The screening of the potential routes of contamination originating from the AFBMD Tech Area is similar to the screening process for the Atlas Missile Area described in the Section 5.2.1.

The type of activity associated with the AFBMD Tech Area is unknown. A Department of the Army permit to the Department of the Air Force to use property on the Nebraska

Ordnance Plant referenced a "Nike Area" approximately one-half mile north of Load Line 1 and an "AFBMD Tech Area" at the north end of Load Line 1. The permit covered the period which began July 26, 1959 and ended July 25, 1964. The Army also continued to use the "Nike Area," during this period. It is assumed that DoD related activities did not take place prior to the effective date of the permit and the release of TCE at Load Line 1 occurred after the permit took effect. As discussed in Section 1.3.2, historical Site information suggests that TCE was used to clean missile parts at the north end of Load Line 1 and the waste TCE was disposed in sanitary sewer drains (Koehler, 1992). The exact locations, quantities, and dates of TCE disposal are not known.

As shown in **Table 5-1**, the vapor pressure of TCE is relatively high and therefore the volatilization rate is correspondingly high. The volatilization rate along with transpiration rates are indications of the potential for the transfer of TCE to the atmosphere over time. During the 33-year time period since the AFBMD Tech Area was initially permitted, there has been significant potential for the volatilization of TCE in the surface or near surface soils. Similarly, the current potential for transfer of TCE to biota is minimal due to the effects of volatilization and transpiration. The current potential for atmospheric release of TCE is minimal in areas where TCE may have been spilled on surface soils because all volatilization would have occurred during the few years after any spill. The areas of the suspected surface discharges of TCE may be characterized as relatively small in extent and relatively restricted in terms of access with regard to the total area of Load Line 1. It is anticipated that the potential exposure to TCE contaminated soil is minimal during agricultural activity (hay harvesting, cultivation of grain, storage of feed, dairy production).

The rate of movement of TCE in the groundwater was estimated as 2 feet/day in Section 5.2.1.

In qualitatively identifying the area where TCE may have been transported, it was assumed that the release mechanism was such that TCE entered the saturated zone at the beginning of construction of the Atlas Missile Area (1959) which would have coincided with the beginning of operations at the AFBMD Tech Area. The basis for this assumption is that TCE would be disposed directly into drainage features or on the ground surface and would be immediately available to enter solution in surface water which percolates through the vadose zone to the saturated zone. Therefore, the period of TCE contamination transport

is 33 years, if transport has been continuing from 1959 until 1992. Multiplying the average linear velocity of the groundwater (2 feet/day) by 12,045 days (33 years), results in a transport distance of 5 miles (24,090 feet) in a linear, advective path in the general direction of the groundwater gradient with no dispersion or chemical interaction between the solute and the porous medium. The transport distance did not compare favorably with the estimated extent of contamination which was estimated using quantified results. TCE contamination was not found in a number of samples collected from monitoring well clusters located within 5-miles (downgradient) of the AFBMD Tech Area (MW-10, MW-17, MW-28, MW-29, MW-20). This suggests that TCE may have been released to the subsurface at a date later than 1959. In addition to monitoring wells, a review of the water well inventory (WCC, 1992g) indicates that there are numerous irrigation and domestic wells located in the area where TCE may have been transported as shown on **Drawing 5-2**.

5.2.3 Explosives - Load Lines 1, 2, 3, and 4

Significant areas of surface and near surface soil contamination by explosives have been characterized by the remedial investigation for OU1 (SEC Donohue, 1992b). The explosives soil contamination will be discussed in Section 5.1.3 only as it pertains to a potential release mechanism for groundwater contamination. Initially the load lines operated between 1942 and 1945 with a second period of operation during the period from 1950 to 1956. The potential for discharge of explosives to the ground existed during and between the periods of operation and extending through the decommissioning period which ended in 1959. During operations, explosives dust or residue were routinely washed out of the load line facilities into local drainage features such as drain outfalls. Explosives contaminated water entered the saturated zone by infiltrating through the vadose zone. The OU1 RI characterized significant TNT contamination of surface and near surface soil at Load Line 1, and lesser TNT contamination near the diamond-shaped areas at Load Lines 2, 3, and 4, and the former Proving Grounds. The greatest extent of RDX contamination was characterized at Load Line 2, and smaller areas of extent of RDX contamination were characterized at the remaining load lines and the former Proving Grounds. Most of the contamination was associated with sumps located near the center of the load lines (diamond areas) where production activities took place. The source areas for the TNT groundwater contamination are assumed to be the areas of greatest soil contamination which are at Load Line 1 and

Load Line 2. The source area for the RDX groundwater contamination is assumed to be the area of greatest soil contamination which is at Load Line 2 soil contamination area.

The rate of movement of explosives in the groundwater was estimated by assuming that the contamination moves at the groundwater flow rate without dispersion, diffusion, or reduced (retarded) mobility. The average linear velocity of groundwater was estimated as 2 feet/day in Section 5.2.1.

In qualitatively identifying the area where explosives may have been transported, it was assumed that the release mechanism was such that explosives entered the saturated zone in the middle of the first period of load line operation (1943). The basis for this assumption is that the explosives were carried from the production buildings to the ground surface and ultimately the saturated zone in an indirect manner. The release mechanism for explosives involved the periodic decontamination of production facilities which would result in the drainage of explosives contaminated water from the buildings to the ground surface. The rate of the release of explosives to the ground surface and the vadose zone would be a function of the amount of explosives dissolved and/or suspended in the decontamination water and the frequency of the decontamination activities. Therefore, the period of explosives contamination transportation is 49 years if transport has been continuing from 1943 until 1992. Multiplying the average linear velocity of the groundwater (2 feet/day) by 17,885 days (49 years), results in a transport distance of 7 miles (35,770 feet) in linear, advective paths in the general direction of the groundwater gradient with no dispersion or chemical integration between the solute and the porous medium. Review of the extent of explosives contamination presented on **Drawing 4-14** and **Drawing 4-15** indicates that the explosives contamination does not extend the full 7 miles downgradient of Load Lines 1 and 2 and that there is significant contamination cross gradient from the Load Lines 1 and 2. The overestimation of the downgradient migration distance can be attributed to two factors: 1) explosives' mobilities are significantly retarded due to preferential partitioning to the porous media matrix (soil) relative to groundwater, 2) explosives may have been released to the saturated zone after 1943. The cross gradient contamination would indicate that Load Line 3 and Load Line 4 may also be potential sources. In addition to the monitoring wells shown on **Drawing 4-14** and **Drawing 4-15**, a review of the water well inventory (WCC, 1992g) indicates that there are numerous irrigation wells and domestic wells located in the area where explosives may have been transported as shown on **Drawing 5-2**.

5.2.4 Administration Area

The Administration Area was used to support activities at the former NOP including vehicle and equipment maintenance, chemical storage, laundry, an analytical laboratory, a hospital, and a locomotive maintenance shop. Currently, a styrofoam manufacturer (Midwest Industries) occupies part of the Administration Area buildings. The historical record and the results of previous investigations do not indicate that significant quantities of contaminants were released to the soils or the groundwater during DoD activities.

The extent of contamination characterized in Section 4.0 does not indicate that there have been substantial contaminant releases to groundwater in the Administration Area. Therefore, the results of this process for screening of potential routes of contamination indicate that there are no currently active transport mechanisms in groundwater at the Administration Area.

5.2.5 Landfill Area

The Landfill Area consists of a series of trenches near the sewage treatment plant. Aerial photos dated June 23, 1949 show evidence of land filling in this area. It is believed that during the operation of the NOP the trenches were filled with solid waste and covered with soil. The area is currently owned by the University of Nebraska which is reported to have buried low-level radioactive and infectious wastes at the Landfill Area. The University reports that there was trash at the ground surface prior to the University operations. The historical record and the results of previous investigations do not indicate that significant quantities of contaminants were released to the soils or the groundwater during DoD activities.

During the OU2 RI field activities discussed in Section 2.0, five well clusters consisting of two wells each were installed around the perimeter of the Landfill Area. As discussed in Section 4.4, the contamination quantified in the Landfill Area wells is not discernible from the regional contamination associated with Load Lines 1, 2, 3, and 4, the Atlas Missile Area, and the North Burning Grounds. Therefore, the results of the screening assessment process are inconclusive with respect to currently active transport mechanisms in groundwater at the Landfill Area.

5.2.6 Bomb Booster Area

The Bomb Booster Area was used to produce tetryl boosters for the detonation of bombs. After operation by the Army, the majority of the Bomb Booster Area structures were used as a fireworks factory. The fireworks supplies and equipment have been scattered about the buildings since the fireworks company abandoned the facility. Explosives from the fireworks company are still present in the abandoned buildings.

The extent of contamination characterized in Section 4.0 does not indicate that there have been substantial contaminant releases to groundwater in the Bomb Booster Area. Therefore, the results of this process for screening of potential routes of contamination indicate that there are no currently active transport mechanisms in groundwater at the Bomb Booster Area.

5.3 CONTAMINANT MIGRATION

A quantitative analysis was performed to simulate potential off-site transport of contaminants. The initial organization and direction for the analysis was set by the screening of potential routes of contamination discussed in Section 5.2. The quantitative analysis is a refinement of the advective pathline analysis presented in Sections 5.2.1 through 5.2.3. The quantitative analysis consisted of the application of a computer model to simulate groundwater transport including the processes of advection, dispersion, and retardation. Prior to the application of the model, a number of parameters necessary to perform the simulation were estimated including dispersion coefficients, contaminant release functions, and retardation factors. Five different scenarios were analyzed. Two of the scenarios simulated TCE transport originating at the Atlas Missile Area and the north end of Load Line 1, two of the scenarios characterized the migration of TNT from Load Lines 1 and 2, and one scenario simulated the transport of RDX from Load Line 2. All analyses were simulated in the Pleistocene sand and gravel unit because it is the unit where the greatest potential for the groundwater flow velocities were estimated. The five scenarios were based on the characterization of source areas provided in the supplemental OU1 Remedial Investigation (SEC Donohue, 1992b) and the characterization of potential TCE source areas presented in Section 4.0. Therefore the transport simulations will be independent of the extent of groundwater contamination characterized in Section 4.0. This

will allow a comparison between the simulated and measured groundwater concentrations Section 5.3.3.

Typically groundwater transport models are calibrated to each application by adjusting the input parameters so that the model output closely resembles the measured conditions. The transport simulations discussed in Section 5.3 were developed using physical parameters measured or estimated at the Site and no consideration of the extent of contamination (discussed in Section 4.0) was made prior to the execution of the simulations (i.e., no calibration was performed). Therefore, the validity of the nature and extent of contamination as illustrated on **Drawing 4-10** through **Drawing 4-15** can be evaluated by comparison with the simulated extent.

Drawings 4-11, 4-12, and **4-15** show that a leaky silt and clay layer at the base of the fine sand unit may be preventing vertical migration of TCE and RDX contamination from the fine sand unit to both the sand and gravel unit and the Omadi sandstone. The cross section illustrated on **Drawing 4-23** represents the vertical relationship between the contamination and the stratigraphy in the eastern portion of the Site. Potentially, the contamination is being transported primarily in the fine sand unit in areas where the leaky silt and clay layer is present, and the contamination migrates vertically to the lower units when the layer is not present. Simulation of vertical migration between aquifer units is beyond the scope of the quantitative simulations presented in this section.

5.3.1 Migration Factors

A number of physical characteristics of both the porous media and the contaminants were estimated using the best available information. These characteristics include the contaminant release mechanisms, the dispersion coefficients, the average linear groundwater velocity, the retardation factors, and the decay factor of the solute. When representative Site data were not available, conservative estimates of migration factors were used so that the resulting simulation would be the case where the contaminant has been transported the longest distance in the shortest time. The migration factors described in Sections 5.3.1.1 through 5.3.1.5 will be used as input during the computer simulation which is discussed in Section 5.3.2.

5.3.1.1 Release Mechanisms

Release mechanisms refer to the processes where contaminants are introduced into the groundwater flow domain. Primary sources of TCE at the Atlas Missile Area and Load Line 1 are surface spills. The primary explosives sources at the Administrative Area, Bomb Booster Area, and Load Lines 1, 2, 3, and 4 are areas of surface soil contamination. These contaminated areas are commonly in surface drainage features associated with ordnance production wash water sumps.

Contaminants may be released to the saturated zone through a number of mechanisms. The exposure may occur when water is used to wash explosives dust from buildings and equipment or when surface water or precipitation mixes with contaminants which have been spilled or discharged on to the ground surface. Through the process of infiltration, the contaminants in solution travel through the vadose zone to the saturated zone. If the surface spill or discharge of a liquid contaminant such as TCE is of sufficient volume, phase contaminants may travel through the vadose zone and enter solution upon reaching the saturated zone. These and other release mechanisms require detailed information concerning the nature of the initial release of the contaminant to the environment. At this site, the dates that explosives and TCE were introduced to the environment, the location of the introduction, and the volume are not documented and therefore are not known. However, investigations have indicated where contaminants are currently present in surface soils or soil gasses. Because of the high degree of uncertainty associated with the release of the contaminants, a number of conservative assumptions were made with regard to the introduction of contaminants to the saturated zone. Contaminant migration through the vadose zone will not be characterized because it is assumed that the contaminants reached the saturated zone shortly after the use of each contaminant began at the Site, as discussed in Section 5.2. The assumed dates of contaminant releases are summarized in **Table 5-2**.

The groundwater simulation is sensitive to the initial concentration of contamination which is the concentration introduced to the saturated zone at the source. Changes in the value of the initial concentration directly impact the simulated concentrations downgradient from the source. If the initial concentration is too high or too low, the simulated concentrations downgradient will be too high or too low, respectively. The more conservative approach is to have the simulations overestimate rather than underestimate the concentrations. Thus an

approach has been used which potentially overestimates the initial concentration. The initial concentrations of each contaminant at each area were characterized in the same manner. After reviewing the results of the OU1 and 2 soil gas investigations and the OU1 soil sampling efforts, general areas of surface and near surface contamination were identified as shown on **Drawing 5-3**. The source areas are not known, however it is suspected that the TCE source areas at the Atlas Missile Area and the AFBMD Tech Area are smaller subareas of the regions where TCE was detected in soil gas at concentrations greater than 10 µg/L. Because of the uncertainty, the simulated source areas of TCE will be assumed to be the areas shown on **Drawing 5-2** which include the areas where TCE was detected in soil gas at concentrations above 10 µg/L. The OU1 soil sampling efforts indicated that explosives soil contamination is associated with sumps and drainages located near the diamond-shaped areas of the load lines. It is suspected that the explosives sources to groundwater are in the vicinity of the soil contamination. The simulated source areas of explosives will be assumed to be the areas shown on **Drawing 5-2** which include the soil contamination areas. The use of large source areas during transport simulations will generate higher initial concentrations and greater lateral extent of simulated contamination than the use of smaller source areas. It was assumed that a volume of water equal to the product of each source area and the rate of infiltration, 2.3 in/yr (Piskin, 1971), would be saturated with the particular contaminant. The volume of contaminant saturated water is then assumed to be diluted by the volume of groundwater that would flow under the source area in a year, and the contaminated groundwater is assumed to be vertically averaged over the saturated thickness of the Pleistocene aquifer. Therefore, the initial concentration which is used in the groundwater transport simulation is a function of the solubility of the contaminant in water, the infiltration rate, the groundwater (Darcy) velocity, the size of the source area, and the thickness of the saturated zone. **Table 5-2** summarizes the initial contaminant concentrations.

The transport simulation will follow the assumption that the groundwater sources are continuous with the constant initial concentrations given in **Table 5-2** beginning at the time of the assumed release and continuing through 1992. This particular assumption should simulate larger areas of elevated concentrations compared to simulations of releases over shorter time periods.

5.3.1.2 Dispersion Coefficients

Two components of groundwater transport of contamination are advection and dispersion. Advection is transport as a consequence of potentiometric (head) differences. Dispersion refers to mixing and spreading of a solute due to molecular diffusion and micro- and macroscopic differences in groundwater velocity. The preliminary analysis discussed in Section 5.2 considered only advection as a transport process. The groundwater modeling discussed in this Section 5.3.2 simulates both advection and dispersion.

Constants, called the coefficients of dispersion, are used to account mathematically for the mixing and spreading of solutes during transport simulation. The longitudinal coefficient of dispersion accounts for dispersion along the flow path and the transverse coefficient of dispersion accounts for dispersion normal to the flow path.

Dispersion coefficients may be characterized in a number of ways including calibration of a numerical model, quantitation of the heterogeneity of the hydraulic conductivity field at a particular site, review of regional dispersivities, or literature review. For the purpose of the groundwater modeling discussed in Section 5.3.2, the dispersivities will be estimated from literature values. Anderson (1979) compiled a list of dispersivities for alluvial sediments which will have dispersivities similar to the dispersivity of the glacio-fluvial Pleistocene deposits at the Site. The value of 40 m (130 ft) for the longitudinal coefficient of dispersion and 12 m (39 ft) for the transverse coefficient of dispersion were estimated from the range of literature values.

5.3.1.3 Average Linear Velocity

One of the most sensitive migration factors is the rate of groundwater flow. At a macroscopic scale, the spatial variation of groundwater flow caused by the natural heterogeneity of the aquifer system accounts for the dispersive nature of contaminant transport. At a more regional scale, the changes in groundwater flow patterns due to aquifer stresses (such as extraction pumping) also influence the groundwater transport pattern. Numerous irrigation wells, municipal wells, commercial wells, and domestic wells downgradient from the Site were identified in Section 3.5.7. Of these wells, the irrigation wells have the greatest potential to impact contaminant migration at the Site during the

irrigation season because of the number of irrigation wells in the immediate vicinity, their large radius of influence, and the high pumping rates associated with irrigation. Potential impacts include additional dispersion of the contaminant plumes because of diverging flow patterns and reduction of the contaminant concentrations due to mass extraction. Due to an unusually wet summer season during the OU2 RI field activities, the irrigation season was shorter than usual, and groundwater flow was not impacted by irrigation wells. In any case, it is beyond the scope of this groundwater transport analysis to characterize non-uniform groundwater flow.

The average linear velocity used in the simulation is the uniform value of 2 feet/day which was initially discussed in Section 5.2.1. The direction of the groundwater flow from each source is shown by the gradients represented on **Drawing 3-13** through **Drawing 3-15**.

5.3.1.4 Retardation Factor

The retardation factor is the ratio of the velocity of a contaminant in a groundwater system to the velocity of the groundwater. The retardation factor is a function of the distribution coefficient and the porosity and bulk density of the porous media. Warrick and Amoozegar-Ford (1981) gave an average value for bulk density for groundwater aquifers as 1.4 g/cm^3, and the effective porosity was estimated as 0.15 in Section 5.2.1.

The distribution coefficient is an equilibrium constant relating the mass of solute sorbed to the porous media and the mass of solute remaining in solution. Soil properties are estimated by calculating the distribution coefficient as the product of the fraction of organic carbon (foc) in the porous media and the distribution coefficient normalized for organic carbon content. The average value of total organic carbon samples collected from the saturated Pleistocene deposits at the Site was 255 mg/kg (foc=0.000255). The retardation factors for RDX, TCE, and TNT were estimated using the physical constants discussed above and normalized distribution coefficients found in the literature. **Table 5-3** lists the retardation factors used in the transport simulation.

5.3.1.5 Decay Factor of the Solute

As discussed in Section 5.1, TCE and explosives degrade to a number of different products. The decay process will not be simulated in the transport analysis. Therefore, the simulated extent of TCE and explosives will be assumed to include the extent of any potential TCE and explosives degradation products.

5.3.2 Groundwater Modeling

A modified version of a FORTRAN computer model presented in Javandel et. al. (1984) was used to simulate groundwater transport. The mathematical model uses a numerical approximation of an analytical solution for the two-dimensional advection-dispersion equation. The computer code was modified slightly by including a Gaussian quadrature integration subprogram as given by Press et. al. (1986) in place of the original library subroutine. Results simulated by the modified code were compared favorably to tabulated results published in Javandel et. al. (1984).

The model allows simulation of two-dimensional groundwater transport considering convection, dispersion, decay, and adsorption in porous media. For the purpose of the simulations documented in this section, decay of the solute over time was considered negligible. The two-dimensional aspect of the model required vertical averaging over the flow and transport domain. The porous medium was represented as homogenous and isotropic with a unidirectional steady state flow field. Therefore, changes to the flow field due to seasonal stresses such as irrigation pumping were not considered during the analysis. The model presents results in terms of the simulated unitized concentration which is the ratio of the simulated concentration to the simulated initial concentration at the source.

5.3.3 Discussion of Groundwater Modeling Results

Drawing 5-3 shows the results of the groundwater simulations. The contaminant concentrations have been unitized for all plumes by dividing the simulated concentrations by the initial concentrations at each source.

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Table 5-4 is a comparison of the Load Line 1 simulated TCE contamination to the measured contamination. The simulated unitized concentration is estimated at the monitoring well cluster using the plumes shown on **Drawing 5-3** and the unitized concentration is multiplied by the estimated concentration ~~of~~ TCE at the source. The comparison with the measured value is made by computing the ratio of the simulated concentration to the greatest concentration measured in a sample collected at that well cluster. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison. For the case where the greatest measured concentration at a cluster is below quantitative limits and the simulated concentration is estimated to be greater than zero, the value given in **Table 5-4** is the ratio of the measured concentration (which is assigned the value of 1 µg/l corresponding to the low-level detection limit) compared to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parentheses. At the well clusters (MW-2, MW-12A, MW-21, MW-23) nearest to the former AFBMD Tech Area (the simulated source area), the simulated values overestimate the measured values by a factor of 14 to 206. This indicates that the estimated concentration of the source, 20 mg/l, may be too high by a factor of approximately 100 (i.e., better results would be obtained if the simulated source was assigned the value of 200 µg/l). In general, the simulation overestimates the extent and magnitude of the Load Line 1 TCE contamination because the simulated initial concentration potentially overestimated the true initial concentration. The TCE may have also reached the saturated zone after the assumed 1959 release date because the simulation overestimated concentration values at downgradient clusters MW-10 and MW-24.

Table 5-5 is a comparison of the Load Line 1 simulated TNT contamination to the measured contamination. The table was computed in a manner similar to that described for **Table 5-4**. The simulated concentration at well cluster MW-2 near the source underestimates the measured concentration of TNT by a factor of approximately 200. At well locations further downgradient (MW-21, MW-10), the measured values are below quantitation limits while the simulated values are relatively high. In general, the simulation overestimates the extent and magnitude of the Load Line 1 TNT contamination because the simulated initial concentration potentially overestimated the true initial concentration. The TNT deposited in the drainage structures may have gone into solution at concentrations much lower than the solubility limit, therefore effectively reducing the concentration of TNT in the saturated

zone immediately below the simulated source. The TNT may have also reached the saturated zone after the assumed 1943 release date.

Table 5-6 is a comparison of the Load Line 2 simulated RDX contamination to the measured contamination. The table was computed in a manner similar to that described for **Table 5-4**. The simulation overestimates the magnitude of downgradient concentrations (MW-31, MW-34, MW-37) and underestimates the cross gradient nature of the contamination. In general, the simulation overestimates the extent and magnitude of the Load Line 2 RDX contamination because the simulated initial concentration potentially overestimated the true initial concentration. The RDX deposited in the drainage structures may have gone into solution at concentrations much lower than the solubility limit, therefore effectively reducing the concentration of RDX in the saturated zone immediately below the simulated source. The RDX may have also reached the saturated zone after the assumed 1943 release date. The simulation assumes that there is a single RDX source at Load Line 2 while the measured contamination indicates that the other load lines and the Burning/Proving Grounds may also be potential sources of RDX.

Table 5-7 is a comparison of the Load Line 2 simulated TNT contamination. The table was computed in a manner similar to that described for **Table 5-4**. The simulation overestimates the magnitude of the concentrations (MW-5, MW-31) while underestimating the cross gradient nature of the extent of contamination. In general, the simulation overestimates the extent and magnitude of the Load Line 2 TNT contamination because the simulated initial concentration potentially overestimated the true initial concentration. The TNT deposited in the drainage structures may have gone into solution at concentrations much lower than the solubility limit, therefore effectively reducing the concentration of TNT in the saturated zone immediately below the simulated source. The TNT may have also reached the saturated zone after the assumed 1943 release date. The simulation assumes that there is a single TNT source at Load Line 2 while the measured contamination indicates that the other load lines may also be potential sources of TNT.

Table 5-8 is a comparison of the simulated TCE contamination (with the source at the Atlas Missile Area) to the measured contamination. The table was computed in a manner similar to that described for **Table 5-4**. The simulation overestimates the concentration in the vicinity of the source area (MW-40, MW-41, MW-58), in the Landfill Area (MW-11,

MW-18, MW-52 through MW-56) and downgradient of the Landfill Area (MW-43). In contrast, the simulation underestimated the concentration at the edge of the contamination (MW-36, MW-44, MW-45). In general, the simulation overestimates the magnitude of the contamination because the simulated initial concentration potentially overestimated the true initial concentration. Additional overestimation of near-source concentration may potentially be caused by the continuous nature of the simulated source area while the actual release of TCE may have occurred over a limited time period. The underestimated extent of TCE contamination simulated in the vicinity of the downgradient edge of the plume may be due to the uniform nature of the simulated flow field. The actual flow field is non-uniform and localized gradients in the vicinity of Johnson Creek and the nearby tiled fields may induce higher groundwater flow velocities with respect to other areas of the flow regime. An additional explanation for the underestimated cross gradient extent of TCE, as characterized by the simulations, include pumping effects of extraction wells. Explanations for the underestimated downgradient extent of TCE include pumping effects of extraction wells and a lower infiltration rate than what was assumed during the simulation.

Over a given time period, the potential for migration distances increases with increasing velocity. Higher groundwater levels are present at the north part of the Landfill Area due to the nearby NRD Reservoir. The groundwater mounding beneath the NRD Reservoir could potentially retard or redirect the flow of groundwater immediately upgradient of the reservoir, thus slowing the transport in the vicinity of the reservoir (including portions of the Landfill Area).

5.4 FATE AND TRANSPORT SUMMARY AND CONCLUSIONS

The environmental screening assessment process indicated that there was sufficient cause to consider quantitative estimation of the fate and transport of TCE released from the Atlas Missile Area, TCE from Load Line 1, and explosives from Load Lines 1, 2, 3, and 4. The preliminary analysis estimated that explosives may have traveled up to 7 miles from their source and TCE may have traveled up to 5 miles.

It cannot be concluded that the landfill is a source of contamination to groundwater because the contamination quantified in the Landfill Area wells is not discernible from the regional

contamination associated with Load Lines 1, 2, 3, and 4, the Atlas Missile Area, and the North Burning Grounds.

The results of the environmental screening assessment process, supported by the extent of contamination characterized in Section 4.0, indicate that there are no currently active transport mechanisms in groundwater at the Administration Area, or the Bomb Booster Area.

The ensuing quantitative analyses compared the nature and extent characterizations presented in Section 4.0 to migration patterns simulated using measured and estimated physical flow and transport parameters. The impact on vertical migration of the leaky silt and clay layer at the base of the fine sand was beyond the scope of the migration simulations. Some of the factors which caused discrepancies between the simulated and measured concentrations were the overestimation of the simulated initial concentrations at the source areas, and that the contaminants may have entered the saturated zone after the assumed release dates. However, the validity of representing the off-site areas potentially affected by contamination, and the characterization of the off-site contaminant concentrations by the nature and extent characterizations of Section 4.0 were confirmed by the simulations.

The fate and transport analyses discussed in this section support the hypothesis that there are no large areas of DNAPLs (particularly TCE) at the Atlas Missile Area or Load Line 1. During the simulation of TCE transport at both areas, the assumption was made that TCE entered the saturated zone at the TCE solubility limit in water. Simulated values at both areas were orders of magnitude greater than the measured values, which suggests that TCE entered the saturated zone at concentrations much lower than the solubility of TCE in water. It is concluded that phase TCE is not present in groundwater in detectable quantities. The conclusion is reinforced by the highest concentration of TCE quantified (1,800 µg/L in sample BMW-040-082) which is approximately 1/600th the solubility of TCE (1,100,000 µg/L).

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6.1 SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

6.1.1 Soil Gas

At the Administration Area, TCE was detected in 12 soil gas samples. TCE was mainly east of the former administration buildings, at a maximum concentration of 74.5 µg/L (**Drawing 4-1**). At the Atlas Missile Area, TCE was detected in 27 shallow (6 feet bgs) and 76 deep (18 to 24 feet bgs) soil gas samples (**Drawing 4-3**). TCE was mainly observed in the central portion of the Atlas Missile Area grid, with the highest concentration being 150 µg/L in sample ATL-059-18G, from between silos 2 and 3. TCE was detected in 39 shallow and 55 deep soil gas samples at Load Line 1, with the highest concentration detected in deep sample LL1-048-16G at 707 µg/L from the northern portion of Load Line 1 at the former AFBMD Tech Area (**Drawing 4-5**).

6.1.2 Soil

At the Administration Area, TCE was not detected in any of the 7 unsaturated soil samples (**Table 6-1**). TCE was detected in 2 of the 24 unsaturated soil samples at the Atlas Missile Area and 2 of the 22 soil samples at Load Line 1, but was below the quantitation limit in all 4 samples. TCE was not detected in any of the saturated soil samples which were collected at the Site (**Table 6-2**).

During the OU1 RI, however, TCE was detected in 7 soil samples near the silos at the Atlas Missile Area at concentrations ranging from 4.4 to 33 µg/kg. TCE was also detected in 4 samples collected during the OU1 RI northwest of the Inert Storage Building at Load Line 1 at concentrations ranging from 5.1 to 99 µg/kg (USACE, 1991).

6.1.3 Groundwater Headspace Screening

At the Administration Area, the highest concentration of TCE in groundwater headspace screening samples was 0.18 µg/L in sample G1-47-131, from south of the administration buildings (**Drawing 4-7**). Adjacent nodes to the southwest and southeast could not be sampled due to access restrictions.

At the Atlas Missile Area, the highest concentration of TCE in "G2" groundwater headspace screening samples was 1,200 µg/L in sample G2-11I-63, from north of Load Line 4 (**Drawing 4-8**). TCE was detected in 10 of 19 shallow groundwater headspace samples, and 11 of 23 deep samples from "G3" grid node sampling locations in the Atlas Missile Area. TCE was detected at three grid nodes on the downgradient edge of the grid (locations G2-36, G2-37, and G2-39). TCE was not detected, however, in the "H" Hydropunch® groundwater samples from the Platte River alluvial aquifer, which are downgradient of "G2" grid node sampling locations (**Drawing 4-8**).

At Load Line 1, TCE was detected in 9 of the 15 shallow groundwater headspace samples and 1 of the 11 deep groundwater headspace samples from the "G3" grid node sampling locations (**Drawing 4-8**).

6.1.4 Groundwater

6.1.4.1 Volatile Organic Compounds

To characterize the extent, selected monitoring well clusters were installed where the TCE screening sample concentrations were below detection limits (**Drawing 4-8**). TCE was the most commonly detected VOC in groundwater samples (**Table 6-3**) and typically exceeded the MCL of 5.0 µg/L in the samples in which it was detected (**Drawing 4-9**). TCE apparently is distributed in two groundwater plumes (**Drawings 4-10** through **4-12**).

At the Administration Area TCE was not detected in groundwater monitoring well samples (**Table 6-4**) or any of the "H2" Hydropunch® samples collected at the Administrative Area (**Table 6-5, Drawing 4-9**). "H2" Hydropunch® samples were substituted for monitoring

wells in the Administration Area when access restrictions prevented the construction of permanent monitoring wells.

At the Landfill Area, TCE was detected in five groundwater monitoring wells. The maximum concentration, 97 µg/L, was in the sample from MW-53B (**Table 6-6, Drawing 4-9**).

Downgradient of the Atlas Missile Area, (including wells at the Landfill and Load Line 4) the MCL for TCE (5 µg/L) was exceeded in samples from 15 groundwater monitoring wells (7 shallow, 5 intermediate, and 3 deep). The highest concentration was 1,800 µg/L in shallow well MW-40B, which is less than one-quarter mile southeast of the Atlas Missile Area (**Table 6-7** and **Drawings 4-9** through **4-12**).

At the Bomb Booster Area, VOCs were not detected in downgradient groundwater monitoring wells MW-57B, MW-16B, or MW-16C. At the former Nike Maintenance Area, VOCs were not detected in the downgradient monitoring well cluster MW-22. These findings are supported by the absence of TCE in soil gas samples collected in the vicinity of the Nike Maintenance Area (Law Environmental, 1990).

Downgradient of Load Line 1, TCE exceeded the MCL in 5 groundwater monitoring well samples at a maximum concentration of 140 µg/L in the sample from MW-21A. Four of the monitoring wells are shallow wells and one is an intermediate well. The MCL for 1,2-dichloropropane was exceeded in monitoring well MW-14A, which is a shallow well near the former fuel storage area at Load Line 3 (**Tables 6-8, 6-9,** and **Drawings 4-9** through **4-12**).

6.1.4.2 Explosives

RDX was the most commonly detected explosive compound and was distributed within and downgradient of the load lines and the Burning Grounds/Proving Range (**Drawings 4-13** through **4-15**). RDX was detected in all samples from groundwater monitoring wells in which explosive analytes were detected.

Tetryl was not detected in any groundwater samples. RDX was the only explosive detected in groundwater samples collected upgradient of the load lines. RDX was detected south of the Bomb Booster Area in the samples from MW-16C (0.91 µg/L),north of Load Line 1 in MW-22B (0.25 µg/L), and at the Administration Area in the deep Hydropunch® sample JH2-004-082 (0.15 µg/L).

Downgradient of the load lines, RDX was detected in 22 groundwater monitoring wells (12 shallow, 8 intermediate, and 2 deep). The concentration of RDX generally decreased with depth from a maximum in shallow wells of 98 µg/L to a maximum of 0.72 µg/L in deep wells. Ten "G2" Hydropunch® groundwater samples were analyzed for explosives, and RDX was detected in two of the samples (G2-30J-90 and G2-34J-43) (**Drawing 4-13**). RDX was found in both H-1 Hydropunch® groundwater samples from the Platte River alluvial aquifer, (**Drawing 4-13**). The maximum concentration of RDX in groundwater samples (98 µg/L) was in the sample from monitoring well MW-5B at Load Line 2.

Downgradient of the Burning Grounds/Proving Range (including monitoring wells discussed in the Landfill and Atlas Missile Area Sections), RDX was detected in 20 groundwater samples from monitoring wells at a maximum concentration of 33 µg/L in MW-11, which is a shallow well located in the former Proving Range. These findings are supported by the results of the OU1 RI where RDX was not detected in any of the 38 soil samples analyzed for RDX at the Administration Area or the 112 samples collected at the Bomb Booster Area. RDX was only detected in 17 of 362 soil samples at Load Line 1, 185 of 358 samples at Load Line 2, 8 of 257 samples at Load Line 3, 6 of 144 samples at Load Line 4, and 16 of 122 samples at the Burning Grounds/Proving Range (SEC Donohue, 1992b).

TNT was detected in groundwater samples from three monitoring wells located immediately downgradient of Load Lines 1, 2, and 3 (MW-2B, MW-5B, and MW-7B). This finding is supported by the OU1 RI in which the maximum concentrations of TNT in soil samples from Load Line 1 was 132,800 mg/kg, the maximum at Load Line 2 was 176,000 mg/kg, and the maximum at Load Line 3 was 29,700 mg/kg (SEC Donohue, 1992b). TNT was not detected, however, in samples from groundwater monitoring wells north of the load lines, at Load Line 4, or in the Landfill Area. The maximum concentrations of TNT in soil samples from the Administration Area (0.314 mg/kg), the Bomb Booster Area (7.0 mg/kg), Load Line 4 (131 mg/kg), and the Burning Grounds/Proving Range (313 mg/kg) were much

lower than concentrations of TNT detected in soil samples at Load Lines 1, 2, and 3 (SEC Donohue, 1992b).

HMX was detected in only 12 groundwater monitoring well samples. The highest concentration of HMX was 45 µg/L in MW-5B located downgradient of the HMX soil contamination found at Load Line 2. The results from the OU1 RI, in which 121 of the 133 detections of HMX in laboratory analyses of soil samples were from Load Line 2, support these results (SEC Donohue, 1992b).

6.1.4.3 Other Analytes

At the Landfill Area, the MCLs for gross alpha and gross beta radioactivity were not exceeded in any of the samples collected from any of the ten groundwater monitoring wells. No pesticides or PCBs were detected above the quantitation limit in groundwater monitoring well samples at the Landfill Area or the Administration Area. The MCL for nitrate plus nitrite were exceeded in 38 groundwater monitoring well samples.

6.1.5 Data Assessment

The data generated during the OU2 RI were reviewed and determined to be usable as received from the laboratory for their stated and intended purpose (see Section 4.4 and **Appendixes E** and **E-1**). The primary contaminants of concern TCE, RDX, and TNT were not impacted by the data assessment. However, the data assessment indicated that some of the VOCs, SVOCs, metals, and pesticides data be used with caution.

6.2 CONCLUSIONS

The nature, extent, and distribution of VOCs in groundwater correlate to the TCE source areas identified in previous investigations (Law Environmental, 1990 and USACE, 1991) and characterized in this investigation.

- The absence of TCE in the downgradient Administration Area monitoring well (cluster MW-48) samples or any of the "H2" Hydropunch® groundwater samples indicates that, although low levels

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of TCE contamination are present in the soil gas and groundwater headspace screening analyses, the Administration Area is not a source of TCE contamination in groundwater. Although restricted access prevented groundwater sampling in limited areas, these areas are cross-gradient of the areas of relatively higher TCE contamination and did not impact this conclusion.

- TCE was not detected in downgradient monitoring wells southeast and south of the Bomb Booster Area, suggesting that this area is not a source of TCE contamination in groundwater

- Soil gas results suggest that the Atlas Missile Area was the primary source of the TCE plume in the eastern part of the Site.

- The potential exists that the soils at the Atlas Missile Area are a continuing source of TCE to groundwater. However, the following information suggests that there is <u>not</u> a continuing source to groundwater:

  - TCE was not detected above quantitation limits in any of the OU2 unsaturated soil samples

  - site historical information and the estimated distribution of TCE in the groundwater suggest that a slug release of TCE to the groundwater occurred, therefore, negligible TCE would be available in the unsaturated zone for continuing release

- The former Nike Maintenance Area is not a source of TCE in groundwater

- Soil gas results suggest that the AFBMD Tech Area in the northern portion of Load Line 1 was the primary source of the TCE plume in the western part of the Site

- The potential exists that the soils at the AFBMD Tech Area are a continuing source of TCE to groundwater, however, the following information suggests that there is <u>not</u> a continuing source to groundwater:

  - TCE was not detected above quantitation limits in OU2 unsaturated soil samples

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- site historical information suggest that a slug release of TCE to the groundwater occurred, therefore, negligible TCE would be available in the unsaturated zone for continuing release

The nature, extent and distribution of explosives in groundwater correlate with the source areas identified through soil investigations in the OU1 RI (USACE, 1991 and SEC Donohue, 1992b).

- The results of laboratory analyses of soil samples (SEC Donohue, 1992b) indicate that the Bomb Booster Area and the Administration Area are not sources of RDX in groundwater, although RDX was detected in samples from monitoring wells MW-16C and MW-22B, which are downgradient of the Administration and Bomb Booster areas, and in the sample from Hydropunch® location H2-4, which is located at the Administration Area

- Although tetryl was detected in shallow soil samples collected in the Bomb Booster Area during the OU1 RI, the absence of detectable concentrations of tetryl in groundwater indicates that the former NOP is not a source of tetryl in groundwater

- The results from the OU1 RI (SEC Donohue, 1992b) support the results of the OU2 RI which indicate that Load Line 2 is the source of the highest concentrations of RDX and HMX in groundwater; that Load Lines 1, 3, and 4 are secondary sources of RDX; and that the Burning Grounds/Proving Range is a secondary source of RDX and HMX

- The results of the OU1 RI (SEC Donohue, 1992b) also support the results of the OU2 RI which indicate that Load Lines 1, 2, and 3 are the sources of the highest concentrations of TNT in groundwater

The results from the OU2 RI characterized the general extent of groundwater contamination resulting from past DoD activities.

- The soil gas survey at the Atlas Missile Area characterized the extent of the area through which TCE may have infiltrated through the vadose zone to groundwater (**Drawing 4-4**).

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- The soil gas survey at Load Line 1 characterized the extent of the area through which TCE may have infiltrated through the vadose zone to groundwater (**Drawing 4-6**).

- The decrease of TCE concentrations with increasing depth, and the absence of TCE in monitoring well clusters (MW-32, MW-34, MW-35, MW-37, MW-41, MW-46, and MW-59) indicate that the general vertical and horizontal extent of the TCE plume from the Atlas Missile Area has been characterized (**Drawings 4-10 through 4-12**). A monitoring well cluster downgradient from MW-36 will be installed subsequent to the RI. Data from the monitoring well cluster will be used to refine the extent of the TCE plume. The refined estimated of the plume will be presented in the Feasibility Study and a technical memorandum.

- The presence of TCE in shallow wells MW-18C and MW-34B, but not in the intermediate wells (MW-18B and MW-43A), or the deep wells (MW-18A and MW-43D), may be due to a leaky silt and clay layer at the base of the fine sand unit at these cluster locations.

- The decrease in TCE concentrations with increasing depth, and the absence of TCE in downgradient monitoring well clusters (MW-10, MW-17, MW-29, MW-28, and MW-29), indicate that the horizontal and vertical extent of the TCE plume from the former AFBMD Tech Area has been characterized (**Drawings 4-10 through 4-12**)

- The decrease of the concentrations of explosives with increasing depth and the absence of any explosive analytes in downgradient monitoring well clusters (MW-10, MW-20, and MW-36 through MW-39) indicate that the general vertical and horizontal extent of explosives contamination has been characterized (**Drawings 4-14 and 4-15**). Two monitoring well clusters, one downgradient from MW-10 and one between (and slightly downgradient from) MW-20 and MW-37, will be installed subsequent to the RI. Data from the monitoring well clusters will be used to refine the extent of the explosives plume. The refined estimated of the plume will be presented in the Feasibility Study and a technical memorandum.

It cannot be concluded that the landfill is a source of contamination to groundwater because the contamination quantified in the Landfill Area wells is not discernible from the regional contamination associated with Load Lines 1, 2, 3, and 4; the Atlas Missile Area; and the North Burning Grounds.

The results of the environmental screening assessment process supported by the extent of contamination characterized in Section 4.0 indicate that there are no currently active transport mechanisms in groundwater at the Administration Area, the Landfill Area, and the Bomb Booster Area.

The estimated extent simulated in the fate and transport modeling for TCE and RDX in groundwater support the conclusion that the general extent of contamination has been adequately characterized by this investigation.

Based on fate and transport analyses there was no evidence of the formation of any DNAPL at the Site. This conclusion is reinforced by the data indicating that the highest concentration of TCE in groundwater was reported at concentrations 1/600th of the TCE solubility.

Anderson, M.P. 1979. Using Models to Simulate the Movement of Contaminants through Groundwater Flow Systems. C.P. Straub, editor. CRC Critical Reviews in Environmental Control. CRC Press.

Bannerjee, S., S.H. Yalkowsky, and S.C. Valvani. 1980. Environmental Science Technology. Vol. 14. pp. 1227-1229.

Bouwer, H., and R.C. Rice. 1976. "A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells." Water Resources Research. Vol. 12. No. 3. pp. 423-428.

Bremner, J.M., and W.L. Branwart. 1976. Soil Biology and Biochemistry. Vol. 8. pp. 79-83.

Burchett, R.R. 1982. Tectonics and Seismicity of Eastern Nebraska. University of Nebraska Conservation and Survey Division. Nebraska Geological Survey Report of Investigation No. 6. University of Nebraska. Lincoln, Nebraska.

Burrows, E.P., D.H. Rosenblatt, W.R. Mitchell, and D.L. Palmer. 1989. Organic Explosives and Related Compounds: Environmental and Health Considerations. Technical Report 8901.

Clement Associates. 1988. Toxicological profile for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene. Draft. Public Health Service. Washington, D.C.

Cooper Jr., H.H., J.D. Bredehoeft, and I.S. Papadopulos. 1967. "Response of a finite diameter well to an instantaneous charge of water." Water Resources Research. Vol. 3. pp. 263-269.

Cooper, W.J., et al. 1987. Environmental Science Technology. Vol. 21. pp. 1112-1114.

Elmore, A.C. 1991. "Monte Carlo Simulation of Groundwater Remediation at a Nebraska Contamination Site." Ph.D. Dissertation, the University of Arizona, Tucson.

Engberg, R.A., and R.F. Spalding. 1978. Groundwater Quality Atlas of Nebraska. Resource Atlas #3. University of Nebraska. Lincoln, Nebraska.

Environmental Science and Engineering (ESE). 1983. Archives Search Response for the Former Nebraska Ordnance Plant, Saunders County, Nebraska. Report No. A017.

Submitted to the U.S. Army Toxic and Hazardous Materials Agency, Assessment Division (USATHMA). July.

Folsom, B.L., J.C. Pennington, C.T. Teeter, M.R. Barton, and J.A. Bright. 1988. Effects of Soil pH and Treatment Level on Persistence and Plant Uptake of 2,4,6-Trinitrotoluene. Army Waterways Experiment Station.

Freeze, R.A., and J.A. Cherry. 1979. Groundwater. Prentice-Hall, Inc.

Greene, B., D.L. Kaplan, and A.M. Kaplan. 1985. Degradation of Pink Water Compounds in Soil - TNT, RDX, HMX. U.S. Army Natick Research and Development Center. Natick, Massachusetts.

Hatch, L.M. 1992. Declaration of Col. Lewis M. Hatch (Ret.). Deposition collected by U.S. Department of Justice. February 25.

Hingston, F.J., A.M. Posner, and J.P. Quick. 1971. "Competitive adsorption of negatively charged liquids on oxide surfaces." Faraday Society. Vol. 52. pp. 334-342.

Howard, P.H., editor. 1990a. Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Vol. 2: Solvents. Lewis Publishers. Chelsea, Michigan.

Howard, P.H., editor. 1990b. Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Vol. 1: Large Production and Priority Pollutants. Lewis Publishers. Chelsea, Michigan.

Javandel, I., C. Doughty, and C-F. Tang. 1984. Groundwater Transport: Handbook of Mathematical Models. Water Resources Monograph Series 10. American Geophysical Union. Washington, D.C.

Karickhoff, S.W. 1984.

Koehler, J. 1992. Declaration of Jack Koehler. Deposition collected by U.S. Department of Justice. February 19.

Law Environmental, Inc. 1990. Soil Gas Survey Report for Nebraska Ordnance Plant, Saunders County, Nebraska. Prepared for the U.S. Army Engineer District, Kansas City. February.

Layton, D.W., T.E. McKone, C.H. Hall, M.A. Nelson, and Y.E. Ricker. 1986. Demilitarization of Conventional Ordnance: Priorities for Database Assessments of Environmental Contaminants. Lawrence Livermore National Laboratory. Livermore, California.

COE 031624

MECOEK 3476

B07NE003702-03898

Layton, 1987 (5-5, parag.2)

Lower Platte North Natural Resources District (NRD). 1985. Groundwater Management Plan.

Lower Platte North Natural Resources District (NRD). 1992. State of Nebraska Well Registration. July.

Lugn, A.L. 1935. The Pleistocene Geology of Nebraska. Nebraska Geological Survey Bulletin No. 10. Second series.

McLean, J.E., and B.E. Bledsoe. 1992. EPA Groundwater Issue, Behavior of Metals in Soils. EPA/540/S-92/018. U.S. Environmental Protection Agency, Robert S. Kerr Environmental Research Laboratory. Ada, Oklahoma. October.

Mehran, M., R.L. Olsen, and B.M. Rector. 1987. "Distribution coefficient of trichloroethylene in soil-water systems." Groundwater. Vol. 25. No. 3. pp. 275-282.

Mitchell, R.W., W.H. Dennis, and E.P. Burrows. 1982. Microbial Interactions with Several Munitions Compounds: 1,3-Dinitrobenzene, 1,3,5-Trinitrobenzene, and 3,5-Dinitroanaline. Technical Report No. 8201. ADA116651. U.S. Army Medical Bioengineering Research and Development Laboratory at Fort Detrick, Maryland. Fredrick, Maryland.

Morris, J., L. Morris, and L. Witt. 1974. The Fishes of Nebraska. Nebraska Game and Parks Commission. Lincoln, Nebraska.

Nathwani, J.S., and C.R. Phillips. 1977. Chemosphere. Vol. 6. pp. 157-162.

Nebraska Agricultural Statistics Service. 1989. 1988 Nebraska Agricultural Statistics.

Nebraska Department of Economic Development. 1992. Nebraska Statistical Handbook, 1990-1991. Lincoln, Nebraska.

Nebraska Department of Labor, Labor Market Information Division. 1989. County Labor Force/Work Force Annual Averages.

Nebraska Game and Parks Commission. 1972. The Nebraska Fish and Wildlife Plan, Volume I, Nebraska Wildlife Resources Inventory. Nebraska Game and Parks Commission. Lincoln, Nebraska.

Nebraska Game and Parks Commission. 1990. State Parks Commission Annual Report. Lincoln, Nebraska.

Nebraska Ordnance Plant. 1944. Part I, Section II of the Industrial Facility Inventory. March.

Nielson, D.M. 1991. Practical Handbook of Groundwater Monitoring.

Olsen, R.L. and A. Davis. 1990a. "Predicting the fate and transport of organic compounds in groundwater, Part 2." Hazardous Material Control. No. 4. pp. 18-37.

Olsen, R.L. and A. Davis. 1990b. "Predicting the fate and transport of organic compounds in groundwater, Part 1." Hazardous Material Control. No. 3. pp. 39-63.

Pal, B.C. and M.G. Ryon. 1986. Database Assessment of Pollution Control in the Military Explosives and Propellants Production Industry. Final Report. Contract No. P083PP3802. AD ORNL-6202. Oak Ridge National Laboratory. Oak Ridge, Tennessee.

Parson, F., et al. 1984. Journal of the American Water Works Association. Vol. 76. pp. 55-59.

Pennington, J.S., and W.H. Patrick Jr. 1990. "Absorption and desorption of 2,4,6-trinitrotoluene by soils." Journal of Environmental Quality. Vol.19. pp. 559-567.

Piskin, R. 1971. "Hydrogeology of the University of Nebraska Field Laboratory at Mead, Nebraska." Ph.D. Dissertation. University of Nebraska, Lincoln.

Press, W.M., B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling. 1986. Numerical Recipes, the Art of Scientific Computing (FORTRAN Version). Cambridge University Press. Lincoln.

Reed, E.C. 1948. "Stratigraphy and geomorphology of the Pleistocene of Nebraska." Geological Society of America Bulletin. Vol. 59.

Reed, E.C., and V.H. Dreeszen. 1965. Revision of the Classification of the Pleistocene Deposits of Nebraska. Nebraska Geological Survey Bulletin No. 23.

Roberts, P.V., J.E. Schreiner, and G.D. Hopkins. 1982. Water Resources. Vol. 16. pp. 1025-1035.

Roberts, W.C., and W.R. Hartley. 1992. Drinking Water Health Advisory, Munitions. Lewis Publishers. Boca Raton, Florida.

Ryon, M.G., B.C. Pal, S.S. Talmage, and R.H. Ross. 1984. Database Assessment of the Health and Environmental Effects of Munition Production Waste Products. Contract

No. P083PP3802. Oak Ridge National Laboratory, U.S. Army Medical Research and Development Command. Oak Ridge, Tennessee.

Saunders County. 1990. Plat Maps of Saunders County, Nebraska.

SEC Donohue. 1992a. Field Investigation Plan, Continuation of RI/FS former Nebraska Ordnance Plant, Operable Unit 1, Mead, Nebraska. Prepared for U.S. Army Corps of Engineers, Kansas City District. February.

SEC Donohue. 1992b. Supplemental Remedial Investigation Draft Report. Supplemental RI/FS former Nebraska Ordnance Plant Operable Unit 1, Mead, Nebraska. Draft. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Shurman, L.M. 1991. "Chemical forms of micronutrients in soils." In J.J. Mortvedt, editor. Micronutrients in Agriculture. Soil Society of America Book Series No. 4. Soil Society of America, Inc. Madison, Wisconsin.

Souders, V.L. 1963. Groundwater Inventory in Silver Creek Basin, Saunders County, Nebraska. Open File Report, University of Nebraska Conservation and Survey Division.

Spanggord, R.J., W.R. Mabey, T.W. Chou, D.L. Haynes, P.L. Alferness, D.S. Tse, and T. Mill. 1982. Environmental Fate Studies of HMX Screening Studies. Contract No. DAMD 17-82-C-2100. AD 148978. U.S. Army Medical Research and Development Command.

Spanggord, R.J., T. Mill, T.W. Chou, W.R. Mabey, J.H. Smith, and S. Lee. 1980. Environmental Fate Studies on Certain Munition Wastewater Constituents. Final Report Phase I Literature Review. Contract No. DAMD 17-78-C-8081. AD-A082 372. SRI International. Menlo Park, California.

Toth, J. 1972. "Properties and Manifestations of Regional Groundwater Movement." 24th International Groundwater Conference. Section 11.

Tucker, W.A., E.V. Dose, G.J. Genscheimer, R.E. Hall, C.D. Pollman, and D.H. Powell. 1985. Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils. Vol. I. Final Report. Environmental Science and Engineering. Gainesville, Florida.

Twin City Testing Corp (TCT). 1991. Engineering Report, Preliminary Assessment of Ordnance Contamination at the Former Nebraska Ordnance Plant, Mead, Nebraska. Final. Prepared for U.S. Army Corps of Engineers, Huntsville Division. Huntsville, Alabama. April.

U.S. Army Corps of Engineers, Kansas City District (USACE). 1987. Confirmation Study Work Plan. Former Nebraska Ordnance Plant, Mead, Nebraska. Final. May.

U.S. Army Corps of Engineers, Kansas City District (USACE). 1989. Confirmation Study. Report with Appendices A and B. Former Nebraska Ordnance Plant, Mead, Nebraska. Final. April.

U.S. Army Corps of Engineers, Kansas City District (USACE). 1991. Remedial Investigation Report with Appendixes A through D. Former Nebraska Ordnance Plant, Mead, Nebraska. Operable Unit 1. Draft. May.

U.S. Army Corps of Engineers, 1992 (2-22 parag.2)

U.S. Bureau of the Census. 1982. Census of Manufactures.

U.S. Bureau of the Census. 1987a. Census of Agriculture.

U.S. Bureau of the Census. 1987b. Census of Wholesale Trade.

U.S. Bureau of the Census. 1990a. Census of Population.

U.S. Bureau of the Census. 1990b. Selected Housing Characteristics: 1990, Saunders County, Nebraska.

U.S. Bureau of the Census. 1990c. Selected Labor Force and Commuting Statistics: 1990, Saunders County, Nebraska.

U.S. Bureau of the Census. 1990d. Selected Social Characteristics: 1990, Saunders County, Nebraska.

U.S. Department of Agriculture, Economic Research Service. 1989. Economic Indicators of the Farm Sector - State Financial Summary.

U.S. Department of Agriculture, Soil Conservation Service and University of Nebraska Conservation and Survey Division. 1965. Soil Survey, Saunders County, Nebraska. U.S. Government Printing Office. Washington, D.C.

U.S. Department of Health and Human Services (USDHHS). 1991. Preliminary Health Assessment for Nebraska Ordnance Plant (former), Mead, Saunders County, Nebraska. CERCLIS No. NE621189001 1. April 25.

U.S. Environmental Protection Agency (USEPA). 1988a. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. EPA/540/6-89. October.

U.S. Environmental Protection Agency (USEPA). 1988b. Superfund Exposure Assessment Manual. OSWER Directive 9285.5-1. EPA/540/1-88/001. April.

U.S. Environmental Protection Agency (USEPA). 1989. (cited in text 4-22 paragr.1)

U.S. Environmental Protection Agency (USEPA). 1991. Supplemental Region IV Risk Assessment Guidance. March 26, 1991.

U.S. Fish and Wildlife Service (USFWS). 1991. National Wetlands Inventory Map for Mead, Nebraska Quadrangle.

U.S. Fish and Wildlife Service (USFWS). 1992. Telephone Conversation, September 9, 1992 from Matt Wilson (WCC) to Wally Jobman (USFWS).

U.S. National Oceanic and Atmospheric Administration (NOAA). 1981. Climatic Summary for the Omaha Area (Eppley Airfield).

U.S. National Oceanic and Atmospheric Administration (NOAA). 1987a. Annual Climatological Summary, Wahoo, Nebraska, 1986.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1987b. Climatological Data Annual Summary, 1986. Vol. 91. No. 13.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1988a. Annual Climatological Summary, Wahoo, Nebraska, 1987.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1988b. Climatological Data Annual Summary, Nebraska, 1987. Vol. 92. No. 13.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1989a. Annual Climatological Summary, Wahoo, Nebraska, 1988.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1989b. Climatological Data Annual Summary, Nebraska, 1988. Vol. 93. No. 13.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1990. Climatological Data Annual Summary, Nebraska, 1989. Vol. 94. No. 13.

U.S. National Oceanic and Atmospheric Administration (NOAA). 1991. Climatological Data Annual Summary, Nebraska, 1990. Vol. 95. No. 13.

University of Nebraska, Bureau of Business Research. 1982. Nebraska Population Projections, 1985-2020.

van der Kamp, G. 1976. "Determining aquifer transmissivity by means of well response tests: the underdamped case." Water Resources Research. Vol. 12. No. 1. pp. 71-77.

Wade, A. 1991. Determination ~~of~~ Aquifer Properties of the Dakota Aquifer in Washington County, Kansas from a Pumping Test. Kansas Geological Survey Open-file Report 91-1c.

Warrick, A.W. and A. Amoozegar-Ford. 1981. Areal Predictions of Water and Solute Flux in the Unsaturated Zone. U.S. Environmental Protection Agency, Robert S. Kerr Environmental Research Laboratory. EPA/600/S2-81-058. June.

Woodward-Clyde Consultants. 1992a. Chemical Data Acquisition Plan, Part I of III - Sampling Plans and Objectives for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft final. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Woodward-Clyde Consultants. 1992b. Chemical Data Acquisition Plan, Part I of III - Sampling Plans and Objectives, Chapter B for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater). Draft. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. November.

Woodward-Clyde Consultants. 1992c. Chemical Data Acquisition Plan, Part II of III - Field Protocols for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft final. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Woodward-Clyde Consultants. 1992d. Chemical Data Acquisition Plan, Part III of III - Quality Assurance Plan for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft final. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Woodward-Clyde Consultants. 1992e. Project Work Plan for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft final. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Woodward-Clyde Consultants. 1992f. Safety, Health, and Emergency Response Plan for Former Nebraska Ordnance Plant, Remedial Investigation, Operable Unit No. 2

(Groundwater). Draft final. Contract No. DACA-41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. May.

Woodward-Clyde Consultants. 1992g. Groundwater Well Inventory Study Technical Memorandum for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft. Prepared for U.S. Army Corps of Engineers, Kansas City District. October.

Woodward-Clyde Consultants. 1992h. Hydrogeologic Study Technical Memorandum for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No. 2 (Groundwater), Mead, Nebraska. Draft. Prepared for U.S. Army Corps of Engineers, Kansas City, District. October.

Woodward-Clyde Consultants. 1993a. Baseline Risk Assessment, Operable Unit No.2 (Groundwater) for Former Nebraska Ordnance Plant, Mead, Nebraska. Draft. Contract No. DACA41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City District. March.

Woodward-Clyde Consultants. 1993b. Remedial Action Objectives/Initial Screening of Alternatives for Former Nebraska Ordnance Plant, Remedial Investigation Operable Unit No.2 (Groundwater), Mead, Nebraska. Draft. Contract No. DACA41-92-C-0023. Prepared for U.S. Army Corps of Engineers, Kansas City Distract. March.

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TABLE 2-1

ANALYTICAL PARAMETERS

Target Compounds List (TCL) VOCs

Chloromethane
Bromomethane
Vinyl Chloride
Chloroethane
Methylene Chloride
Acetone
Carbon Disulfide
1,1-Dichloroethene
1,1-Dichloroethane
cis-1,2-Dichloroethene[2]
trans-1,2-Dichloroethene[2]
1,2-Dichloroethene (total)[1]
Chloroform
1,2-Dichloroethane
2-Butanone
Bromochloromethane
1,1,1-Trichloroethane
Carbon Tetrachloride
Bromodichloromethane[2]
1,2-Dichloropropane
cis-1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene
trans-1,3-Dichloropropene
Bromoform
1,2-Dibromoethane[2]
4-Methyl-2-Pentanone
2-Hexanone
Tetrachloroethene
Toluene
1,1,2,2-Tetrachloroethane
Chlorobenzene
Ethylbenzene
Styrene
Xylenes (Total)
1,2-Dibromo-3-chloropropane[2]
1,3-Dichlorobenzene[2]
1,4-Dichlorobenzene[2]
1,2-Dichlobenzene[2]

Notes:

[1] Not on compound list for CLP-SOW (6-91) method for low level analysis.
[2] Not on compound list for CLP-SOW (3-90)-REVS for high level analysis.

Target Compound List (TCL) SVOCs

Phenol
Bis(2-chloroethyl)ether
2-chlorophenol
1,3-dichlorobenzene
1,4-dichlorobenzene
1,2-dichlorobenzene
2-methylphenol
2,2'-oxybis(1-chloropropane)
4-methylphenol
N-nitrosodi-*n*-propylamine
Hexachloroethane
Nitrobenzene
Isophorone
2-nitrophenol
2,4-dimethylphenol
bis(2-chloroethoxy)methane
2,4-dichlorophenol
1,2,4-trichlorobenzene
Naphthalene
4-chloroaniline
Hexachlorobutadiene
4-chloro-3-methylphenol

TABLE 2-1

ANALYTICAL PARAMETERS
(Continued)

Target Compound List (TCL) for SVOCs
(Continued)

2-methylnaphthalene
Hexachlorocyclopentadiene
2,4,6-trichlorophenol
2,4,5-trichlorophenol
2-chloronaphthalene
2-nitroaniline
Dimethylphthalate
Acenaphthylene
2,6-dinitrotoluene
3-nitroaniline
Acenaphthene
2,4-dinitrophenol
4-nitrophenol
Dibenzofuran
2,4-dinitrotoluene
Diethylphthalate
4-chlorophenyl-phenylether
Fluorene
4-nitroaniline
4,6-dinitro-2-methylphenol
N-nitrosodiphenylamine
4-bromophenyl-phenylether
Hexachlorobenzene
Pentachlorophenol
Phenanthrene
Anthracene
Carbazole
Di-*n*-butylphthalate
Fluoranthene
Pyrene
Benzylbutylphthalate
3,3-dichlorobenzidine
Benzo(a)anthracene
Chrysene
bis(2-ethylhexyl)phthalate
Di-*n*-octylphthalate
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenzo(a,h)anthracene
Benzo(ghi)perylene

Target Compound List (TCL) Pesticides/PCB

α-BHC
ß-BHC
δ-BHC
γ-BHC (Lindane)
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan I
Dieldrin
4,4'-DDE
Endrin
Endosulfan II
4,4'-DDD
Endosulfan sulfate
4,4'-DDT
Methoxychlor
Endrin ketone
Endrin aldehyde
α-Chlordane
γ-Chlordane
Toxaphene
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

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TABLE 2-1

ANALYTICAL PARAMETERS
(Continued)

Inorganic Target Analyte List (TAL)

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide

Explosive Compounds

Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
1,3,5-trinitrobenzene (TNB)
1,3-dinitrobenzene (DNB)
Methyl-2,4,6-trinitro-phenylnitramine (tetryl)
Nitrobenzene (NB)
2,4,6-trinitrotoluene (TNT)
2,4-dinitrotoluene (2,4-DNT)
2,6-dinitrotoluene (2,6-DNT)
o-nitrotoluene
m-nitrotoluene
p-nitrotoluene

General Water Quality Parameters

(TSS) Total Suspended Solids
(TDS) Total Dissolved Solids
Alkalinity
Hardness
BOD
NO_3/NO_2 (as Nitrogen)

Radioactivity

Gross alpha
Gross beta

COE 031635

TABLE 2-1

ANALYTICAL PARAMETERS
(Continued)

Soil Gas/Water Headspace Analytes

BTEX:
- Benzene
- Toluene
- Ethylbenzene
- Xylenes (total)

1,2-dichloroethane (total)

Total Hydrocarbons (THCs):
- Diesel

Chlorinated Hydrocarbons (ClHs):
- Tetrachloroethene
- Trichloroethene
- 1,1,1-trichloroethane
- 1,1,2-trichloroethane
- 1,1-dichloroethane
- 1,2-dichloroethane

COE 031636

Table 2-2 Hydropunch and Geoprobe Sampling Depths for Groundwater Screening and Groundwater Sampling

Sample Point	Sample ID	Sample Depth (ft bgs)
G1-14	G1-14I-33	33
G1-14	G1-14J	123
G1-14	G1-14SWI-44	44
G1-15	G1-15I-33	33
G1-15	G1-15J	129
G1-24	G1-24I-57	57
G1-24	G1-24J	124
G1-25	G1-25I-61	61
G1-26	G1-26I-55	55
G1-27	G1-27I-44	44
G1-27	G1-27J	110
G1-35	G1-35I-44	44
G1-35	G1-35J	122.5
G1-36	G1-36I-59	59
G1-37	G1-37I-51	51
G1-37	G1-37J	123
G1-46	G1-46I-64	64
G1-47	G1-47I-59	59
G1-47	G1-47J	131.5
G2-02	G2-02I-50	50
G2-02	G2-02J-117	117
G2-03	G2-03I-(51-54)	51-54
G2-03	G2-03J-(101-103)	101-102
G2-04	G2-04I-(63-65)	63-65
G2-04	G2-04J-(105-107)	105-107
G2-05	G2-05I-(57-60)	57-60
G2-06	G2-06I-(60-63)	60-63
G2-07	G2-07I-(57-60)	57-60
G2-08	G2-08I-57	57
G2-08	G2-08J-94.5	94.5
G2-09	G2-09I-(57-60)	57-60
G2-09	G2-09J-108.5	108.5
G2-10	G2-10I-(60-63)	60-63
G2-11	G2-11I-(60-63)	60-63
G2-12	G2-12I-43	43
G2-12	G2-12J-84	84
G2-14	G2-14I-(54-57)	54-57
G2-14	G2-14J-95	95
G2-15	G2-15I-(60-63)	60-63
G2-16	G2-16I-(60-63)	60-63

Sample Point	Sample ID	Sample Depth (ft bgs)
G2-17	G2-17I-(54-57)	54-57
G2-18	G2-18I-45	45
G2-18	G2-18J-61	61
G2-20	G2-20I-63	63
G2-20	G2-20J-84	84
G2-21	G2-21I-53	53
G2-21	G2-21J-69.5	69.5
G2-22	G2-22I-48	48
G2-22	G2-22J-77	77
G2-25	G2-25J-93	93
G2-26	G2-26J-93	93
G2-27	G2-27J-101	101
G2-30	G2-30J-90.5	90.5
G2-31	G2-31J-70	70
G2-32	G2-32J-54	54
G2-34	G2-34J-43	43
G2-35	G2-35J-45.75	45.75
G2-35	G2-35J-46	46
G2-36	G2-36J-43	43
G2-37	G2-37J-47	47
G2-38	G2-38J-49.5	49.5
G2-39	G2-39J-48	48
G3-01	G3-01I-64	64
G3-01	G3-01J-98	98
G3-02	G3-02I-52	52
G3-02	G3-02J-100.5	100.5
G3-04	G3-04I-57	57
G3-04	G3-04J-115	115
G3-05	G3-05I-60	60
G3-05	G3-05J-100	100
G3-05	G3-05J-2-51	2-51
G3-05	G3-05J-60	60
G3-06	G3-06I-60	60
G3-07	G3-07I-61	61
G3-07	G3-07J-99	99
G3-08	G3-08I-56	56
G3-08	G3-08J-130	130
G3-09	G3-09I-44	44
G3-10	G3-10I-56	56
G3-11	G3-11I-60	60

Table 2-2 Hydropunch and Geoprobe Sampling Depths for Groundwater Screening and Groundwater Sampling

Sample Point	Sample ID	Sample Depth (ft bgs)
G3-12	G3-12I-60	60
G3-12	G3-12J-100	100
G3-13	G3-13I-60	60
G3-13	G3-13J-95	95
G3-14	G3-14I-56	56
G3-15	G3-15I-60	60
G3-15	G3-15J-126	126
G3-16	G3-16I-60	60
G3-16	G3-16J-118	118
G3-19	G3-19I-60	60
G3-19	G3-19J-100	100
H-01	H-01I-68	68
H-01	H-01J-88	88
H-02	H-02I-22	22
H-02	H-02J-48	48
H-03	H-03I-24	24
H-03	H-03J-48	48
H-04	H-04I-69	69
H-04	H-04J-95	95
H-05	H-05I-29	29
H-05	H-05J-50	50
H-06	H-06I-24	24
H-06	H-06J-48	48
H-07	H-07I-29	29
H-07	H-07J-53.5	53.5
H2-01I	HH2-001-082	55
H2-01I	HH2-601-082	55
H2-01J	JH2-001-082	115
H2-01J	JH2-601-082	115
H2-02I	HH2-002-082	59
H2-02I	HH2-602-082	59
H2-02J	JH2-002-082	115
H2-02J	JH2-602-082	115
H2-03I	HH2-003-082	62
H2-03I	HH2-603-082	62
H2-03J	JH2-003-082	115
H2-03J	JH2-603-082	115
H2-04I	HH2-004-082	60
H2-04I	HH2-604-082	60
H2-04J	JH2-004-082	115
H2-04J	JH2-604-082	115

Note : 1. Sample depth shown is the depth below ground surface (bgs) at the bottom of sample interval.

2. Screening Geoprobe and Hydropunch samples collected in the Administration Area, Atlas Missile Area, and Load Line 1 are identified by the prefixes G1, G2, and G3 respectively. Hydropunch samples (not screening samples) collected in the Administration Area are identified by the prefixes HH2 and JH2 for shallow and deep samples, respectively. Hydropunch samples collected in the southeast portion of the Site, including Platte River Valley, are identified by the prefix H.

TABLE 2-3
GRAIN-SIZE DISTRIBUTION ANALYSES

Monitoring Well Cluster	Interval Below Water Table		Shallow Screen Interval		Intermediate Screen Interval	
	Sample Depth Interval (Feet bgs)	30% Finer Size (mm)	Sample Depth Interval (Feet bgs)	30% Finer Size (mm)	Sample Depth Interval (Feet bgs)	30% Finer Size (mm)
MW-21	NS	NS	72 - 79	0.15	125 - 128.6	0.48
MW-22	NS	NS	NS	NS	NS	NS
MW-23	36 - 37	0.18	67 - 74	0.16	95 - 100	0.30
MW-24	NS	NS	72 - 74	0.18	116 - 118	0.42
MW-25	47 - 49	0.17	83 - 85	0.18	151 - 152	0.16
MW-26	NS	NS	82 - 84	0.27	NS	NS
MW-27	NS	NS	64 - 68	0.23	102 - 107	0.28
MW-28	NS	NS	75 - 77	0.20	129 - 133	0.16
MW-29	NS	NS	66.5 - 72.5	0.19	135.5 - 137.5	0.55
MW-30	NS	NS	59.5 - 65	0.12	91 - 98	0.34
MW-31	47 - 49	0.16	59 - 61	0.16	105 - 106	0.29
MW-32	NS	NS	77 - 81	0.20	90 - 95	0.77
MW-33	48 - 52	0.25	83 - 85	0.28	117 - 119	0.18
MW-34	56 - 62	0.17	62 - 69	0.15	104 - 110	0.26
MW-35	NS	NS	65 - 67	0.13	89 - 93	2.00
MW-36	NS	NS	16 - 18	0.32	30 - 32	0.45
MW-37	NS	NS	24 - 26	0.075	36 - 38	0.75
MW-38	NS	NS	NS	NS	NS	NS
MW-39	NS	NS	NS	NS	NS	NS
MW-40	52 - 54	0.16	59 - 65	0.14	120 - 127	0.50
MW-41	NS	NS	NS	NS	NS	NS
MW-42	NS	NS	56 - 58	0.18	91 -93	0.30
MW-43	NS	NS	47 - 53	0.32	99 - 101	0.26
MW-44	NS	NS	23 - 25	<0.075	35 - 37	0.30
MW-45	12 - 14	0.14	20 - 22	0.24	34 - 36	0.58
MW-46	NS	NS	20 - 22	0.22	38 - 40	0.51
MW-47	NS	NS	NS	NS	NS	NS
MW-48	NS	NS	NS	NS	NS	NS
MW-52	NS	NS	42 - 44	0.13	56 - 58	0.24
MW-53	NS	NS	52 - 54	0.12	NS	NS
MW-54	NS	NS	24 - 26	0.14	72 - 74	0.40
MW-55	NS	NS	12 - 14	0.16	82 - 84	0.40
MW-56	NS	NS	36 - 38	0.09	72 - 74	0.55
MW-57	NS	NS	NS	NS	NS	NS
MW-58	NS	NS	82 - 84	0.14	129 - 131	0.36
MW-59	47 - 49	0.17	71 - 73	0.60	123 - 125	0.95

Notes:

1. NS = Not sampled.
2. 30% finer size = 70% cumulative retained.
3. Interval below water table samples were collected for saturated soil samples.

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Table 2-4
Monitoring Well Construction Details

Monitoring Well	Top of Casing Elevation	Ground Surface Elevation (ft)	Filter pack size	Depth to Top of Filter Pack (ft bgs)	Top of Screened Interval		Bottom of Screened Interval		Bottom of Well		Bottom of Boring		Top of Bedrock		Bedrock Type
					Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft below TOC)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	
MW-01A*	1176.5	1174		73.1	79	1095	109	1065	113.8	1062.7	114	1060	123	1051	SH
MW-01B*	1176.28	1173.78		34.6	39	1134.78	79	1094.78	79.99	1096.29	81	1092.78	NP	NP	NP
MW-02A*	1174.39	1171.89		61	67.7	1104.19	96.9	1074.99	101.2	1073.19	101.7	1070.19	99.5	1072.39	SS
MW-02B*	1174.81	1172.31		29.7	34.3	1138.01	63.5	1108.81	64.5	1110.31	67	1105.31	NP	NP	NP
MW-03A*	1179.08	1176.58		91.7	97	1079.58	145.8	1030.78	149.4	1029.68	147.4	1029.18	146	1030.58	SH
MW-03B*	1179.37	1176.87		35	39.9	1136.97	98.39	1078.48	101	1078.37	99.5	1077.37	NP	NP	NP
MW-04A*	1168.24	1165.74		69.2	74.2	1091.54	103.5	1062.24	107.8	1060.44	109	1056.74	103.5	1062.24	SH
MW-04B*	1168.37	1165.87		26	32.1	1133.77	71.2	1094.67	73.74	1094.63	75	1090.87	NP	NP	NP
MW-05A*	1167.61	1165.11		56	61.8	1103.31	100.8	1064.31	105.3	1062.31	107.2	1057.91	100.8	1064.31	SH
MW-05B*	1167.66	1165.16		21	30	1135.16	59.3	1105.86	61.97	1105.69	65	1100.16	NP	NP	NP
MW-06A*	1164.94	1162.44		55.8	61	1101.44	100	1062.44	104.4	1060.54	105	1057.44	100	1062.44	SH
MW-06B*	1165.12	1162.62		21	34.8	1127.82	64	1098.62	66.74	1098.38	68	1094.62	NP	NP	NP
MW-07A*	1164.4	1161.9		60	70.2	1091.7	99.5	1062.4	103.8	1060.6	104	1057.9	99.5	1062.4	SH
MW-07B*	1164.14	1161.64		29.2	34.7	1126.94	73.7	1087.94	76.58	1087.56	78	1083.64	NP	NP	NP
MW-08A*	1165.5	1163		75	84	1079	123	1040	127.9	1037.6	131	1032	123	1040	SS
MW-08B*	1165.51	1163.01		33	42.1	1120.91	81	1082.01	84.01	1081.5	83.6	1079.41	NP	NP	NP
MW-09A*	1170.99	1168.49		82.2	89	1079.49	128	1040.49	133.95	1037.04	134	1034.49	127.7	1040.79	SS
MW-09B*	1170.89	1168.39		41	46.3	1122.09	85.3	1083.09	88.46	1082.43	89	1079.39	NP	NP	NP
MW-09D	1170.87	1168.9		127.5	131	1037.9	136	1032.9	138.76	1032.11	139	1029.9	121.6	1047.3	SS
MW-10A*	1149.92	1147.42		56.4	61.4	1086.02	100.4	1047.02	105	1044.92	103	1044.42	100	1047.42	SS
MW-10B*	1149.83	1147.33		28	33	1114.33	62.2	1085.13	65.03	1084.8	65	1082.33	NP	NP	NP
MW-11A*	1152.71	1150.21		14.7	18.8	1131.41	48	1102.21	51.73	1100.98	50.5	1099.71	48	1102.21	SS
MW-12A*	1178.25	1175.75		22.7	27.6	1148.15	37.3	1138.45	39.85	1138.4	42	1133.75	NP	NP	NP
MW-13A*	1174.68	1172.18		24.5	29.5	1142.68	39.2	1132.98	41.91	1132.77	42	1130.18	NP	NP	NP
MW-14A*	1178.43	1175.93		32	38.6	1137.33	48.3	1127.63	50.96	1127.47	50	1125.93	NP	NP	NP
MW-15A*	1169.64	1167.14		32.2	37	1130.14	46.7	1120.44	49.54	1120.1	50	1117.14	NP	NP	NP
MW-16B* (1)		1182							110.1		125	1057	106.8	1075.2	SH
MW-16C* (1)		1182		28.7	31	1151	41	1141	44.32		45	1137	NP	NP	NP
MW-17A* (1)		1150		68.5	72.1	1077.9	77.1	1072.9	80.23		78.2	1071.8	56.49	1093.51	SH
MW-17B* (1)		1150		48	50.4	1099.6	55.8	1094.2	94.84		59	1091	56.77	1093.23	SH
MW-17C* (1)	1152.8	1150	10\16	4.7	7.2	1142.8	17.2	1132.8	20.2	1132.6	22	1128	NP	NP	NP
MW-18A* (1)	1149	1146		120	122	1024	125	1021	127.4	1021.6	141	1005	100.8	1045.2	SS
MW-18B*									103.14				NP	NP	NP
MW-18C* (1)	1149.3	1146		34.3	36.7	1109.3	46.7	1099.3	49.8	1099.5	51	1095	NP	NP	NP
MW-19A* (1)		1163		123.1	125	1038	128	1035	130.9		155.5	1007.5	NP	NP	NP
MW-19B* (1)	1165	1163	10\16	98	99	1064	104	1059	104.9	1060.1	105	1058	104.2	1058.8	SH
MW-19C* (1)	1162.8	1163		8.4	10.4	1152.6	48.5	1114.5	20.7	1142.1	27	1136	NP	NP	NP
MW-20A* (1)		1150		141.8	145	1005	150.4	999.6	152.6		153.3	996.7	138.45	1011.55	SS
MW-20B* (1)	1151.7	1150		125.6	128.6	1021.4	133.6	1016.4	136.7	1015	138	1012	136.5	1013.5	SS
MW-20C* (1)	1154.7	1150		45.8	50.3	1099.7	60.3	1089.7	63.42	1091.28	62	1088	NP	NP	NP
MW-21A	1165.22	1163.31	10\20	113	116	1047.31	126	1037.31	128.72	1036.5	128.5	1034.81	NP	NP	NP
MW-21B	1165.18	1163.26	20\40	63	66	1097.26	76	1087.26	78.45	1086.73	79	1084.26	NP	NP	NP
MW-21D	1165.16	1163.26	10\20	130.2	133	1030.26	138	1025.26	140.59	1024.57	139	1024.26	127.3	1035.96	SH/SS
MW-22A	1176.35	1174.5	4\8	85	87.8	1086.7	97.8	1076.7	100.92	1075.43	106	1068.5	99.5	1075	SH
MW-22B	1176.24	1174.38	20\40	55	58	1116.38	68	1106.38	70.51	1105.73	70	1104.38	NP	NP	NP
MW-23A	1173.13	1171.45	10\20	84	88.5	1082.95	98.5	1072.95	101.68	1071.45	105	1066.45	99.3	1072.15	SH
MW-23B	1173.5	1171.62	10\20	63.5	67.5	1104.12	77.5	1094.12	79.88	1093.62	79	1092.62	NP	NP	NP
MW-24A	1163	1160.96	4\8	109.4	111.5	1049.46	121.5	1039.46	124.04	1038.96	140.8	1020.16	125	1035.96	SH
MW-24B	1163.05	1160.86	20\40	53	56	1104.86	66	1094.86	68.69	1094.36	67.5	1093.36	NP	NP	NP
MW-25A	1174.83	1172.81	10\20	143	145	1027.81	155	1017.81	158.08	1016.75	156.6	1016.21	NP	NP	NP
MW-25B	1174.29	1172.51	10\20	70	74	1098.51	84	1088.51	86.6	1087.69	85	1087.51	NP	NP	NP

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Table 2-4
Monitoring Well Construction Details

Monitoring Well	Top of Casing Elevation	Ground Surface Elevation (ft)	Filter pack size	Depth to Top of Filter Pack (ft bgs)	Top of Screened Interval		Bottom of Screened Interval		Bottom of Well		Bottom of Boring		Top of Bedrock		Bedrock Type
					Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft below TOC)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	
MW-25D	1175.04	1173.12	10\20	161	163.2	1009.92	168.2	1004.92	170.76	1004.28	170	1003.12	156.8	1016.32	SS
MW-26A	1173.73	1172.02	10\20	89.8	92.5	1079.52	102.5	1069.52	105.3	1068.43	120	1052.02	103.8	1068.22	SS/SH
MW-26B	1173.74	1172	10\20	63	66	1106	76	1096	78.38	1095.36	77.5	1094.5	NP	NP	NP
MW-27A	1175.63	1173.72	4\8	94	96	1077.72	106	1067.72	108.91	1066.72	121.9	1051.82	106.8	1066.92	SH
MW-27B	1175.64	1173.7	10\20	58	61.5	1112.2	71.5	1102.2	73.94	1101.7	73	1100.7	NP	NP	NP
MW-28A	1171.81	1169.88	10\20	124.8	127.6	1042.28	137.6	1032.28	140.03	1031.78	138.6	1031.28	138	1031.88	SS
MW-28B	1172.11	1170.02	10\20	63.5	67.5	1102.52	77.5	1092.52	80.12	1091.99	79	1091.02	NP	NP	NP
MW-28D	1171.58	1169.43	10\20	142	144	1025.43	149	1020.43	151.4	1020.18	149.5	1019.93	138	1031.43	SS
MW-29A	1159.66	1158.1	4\8	120	122.6	1035.5	132.6	1025.5	135.66	1024	143	1015.1	137.1	1021	SH
MW-29B	1160.63	1158.35	10\20	61	64.5	1093.85	74.5	1083.85	77.28	1083.35	76	1082.35	NP	NP	NP
MW-30A	1168.13	1166.19	10\20	91	94	1072.19	99	1067.19	101.68	1066.45	110	1056.19	101.5	1064.69	SH/SS
MW-30B	1167.96	1166.03	20\40	56	59.5	1106.53	69.5	1096.53	73.14	1094.82	71	1095.03	NP	NP	NP
MW-31A	1166.97	1164.94	10\20	91.2	94.5	1070.44	104.5	1060.44	107.03	1059.94	112	1052.94	106	1058.94	SH
MW-31B	1166.54	1164.65	10\20	47	50	1114.65	60	1104.65	62.79	1103.75	62	1102.65	NP	NP	NP
MW-32A	1153.77	1151.95	4\8	82	88.5	1063.45	98.5	1053.45	101.19	1052.58	99.5	1052.45	99.55	1052.4	SH
MW-32B	1153.7	1151.91	10\20	69	71	1080.91	81	1070.91	83.29	1070.41	82	1069.91	NP	NP	NP
MW-32D	1153.62	1151.67	10\20	103.5	106.5	1045.17	111.5	1040.17	114.08	1039.54	113	1038.67	99.5	1052.17	SH
MW-33A	1159.92	1158.03	10\20	96.5	100.5	1057.53	110.5	1047.53	113.3	1046.62	112	1046.03	NP	NP	NP
MW-33B	1159.97	1158.13	10\20	69.5	73.5	1084.63	83.5	1074.63	85.84	1074.13	84.5	1073.63	NP	NP	NP
MW-33D	1159.84	1157.89	10\20	118	120	1037.89	125	1032.89	127.45	1032.39	127	1030.89	116.5	1041.39	SS
MW-34A	1156.4	1154.66	10\20	98	102	1052.66	112	1042.66	114.24	1042.16	113	1041.66	113	1041.66	SS
MW-34B	1156.61	1154.61	20\40	61	65	1089.61	75	1079.61	77.5	1079.11	76	1078.61	NP	NP	NP
MW-34D	1156.34	1154.44	10\20	117.3	120	1034.44	125	1029.44	127.94	1028.4	127.5	1026.94	112.9	1041.54	SS
MW-35A	1139.41	1137.42	4\8	78.5	81.5	1055.92	91.5	1045.92	93.99	1045.42	92.5	1044.92	NP	NP	NP
MW-35B	1139.27	1137.38	20\40	53	57	1080.38	67	1070.38	69.49	1069.78	68	1069.38	NP	NP	NP
MW-35D	1139.6	1137.4	10\20	98	100.5	1036.9	105.5	1031.9	108.2	1031.4	117	1020.4	93	1044.4	SS
MW-36A	1076.24	1076.46	10\20	25	28	1048.46	38	1038.46	38.5	1037.74	39	1037.46	NP	NP	NP
MW-36B	1076.27	1076.42	20\40	14	17	1059.42	27	1049.42	27.35	1048.92	28.5	1047.92	NP	NP	NP
MW-36D	1076.41	1076.55	10\20	41	43	1033.55	48	1028.55	48.5	1027.91	49	1027.55	39	1037.55	SS
MW-37A	1084.83	1082.68	4\8	28.3	30.5	1052.18	40.5	1042.18	43.15	1041.68	48	1034.68	41.4	1041.28	SS
MW-37B	1084.82	1082.7	20\40	21.7	24	1058.7	29	1053.7	31.62	1053.2	30	1052.7	NP	NP	NP
MW-37D	1084.69	1082.61	10\20	43.5	45.5	1037.11	50.5	1032.11	53.08	1031.61	51.8	1030.81	41.5	1041.11	SS
MW-38A	1081.95	1079.61	10\20	41.7	44.7	1034.91	49.2	1030.41	53.24	1028.71	51	1028.61	49.2	1030.41	SS
MW-38D	1081.55	1079.67	10\20	55.6	58.5	1021.17	63.5	1016.17	66.11	1015.44	65	1014.67	49.2	1030.47	SS
MW-39A	1082.45	1080.63	10\20	40	44	1036.63	48.5	1032.13	51.14	1031.31	49.6	1031.03	48.5	1032.13	SS
MW-39D	1082.58	1080.73	10\20	50.5	52.5	1028.23	55.3	1025.43	57.44	1025.14	59	1021.73	48.5	1032.23	SS/SH
MW-40A	1171.67	1169.67	4\8	123	120.5	1049.17	125.5	1044.17	128.14	1043.53	145	1024.67	127.6	1042.07	SS/SH
MW-40B	1171.92	1169.96	20\40	51	54	1115.96	64	1105.96	66.71	1105.21	65.5	1104.46	NP	NP	NP
MW-41A	1168.21	1165.9	10\20	68.4	71.5	1094.4	81.5	1084.4	84.31	1083.9	83.3	1082.6	82.3	1083.6	SS
MW-41B	1168.26	1165.85	20\40	33	36	1129.85	46	1119.85	48.91	1119.35	47	1118.85	NP	NP	NP
MW-41D	1168.19	1165.99	10\20	85	87	1078.99	92	1073.99	94.7	1073.49	93	1072.99	82	1083.99	SS
MW-42A	1146.14	1144.15	10\20	83	86	1058.15	96	1048.15	98.7	1047.44	97.5	1046.65	NP	NP	NP
MW-42B	1146.25	1144.12	20\40	50	53	1091.12	63	1081.12	65.63	1080.62	64.5	1079.62	NP	NP	NP
MW-42D	1146.14	1144.02	10\20	101.2	103.2	1040.82	108.2	1035.82	110.82	1035.32	109.2	1034.82	97.8	1046.22	SS
MW-43A	1142.51	1140.63	10\20	87.5	90.5	1050.13	100.5	1040.13	102.88	1039.63	102	1038.63	NP	NP	NP
MW-43B	1142.35	1140.51	10\20	37	40	1100.51	50	1090.51	52.79	1089.56	52	1088.51	NP	NP	NP
MW-43D	1142.56	1140.56	10\20	104	106.4	1034.16	111.4	1029.16	113.9	1028.66	114	1026.56	101.5	1039.06	SS
MW-44A	1093.3	1091.53	10\20	25	29.5	1062.03	39.5	1052.03	41.77	1051.53	42.5	1049.03	NP	NP	NP
MW-44B	1092.08	1090.24	20\40	13	16	1074.24	26	1064.24	28.34	1063.74	30	1060.24	NP	NP	NP
MW-44D	1093.82	1091.93	10\20	48.8	50.8	1041.13	55.8	1036.13	58.19	1035.63	57	1034.93	44	1047.93	SS
MW-45A	1081.15	1079.19	4\8	26.1	28	1051.19	38	1041.19	40.46	1040.69	39	1040.19	NP	NP	NP

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Table 2-4
Monitoring Well Construction Details

Monitoring Well	Top of Casing Elevation	Ground Surface Elevation (ft)	Filter pack size	Depth to Top of Filter Pack (ft bgs)	Top of Screened Interval		Bottom of Screened Interval		Bottom of Well		Bottom of Boring		Top of Bedrock		Bedrock Type
					Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft below TOC)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	Depth (ft bgs)	Elevation (ft)	
MW-45B	1081.16	1079.16	20\40	15	17	1062.16	27	1052.16	29.52	1051.64	28.5	1050.66	NP	NP	NP
MW-45D	1081.06	1079.28	10\20	40.5	43	1036.28	48	1031.28	50.28	1030.78	49.7	1029.58	39	1040.28	SS
MW-46A	1082.32	1080.33	20\40	30.2	33.2	1047.13	43.2	1037.13	46.25	1036.07	48	1032.33	47.5	1032.83	SS
MW-46B	1082.43	1080.39	20\40	18	21	1059.39	31	1049.39	33.8	1048.63	34	1046.39	NP	NP	NP
MW-46D	1082.27	1080.33	10\20	50.5	52.5	1027.83	57.5	1022.83	59.94	1022.33	58.5	1021.83	47.5	1032.83	SS
MW-47A	1201.27	1199.3	10\20	105.1	112.8	1086.5	122.8	1076.5	125.27	1076	135.3	1064	126	1073.3	SH
MW-47B	1201.21	1199.31	20\40	71.9	74.8	1124.51	84.8	1114.51	87.5	1113.71	86.6	1112.71	NP	NP	NP
MW-48A	1192.99	1190.91	10\20	108.1	110.7	1080.21	120.7	1070.21	123.28	1069.71	124	1066.91	122	1068.91	SS
MW-48B	1192.9	1190.9	20\40	70.5	73	1117.9	83	1107.9	85.5	1107.4	83.5	1107.4	NP	NP	NP
MW-48D	1193.2	1191.19	10\20	120.8	125.5	1065.69	130.5	1060.69	133.01	1060.19	133	1058.19	119.4	1071.79	SS
MW-52A	1154.81	1153.1	10\20	45.3	48	1105.1	58	1095.1	60.6	1094.21	65	1088.1	NP	NP	NP
MW-52B	1155.24	1153.5	20\40	39	42.5	1111	52.5	1101	54.85	1100.39	54	1099.5	NP	NP	NP
MW-53A	1135.96	1134.02	4\8	84.4	87	1047.02	97	1037.02	99.64	1036.32	101	1033.02	99.9	1034.12	SS
MW-53B	1136.51	1134.49	20\40	24.5	27.5	1106.99	37.5	1096.99	40.12	1096.39	39	1095.49	NP	NP	NP
MW-54A	1121.17	1119.31	4\8	62	66	1053.31	76	1043.31	78.82	1042.35	83.5	1035.81	81.5	1037.81	SS
MW-54B	1121.18	1119.31	20\40	21	24	1095.31	29	1090.31	31.37	1089.81	31	1088.31	NP	NP	NP
MW-55A	1126.09	1124.12	10\20	72	74	1050.12	84	1040.12	86.5	1039.59	87	1037.12	85	1039.12	SS
MW-55B	1126.87	1124.68	10\20	52.5	56	1068.68	66	1058.68	68.69	1058.18	68	1056.68	NP	NP	NP
MW-56A	1125.56	1123.77	4\8	66	69	1054.77	79	1044.77	81.29	1044.27	82	1041.77	81	1042.77	SS
MW-56B	1125.84	1124.04	20\40	18	21	1103.04	31	1093.04	33.3	1092.54	32.7	1091.34	NP	NP	NP
MW-57B	1195.83	1193.88	20\40	53	55	1138.88	65	1128.88	67.45	1128.38	67	1126.88	NP	NP	NP
MW-58A	1174.94	1173.05	10\20	120	122.5	1050.55	132.5	1040.55	134.89	1040.05	144.5	1028.55	135	1038.05	SS/SH
MW-58B	1174.96	1172.97	20\40	68.4	70.7	1102.27	80.7	1092.27	84.64	1090.32	135	1037.97	134	1038.97	SS
MW-59A	1162.52	1160.63	4\8	111.5	113.1	1047.53	123.1	1037.53	125.49	1037.03	124	1036.63	NP	NP	NP
MW-59B	1162.61	1160.86	10\20	36.8	38	1122.86	48	1112.86	50.25	1112.36	49	1111.86	NP	NP	NP
MW-59D	1162.14	1160.42	10\20	130.2	132.2	1028.22	137.2	1023.22	139.42	1022.72	139	1021.42	125	1035.42	SS

Note : 1. Ground Surface Elevation estimated from Mead, Nebraska 7.5-minute series topographic map, Nebraska - Saunders County.
2. NP = Not penetrated.
3. SH = Shale.
4. SS = Sandstone.
5. * indicates wells previously installed by the USACE and all construction details are not available (USACE, 1989).
6. Bottom of well depths were obtained from as-built drawings and checked with later well soundings.

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Table 2-5 Monitoring Well Development Data

Well Number	Amount of fluids lost (gal) (1)	Amount of fluids removed (gal)	Comments
MW-09D	60	760	
MW-21A	45	591	Initial flow 8.1 gpm, Final flow 10.5 gpm
MW-21B	100	789	Initial flow 8.6 gpm, Final flow 9.1 gpm
MW-21D	50	440	
MW-22A	180	1150	Final avg flow of 5 gpm
MW-22B	100	680	Initial Flow 5 gpm, final 7gpm
MW-23A	125	905	Final flow 5 gpm
MW-23B	230	710	Initial flow 46 gpm, Final flow 8 gpm
MW-24A	300	1400	
MW-24B	100	885	
MW-25A	200	1507	Final avg flow 5 gpm
MW-25B	190	726	Initial flow 8.8 gpm, Final flow 10 gpm
MW-25D	1300	3948	Initial Flow 8 gpm, final 8 gpm
MW-26A	400	2090	Unclogged screen, increased flow from .5 gpm to 9 gpm
MW-26B	100	1189	
MW-27A	600	1860	Increase flow from 1 gpm to 6 gpm
MW-27B	250	1818	Initial flow 9.1 gpm, final flow 10 gpm
MW-28A	300	1000	
MW-28B	100	1189	Initial flow 8 gpm, final flow 9.1 gpm
MW-28D	50	770	Initial & Final flow 7 gpm
MW-29A	1000	3026	Good flow 5-6 gpm removed appx. 3 ft. sand from bottom
MW-29B	200	1848	Initial flow 8.6 gpm, final flow 9.1 gpm / removed .8 ft. of sand
MW-30A	500	1614.5	avg. flow 4.5 gpm
MW-30B	150	2060	Initial flow 9.1 gpm, Final flow 10 gpm / removed 1.4' of fine sand
MW-31A	210	660	Good flow 3.5 4 gpm
MW-31B	100	740	Initial flow rate 4 gpm . final flow rate 9 gpm
MW-32A	110	925	Removed 3.1 ft of fine sands, final flow rate 7.5 gpm
MW-32B	70	880	Final avg. flow rate 5 gpm
MW-32D	125	675	Final avg flow of 5 gpm
MW-33A	180	1725	Initial flow 6 gpm, Final 7.5 gpm / removed 2.30' of sand
MW-33B	165	1276	Initial & Final flow 8.6 gpm / Removed 1.5 inches of sand
MW-33D	170	545	Slow yield, flow 0.33 gpm
MW-34A	200	1240	Initial Flow 5.5 gpm Final 7.5 gpm
MW-34B	200	1494	Initial Flow 8.6 gpm, Final Flow 10gpm
MW-34D	100	590	Good flow, avg. 5.2 gpm
MW-35A	400	1390	Initial Flow 4 gpm, final 7gpm / remove sand from wells
MW-35B	270	1240	Removed 4 ft. of sand / Flow @ 8 Gpm
MW-35D	450	1505	Final avg flow 7 gpm
MW-36A	70	1480	
MW-36B	60	957.2	
MW-36D	20	1214.7	
MW-37A	100	509	Initial Flow 1/3 gpm, final 8 pgm / Clogged screen-"Unclog"
MW-37B	40	800	Initial Flow 5 gpm . Final flow 10 gpm
MW-37D	20	790	Initial flow 5 gpm, final 10 gpm
MW-38A	370	1300	
MW-38D	50	640	
MW-39A	153	500	
MW-39D	60	560	
MW-40A	190	650	
MW-40B	100	1403	
MW-41A	100	355	
MW-41B	100	1060	
MW-41D	25	350	
MW-42A	300	1399.4	

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Table 2-5 Monitoring Well Development Data

Well Number	Amount of fluids lost (gal) (1)	Amount of fluids removed (gal)	Comments
MW-42B	90	780	
MW-42D	50	640	
MW-43A	200	1576	
MW-43B	70	801.4	
MW-43D	100	730	Initial Flow 5gpm, Final Flow 8gpm
MW-44A	70	790	
MW-44B	40	48	
MW-44D	40	480	Initial Flow 6 gpm, Final flow 10 gpm
MW-45A	50	1720	Initial flow 8 gpm, Final flow 10 gpm
MW-45B	125	540	
MW-45D	100	680	Initial flow 6 gpm, Final flow 10 gpm
MW-46A	150	825	Initial flow & Final flow 7.5 gpm
MW-46B	50	435	Initial flow 7.5 gpm , Final flow 8.0 gpm
MW-46D	25	580	Initial flow 7 gpm , Final flow 10 gpm
MW-47A	1300	3945	
MW-47B	200	1900	
MW-48A	250	1030	
MW-48B	50	780	
MW-48D	200	700	
MW-52A	75	980	Initial flow 4 gpm, final flow 10 gpm
MW-52B	120	1420	Initial flow 5 gpm , Final flow 3.5 gpm / Slow yield, slow recharge
MW-53A	55	515	Initial Flow 7gpm, Final 8gpm / No sand @ the bottom
MW-53B	190	820	Initial Flow 8.82 gpm, Final flow 10 gpm
MW-54A	35	900	Initial flow 5 gpm, final flow 10 gpm
MW-54B	175	20	Bailed dry four times
MW-55A	20	680	Initial Flow 7gpm, Final Flow 10 gpm/ remove 2ft. of sand
MW-55B	135	450	Initial flow & Final flow 7.5 gpm
MW-56A	50	750	Initial flow & final flow 6 gpm
MW-56B	130	439	Initial flow 2.5 gpm, Final flow 7.5 gpm
MW-57B	150	1070	
MW-58A	400	1280	Intial Flow 6 gpm,Final 9 gpm
MW-58B	300	1030	
MW-59A	150	1180	
MW-59B	60	860	
MW-59D	105	680	Initial flow 6 gpm, Final flow 8 gpm.

Note (1) The amount of fluid lost is the estimated volume of drilling fluids and water lost during sand pack installation within the screen interval.

COE 031644

TABLE 3-1

MONTHLY MEAN TEMPERATURE (°F)[1]
WAHOO, NEBRASKA

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1986	33.6	25.7	46.0	54.2	63.7	76.5	78.7	70.5	68.1	53.9	36.1	30.0	53.1
1987	--[2]	--[2]	--[2]	--[2]	65.2	74.5	78.5	71.3	64.3	47.0	43.3	31.0	___[2]
1988	18.5	23.0	39.7	48.6	67.0	76.8	74.8	76.3	65.5	49.1	39.8	30.0	50.8
1989	31.0	15.2	35.8	52.8	60.2	68.3	77.1	73.1	62.2	52.9	35.9	17.5	48.5
1990	31.7	29.4	40.0	48.4	57.4	72.9	74.8	73.9	68.6	52.2	41.9	20.6	51.0

Notes:

1 Source NOAA National Climatic Data Center.
2 Incomplete data.

MECOEK 3497

COE 031645

TABLE 3-2

MONTHLY PRECIPITATION IN INCHES[1]
WAHOO, NEBRASKA

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1986	0.00	1.20	3.65	7.10	4.46	1.77	4.16	8.28	12.25	5.45	0.70	0.00	49.02
1987	--[2]	--[2]	--[2]	--[2]	3.94	2.50	2.26	9.40	1.93	1.00	0.79	1.13	--[2]
1988	0.64	0.12	0.04	1.91	2.78	1.53	4.41	1.07	6.78	0.07	1.28	0.44	21.07
1989	0.99	0.01	0.19	0.74	1.73	4.42	3.25	3.77	5.91	0.77	0.10	0.50	22.38
1990	0.46	0.23	2.69	0.20	5.03	3.25	6.27	1.03	1.22	1.78	0.95	1.01	24.12
Normal[3]	0.67	1.12	2.25	3.34	4.70	4.90	3.44	4.26	3.79	2.44	1.29	0.96	33.16

Notes:

1. Source NOAA National Climatic Data Center.
2. Incomplete data.
3. Normal precipitation is the average from 1951 to 1980.

MECOEK 3498

COE 031646

TABLE 3-3

TOTAL MONTHLY EVAPORATION (INCHES)[1,2]
OMAHA (NORTH), NEBRASKA

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1986	—	—	—	6.65	7.09	9.23	9.82	5.97	5.20	3.58	—	—
1987	—	—	—	—	7.74	8.50	8.69	6.07	5.67	—	—	—
1988	—	—	—	—	10.23	11.48	7.95	10.18	7.36	4.36	—	—
1989	—	—	—	—	8.12	9.22	9.31	6.89	6.42	4.60	—	—
1990	—	—	—	—	6.08	8.44	8.96	7.59	7.20	5.80	—	—

Notes:

1 Source = NOAA National Climatic Data Center.
2 Evaporation recorded between last freeze in spring and first freeze in fall.

TOTAL MONTHLY WIND MOVEMENT (MILES)[1,2]
OMAHA (NORTH), NEBRASKA

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1986	—	—	—	3,279	2,375	1,961	2,184	1,858	1,994	2,210	—	—
1987	—	—	—	—	2,365	1,770	1,029	1,391	1,786	—	—	—
1988	—	—	—	—	3,023	2,231	1,589	2,064	2,263	2,227	—	—
1989	—	—	—	—	2,467	2,104	1,567	1,654	2,183	2,090	—	—
1990	—	—	—	—	2,222	2,186	1,940	1,639	1,763	2,694	—	—

Notes:

1 Source = NOAA National Climatic Data Center.
2 Wind movement recorded between last freeze in spring and first freeze in fall.

COE 031647
MECOEK 3499

TABLE 3-4

ELEVATION OF GEOLOGIC CONTACTS

Monitoring Well Boring No.	Land Surface Elevation (Ft MSL)	Depth to Top of Fine Sand Unit (Ft bgs)	Elevation of Top of Fine Sand Unit (Ft MSL)	Thickness of Fine Sand Unit (Ft)	Depth to Top of Sand and Gravel Unit (Ft bgs)	Elevation of Top of Sand and Gravel Unit (Ft MSL)	Thickness of Sand and Gravel Unit (Ft)	Depth to Top of Platte River Fine Sand (Ft bgs)	Elevation of Top of Platte River Fine Sand (Ft MSL)	Thickness of Platte River Fine Sand (Ft)	Depth to Top of Platte River Sand and Gravel (Ft bgs)	Elevation of Top of Platte River Sand and Gravel (Ft MSL)	Thickness of Platte River Sand and Gravel (Ft)	Depth to Top of Bedrock (Ft bgs)	Elevation of Top of Bedrock (Ft MSL)
MW-9D	1168.9	16.5	1152	76.5	93	1076	28.6	NA	NA	NA	NA	NA	NA	121.6	1047
MW-21D	1163.26	20	1143	57	77	1086	50.3	NA	NA	NA	NA	NA	NA	127.3	1036
MW-22A	1174.5	15	1160	64.5	79.5	1095	20	NA	NA	NA	NA	NA	NA	99.5	1075
MW-23A	1171.45	23	1148	56	79	1092	20.3	NA	NA	NA	NA	NA	NA	99.3	1072
MW-24A	1160.96	15.8	1145	64.2	80	1081	45	NA	NA	NA	NA	NA	NA	125	1036
MW-25D	1173.12	13.5	1160	71.5	85	1088	71.8	NA	NA	NA	NA	NA	NA	156.8	1016
MW-26A	1172.02	14.5	1158	61.5	76	1096	27.8	NA	NA	NA	NA	NA	NA	103.8	1068
MW-27A	1173.72	9	1165	63	72	1102	34.8	NA	NA	NA	NA	NA	NA	106.8	1067
MW-28D	1169.43	11	1158	68	79	1090	59	NA	NA	NA	NA	NA	NA	138	1031
MW-29A	1158.1	14.5	1144	72.5	87	1071	50.1	NA	NA	NA	NA	NA	NA	137.1	1021
MW-30A	1166.19	19.8	1146	50.2	70	1096	31.5	NA	NA	NA	NA	NA	NA	101.5	1065
MW-31A	1164.94	8	1157	50	58	1107	48	NA	NA	NA	NA	NA	NA	106	1059
MW-32D	1151.67	17	1135	65	82	1070	17.5	NA	NA	NA	NA	NA	NA	99.5	1052
MW-33D	1157.89	7.5	1150	77	84.5	1073	32	NA	NA	NA	NA	NA	NA	116.5	1041
MW-34D	1154.44	20	1134	56	76	1078	36.9	NA	NA	NA	NA	NA	NA	112.9	1042
MW-35D	1137.4	17.5	1120	50.5	68	1069	25	NA	NA	NA	NA	NA	NA	93	1044
MW-36D	1076.55	NA	NA	NA	NA	NA	NA	15.5	1061	11.5	27	1050	12	39	1038
MW-37D	1082.61	NA	NA	NA	NA	NA	NA	10.5	1072	18.5	29	1054	12.4	41.4	1041
MW-38A	1179.61	NA	NA	NA	NA	NA	NA	13.1	1167	8.9	22	1158	27.2	49.2	1130
MW-39A	1180.63	NA	NA	NA	NA	NA	NA	10.7	1170	11.3	22	1159	26.5	48.5	1132
MW-40A	1169.67	15.7	1154	73.3	89	1081	38.6	NA	NA	NA	NA	NA	NA	127.6	1042
MW-41D	1165.99	19	1147	41	60	1106	22	NA	NA	NA	NA	NA	NA	82	1084
MW-42D	1144.02	16	1128	48	64	1080	33.8	NA	NA	NA	NA	NA	NA	97.8	1046
MW-43D	1140.56	18	1123	46	80	1061	21.5	NA	NA	NA	NA	NA	NA	101.5	1039
MW-44D	1091.93	NA	NA	NA	NA	NA	NA	17	1075	11	28	1064	16	44	1048

TABLE 3-4

ELEVATION OF GEOLOGIC CONTACTS
(Continued)

Monitoring Well Boring No.	Land Surface Elevation (Ft MSL)	Depth to Top of Fine Sand Unit (Ft bgs)	Elevation of Top of Fine Sand Unit (Ft MSL)	Thickness of Fine Sand Unit (Ft)	Depth to Top of Sand and Gravel Unit (Ft bgs)	Elevation of Top of Sand and Gravel Unit (Ft MSL)	Thickness of Sand and Gravel Unit (Ft)	Depth to Top of Platte River Fine Sand (Ft bgs)	Elevation of Top of Platte River Fine Sand (Ft MSL)	Thickness of Platte River Fine Sand (Ft)	Depth to Top of Platte River Sand and Gravel (Ft bgs)	Elevation of Top of Platte River Sand and Gravel (Ft MSL)	Thickness of Platte River Sand and Gravel (Ft)	Depth to Top of Bedrock (Ft bgs)	Elevation of Top of Bedrock (Ft MSL)
MW-45D	1079.28	NA	NA	NA	NA	NA	NA	16	1063	6	22	1057	17	39	1040
MW-46D	1080.33	NA	NA	NA	NA	NA	NA	11.5	1069	15	26.5	1054	21	47.5	1033
MW-47A	1199.3	15.8	1184	70.2	86	1113	40	NA	NA	NA	NA	NA	NA	126	1073
MW-48A	1190.91	18	1173	66	84	1107	38	NA	NA	NA	NA	NA	NA	122	1069
MW-52A	1153.1	19	1134	41	53	1100	NA	NA	NA	NA	NA	NA	NA	NP	NP
MW-53A	1134.02	11	1123	35	83	1051	16.9	NA	NA	NA	NA	NA	NA	99.9	1034
MW-54A	1119.31	23	1096	18	55	1064	26.5	NA	NA	NA	NA	NA	NA	81.5	1038
MW-55A	1124.12	5	1119	30	56	1068	29	NA	NA	NA	NA	NA	NA	85	1039
MW-56A	1123.77	4	1120	42	60.5	1063	20.5	NA	NA	NA	NA	NA	NA	81	1043
MW-57B	1193.88	13	1181	53	66	1128	NA	NA	NA	NA	NA	NA	NA	NP	NP
MW-58A	1173.05	20	1153	66	86	1087	49	NA	NA	NA	NA	NA	NA	135	1038
MW-59D	1160.42	12	1148	74	86	1074	39	NA	NA	NA	NA	NA	NA	125	1035

Notes:

NA = Not applicable.
NP = Not penetrated.

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Table 3-5 Water Level Measurements

Sample Point	6/10/1992		6/24/1992		7/8/1992		7/23/1992		8/5/1992		9/9/1992		10/14/1992		11/10/1992		1/8/1993	
	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)
MW-01A	43.34	1133.16	43.32	1133.18	43.45	1133.05	43.50	1133.00	43.46	1133.04	43.50	1133.00	43.55	1132.95	43.65	1132.85	43.67	1132.83
MW-01B	43.20	1133.08	43.15	1133.13	43.28	1133.00	43.32	1132.96	43.29	1132.99	43.35	1132.93	43.36	1132.92	43.43	1132.85	43.47	1132.81
MW-02A	41.11	1133.28	41.13	1133.26	41.29	1133.10	41.30	1133.09	41.30	1133.09	41.32	1133.07	41.71	1132.68	41.27	1133.12	41.22	1133.17
MW-02B	41.47	1133.34	41.57	1133.24	41.70	1133.11	41.68	1133.13	41.68	1133.13	41.75	1133.06	41.29	1133.52	41.68	1133.13	41.63	1133.18
MW-03A	46.78	1132.30	47.91	1131.17	46.95	1132.13	46.95	1132.13	46.97	1132.11	47.00	1132.08	46.99	1132.09	46.97	1132.11	46.60	1132.48
MW-03B	46.63	1132.74	47.67	1131.70	46.80	1132.57	46.81	1132.56	46.82	1132.55	46.90	1132.47	46.86	1132.51	46.83	1132.54	46.81	1132.56
MW-04A	37.55	1130.69	37.62	1130.62	37.76	1130.48	37.74	1130.50	37.77	1130.47	37.90	1130.34	37.93	1130.31	37.89	1130.35	37.90	1130.34
MW-04B	37.72	1130.65	37.78	1130.59	37.92	1130.45	37.89	1130.48	37.92	1130.45	38.05	1130.32	38.11	1130.26	38.05	1130.32	38.08	1130.29
MW-05A	36.31	1131.30	36.50	1131.11	36.55	1131.06	36.51	1131.10	36.60	1131.01	36.80	1130.81	36.79	1130.82	36.78	1130.83	36.79	1130.82
MW-05B	36.46	1131.20	36.58	1131.08	36.69	1130.97	36.64	1131.02	36.72	1130.94	36.95	1130.71	36.90	1130.76	36.87	1130.79	36.91	1130.75
MW-06A	40.86	1124.08	40.88	1124.06	41.15	1123.79	41.02	1123.92	41.00	1123.94	41.09	1123.85	41.10	1123.84	41.12	1123.82	41.06	1123.88
MW-06B	41.00	1124.12	41.12	1124.00	41.31	1123.81	41.23	1123.89	41.18	1123.94	41.27	1123.85	41.28	1123.84	41.29	1123.83	41.29	1123.83
MW-07A	40.20	1124.20	40.29	1124.11	40.48	1123.92	40.37	1124.03	40.33	1124.07	40.51	1123.89	40.48	1123.92	40.46	1123.94	40.40	1124.00
MW-07B	39.94	1124.20	40.06	1124.08	40.25	1123.89	40.13	1124.01	40.02	1124.12	40.27	1123.87	40.25	1123.89	40.14	1124.00	40.04	1124.10
MW-08A	48.23	1117.27	48.22	1117.28	48.38	1117.12	48.40	1117.10	48.45	1117.05	48.52	1116.98	48.50	1117.00	48.50	1117.00	48.47	1117.03
MW-08B	48.25	1117.26	48.25	1117.26	48.38	1117.13	48.42	1117.09	48.44	1117.07	48.51	1117.00	48.51	1117.00	48.55	1116.96	48.49	1117.02
MW-09A	53.48	1117.51	53.55	1117.44	53.66	1117.33	53.68	1117.31	53.70	1117.29	53.74	1117.25	53.89	1117.10	53.76	1117.23	53.67	1117.32
MW-09B	53.69	1117.20	53.45	1117.44	53.57	1117.32	53.62	1117.27	53.62	1117.27	53.95	1116.94	53.71	1117.18	53.93	1116.96	53.87	1117.02
MW-09D	NA		NA		NA		NA		NA		53.47	1117.40	53.43	1117.44	53.44	1117.43	53.41	1117.46
MW-10A	39.20	1110.72	39.25	1110.67	39.42	1110.50	39.18	1110.74	39.35	1110.57	39.16	1110.76	39.62	1110.30	39.59	1110.33	39.12	1110.80
MW-10B	38.73	1111.10	38.82	1111.01	38.97	1110.86	38.73	1111.10	38.89	1110.94	39.06	1110.77	39.16	1110.67	39.13	1110.70	39.05	1110.78
MW-11A	33.75	1118.96	33.74	1118.97	33.87	1118.84	32.45	1120.26	31.80	1120.91	32.07	1120.64	32.78	1119.93	NM		33.22	1119.49
MW-12A	38.21	1140.04	38.23	1140.02	38.34	1139.91	38.32	1139.93	38.37	1139.88	38.34	1139.91	38.40	1139.85	38.44	1139.81	38.40	1139.85
MW-13A	38.04	1136.64	38.21	1136.47	38.39	1136.29	38.43	1136.25	38.50	1136.18	38.74	1135.94	38.93	1135.75	38.94	1135.74	38.98	1135.70
MW-14A	48.29	1130.14	48.33	1130.10	48.41	1130.02	48.38	1130.05	48.40	1130.03	48.42	1130.01	48.49	1129.94	48.53	1129.90	48.57	1129.86
MW-15A	47.44	1122.20	47.43	1122.21	47.55	1122.09	47.56	1122.08	47.57	1122.07	47.59	1122.05	47.58	1122.06	47.54	1122.10	47.64	1122.00
MW-16B	36.75	NS	36.68	NS	36.95	NS	36.98	NS	36.89	NS	36.95	NS	36.76	NS	36.68	NS	36.60	NS
MW-16C	37.51	NS	37.44	NS	37.69	NS	37.73	NS	37.64	NS	37.73	NS	37.54	NS	37.46	NS	37.37	NS
MW-17A	7.16	NS	NM		7.33	NS	7.21	NS	9.02	NS	7.34	NS	7.45	NS	7.51	NS	7.53	NS
MW-17B	8.84	NS	9.00	NS	9.17	NS	9.89	NS	7.32	NS	9.36	NS	9.40	NS	9.35	NS	9.32	NS
MW-17C	8.71	1144.09	9.00	1143.80	9.15	1143.65	8.68	1144.12	8.93	1143.87	9.26	1143.54	9.21	1143.59	9.04	1143.76	8.93	1143.87
MW-18A	43.65	1105.35	43.70	1105.30	44.12	1104.88	43.89	1105.11	43.74	1105.26	43.89	1105.11	43.74	1105.26	43.68	1105.32	43.61	1105.39
MW-18B	44.07	NS	44.11	NS	44.60	NS	44.32	NS	44.17	NS	44.35	NS	44.20	NS	44.13	NS	44.03	NS
MW-18C	42.29	1107.01	42.30	1107.00	42.42	1106.88	42.42	1106.88	42.43	1106.87	42.47	1106.83	42.45	1106.85	42.46	1106.84	42.35	1106.95
MW-19A	14.78	NS	14.70	NS	14.98	NS	15.00	NS	15.00	NS	15.08	NS	15.04	NS	15.06	NS	15.00	NS
MW-19B	14.93	1150.07	14.90	1150.10	15.08	1149.92	15.13	1149.87	15.17	1149.83	15.22	1149.78	15.19	1149.81	15.20	1149.80	15.18	1149.82
MW-19C	15.48	1147.32	15.40	1147.40	15.62	1147.18	15.68	1147.12	15.69	1147.11	15.79	1147.01	15.74	1147.06	15.76	1147.04	15.67	1147.13
MW-20A	57.72	NS	57.72	NS	57.87	NS	57.84	NS	57.88	NS	57.95	NS	58.02	NS	58.08	NS	58.12	NS

Table 3-5 Water Level Measurements

Sample Point	6/10/1992		6/24/1992		7/8/1992		7/23/1992		8/5/1992		9/9/1992		10/14/1992		11/10/1992		1/8/1993	
	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)
MW-20B	57.58	1094.12	57.61	1094.09	57.74	1093.96	57.70	1094.00	57.79	1093.91	57.82	1093.88	57.92	1093.78	57.94	1093.76	57.97	1093.73
MW-20C	56.34	1098.36	56.38	1098.32	56.42	1098.28	56.43	1098.27	56.46	1098.24	56.49	1098.21	56.58	1098.12	56.64	1098.06	56.75	1097.95
MW-21A	NA		NA		NA		NA		36.47	1128.75	36.50	1128.72	36.56	1128.66	36.58	1128.64	36.58	1128.64
MW-21B	NA		NA		NA		NA		36.46	1128.72	36.49	1128.69	36.55	1128.63	36.56	1128.62	36.57	1128.61
MW-21D	NA		NA		NA		NA		36.47	1128.69	36.46	1128.70	36.52	1128.64	36.54	1128.62	36.55	1128.61
MW-22A	NA		22.28	1154.07	35.45	1140.90	33.40	1142.95	33.43	1142.92	33.49	1142.86	33.54	1142.81	33.57	1142.78	33.57	1142.78
MW-22B	NA		NA		33.40	1142.84	33.36	1142.88	33.40	1142.84	33.47	1142.77	33.51	1142.73	33.54	1142.70	33.54	1142.70
MW-23A	NA		NA		32.80	1140.33	32.73	1140.40	32.75	1140.38	32.83	1140.30	32.90	1140.23	32.95	1140.18	32.91	1140.22
MW-23B	NA		NA		NA		33.18	1140.32	33.12	1140.38	33.19	1140.31	32.26	1141.24	33.32	1140.18	33.27	1140.23
MW-24A	NA		NA		NA		NA		24.78	1138.22	39.52	1123.48	39.58	1123.42	39.65	1123.35	39.71	1123.29
MW-24B	NA		NA		NA		NA		NA		39.32	1123.73	39.38	1123.67	39.45	1123.60	39.51	1123.54
MW-25A	NA		NA		44.66	1130.17	45.00	1129.83	45.00	1129.83	45.05	1129.78	45.07	1129.76	45.05	1129.78	45.05	1129.78
MW-25B	NA		NA		NA		44.44	1129.85	44.42	1129.87	44.47	1129.82	44.48	1129.81	44.50	1129.79	44.48	1129.81
MW-25D	NA		NA		41.29	1133.75	45.36	1129.68	45.39	1129.65	45.45	1129.59	45.45	1129.59	45.42	1129.62	44.42	1130.62
MW-26A	NA		NA		NA		NA		35.22	1138.51	35.44	1138.29	35.37	1138.36	35.35	1138.38	35.34	1138.39
MW-26B	NA		NA		NA		NA		35.32	1138.42	35.50	1138.24	35.44	1138.30	35.42	1138.32	35.40	1138.34
MW-27A	36.37	1139.26	39.71	1135.92	40.25	1135.38	40.20	1135.43	40.22	1135.41	40.30	1135.33	40.43	1135.20	40.45	1135.18	40.48	1135.15
MW-27B	NA		NA		NA		40.32	1135.32	40.24	1135.40	40.31	1135.33	40.43	1135.21	40.47	1135.17	40.48	1135.16
MW-28A	NA		NA		NA		50.48	1121.33	50.55	1121.26	50.64	1121.17	50.69	1121.12	50.71	1121.10	50.72	1121.09
MW-28B	NA		NA		NA		50.93	1121.18	50.99	1121.12	51.11	1121.00	51.13	1120.98	51.17	1120.94	51.20	1120.91
MW-28D	NA		NA		NA		50.25	1121.33	50.03	1121.55	50.41	1121.17	50.46	1121.12	50.49	1121.09	50.51	1121.07
MW-29A	NA		48.29	1111.37	48.26	1111.40	48.24	1111.42	48.35	1111.31	48.50	1111.16	48.50	1111.16	48.50	1111.16	48.55	1111.11
MW-29B	NA		NA		49.17	1111.46	49.16	1111.47	49.27	1111.36	49.40	1111.23	49.40	1111.23	49.41	1111.22	49.43	1111.20
MW-30A	41.71	1126.42	41.72	1126.41	41.84	1126.29	41.80	1126.33	41.80	1126.33	41.84	1126.29	42.90	1125.23	41.92	1126.21	41.93	1126.20
MW-30B	NA		NA		41.62	1126.34	41.57	1126.39	41.59	1126.37	41.62	1126.34	41.68	1126.28	41.71	1126.25	41.74	1126.22
MW-31A	41.64	1125.33	51.44	1115.53	49.72	1117.25	49.70	1117.27	49.74	1117.23	49.75	1117.22	49.84	1117.13	49.89	1117.08	49.91	1117.06
MW-31B	NA		49.23	1117.31	49.28	1117.26	49.26	1117.28	49.30	1117.24	49.32	1117.22	49.39	1117.15	49.45	1117.09	49.49	1117.05
MW-32A	NA		NA		46.45	1107.32	46.44	1107.33	46.42	1107.35	46.51	1107.26	46.60	1107.17	46.63	1107.14	46.69	1107.08
MW-32B	NA		NA		46.38	1107.32	46.36	1107.34	46.41	1107.29	46.45	1107.25	46.52	1107.18	46.57	1107.13	46.63	1107.07
MW-32D	NA		36.30	1117.32	46.34	1107.28	46.32	1107.30	46.33	1107.29	46.40	1107.22	46.47	1107.15	46.53	1107.09	46.67	1106.95
MW-33A	NA		NA		NA		51.30	1108.62	51.25	1108.67	51.31	1108.61	51.38	1108.54	51.43	1108.49	51.47	1108.45
~~MW-33B~~	~~NA~~		~~NA~~		~~NA~~		~~51.24~~	~~1108.73~~	~~51.27~~	~~1108.70~~	~~51.32~~	~~1108.65~~	~~51.39~~	~~1108.58~~	~~51.45~~	~~1108.52~~	~~51.49~~	~~1108.48~~
MW-33D	NA		43.39	1116.45	50.95	1108.89	51.08	1108.76	51.00	1108.84	51.08	1108.76	51.15	1108.69	51.22	1108.62	51.24	1108.60
MW-34A	NA		NA		56.81	1099.59	56.62	1099.78	56.65	1099.75	56.69	1099.71	56.76	1099.64	56.82	1099.58	56.86	1099.54
MW-34B	NA		NA		56.83	1099.78	56.82	1099.79	56.86	1099.75	56.90	1099.71	56.97	1099.64	57.04	1099.57	57.09	1099.52
MW-34D	NA		56.49	1099.85	56.60	1099.74	56.60	1099.74	56.65	1099.69	56.66	1099.68	56.75	1099.59	56.81	1099.53	56.85	1099.49
MW-35A	NA		NA		51.51	1087.90	51.48	1087.93	51.70	1087.71	51.52	1087.89	51.49	1087.92	51.45	1087.96	51.41	1088.00
MW-35B	NA		NA		51.43	1087.84	51.36	1087.91	51.39	1087.88	51.46	1087.81	51.43	1087.84	51.40	1087.87	51.33	1087.94

Table 3-5 Water Level Measurements

Sample Point	6/10/1992		6/24/1992		7/8/1992		7/23/1992		8/5/1992		9/9/1992		10/14/1992		11/10/1992		1/8/1993	
	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)
MW-35D	51.48	1088.12	51.56	1088.04	51.70	1087.90	51.66	1087.94	51.68	1087.92	51.73	1087.87	52.69	1086.91	51.66	1087.94	51.61	1087.99
MW-36A	NA		NA		NA		NA		NA		0.04	1076.20	artesion		artesion		artesian	
MW-36B	NA		NA		NA		NA		NA		0.07	1076.20	artesion		artesion		artesian	
MW-36D	NA		NA		NA		NA		NA		0.23	1076.18	artesion		artesion		artesian	
MW-37A	NA		9.94	1074.89	7.00	1077.83	6.84	1077.99	6.84	1077.99	6.97	1077.86	6.90	1077.93	6.87	1077.96	6.81	1078.02
MW-37B	NA		9.70	1075.12	6.91	1077.91	6.76	1078.06	6.77	1078.05	6.89	1077.93	6.82	1078.00	6.80	1078.02	6.75	1078.07
MW-37D	NA		NA		NA		6.70	1077.99	6.72	1077.97	6.85	1077.84	6.78	1077.91	6.74	1077.95	6.69	1078.00
MW-38A	NA		NA		NA		NA		NA		5.77	1076.18	5.19	1076.76	5.00	1076.95	5.40	1076.55
MW-38D	NA		NA		NA		NA		NA		5.33	1076.22	4.78	1076.77	4.59	1076.96	4.93	1076.62
MW-39A	NA		NA		NA		NA		NA		3.45	1079.00	2.77	1079.68	2.50	1079.95	2.98	1079.47
MW-39D	NA		NA		NA		NA		NA		3.60	1078.98	2.90	1079.68	2.64	1079.94	3.13	1079.45
MW-40A	NA		NA		NA		NA		44.12	1127.55	43.72	1127.95	43.79	1127.88	43.89	1127.78	43.97	1127.70
MW-40B	NA		NA		NA		NA		43.92	1128.00	43.86	1128.06	43.93	1127.99	44.05	1127.87	44.11	1127.81
MW-41A	NA		NA		NA		NA		NA		41.21	1127.00	41.43	1126.78	41.60	1126.61	41.77	1126.44
MW-41B	NA		NA		NA		NA		NA		41.24	1127.02	41.45	1126.81	41.60	1126.66	41.79	1126.47
MW-41D	NA		NA		NA		NA		NA		41.20	1126.99	41.43	1126.76	41.59	1126.60	41.83	1126.36
MW-42A	NA		NA		NA		NA		NA		52.63	1093.51	52.25	1093.89	52.22	1093.92	51.97	1094.17
MW-42B	NA		NA		NA		NA		NA		52.73	1093.52	52.35	1093.90	52.15	1094.10	52.08	1094.17
MW-42D	NA		NA		NA		NA		52.25	1093.89	52.64	1093.50	52.26	1093.88	52.15	1093.99	51.97	1094.17
MW-43A	NA		NA		NA		NA		NA		45.72	1096.79	45.43	1097.08	45.34	1097.17	45.17	1097.34
MW-43B	NA		NA		NA		NA		NA		45.52	1096.83	45.23	1097.12	45.14	1097.21	44.97	1097.38
MW-43D	NA		NA		NA		45.52	1097.04	45.47	1097.09	45.77	1096.79	45.47	1097.09	45.40	1097.16	45.23	1097.33
MW-44A	NA		NA		NA		NA		NA		9.43	1083.87	9.16	1084.14	9.10	1084.20	8.98	1084.32
MW-44B	NA		NA		NA		NA		NA		10.23	1081.85	10.10	1081.98	10.09	1081.99	9.85	1082.23
MW-44D	NA		NA		NA		NA		7.95	1085.87	8.23	1085.59	7.94	1085.88	7.88	1085.94	7.76	1086.06
MW-45A	NA		NA		NA		NA		2.49	1078.66	2.82	1078.33	2.32	1078.83	2.23	1078.92	frozen	
MW-45B	NA		NA		NA		NA		NA		2.78	1078.38	2.27	1078.89	2.19	1078.97	frozen	
MW-45D	NA		NA		NA		NA		2.40	1078.66	2.73	1078.33	2.22	1078.84	2.14	1078.92	2.33	1078.73
MW-46A	NA		NA		NA		NA		3.00	1079.32	3.59	1078.73	2.94	1079.38	2.78	1079.54	3.17	1079.15
MW-46B	NA		NA		NA		NA		3.10	1079.33	3.70	1078.73	3.05	1079.38	2.89	1079.54	3.30	1079.13
MW-46D	NA		NA		NA		NA		2.95	1079.32	3.55	1078.72	2.89	1079.38	2.74	1079.53	3.12	1079.15
MW-47A	NA		NA		NA		NA		NA		30.49	1170.78	30.55	1170.72	30.62	1170.65	30.68	1170.59
MW-47B	NA		NA		NA		NA		NA		30.40	1170.81	30.45	1170.76	30.51	1170.70	30.58	1170.63
MW-48A	NA		NA		NA		NA		NA		34.64	1158.35	35.60	1157.39	35.35	1157.64	35.69	1157.30
MW-48B	NA		NA		NA		NA		NA		34.57	1158.33	35.23	1157.67	35.29	1157.61	35.35	1157.55
MW-48D	NA		NA		NA		NA		NA		34.80	1158.40	36.12	1157.08	35.69	1157.51	36.18	1157.02
MW-52A	NA		NA		41.20	1113.61	40.66	1114.15	39.74	1115.07	39.67	1115.14	40.49	1114.32	NM		40.41	1114.40
MW-52B	NA		NA		41.28	1113.96	40.66	1114.58	40.32	1114.92	40.20	1115.04	39.96	1115.28	NM		40.92	1114.32

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Table 3-5 Water Level Measurements

Sample Point	6/10/1992		6/24/1992		7/8/1992		7/23/1992		8/5/1992		9/9/1992		10/14/1992		11/10/1992		1/8/1993	
	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)	Depth (ft TOC)	Elevation (ft)
MW-53A	NA		NA		30.24	1105.72	29.38	1106.58	28.89	1107.07	28.96	1107.00	28.93	1107.03	28.66	1107.30	28.95	1107.01
MW-53B	NA		NA		NA		28.13	1108.38	27.65	1108.86	27.60	1108.91	27.55	1108.96	27.59	1108.92	27.52	1108.99
MW-54A	NA		NA		13.10	1108.07	12.58	1108.59	12.26	1108.91	12.33	1108.84	13.38	1107.79	12.47	1108.70	12.49	1108.68
MW-54B	NA		NA		10.44	1110.74	9.83	1111.35	9.72	1111.46	9.79	1111.39	9.93	1111.25	10.00	1111.18	10.10	1111.08
MW-55A	NA		NA		NA		19.85	1106.24	18.84	1107.25	18.94	1107.15	18.93	1107.16	18.95	1107.14	18.95	1107.14
MW-55B	NA		NA		NA		NA		19.45	1107.42	19.53	1107.34	19.53	1107.34	19.55	1107.32	19.56	1107.31
MW-56A	NA		NA		NA		21.20	1104.36	18.91	1106.65	19.03	1106.53	18.99	1106.57	19.00	1106.56	18.99	1106.57
MW-56B	NA		NA		NA		17.55	1108.29	17.52	1108.32	17.49	1108.35	17.45	1108.39	17.41	1108.43	17.39	1108.45
MW-57B	NA		NA		NA		NA		NA		41.79	1154.04	41.57	1154.26	41.47	1154.36	41.29	1154.54
MW-58A	NA		NA		NA		NA		39.86	1135.08	39.90	1135.04	39.93	1135.01	39.98	1134.96	40.02	1134.92
MW-58B	NA		NA		NA		NA		40.45	1134.51	40.07	1134.89	40.09	1134.87	40.14	1134.82	40.20	1134.76
MW-59A	NA		NA		NA		NA		27.92	1134.60	27.96	1134.56	27.97	1134.55	28.04	1134.48	28.07	1134.45
MW-59B	NA		NA		NA		NA		28.31	1134.30	28.33	1134.28	28.37	1134.24	28.42	1134.19	28.49	1134.12
MW-59D	NA		NA		NA		NA		27.52	1134.62	27.49	1134.65	27.51	1134.63	27.59	1134.55	27.65	1134.49

Notes : 1. Water level readings are measured in feet from top of casing (TOC)
2. Shaded readings indicate that water level were measured before well development was completed
3. NA indicates that water level was not available because monitoring well was not installed.
4. NS indicates that the elevation of the monitoring well was not surveyed at the time of this report.
5. NM indicates that the water level was not measured.

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TABLE 3-6

AQUIFER PROPERTIES

Hydrostratigraphic Unit		Hydraulic Conductivity, K (ft/min)	Transmissivity, T (GPD/ft)	Source of Information	Slug Test Analysis Used
Platte River Aquifer		0.032 0.040 (Mean 0.036)	1.1×10^4 1.4×10^4 (Mean 1.3×10^4)	MW-46A slug test MW-46B slug test	2 2
Todd Valley Aquifer	Fine Sand Unit	0.0066 0.073 0.023 (Mean 0.034)		MW-21B slug test MW-26B slug test MW-53B slug test	1 1 1
	Sand and Gravel Unit	0.082 0.14 (Mean 0.11)	1.2×10^4 2.50×10^4 (Mean 1.90×10^4)	MW-21A slug test MW-53A slug test	2 2
		0.0028		MW-26A slug test	1
	Both the above units considered as one aquifer unit	0.014 to 0.15 (Mean 0.094)	1.3×10^4 to 1.3×10^5 (Mean 6.9×10^4)	Grain-size analysis of samples from 84 boreholes Piskin (1971)	
Omadi Sandstone Aquifer		0.034 0.053 (Mean 0.044)	2.8×10^3 4.0×10^3 (Mean 3.4×10^3)	MW-21D slug test MW-21D slug test MW-46D slug test MW-46D slug test	1 3 1 3
		0.021 to 0.050 (Mean 0.033)	4.0×10^3 to 5.5×10^4 (Mean 2.2×10^4)	Grain-size analysis of samples from 43 boreholes Piskin (1971)	

Slug test analyses:
1. Bouwer and Rice (1976)
2. van der Kamp (1976)
3. Cooper, Bredehoeft, Papadopulos (1967)

Notes:

[1] Hydraulic conductivities calculated from slug tests analyzed using the van der Kamp (1976) method, which yields a value for transmissivity, were obtained by dividing the transmissivity by the thickness of the unit. (Refer to boring logs in Appendix A).

[2] Estimates of hydraulic conductivity and transmissivity from slug test data are reported to two significant figures. However, these values are considered to be accurate to one significant figure only.

TABLE 3-7

SELECTED TOTAL METALS AND WATER QUALITY PARAMETER RESULTS FROM BACKGROUND WELLS MW-47A AND MW-47B

	MW-47A	MW-47B	Mean	2 x Mean	2 x Maximum
Aluminum (µg/L)	168	416	292	584	832
Iron (µg/L)	1,310	1,840	1,575	3,150	3,680
Manganese (µg/L)	416	373	394.5	789	832
Nitrate plus Nitrite (as Nitrogen) (mg/L)	51	53	52	104'	106

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TABLE 3-8

FISHERY RESOURCES
SAUNDERS COUNTY, NEBRASKA

Common Name	Genus and Species	Range in Saunders County
Paddlefish	*Polyodon spathula (Walbaun)*	Platte
Shovelnose sturgeon	*Scaphirhynchus platorhynchus (Rafinesque)*	Platte
Lake sturgeon	*Acipenser fulvescens Rafinesque*	Platte
Pallid sturgeon	*Scaphirhyuchus albus (Forbes and Richardson)*	Platte
Longnose gar	*Lepisosteus osseus (Linnaeus)*	Platte
Shortnose gar	*Lepisosteus platostomus (Rafinesque)*	Platte
Gizzard shad	*Dorosoma cepedianum (Lesueur)*	Platte, Salt Creek
Goldeye	*Hiodon alosoides (Rafinesque)*	Platte
Northern pike	*Esox lucius Linnaeus*	Platte
Stoneroller	*Campostoma anomalum (Rafinesque)*	Platte
Goldfish	*Carassius auratus (Linnaeus)*	Tributaries
Carp	*Cyprinus carpio Linnaeus*	Entire county
Brassy minnow	*Hybognathus hankinsoni Hubbs*	Entire county
Silvery minnow	*Hybognathus nuchalis Agassiz*	Salt Creek, Platte
Fathead chub	*Hybopsis gracilis Richardson*	Entire County
Golden shiner	*Notemigonus crysoleucas (Mitchill)*	Tributaries
Emerald shiner	*Notropis atherinoides Rafinesque*	Platte, Salt Creek
River shiner	*Notropis blennius (Girard)*	Platte, Salt Creek
Bigmouth shiner	*Notropis dorsalis (Agassiz)*	Entire county
Red shiner	*Notropis lutrensis (Baird and Girard)*	Entire county
Creek chub	*Semotilus atromaculatus (Mitchill)*	Entire county
Flathead minnow	*Pimephalese promelas Rafinesque*	Entire county
River carpsucker	*Carpiodes carpio (Rafinesque)*	Entire county
Quillback	*Carpiodes cyprinus (Lesueur)*	Platte, Salt Creek
White sucker	*Catostomus commersoni (Lacepede)*	Platte
Smallmouth buffalo	*Ictiobus bubalus (Rafinesque)*	Platte
Bigmouth buffalo	*Ictiobus cyprinellus (Valenciennes)*	Platte
Shorthead redhorse	*Moxostoma macrolepidotum (Lesueur)*	Platte
Channel catfish	*Ictalurus punctatus (Rafinesque)*	Entire county
Black bullhead	*Ictalurus melas (Rafinesque)*	Entire county
Yellow bullhead	*Ictalurus natalis (Lesueur)*	Platte, Salt Creek
Stonecat	*Noturus flavus Rafinesque*	Salt Creek

TABLE 3-8

FISHERY RESOURCES
SAUNDERS COUNTY, NEBRASKA
(Continued)

Common Name	Genus and Species	Range in Saunders County
Tadpole madtom	*Noturus gyrinus (Mitchill)*	Platte, Salt Creek
Flathead catfish	*Pylodictus olivaris (Rafinesque)*	Platte
Burbot	*Lota lota (Linnaeus)*	Platte
Plains killifish	*Fundulus kansae Garman*	Platte, Salt Creek
Plains topminnow	*Fundulus sciadicus Cope*	Platte, Salt Creek
Brook Stickleback	*Culaea inconstans (Kirtland)*	Tributaries
Green sunfish	*Lepomis cyanellus (Rafinesque)*	Entire county
Pumpkinseed	*Lepomis gibbosus (Linnaeus)*	Tributaries
Orangespotted sunfish	*Lepomis humilis (Girard)*	Entire county
Bluegill	*Lepomis macrochirus Rafinesque*	Entire county
Largemouth bass	*Micropterus salmoides*	Entire county
Black crappie	*Pomoxis nigromaculatus (Lesueur)*	Entire county
White crappie	*Pomoxis annularis (Rafinesque)*	Entire county
Johnny darter	*Etheostoma nigrum Rafinesque*	Platte
Yellow perch	*Perca flavescens (Mitchill)*	Lakes
Sauger	*Stizostedion canadense (Smith)*	Platte
Walleye	*Stizostedion vitreum vitreum (Mitchill)*	Platte, Salt Creek
Freshwater drum	*Aplodinotus grunniens Rafinesque*	Platte

Notes:

Source:	Range maps from Morris et al. (1974).
Platte:	Platte River.
Tributaries:	Tributaries of the Platte River.
Salt Creek:	Tributary of Platte River which joins the Platte near Ashland.
Entire County:	All streams, lakes.

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TABLE 3-9

CANDIDATE SPECIES OF WILDLIFE AND PLANTS FOR THREATENED AND ENDANGERED STATUS SAUNDERS COUNTY, NEBRASKA

Common Name	Scientific Name
Fish	
Plains Topminnow	*Fundulus sciadicus*
Reptiles	
Blanding's Turtle	*Emydoidea blandingii*
Mammals	
Plains Spotted Skunk	*Spilogale putorius interrupta*
Birds	
Ferruginous Hawk	*Buteo regalis*
Loggerhead Shrike	*Lanius ludovicianus*
Invertebrates	
Regal Fritillary Butterfly	*Speyerdia idalia*
Plants	
Western Prairie Fringed Orchid	*Platanthera praeclara*

Note:

Source = U.S. Fish and Wildlife Service. 1992.
Category 2 candidate species are those which the USFWS are seeking additional information in order to determine their biological status. Candidate species have no legal protection under the Endangered Species Act and are included on this table for planning purposes only.

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TABLE 3-10

THREATENED AND ENDANGERED WILDLIFE AND PLANT SPECIES SAUNDERS COUNTY, NEBRASKA

Common Name	Scientific Name
Fish	
None Listed	
Reptiles	
None Listed	
Mammals	
None Listed	
Birds	
Bald Eagle	*Huliaeetus leucocephalus*
Peregrine Falcon	*Falco peregrinus*
Interior Least Tern	*Sterna antillarum*
Piping Plover	*Cheradrius melodus*
Invertebrates	
American Burying Beetle	*Nicrophorus americanus*
Plants	
None Listed	

Note:

Source = U.S. Fish and Wildlife Service. 1992.

COE 031659

Table 4-1 Administration Area Soil Gas Results

Sample ID	1,1-Dichloroethane		Tetrachloroethene		Toluene		1,1,1-Trichloroethane		Trichloroethene		cis-1,2-Dichloroethene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
ADS-002-18		ND		ND		ND		ND	0.02			ND
ADS-004-06		ND		ND	0.2			ND		ND		ND
ADS-004-18		ND		ND		ND		ND	0.03			ND
ADS-005-06		ND		ND		ND		ND	0.23			ND
ADS-005-18		ND	0.02			ND		ND	74.5			ND
ADS-005-18D		ND		ND		ND		ND	79.6			ND
ADS-007-18		ND		ND		ND		ND	0.26			ND
ADS-007-18D		ND		ND		ND		ND	0.24			ND
ADS-012-(15-18)		ND		ND		ND		ND	0.06			ND
ADS-013-18		ND		ND		ND		ND	0.02			ND
ADS-014-18		ND	0.12			ND		ND	0.1			ND
ADS-015-18		ND		ND		ND		ND	3.06			ND
ADS-017-06		ND		ND		ND		ND		ND	0.4	
ADS-017-18		ND		ND		ND		ND	0.23			ND
ADS-020-18	0.2			ND		ND		ND	0.02			ND
ADS-023-18		ND	0.27			ND		ND		ND		ND
ADS-023-18D		ND	0.29			ND		ND		ND		ND
ADS-024-18		ND	0.03			ND		ND		ND		ND
ADS-026-06		ND		ND		ND		ND		ND	0.1	
ADS-031-18		ND		ND		ND	0.5		0.11			ND
ADS-032-06		ND	0.01			ND		ND		ND		ND
ADS-032-18		ND	0.19			ND		ND		ND		ND

Note : 1. Only samples and compounds which have detection are shown.
2. All concentrations are in ug/L
3. ND indicates compound was not detected at the quantitation limit.
4. Quantitation limit of the various compounds are as follows,
1,1-Dichloroethane, Toluene, 1,1,1-Trichloroethane, and cis-1,2-Dichloroehtene : 0.1 ug/L
Tetrachloroethene, and Trichloroethene : 0.01 ug/L

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COE 031660

Table 4-2 Administration Area Unsaturated Soil Results

	ADS-003-06B			ADS-003-18B			ADS-005-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/kg)									
4,4'-DDD		U	3.9		U	3.4	0.26	JP	
4,4'-DDT	1.2	JB		0.9	JB		1.1	JB	
Aldrin	0.41	JPB		0.12	JPB		0.13	JPB	
Dieldrin	0.72	JPB		0.26	JPB		0.5	JPB	
Endosulfan sulfate		U	3.9		U	3.4		U	3.9
Endrin	0.46	JPB		0.19	JPB		0.29	JPB	
Endrin ketone		U	3.9		U	3.4		U	3.9
Gamma-BHC (Lindane)	0.15	JPB		0.096	JPB		0.1	JPB	
Heptachlor	0.39	JB		0.22	JB		0.24	JPB	
SEMIVOLATILES (SVOC) (ug/kg)									
Di-n-butyl phthalate		U	390		U	340		U	390
bis(2-Ethylhexyl)phthalate		U	390		U	340		U	390
METALS / CYANIDE (mg/kg)									
Aluminum	2130			2080			13200		
Antimony		UN	8.9		UN	7.8		UN	8.9
Arsenic	1.3	BW			U	0.83	13.3	S	
Barium	19.4	B		27.4	B		300		
Beryllium		U	0.23		U	0.2	0.76	B	
Calcium	552	B		883	B		4180		
Chromium	2	B		2.3			15.5		
Cobalt		U	1.4	1.3	B		14.1		
Copper	1.5	B		1.7	B		21.8		
Cyanide		UN	0.6		UN	0.52		UN	0.59
Iron	2080			2220			20600		
Lead	2.6			1.6			17.6		
Magnesium	670	B		727	B		4450		
Manganese	58.9			62.1			1160		
Nickel		U	2.3	2.3	B		43.7		
Potassium	551	B		391	B		2330		
Selenium		UW	0.92		U	0.83		U	0.94
Sodium	85.2	B		68.8	B		166	B	
Thallium		U	0.46		U	0.42		U	0.47
Vanadium	5.1	B		4.6	B		33.2		
Zinc	11.3			10.6			73.5		
VOLATILES (VOC) (ug/kg)									
Acetone	220	B		90	B		31	B	
Methylene chloride	33	B		22	B		15	B	

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Table 4-2 Administration Area Unsaturated Soil Results

	ADS-005-18B			ADS-010-03B			ADS-022-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/kg)									
4,4'-DDD	0.27	JP			U	4.3		U	4.1
4,4'-DDT	0.82	JB		0.74	JPB		0.62	JPB	
Aldrin	0.13	JPB		0.11	JPB		0.15	JPB	
Dieldrin	0.6	JPB		0.46	JPB		0.35	JPB	
Endosulfan sulfate		U	3.5		U	4.3	0.18	JP	
Endrin	0.14	JPB		0.44	JPB		0.19	JPB	
Endrin ketone		U	3.5		U	4.3	0.15	J	
Gamma-BHC (Lindane)	0.12	JPB		0.1	JPB		0.11	JPB	
Heptachlor	0.25	JB		0.24	JB		0.28	JB	
SEMIVOLATILES (SVOC) (ug/kg)									
Di-n-butyl phthalate		U	350	94	J			U	400
bis(2-Ethylhexyl)phthalate		U	350	47	J		46	J	
METALS / CYANIDE (mg/kg)									
Aluminum	2310			16700			11500		
Antimony		UN	8.3		UN	10.2		UN	9.7
Arsenic	1.4	B		10.8			9.1		
Barium	19.7	B		333			266		
Beryllium		U	0.21	0.96	B		0.71	B	
Calcium	688	B		5130			5040		
Chromium	2.7			20.1			14.8		
Cobalt		U	1.3	11.9	B		12.2	B	
Copper	3.3	B		22.2			18.7		
Cyanide		UN	0.53		UN	0.66		UN	0.62
Iron	2840			22600			18300		
Lead	1.9			17.8			19.4	S	
Magnesium	646	B		5380			4690		
Manganese	23			740			794		
Nickel	2.9	B		30.2			28		
Potassium	556	B		2800			2260		
Selenium		U	0.85		U	1.1		U	2
Sodium	83.7	B		235	B		239	B	
Thallium		U	0.42		U	0.53		UW	0.5
Vanadium	5.4	B		44.1			30.8		
Zinc	9.3			79.6			69.6		
VOLATILES (VOC) (ug/kg)									
Acetone	28	B		87	B		100	B	
Methylene chloride	15	B		49	B		45	B	

COE 031662

Table 4-2 Administration Area Unsaturated Soil Results

	ADS-022-18B		
	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/kg)			
4,4'-DDD	0.47	JP	
4,4'-DDT	0.8	JPB	
Aldrin	0.14	JPB	
Dieldrin	0.41	JPB	
Endosulfan sulfate		U	3.5
Endrin	0.54	JPB	
Endrin ketone		U	3.5
Gamma-BHC (Lindane)	0.1	JPB	
Heptachlor	0.24	JB	
SEMIVOLATILES (SVOC) (ug/kg)			
Di-n-butyl phthalate		U	350
bis(2-Ethylhexyl)phthalate		U	350
METALS / CYANIDE (mg/kg)			
Aluminum	1310		
Antimony		UN	8
Arsenic	0.94	BW	
Barium	15.2	B	
Beryllium		U	0.21
Calcium	471	B	
Chromium	2.7		
Cobalt		U	1.2
Copper	1.1	B	
Cyanide		UN	0.53
Iron	1340		
Lead	1.8		
Magnesium	446	B	
Manganese	35.1		
Nickel		U	2.1
Potassium	338	B	
Selenium		UW	0.85
Sodium	103	B	
Thallium		U	0.42
Vanadium	2.9	B	
Zinc	7.4		
VOLATILES (VOC) (ug/kg)			
Acetone	97	B	
Methylene chloride	24	B	

Note : 1. Only compounds detected are shown.

2. Sample number designation

All sample numbers consist of three fields,

"field 1"-"field2"-field 3", such as "ADS"-"009"-"18B" for sample ADS-009-18B

Field 1: indicates the soil gas grid from which the sample was collected

"ADS" indicates the sample was collected from the soil gas grid of the Administration Area.

"ATL" indicates the sample was collected from the soil gas grid of the Atlas Missile Area.

"LL1" indicates the sample was collected from the soil gas grid of Load Line 1.

Field 2 : indicates the grid point in the corresponding soil gas grid from which the sample was collected.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The first two digits indicates the actual depth, in feet, at which the sample was collected.

3. Refer to Table 4-25, 4-26 and 4-27 for data qualifers definitions. The following tables presenting analytical data should refer to Table 4-25, 4-26, and 4-27 for data qualifiers definitions also.

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Table 4-3
Comparison of TCE Results
for Unsaturated and Associated Soil Gas Samples

Sample Point	Unsaturated Soil			Soil Gas		
	Sample ID	Results	Footnote	Sample ID	Results	Data qualifier
ADS-003	ADS-003-06B		U	ADS-003-06		ND
ADS-003	ADS-003-18B		U	ADS-003-18		ND
ADS-005	ADS-005-06B		U	ADS-005-06	0.23	
ADS-005	ADS-005-18B		U	ADS-005-18	74.5	
ADS-010	ADS-010-03B		U	ADS-010-(03-06)		ND
ADS-022	ADS-022-06B		U	ADS-022-06		ND
ADS-022	ADS-022-18B		U	ADS-022-18		ND
ATL-006	ATL-006-06B		U	ATL-006-06		ND
ATL-006	ATL-006-18B		U	ATL-006-18		ND
ATL-026	ATL-026-06B		U	ATL-026-06		ND
ATL-031	ATL-031-06B		U	ATL-031-06		ND
ATL-037	ATL-037-06B		U	ATL-037-06		ND
ATL-048	ATL-048-06B		U	ATL-048-06	0.07	
ATL-048	ATL-048-18B		U	ATL-048-18	6.27	
ATL-058	ATL-058-06B		U	ATL-058-06	0.03	
ATL-058	ATL-058-18B		U	ATL-058-18		ND
ATL-059	ATL-059-06B	4	J	ATL-059-06	22.2	
ATL-059	ATL-059-18B	4	J	ATL-059-18	150	
ATL-060	ATL-060-18B		U	ATL-060-18	62.4	
ATL-063	ATL-063-06B		U	ATL-063-06		ND
ATL-063	ATL-063-18B		U	ATL-063-18	10.6	
ATL-065	ATL-065-06B		U	ATL-065-06		ND
ATL-065	ATL-065-22B		U	ATL-065-22	5.87	
ATL-083	ATL-083-06B		U	ATL-083-06		ND
ATL-083	ATL-083-18B		U	ATL-083-18		ND
ATL-086	ATL-086-06B		U	ATL-086-06		ND
ATL-086	ATL-086-18B-RE		U	ATL-086-18		ND
ATL-099	ATL-099-22B		U	ATL-099-22	1.01	
ATL-105	ATL-105-24B		U	ATL-105-24	0.67	
ATL-113	ATL-113-06B		U	ATL-113-06		ND
ATL-113	ATL-113-18B		U	ATL-113-18		ND
LL1-002	LL1-002-06B		U	LL-002-06		ND
LL1-002	LL1-002-18B		U	LL-002-18		ND
LL1-012	LL1-012-06B		U	LL-012-06		ND
LL1-027	LL1-027-06B		U	LL-027-06		ND
LL1-031	LL1-031-06B		U	LL-031-06	6.86	
LL1-039	LL1-039-19B		U	LL-039-19	94.1	
LL1-047	LL1-047-06B		U	LL-047-06	152	
LL1-047	LL1-047-17B		U	LL-047-17	185	
LL1-048	LL1-048-06B	10	J	LL-048-06		ND
LL1-048	LL1-048-16B		U	LL-048-16	707	
LL1-054	LL1-054-06B	10	J	LL-054-06	270	
LL1-055	LL1-055-15B		U	LL-055-15	8.19	
LL1-061	LL1-061-06B		U	LL-061-06	49.6	
LL1-068	LL1-068-18B		U	LL-068-18G	111	
LL1-069	LL1-069-15B		U	LL-069-15G	71.8	
LL1-069	LL1-069-17B		U	LL-069-18G	335	
LL1-075	LL1-075-06B		U	LL-075-06G	6.33	
LL1-075	LL1-075-18B		U	LL-075-18G	47.1	
LL1-080	LL1-080-17B		U	LL-080-18G	0.41	
LL1-083	LL1-083-06B		U	LL-083-06G	0.15	
LL1-094	LL1-094-06B		U	LL-094-06G		ND
LL1-094	LL1-094-18B		U	LL-094-18G	2.16	

Note : 1. ND indicates compound was not detected at the quantitation limit.
2. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for other data qualifier definitions.

Table 4-4 Atlas Missile Area Soil Gas TCE Results

Sample ID	Trichloroethene (ug/L)
ATL-004-12	0.02
ATL-007-06	0.02
ATL-007-18	0.02
ATL-008-18	0.03
ATL-010-18	0.01
ATL-019-18	0.07
ATL-020-18	0.01
ATL-021-18	0.02
ATL-022-18	0.03
ATL-026-12	0.03
ATL-031-18	3.11
ATL-032-06	0.04
ATL-032-18	1.95
ATL-033-06	0.03
ATL-033-18	1.12
ATL-034-06	0.02
ATL-034-18	0.46
ATL-035-06	0.06
ATL-035-18	0.62
ATL-036-18	0.44
ATL-037-18	0.02
ATL-038-18	0.01
ATL-039-17	0.01
ATL-040-06	0.01
ATL-040-18	0.02
ATL-041-18	0.03
ATL-042-18	0.01
ATL-043-18	0.03
ATL-044-09	0.01
ATL-045-06	1.83
ATL-045-18	18.30
ATL-045-18D	16.40
ATL-046-06	0.15
ATL-046-18	12.20
ATL-046-18D	11.80
ATL-047-06	0.02
ATL-047-18	15.10
ATL-048-06	0.07

Sample ID	Trichloroethene (ug/L)
ATL-048-18	6.27
ATL-049-18	1.50
ATL-050-18	5.52
ATL-051-18	1.57
ATL-052-20	0.18
ATL-052-20D	0.16
ATL-053-06	0.01
ATL-053-20	0.03
ATL-058-06	0.03
ATL-059-06	22.20
ATL-059-18	150.00
ATL-060-06	0.47
ATL-060-18	62.40
ATL-061-06	0.91
ATL-061-19	30.50
ATL-061-19D	29.70
ATL-062-06	0.18
ATL-062-18	22.00
ATL-063-18	10.60
ATL-063-18D	10.60
ATL-064-06	0.34
ATL-064-24	8.06
ATL-064-24D	8.16
ATL-065-22	5.87
ATL-066-23	3.44
ATL-067-21	2.61
ATL-067-21D	2.68
ATL-068-19	0.77
ATL-071-18	0.02
ATL-072-06	0.02
ATL-072-18	0.21
ATL-073-18	4.98
ATL-074-06	0.07
ATL-074-26	6.54
ATL-074-26D	0.96
ATL-075-23	3.56
ATL-076-06	0.02
ATL-076-18	1.50

Sample ID	Trichloroethene (ug/L)
ATL-077-21	4.78
ATL-078-18	5.94
ATL-079-06	0.39
ATL-079-21	0.22
ATL-080-24	1.61
ATL-081-24	0.91
ATL-082-20	0.19
ATL-082-20D	0.20
ATL-087-06	2.36
ATL-087-21	5.10
ATL-088-20	0.31
ATL-089-07	0.03
ATL-089-21	2.07
ATL-090-21	0.09
ATL-091-23	0.12
ATL-092-23	0.17
ATL-093-21	1.32
ATL-093-21D	1.34
ATL-094-22	0.04
ATL-095-21	0.02
ATL-099-22	1.01
ATL-100-25	0.40
ATL-100-25D	0.41
ATL-102-24	5.91
ATL-103-06	0.02
ATL-103-21	5.28
ATL-104-22	2.56
ATL-105-24	0.67
ATL-106-21	0.17
ATL-107-22	0.03
ATL-114-22	1.05
ATL-115-06	0.05
ATL-115-22	2.44
ATL-116-23	0.24
ATL-117-21	0.03
ATL-118-21	0.03
ATL-120-06	0.02
ATL-120-22	0.02

Note : 1. Only samples with TCE detected are shown.
2. Quantitation limit of TCE is 0.01 ug/L.

COE 031665

MECOEK 3517

Table 4-5 Atlas Missile Area Unsaturated Soil Results

	ATL-006-06B			ATL-006-18B			ATL-026-06B			ATL-031-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	9	BJ		14	B			U	12	14		
Benzene	2	BJ		2	BJ			U	12		U	12
Methylene chloride	16	B		14	B		33	B		25	B	
Trichloroethene		U	11		U	10		U	12		U	12

	ATL-037-06B			ATL-048-06B			ATL-048-18B			ATL-058-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	14	B			U	10	67	B		26	B	
Benzene	2	BJ			U	10		U	11		U	12
Methylene chloride	38	B		24	B		25	B		30	B	
Trichloroethene		U	12		U	10		U	11		U	12

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MECOEK 3518

Table 4-5 Atlas Missile Area Unsaturated Soil Results

	ATL-058-18B			ATL-059-06B			ATL-059-18B			ATL-060-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone		U	10		U	12	50				U	10
Benzene		U	10		U	12		U	13		U	10
Methylene chloride	12	B		16	B		42	B		14	B	
Trichloroethene		U	10	4	J		4	J			U	10

	ATL-063-06B			ATL-063-18B			ATL-065-06B			ATL-065-22B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	78			18	B		13	B		22	B	
Benzene		U	12	2	BJ		2	BJ		2	BJ	
Methylene chloride	36	B		15	B		23	B		16	B	
Trichloroethene		U	12		U	10		U	12		U	10

MECOEK 3519

COE 031667

Table 4-5 Atlas Missile Area Unsaturated Soil Results

	ATL-083-06B			ATL-083-18B			ATL-086-06B			ATL-086-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	21	B		9	BJ		33			300	E	
Benzene	2	BJ		2	BJ			U	13		U	11
Methylene chloride	14	B		18	B		44	B		29	B	
Trichloroethene		U	12		U	11		U	13		U	11

	ATL-086-18B-RE			ATL-099-22B			ATL-105-24B			ATL-113-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	220	B		14	B		15	B		63		
Benzene		U	19	2	BJ		2	BJ			U	12
Methylene chloride	82	B		34	B		20	B		34	B	
Trichloroethene		U	19		U	10		U	10		U	12

COE 031668

MECOEK 3520

Table 4-5 Atlas Missile Area Unsaturated Soil Results

	ATL-113-18B		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)			
Acetone	130		
Benzene		U	10
Methylene chloride	17	B	
Trichloroethene		U	10

Note : 1. *Only compounds detected are shown.*

2. Sample number designation

All sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "ADS"-"009"-"18B" for sample ADS-009-18B.

Field 1 : indicates the soil gas grid from which the sample was collected.

"ADS" indicates the sample was collected from the soil gas grid of the Administration Area.

"ATL" indicates the sample was collected from the soil gas grid of the Atlas Missile Area.

"LL1" indicates the sample was collected from the soil gas grid of Load Line 1.

Field 2 : indicates the grid point in the corresponding soil gas grid from which the sample was collected.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The first two digits indicates the actual depth, in feet, at which the sample was collected.

3. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

COE 031669

MECOEK 3521

Table 4-6 Atlas Missile Area Saturated Soil Results

	MWA-040-104			MWB-040-059			MWC-040-052			MWC-040-052-RE		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	377			80.3			206				NA	
VOLATILES (VOC) (ug/kg)												
2-Butanone		U	11		U	11	5	J			U	20
Acetone	110			120			280	E		160	B	
Chloroform		U	11		U	11		U	12		U	20
Methylene chloride	29	B		41	B		27	B		28	B	
Trichloroethene		U	11	1	J			U	12		U	20

	MWA-043-099			MWB-043-047			MWC-043-041			MWD-043-105		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	142			364			536			317		
VOLATILES (VOC) (ug/kg)												
2-Butanone		U	13		U	12		U	12		U	12
Acetone	75	B		61	B		42	B		30	B	
Chloroform		U	13		U	12		U	12		U	12
Methylene chloride	55	B		16	B		15	B		10	BJ	
Trichloroethene		U	13		U	12		U	12		U	12

COE 031670

MECOEK 3522

Table 4-6 Atlas Missile Area Saturated Soil Results

	MWA-044-035			MWB-044-023			MWC-044-010			MWD-044-051		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	272			379			806			79.1		
VOLATILES (VOC) (ug/kg)												
2-Butanone		U	12		U	11		U	11		U	16
Acetone	23	B		52	B		51	B		60	B	
Chloroform		U	12		U	11		U	11		U	16
Methylene chloride	69	B		33	B		27	B		89	B	
Trichloroethene		U	12		U	11		U	11		U	16

	MWA-045-034			MWB-045-022			MWC-045-012			MWD-045-042		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	478			124			356			151		
VOLATILES (VOC) (ug/kg)												
2-Butanone		U	14		U	15		U	14		U	11
Acetone	21	B		30	B		26	B		290	BE	
Chloroform		U	14		U	15		U	14		U	11
Methylene chloride	23	B		24	B		22	B		39	B	
Trichloroethene		U	14		U	15		U	14		U	11

COE 031671

MECOEK 3523

Table 4-6 Atlas Missile Area Saturated Soil Results

	MWD-045-042-RE			MWA-058-125			MWB-058-082			MWC-058-046		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)		NA		464			391			258		
VOLATILES (VOC) (ug/kg)												
2-Butanone		U	19	3	J			U	11		U	12
Acetone	260			20	B		43	B			U	12
Chloroform		U	19	1	J			U	11		U	12
Methylene chloride	35	B		15	B		25	B		19	B	
Trichloroethene		U	19		U	11		U	11		U	12

Note : 1. Only compounds detected are shown.

2. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as MWB-209-098.
"MWB"-"209"-"098" for sample MWB-209-098.

Field 1 : indicates the level at which the sample was collected (e.g. "BMW");

"A" indicates the sample was collected at the depth of the "A" well in the corresponding cluster.

"B" indicates the sample was collected at the depth of the "B" well in the corresponding cluster.

"C" indicates the sample was collected at the groundwater level at that well cluster.

"D" indicates the sample was collected at the depth of the "D" well in the corresponding cluster.

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : indicates the actual depth, in feet, at which the sample was collected.

3. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

COE 031672

MECOEK 3524

Table 4-7 Saturated Soil Total Organic Carbon Results

Sample ID	Results (mg/kg)
MWA-023-098	256
MWB-023-072	158
MWC-023-036	164
MWA-025-151	183
MWB-025-083	188
MWC-025-047	190
MWD-025-167	105
MWB-031-059	170
MWC-031-047	132
MWD-031-112	957
MWA-033-106	278
MWB-033-083	240
MWC-033-048	353
MWD-033-117	106
MWA-034-102	181
MWB-034-062	107
MWC-034-058	86
MWD-034-124	2990
MWA-040-104	377
MWB-040-059	80.3
MWC-040-052	206
MWA-043-099	142
MWB-043-047	364
MWC-043-041	536
MWD-043-105	317
MWA-044-035	272
MWB-044-023	379
MWC-044-010	806
MWD-044-051	79.1
MWA-045-034	478
MWB-045-022	124
MWC-045-012	356
MWD-045-042	151
MWA-058-125	464
MWB-058-082	391
MWC-058-046	258

COE 031673

Table 4-8 Load Line 1 Soil Gas Results

Sample ID	Tetrachloroethene		Toluene		1,1,1-Trichloroethane		Trichloroethene		cis-1,2-Dichloroethene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
LL-002-06		ND		ND		ND		ND	0.1	
LL-003-18		ND		ND		ND	0.04			ND
LL-004-18		ND		ND		ND	0.02			ND
LL-005-06		ND		ND		ND		ND	0.4	
LL-005-18		ND		ND		ND	0.02			ND
LL-006-18		ND		ND		ND	0.03			ND
LL-008-18		ND		ND		ND	0.07			ND
LL-009-06		ND		ND		ND	0.01			ND
LL-009-18		ND		ND		ND	0.17			ND
LL-011-18		ND		ND		ND	0.04			ND
LL-012-18		ND		ND		ND	0.06			ND
LL-013-06		ND		ND		ND	0.02			ND
LL-013-18		ND		ND		ND	0.07			ND
LL-014-(03-06)		ND		ND		ND		ND	0.3	
LL-014-15		ND		ND		ND		ND	0.3	
LL-015-06		ND		ND		ND	0.01			ND
LL-015-18		ND		ND		ND	0.09			ND
LL-016-18		ND		ND		ND	0.12			ND
LL-017-06		ND		ND		ND	0.01			ND
LL-017-18		ND		ND		ND	0.12			ND
LL-018-06		ND		ND		ND	0.02			ND
LL-019-18		ND		ND		ND	0.10			ND
LL-020-18		ND		ND		ND	0.09			ND
LL-021-18		ND		ND		ND	0.03			ND
LL-022-18		ND		ND		ND	0.08			ND
LL-023-06		ND		ND		ND	0.03			ND
LL-023-18		ND	0.2			ND	1.21			ND
LL-023-18D		ND	0.2			ND	1.33			ND
LL-024-06		ND		ND		ND	0.05			ND
LL-024-18		ND	0.2			ND	0.61			ND
LL-025-06		ND		ND		ND	0.01			ND
LL-025-18		ND		ND		ND	0.25			ND
LL-026-18		ND		ND		ND	0.01			ND
LL-027-18		ND		ND		ND	0.10			ND
LL-028-06		ND		ND		ND	0.03			ND
LL-028-18		ND		ND		ND	0.34			ND
LL-029-18		ND	0.5			ND	0.09		0.2	
LL-030-15		ND		ND		ND	0.33			ND
LL-031-06		ND		ND		ND	6.86			ND
LL-031-17		ND		ND		ND	21.30			ND
LL-032-06		ND		ND		ND	3.18			ND
LL-032-19	0.06			ND		ND	21.20			ND
LL-032-19D		ND		ND		ND	21.00			ND
LL-033-06		ND		ND		ND	0.33			ND
LL-033-19		ND	0.2			ND	2.61			ND
LL-034-06		ND		ND		ND	0.03			ND
LL-034-18		ND		ND		ND	0.65			ND
LL-034-18D		ND		ND		ND	0.70			ND
LL-035-16		ND		ND		ND	0.01			ND
LL-035-18		ND		ND		ND	0.25			ND
LL-037-(03-06)		ND		ND		ND	0.07			ND
LL-037-18		ND		ND		ND	0.07			ND
LL-038-06		ND		ND		ND	21.60			ND
LL-038-15		ND		ND		ND	30.20			ND
LL-038-15D		ND		ND		ND	36.70			ND
LL-039-06		ND		ND		ND	50.20			ND
LL-039-19		ND		ND		ND	94.10			ND
LL-039-19D		ND		ND		ND	99.70			ND
LL-040-06		ND		ND		ND	16.60			ND
LL-040-16		ND		ND		ND	35.50			ND

COE 031674

Table 4-8 Load Line 1 Soil Gas Results

Sample ID	Tetrachloroethene		Toluene		1,1,1-Trichloroethane		Trichloroethene		cis-1,2-Dichloroethene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
LL-041-06		ND		ND		ND	16.10			ND
LL-041-16		ND		ND		ND	224.00			ND
LL-042-06		ND		ND		ND	0.36			ND
LL-042-18		ND		ND		ND	11.80			ND
LL-043-06		ND		ND		ND	0.22			ND
LL-043-18		ND		ND		ND	0.19			ND
LL-044-06		ND		ND		ND	0.13			ND
LL-044-18		ND		ND		ND	0.20			ND
LL-045-06		ND		ND		ND	26.80			ND
LL-045-07G	NA		NA		NA		38.5		NA	
LL-045-16G	NA		NA		NA		357		NA	
LL-045-17		ND		ND		ND	505.00			ND
LL-045-21G	NA		NA		NA		326		NA	
LL-45D-21G	NA		NA		NA		134		NA	
LL-046-(03-06)		ND		ND		ND	1.22			ND
LL-046-15G	NA		NA		NA		225		NA	
LL-046-16		ND		ND		ND	410.00			ND
LL-046-16D		ND		ND		ND	497.00			ND
LL-046-21G	NA		NA		NA		237		NA	
LL-047-06	0.01			ND		ND	152.00		0.3	
LL-047-17		ND		ND		ND	185.00			ND
LL-048-03G	NA		NA		NA		25.9		NA	
LL-048-09G	NA		NA		NA		1.56		NA	
LL-048-15G	NA		NA		NA		437		NA	
LL-048-16	0.20			ND	0.7		707.00		1.7	
LL-048-21G	NA		NA		NA		468		NA	
LL-049-06		ND		ND		ND	0.04			ND
LL-049-16		ND		ND		ND	194.00			ND
LL-050-06		ND		ND		ND	0.13			ND
LL-050-18		ND		ND		ND	1.10			ND
LL-051-06		ND		ND		ND	0.07			ND
LL-051-18		ND		ND		ND	0.67			ND
LL-051-18D		ND		ND		ND	0.25			ND
LL-052-06		ND		ND		ND	0.03			ND
LL-052-18		ND		ND		ND	0.35			ND
LL-052-18D		ND		ND		ND	0.39			ND
LL-053-06		ND		ND		ND	128.00			ND
LL-053-18		ND		ND		ND	184.00			ND
LL-054-06		ND		ND		ND	270.00			ND
LL-054-18		ND		ND		ND	10.50			ND
LL-055-(03-06)		ND	3.5			ND	0.18			ND
LL-055-15		ND		ND		ND	8.19			ND
LL-056-06		ND		ND		ND	0.12			ND
LL-056-16		ND		ND		ND	7.60			ND
LL-057-(03-06)		ND		ND		ND	0.29			ND
LL-057-18		ND		ND	0.1		160.00			ND
LL-058-06		ND		ND		ND	0.15			ND
LL-058-18		ND		ND		ND	0.13			ND
LL-059-06		ND		ND		ND	0.06			ND
LL-059-18		ND		ND		ND	0.41			ND
LL-060-06		ND		ND		ND	0.04			ND
LL-060-18		ND		ND		ND	0.07			ND
LL-061-06		ND		ND		ND	49.60			ND
LL-061-18		ND		ND		ND	174.00			ND
LL-062-(03-06)		ND		ND		ND	0.70			ND
LL-062-18		ND		ND		ND	6.33			ND
LL-063-06		ND		ND		ND	0.03			ND
LL-063-18		ND		ND		ND	0.74			ND
LL-065-18		ND		ND		ND	0.06			ND
LL-066-06G	NA		NA		NA		0.02		NA	

Table 4-8 Load Line 1 Soil Gas Results

Sample ID	Tetrachloroethene		Toluene		1,1,1-Trichloroethane		Trichloroethene		cis-1,2-Dichloroethene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
LL-066-18G	NA		NA		NA		2.99		NA	
LL-067-06G	NA		NA		NA		3.44		NA	
LL-067-18G	NA		NA		NA		36.8		NA	
LL-67D-18G	NA		NA		NA		32.4		NA	
LL-068-18G	NA		NA		NA		111		NA	
LL-068-6G	NA		NA		NA		3.44		NA	
LL-069-04G	NA		NA		NA		54.1		NA	
LL-069-06G	NA		NA		NA		83.5		NA	
LL-069-09G	NA		NA		NA		64.7		NA	
LL-069-15G	NA		NA		NA		71.8		NA	
LL-069-18G	NA		NA		NA		335		NA	
LL-069-21G	NA		NA		NA		142		NA	
LL-070-06G	NA		NA		NA		2.12		NA	
LL-070-18G	NA		NA		NA		11.3		NA	
LL-071-06G	NA		NA		NA		6.84		NA	
LL-071-18G	NA		NA		NA		36.4		NA	
LL-072-04G	NA		NA		NA		15		NA	
LL-072-06G	NA		NA		NA		21.3		NA	
LL-072-09G	NA		NA		NA		14.9		NA	
LL-072-15G	NA		NA		NA		93.6		NA	
LL-072-18G	NA		NA		NA		168		NA	
LL-072-21G	NA		NA		NA		82		NA	
LL-073-06G	NA		NA		NA		7.55		NA	
LL-073-18G	NA		NA		NA		60.5		NA	
LL-074-18G	NA		NA		NA		0.1		NA	
LL-075-06G	NA		NA		NA		6.33		NA	
LL-075-18G	NA		NA		NA		47.1		NA	
LL-076-06G	NA		NA		NA		1.42		NA	
LL-076-18G	NA		NA		NA		28.3		NA	
LL-76D-18G	NA		NA		NA		17.5		NA	
LL-077-06G	NA		NA		NA		0.05		NA	
LL-077-18G	NA		NA		NA		0.91		NA	
LL-078-06G	NA		NA		NA		0.09		NA	
LL-078-18G	NA		NA		NA		2.69		NA	
LL-079-18G	NA		NA		NA		1.8		NA	
LL-080-18G	NA		NA		NA		0.41		NA	
LL-081-18G	NA		NA		NA		0.67		NA	
LL-083-06G	NA		NA		NA		0.15		NA	
LL-083-18G	NA		NA		NA		7.22		NA	
LL-084-18G	NA		NA		NA		1.1		NA	
LL-085-18G	NA		NA		NA		0.06		NA	
LL-094-18G	NA		NA		NA		2.16		NA	

Note 1 Only samples and compounds which have detection are shown.

2. All concentrations are in ug/L

3 ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

4 Quantitation limit of the various compounds are as follows.

Toluene, 1,1,1-Trichloroethane, and cis-1,2-Dichloroehtene : 0.1 ug/L

Tetrachloroethene, and Trichloroethene : 0.01 ug/L

5 Suffix "G" after the depth on sample ID refers to soil gas samples collected during Phase II field activities.

COE 031676

Table 4-9 Load Line 1 Unsaturated Soil Results

	LL1-002-06B			LL1-002-18B			LL1-012-06B			LL1-027-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	31	B		40			25	B		28		
Benzene		U	13		U	10		U	13		U	11
Methylene chloride	48	B		42	B		52	B		47	B	
Trichloroethene		U	13		U	10		U	13		U	11

	LL1-031-06B			LL1-039-19B			LL1-047-06B			LL1-047-17B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	32				U	10	37	B		42	B	
Benzene		U	11		U	10	2	BJ		2	BJ	
Methylene chloride	21	B		21	B		35	B		30	B	
Trichloroethene		U	11		U	10		U	11		U	11

MECOEK 3529

COE 031677

Table 4-14B Administration Area Groundwater Monitoring Well Inorganics Results

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	64.5	B		45.5	B		120	B	
Arsenic	15.7			15	S		11.9		
Barium	134	B		147	B		122	B	
Calcium	81000			89700			78000		
Iron	1280			1770			1020		
Magnesium	14900			17300			13000		
Manganese	428			391			320		
Potassium	11200			10900			11100		
Sodium	48200			24400			22100		
Vanadium		U	5		U	5		U	5
Zinc	6.4	B		7.1	B		5.6	B	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	168	B*		416	*		210	*	
Arsenic	15.5			18			11.9		
Barium	127	B		140	B		116	B	
Calcium	78900			85200			73600		
Iron	1310	*		1840	*		1030	*	
Magnesium	14500			16400			12300		
Manganese	416			373			303		
Potassium	10900			10400			10200		
Sodium	46700	E		23500	E		21100	E	
Vanadium		U	5		U	5		U	5
Zinc	4.9	B		4.3	B		5.4	B	

COE 031678

Table 4-14B Administration Area Groundwater Monitoring Well Inorganics Results

	BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum	102	B		116	B	
Arsenic	9.2	B		20.6		
Barium	244			141	B	
Calcium	74700			79100		
Iron		U	46	1480		
Magnesium	18300			13600		
Manganese	14.4	B		320		
Potassium	10800			10600		
Sodium	20900			24200		
Vanadium	11.7	B			U	5
Zinc	9.7	B		7.1	B	
TOTAL METALS / CYANIDE (ug/l)						
Aluminum	230	*		230	*	
Arsenic	9.3	B		19.8		
Barium	234			134	B	
Calcium	73000			75700		
Iron	64.4	B*		1430	*	
Magnesium	17900			13000		
Manganese	14.9	B		309		
Potassium	10500			10200		
Sodium	20400	E		23600	E	
Vanadium	11.3	B			U	5
Zinc	4.3	B		11.7	B	

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW"for "A" well);

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier definitions.

COE 031679

TABLE 4-15
MAXIMUM CONTAMINANT LEVELS (MCLs) FOR SELECTED ORGANIC COMPOUNDS

Compound	MCL[1] mg/L	MCLG[2] mg/L	SMCL[3] mg/L	Nebraska GQS[4] mg/L
Trichloroethene	0.005	0	---	0.005
Chloroform (total trihalomethanes)	0.1	---	---	0.1
Toluene	1	1	---	1
cis-1,2-dichloroethene	0.07	0.07	---	0.07
1,2-dichloropropane	0.005	0	---	---
Tetrachloroethene	0.005	0	---	0.005
1,1,1-trichlorethene	0.20	0.20	---	0.20
Methoxychlor	0.04	0.04	---	0.04
Chlordane	0.002	0	---	0.002
Lindane	0.0002	0.0002	---	0.0002
Heptachlor	0.0004	0	---	0.0004
Heptachlor Epoxide	0.0002	0	---	0.0002

Notes:

1 MCL = Maximum Contaminant Level.
2 MCLG = Maximum Contaminant Level Goal.
3 SMCL = Secondary Maximum Contaminant Level.
4 Nebraska GQS = Nebraska Groundwater Quality Standard.

COE 031680

TABLE 4-16
MAXIMUM CONTAMINANT LEVELS (MCLs) FOR INORGANICS, WATER QUALITY PARAMETERS, AND RADIOACTIVITY

Compound	MCL[2] mg/L	MCLG[3] mg/L	SMCL[4] mg/L	Nebraska GQS[5] mg/L
Arsenic	0.05	---	---	0.05
Barium	2	2	---	1
Cadmium	0.005	0.005	---	0.005
Chromium	0.1	0.1	---	0.1
Copper	---	1.3	1	1
Lead	0.015[7]	zero	---	0.05
Mercury	0.002	0.002	---	0.002
Selenium	0.05	0.05	---	0.05
Antimony	0.006[1]	0.006[1]	---	---
Beryllium	0.004[1]	0.004[1]	---	---
Nickel	0.1[1]	0.1[1]	---	---
Thallium	0.002[1]	0.0005[1]	---	---
Cyanide	0.2	---	---	---
Aluminum	---	---	0.05 to 0.2	---
Iron	---	---	0.3	0.3
Manganese	---	---	0.05	0.05
Silver	---	---	0.1	---
Zinc	---	---	5	5
Nitrate (as N)	10	10	---	10
Nitrite (as N)	1	1	---	1
Sum of Nitrate (as N) and Nitrite (as N)	10	10	---	10
Total Dissolved Solids	---	---	500	---
Radioactivity				
Gross Alpha	15 pCi/l[6]	---	---	15 pCi/l[6]
Gross Beta	50 pCi/l[6]	---	---	50 pCi/l[6]

Notes:

1. Effective January 17, 1994.
2. MCL = Maximum Contaminant Level mg/L except for radioactivity.
3. MCLG = Maximum Contaminant Level Goal.
4. SMCL = Secondary Maximum Contaminant Level.
5. Nebraska GQS = Nebraska Groundwater Quality Standard mg/L except for radioactivity.
6. pCi/l = pico-Curies per liter.
7. Action level for lead, not a MCL.

COE 031681

Table 4-9 Load Line 1 Unsaturated Soil Results

	LL1-048-06B			LL1-048-16B			LL1-054-06B			LL1-055-15B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	56	B		53			16			44		
Benzene	3	BJ			U	11		U	12		U	11
Methylene chloride	26	B		61	B		25	B		20	B	
Trichloroethene	10	J			U	11	10	J			U	11

	LL1-061-06B			LL1-068-18B			LL1-069-15B			LL1-069-17B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone	17	B		21			12				U	10
Benzene		U	11		U	11		U	10		U	10
Methylene chloride	25	B		15	B		14	B		8	BJ	
Trichloroethene		U	11		U	11		U	10		U	10

MECOEK 3534

COE 031682

Table 4-9 Load Line 1 Unsaturated Soil Results

	LL1-075-06B			LL1-075-18B			LL1-080-17B			LL1-083-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
Acetone		U	11	12			12			7	J	
Benzene		U	11		U	10		U	10		U	12
Methylene chloride	9	BJ		16	B		8	BJ		11	BJ	
Trichloroethene		U	11		U	10		U	10		U	12

	LL1-094-06B			LL1-094-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)						
Acetone	17			9	J	
Benzene		U	12		U	10
Methylene chloride	12	BJ		7	BJ	
Trichloroethene		U	12		U	10

Note : 1. Only compounds detected are shown.

2. Sample number designation

All sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "ADS"-"009"-"18B" for sample ADS-009-18B.

Field 1 : indicates the soil gas grid from which the sample was collected.

"ADS" indicates the sample was collected from the soil gas grid of the Administration Area.

"ATL" indicates the sample was collected from the soil gas grid of the Atlas Missile Area.

"LL1" indicates the sample was collected from the soil gas grid of Load Line 1.

Field 2 : indicates the grid point in the corresponding soil gas grid from which the sample was collected.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The first two digits indicates the actual depth, in feet, at which the sample was collected.

3. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

COE 031683

MECOEK 3535

Table 4-10 Load Lines 1, 2, 3, and 4 Saturated Soil Results

	MWA-023-098			MWB-023-072			MWC-023-036			MWA-025-151		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	256			158			164			183		
VOLATILES (VOC) (ug/kg)												
Acetone	23	B			U	12		U	12		U	12
Benzene		U	11		U	12		U	12		U	12
Methylene chloride	38	B		11	BJ		7	BJ		11	BJ	

	MWB-025-083			MWC-025-047			MWD-025-167			MWB-031-059		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	188			190			105			170		
VOLATILES (VOC) (ug/kg)												
Acetone		U	12		U	11	28	B		420	E	
Benzene		U	12		U	11		U	12		U	12
Methylene chloride	7	BJ		8	BJ		39	B		47	B	

MECOEK 3536

COE 031684

Table 4-10 Load Lines 1, 2, 3, and 4 Saturated Soil Results

	MWB-031-059-RE			MWC-031-047			MWD-031-112			MWA-033-106		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)		NA		132			957			278		
VOLATILES (VOC) (ug/kg)												
Acetone	450			72			16	B		32	B	
Benzene		U	29		U	12	2	BJ			U	12
Methylene chloride	75	B		19	B		12	B		30	B	

	MWB-033-083			MWC-033-048			MWD-033-117			MWA-034-102		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	240			353			106			181		
VOLATILES (VOC) (ug/kg)												
Acetone	44			16	B		38			88		
Benzene		U	12	2	BJ			U	13		U	12
Methylene chloride	26	B		29	B		41	B		17	B	

COE 031685

MECOEK 3537

Table 4-10 Load Lines 1, 2, 3, and 4 Saturated Soil Results

	MWB-034-062			MWC-034-058			MWD-034-124			MWD-034-124-RE		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL ORGANIC CARBON (mg/kg)												
Total Organic Carbon (TOC)	107			86			2990				NA	
VOLATILES (VOC) (ug/kg)												
Acetone		U	12	43			110	B		96	BD	
Benzene		U	12		U	12	2	BJ			U	12
Methylene chloride	17	B		18	B		87	B		7	BDJ	

Note : 1. Only compounds detected are shown.

2. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as MWB-209-098.

"MWB"-"209"-"098" for sample MWB-209-098.

Field 1 : indicates the level at which the sample was collected (e.g. "BMW");

"A" indicates the sample was collected at the depth of the "A" well in the corresponding cluster.

"B" indicates the sample was collected at the depth of the "B" well in the corresponding cluster.

"C" indicates the sample was collected at the groundwater level at that well cluster.

"D" indicates the sample was collected at the depth of the "D" well in the corresponding cluster.

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : indicates the actual depth, in feet, at which the sample was collected.

3. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

COE 031686

MECOEK 3538

Table 4-11 Administration Area ("G1") Groundwater Headspace VOC Screening Results

Sample ID	Tetrachloroethene		Trichloroethene		cis-1,2-Dichloroehtene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
G1-14I-33		ND		ND	5.3	
G1-14J		ND		ND	0.9	
G1-14SWI-44		ND		ND	0.7	
G1-25I-61		ND	0.13			ND
G1-26I-55		ND	0.18			ND
G1-35I-44		ND		ND	0.7	
G1-36I-59		ND	0.06		1.3	
G1-37I-51		ND		ND	1.3	
G1-46I-64	0.01		0.23			ND
G1-47I-59		ND		ND	0.9	
G1-47J		ND	0.18			ND

Note : 1. Only samples and compounds which have detection are shown.
2. All concentrations are in ug/L
3. ND indicates compound was not detected at the quantitation limit.
4. Quantitation limit of the various compounds are as follows,
cis-1,2-Dichloroehtene : 0.1 ug/L
Tetrachloroethene, and Trichloroethene : 0.01 ug/L

COE 031687
MECOEK 3539

Table 4-12 Atlas Missile Area ("G2") Groundwater Headspace VOC Screening Results

Sample ID	Tetrachloroehtene		1,1,1-Trichloroethane		Trichloroethene		cis-1,2-Dichloroethene	
	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier	Result	Data Qualifier
G2-02J-117		ND		ND		ND	0.2	
G2-03J-(101-103)	NA		NA		0.09		NA	
G2-03J-(101-103)D	NA		NA		0.14		NA	
G2-04J-(105-107)	NA		NA		0.03		NA	
G2-04J-(105-107)D	NA		NA		0.03		NA	
G2-05I-(57-60)	NA		NA		0.10		NA	
G2-06I-(60-63)	NA		NA		0.10		NA	
G2-08J-94.5	0.02			ND		ND	3.7	
G2-09I-(57-60)	NA		NA		0.03		NA	
G2-10I-(60-63)	NA		NA		29.20		NA	
G2-10I-(60-63)D	NA		NA		22.40		NA	
G2-11I-(60-63)	NA		NA		1200.00		NA	
G2-12J-84		ND		ND	0.03			ND
G2-14I-(54-57)	NA		NA		0.03		NA	
G2-14J-95		ND		ND		ND	0.1	
G2-15I-(60-63)	NA		NA		0.14		NA	
G2-16I-(60-63)	NA		NA		11.70		NA	
G2-17I-(54-57)	NA		NA		0.11		NA	
G2-18J-61		ND		ND	0.02			ND
G2-20J-84		ND		ND	0.02		0.2	
G2-21I-53	NA		NA		0.01		NA	
G2-21J-69.5		ND		ND	21.00		0.5	
G2-21J-69.5D		ND		ND	26.70			ND
G2-26J-93		ND		ND	0.90			ND
G2-30J-90.5		ND		ND		ND	0.7	
G2-31J-70		ND		ND	49.00		5	
G2-32J-54		ND		ND		ND	0.5	
G2-36J-43		ND	0.3		21.20			ND
G2-36J-43D		ND	0.4		27.60		4.4	
G2-37J-47		ND	0.6		58.80		4.7	
G2-39J-48		ND		ND	7.47		1	

Note : 1. Only samples and compounds which have detection are shown.
2. All concentrations are in ug/L
3. ND indicates compound was not detected at the quantitation limit.
4. NA indicates compound was not analyzed.
5. Quantitation limit of the various compounds are as follows,
1,1,1-Trichloroethane, and cis-1,2-Dichloroehtene : 0.1 ug/L
Tetrachloroethene, and Trichloroethene : 0.01 ug/L

COE 031688
MECOEK
3540

Table 4-13 Load Lines 1,2,3, and 4 ("G3") Groundwater Headspace VOC Screening Results

Sample ID	Trichloroethene Result	Trichloroethene Data Qualifier	cis-1,2-Dichloroehtene Result	cis-1,2-Dichloroehtene Data Qualifier
G3-02J-100.5		ND	2.2	
G3-06I-60	0.16			NA
G3-06I-60D	0.10			NA
G3-08I-56	0.05			NA
G3-09I-44	0.07			NA
G3-09I-44D	0.04			NA
G3-10I-56	0.23			NA
G3-11I-60	0.11			NA
G3-12I-60	0.06			NA
G3-14I-56	0.08			NA
G3-15I-60	0.01			NA
G3-15J-126		ND	0.5	
G3-16I-60	0.05			NA
G3-16J-118	0.03			ND

Note : 1. Only samples and compounds which have detection are shown.
2. All concentrations are in ug/L
3. ND indicates compound was not detected at the quantitation limit.
4. NA indicates compound was not analyzed.
5. Quantitation limit of the various compounds are as follows,
cis-1,2-Dichloroehtene : 0.1 ug/L
Trichloroethene : 0.01 ug/L

MECOEK 3541
COE 031689

Table 4-14A
Administration Area Groundwater Monitoring Well Results of VOC, SVOC, Water Quality, and Field Parameter Analyses

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Di-n-butyl phthalate		U	10	1	J			U	10
Diethyl phthalate		U	10	2	BJ			U	10
Phenol		U	10	3	J		1	J	
bis(2-Ethylhexyl)phthalate	3	BJ		15	B		2	BJ	
VOLATILES (VOC) (ug/l)									
Methylene chloride		U	2	0.8	BJ		2		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	300			300			250		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4.2		
Hardness as Calcium Carbonate	270			300			250		
Nitrate-Nitrite-N	51			53			0.63		
Total Dissolved Solids (TDS)	430			420			360		
Total Suspended Solids (TSS)	5			16			9		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	550			494			441		
Temperature (Celsius)	12.8			12			12.2		
pH	6.94			6.9			7.16		

COE 031690

Table 4-14A
Administration Area Groundwater Monitoring Well Results of VOC, SVOC, Water Quality, and Field Parameter Analyses

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Di-n-butyl phthalate		JU	10		U	10	1	J	
Diethyl phthalate	1	J			U	10	2	BJ	
Phenol		U	10		U	10	3	J	
bis(2-Ethylhexyl)phthalate	5	BJ		2	BJ		20	B	
VOLATILES (VOC) (ug/l)									
Methylene chloride		NA		0.7	J		0.7	BJ	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA		110			250		
Biochemical Oxygen Demand (BOD)		NA			U	3		U	3
Hardness as Calcium Carbonate		NA		270			240		
Nitrate-Nitrite-N		NA		36				U	0.2
Total Dissolved Solids (TDS)		NA		520			380		
Total Suspended Solids (TSS)		NA		8			5		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)		NA		528			451		
Temperature (Celsius)		NA		12.4			12.8		
pH		NA		6.51			7		

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Quantitation limit of the various compounds are as follows,

TNB, DNB, TNT, 2,4-DNT, Nitrobenzene, and HMX : 0.25 ug/L

2,6-DNT, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene, and Tetryl : 0.5 ug/L

4. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW"for "A" well);

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

5. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier definitions

COE 031691

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX		U	0.15		NA			U	0.15
PESTICIDES/PCB (ug/l)									
4,4'-DDT	0.004	JP			NA			U	0.1
Endosulfan I		U	0.05		NA			U	0.05
Endosulfan II	0.004	JP			NA		0.011	JP	
Gamma chlordane		U	0.05		NA			U	0.05
Gamma-BHC (Lindane)		U	0.05		NA			U	0.05
Heptachlor		U	0.05		NA			U	0.05
Heptachlor epoxide		U	0.05		NA			U	0.05
p,p'-Methoxychlor		U	0.5		NA		0.024	JP	
SEMIVOLATILES (SVOC) (ug/l)									
4-Nitrophenol		U	25		NA			U	25
Di-n-butyl phthalate		U	10		NA		1	BJ	
Diethyl phthalate		U	10		NA			U	10
Dimethyl phthalate		U	10		NA			U	10
N-Nitrosodiphenylamine(1)		U	10		NA			U	10
Phenol		U	10		NA			U	10
bis(2-Ethylhexyl)phthalate	2	BJ			NA		3	BJ	
VOLATILES (VOC) (ug/l)									
Methylene Chloride	3	B		4	B		2	B	
Acetone	13				U	5		U	5
Carbon Dissulfide		U	1		U	1	4		
Toluene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	160				NA		290		
Biochemical Oxygen Demand (BOD)		U	4		NA		4		
Hardness as Calcium Carbonate	350				NA		360		
Nitrate-Nitrite-N	6.3				NA			U	0.2
Total Dissolved Solids (TDS)	300				NA		390		
Total Suspended Solids (TSS)	25				NA		30		

COE 031692

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX		NA			U	0.15		NA	
PESTICIDES/PCB (ug/l)									
4,4'-DDT		NA			U	0.1		NA	
Endosulfan I		NA			U	0.05		NA	
Endosulfan II		NA			U	0.1		NA	
Gamma chlordane		NA			U	0.05		NA	
Gamma-BHC (Lindane)		NA			U	0.05		NA	
Heptachlor		NA			U	0.05		NA	
Heptachlor epoxide		NA			U	0.05		NA	
p,p'-Methoxychlor		NA			U	0.5		NA	
SEMIVOLATILES (SVOC) (ug/l)									
4-Nitrophenol		NA			U	25		NA	
Di-n-butyl phthalate		NA			U	10		NA	
Diethyl phthalate		NA			U	10		NA	
Dimethyl phthalate		NA			U	10		NA	
N-Nitrosodiphenylamine(1)		NA			U	10		NA	
Phenol		NA			U	10		NA	
bis(2-Ethylhexyl)phthalate		NA			U	10		NA	
VOLATILES (VOC) (ug/l)									
Methylene Chloride	3	B		1	BJ		0.9	BJ	
Acetone		U	5		U	5		U	5
Carbon Dissulfide		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA		210				NA	
Biochemical Oxygen Demand (BOD)		NA			U	4		NA	
Hardness as Calcium Carbonate		NA		280				NA	
Nitrate-Nitrite-N		NA		6.3				NA	
Total Dissolved Solids (TDS)		NA		310				NA	
Total Suspended Solids (TSS)		NA		28				NA	

COE 031693

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX		U	0.15		NA			U	0.15
PESTICIDES/PCB (ug/l)									
4,4'-DDT		U	0.1		NA			U	0.1
Endosulfan I		U	0.05		NA			U	0.05
Endosulfan II		U	0.1		NA			U	0.1
Gamma chlordane		U	0.05		NA		0.003	JPB	
Gamma-BHC (Lindane)		U	0.05		NA			U	0.05
Heptachlor		U	0.05		NA			U	0.05
Heptachlor epoxide		U	0.05		NA			U	0.05
p,p'-Methoxychlor		U	0.5		NA			U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
4-Nitrophenol		U	25		NA			U	25
Di-n-butyl phthalate		U	10		NA		3	J	
Diethyl phthalate	1	J			NA		1	J	
Dimethyl phthalate		U	10		NA			U	10
N-Nitrosodiphenylamine(1)		U	10		NA			U	10
Phenol	1	BJ			NA		2	J	
bis(2-Ethylhexyl)phthalate	10	B			NA		12	B	
VOLATILES (VOC) (ug/l)									
Methylene Chloride	1	BJ		0.8	BJ		0.8	BJ	
Acetone		U	5		U	5		U	5
Carbon Dissulfide		U	1		U	1	2		
Toluene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	370				NA		210		
Biochemical Oxygen Demand (BOD)		U	4		NA			U	4
Hardness as Calcium Carbonate	480				NA		240		
Nitrate-Nitrite-N		U	0.2		NA		8.9		
Total Dissolved Solids (TDS)	390				NA		600		
Total Suspended Solids (TSS)	47				NA		47		

COE 031694

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX		U	0.15		U	0.15		U	0.15
PESTICIDES/PCB (ug/l)									
4,4'-DDT		U	0.1		U	0.1		U	0.1
Endosulfan I		U	0.05	0.005	JP			U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05		U	0.05
Heptachlor epoxide		U	0.05	0.013	JP			U	0.05
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
4-Nitrophenol		U	25		U	25		U	25
Di-n-butyl phthalate		U	10	1	J		1	J	
Diethyl phthalate		U	10	2	J		1	J	
Dimethyl phthalate		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Phenol		U	10	2	BJ		3	BJ	
bis(2-Ethylhexyl)phthalate	3	BJ		2	BJ		10	B	
VOLATILES (VOC) (ug/l)									
Methylene Chloride		U	2	3	B		4	B	
Acetone		U	5		U	5		U	5
Carbon Dissulfide		U	1	1				U	1
Toluene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			340			330		
Biochemical Oxygen Demand (BOD)		U	6		U	15	19		
Hardness as Calcium Carbonate	250			280			300		
Nitrate-Nitrite-N	8.4				U	0.2		U	0.2
Total Dissolved Solids (TDS)	690			420			410		
Total Suspended Solids (TSS)	180			42			71		

COE 031695

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	IH2-004-082			IH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)						
RDX		U	0.15		U	0.15
PESTICIDES/PCB (ug/l)						
4,4'-DDT		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05
p,p'-Methoxychlor		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)						
4-Nitrophenol		U	25	1	J	
Di-n-butyl phthalate	1	J			U	10
Diethyl phthalate	2	J		2	J	
Dimethyl phthalate	1	J		1	J	
N-Nitrosodiphenylamine(1)	1	J			U	10
Phenol	5	BJ		5	BJ	
bis(2-Ethylhexyl)phthalate	3	BJ		2	BJ	
VOLATILES (VOC) (ug/l)						
Methylene Chloride	1	BJ		2	B	
Acetone	3	J		5		
Carbon Dissulfide		U	1	0.8	J	
Toluene		U	1		U	1
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	180			180		
Biochemical Oxygen Demand (BOD)	4				U	3
Hardness as Calcium Carbonate	220			210		
Nitrate-Nitrite-N	5.8			6.3		
Total Dissolved Solids (TDS)	370			1500		
Total Suspended Solids (TSS)	15			730		

COE 031696

Table 4-17A
Administration Area Hydropunch ("H2") Groundwater Results of Explosives, VOC, SVOC, Pesticides/PCB,and Water Quality Analyses

	JH2-004-082			JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX	0.15				NA			U	0.15
PESTICIDES/PCB (ug/l)									
4,4'-DDT		U	0.1		NA			U	0.1
Endosulfan I	0.002	JP			NA			U	0.05
Endosulfan II		U	0.1		NA			U	0.1
Gamma chlordane		U	0.05		NA			U	0.05
Gamma-BHC (Lindane)	0.0067	JP			NA			U	0.05
Heptachlor	0.017	J			NA			U	0.05
Heptachlor epoxide		U	0.05		NA			U	0.05
p,p'-Methoxychlor		U	0.5		NA			U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
4-Nitrophenol		U	25		U	25	5	J	
Di-n-butyl phthalate		U	10	7	J			U	10
Diethyl phthalate		U	10	1	J			U	10
Dimethyl phthalate		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Phenol		U	10	1	J			U	10
bis(2-Ethylhexyl)phthalate		U	10	4	BJ		1	BJ	
VOLATILES (VOC) (ug/l)									
Methylene Chloride	2	B			NA			U	2
Acetone	14				NA		6		
Carbon Dissulfide		U	1		NA			U	1
Toluene	0.7	J			NA			U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	320				NA		1220		
Biochemical Oxygen Demand (BOD)	6				NA		13		
Hardness as Calcium Carbonate	300				NA		280		
Nitrate-Nitrite-N		U	0.2		NA		490		
Total Dissolved Solids (TDS)	410	*			NA		440	*	
Total Suspended Solids (TSS)	3600				NA		50000		

Note : 1. Only compounds detected are shown.
2. NA indicates compound was not analyzed.
3. Sample number designation
All Administration area hydropunch sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "JH2"-"003"-"082" for sample JH2-003-082.
Field 1 : indicates the level at which the sample was collected (IH2 for shallow and JH2 for deep).
Field 2 : The last two digits indicates the grid point where the sample was collected.
A zero as the first digit indicates the sample was filtered using a Baxter filter.
A six as the first digit indicates the sample was not filtered using a Baxter filter.
Field 3 : The last digit denotes the year in which the sample was collected.
The first two digits denotes the month when the sample was collected.
For instance, "082" denotes the sample was collected in 8/92.
A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.
4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for data qualifier definition

COE 031697

Table 4-17B
Administration Area Hydropunch ("H2") Groundwater Inorganics Results

	IH2-001-082			JH2-001-082			IH2-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	80.2	B		756				U	41
Arsenic		UW	4	7.8	B			UW	4
Barium	118	B		145	B		248		
Beryllium		U	1		U	1		U	1
Calcium	47500			81000			53700		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6	7.6	B	
Copper		U	4	4.9	B			U	4
Iron	1010			1130			1240		
Lead		UW	2		UW	2		UW	2
Magnesium	17000			15100			20300		
Manganese	366			475			558		
Nickel	21.5	B			U	10	33.4	B	
Potassium	9240			13400			11200		
Sodium	19700			36300			24200		
Vanadium		U	5		U	5		U	5
Zinc	412			52.8			103		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	284			5730			1340		
Arsenic		U	4		U	4		UW	4
Barium	119	B		167	B		220		
Beryllium		U	2		U	2		U	2
Calcium	43700			75200			45500		
Chromium		U	8	14.5			27.2		
Cobalt		U	7		U	7	7.1	B	
Copper		U	16		U	16	21.5	B	
Cyanide	13.8				U	10		U	10
Iron	2520	E		6800	E		5160	E	
Lead		U	2	3				U	2
Magnesium	15900			14600			17400		
Manganese	338			480			502		
Mercury		U	0.2		U	0.2		U	0.2
Nickel	26.9	B			U	25	43.2		
Potassium	7770			12200			9770		
Selenium		UWN	4		UWN	4		UWN	4
Sodium	18500			31700			20200		
Vanadium		U	8	10.6	B			U	8
Zinc	458			130			171		

COE 031698

Table 4-17B
Administration Area Hydropunch ("H2") Groundwater Inorganics Results

	JH2-002-082			IH2-003-082			IH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		U	41		U	41		U	41
Arsenic	5.8	B			UW	4		UW	4
Barium	117	B		141	B		149	B	
Beryllium		U	1		U	1		U	1
Calcium	91000			62800			62900		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Iron	2810			4460			5230		
Lead		UW	2		UW	2		UW	2
Magnesium	16200			19800			19900		
Manganese	601			415			441		
Nickel	18.3	B		27.3	B		29.2	B	
Potassium	12500			11000			10700		
Sodium	22800			28500			28400		
Vanadium		U	5		U	5		U	5
Zinc	94.3			248			272		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	263			889			276		
Arsenic	5	BW			UW	4		UW	4
Barium	113	B		144	B		177	B	
Beryllium		U	2		U	2		U	2
Calcium	82200			53900			58700		
Chromium	10.2			15.4			10.5		
Cobalt		U	7		U	7		U	7
Copper		U	16	19.7	B		32.3		
Cyanide		U	10		U	10		U	10
Iron	6080	E		8700	E		11600	E	
Lead		U	2		U	2		U	2
Magnesium	14800			17200			18500		
Manganese	525			425			495		
Mercury		U	0.2		U	0.2		U	0.2
Nickel	33.3	B		39.1	B		44.1		
Potassium	12700			9990			9860		
Selenium		UWN	4	43.2	SN		26	N+	
Sodium	20200			23700			25600		
Vanadium		U	8		U	8		U	8
Zinc	130			332			586		

COE 031699

Table 4-17B
Administration Area Hydropunch ("H2") Groundwater Inorganics Results

	JH2-003-082			JH2-603-082			IH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	357			137	B		293		
Arsenic	8.7	BW		7.9	BW		4.4	B	
Barium	165	B		123	B		111	B	
Beryllium		U	1		U	1		U	1
Calcium	90700			89300			54600		
Chromium	49				U	6		U	6
Cobalt		U	6		U	6	6.2	B	
Copper	46.2				U	4	5.3	B	
Iron	22200			3790			639		
Lead	3.5				U	2		U	2
Magnesium	15800			16200			17100		
Manganese	812			655			145		
Nickel	28.7	B		16.8	B		12.9	B	
Potassium	12900			12900			10700		
Sodium	30900			34100			21900		
Vanadium		U	5		U	5		U	5
Zinc	530			144			56.1		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	619			2220			1960		
Arsenic	8.9	BW		11	W		5.2	BW	
Barium	133	B		154	B		120	B	
Beryllium		U	2		U	2		U	2
Calcium	87100			80500			48500		
Chromium	18.5			95.8			13.4		
Cobalt		U	7		U	7		U	7
Copper		U	16	46.6				U	16
Cyanide		U	10		U	10		U	10
Iron	9210	E		28700	E		2600	E	
Lead		U	2	3.1				U	2
Magnesium	15700			14400			15100		
Manganese	693			733			79.6		
Mercury		U	0.2		U	0.2		U	0.2
Nickel	27.8	B		50.4				U	25
Potassium	12100			13000			8710		
Selenium		UWN	4		UWN	4		UWN	4
Sodium	29700			26300			18200		
Vanadium		U	8		U	8		U	8
Zinc	222			590			132		

COE 031700

Table 4-17B
Administration Area Hydropunch ("H2") Groundwater Inorganics Results

	IH2-604-082			JH2-004-082			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	52.7	B		5140			390		
Arsenic	5	B		71.8			33.9		
Barium	80	B		997			719		
Beryllium		U	1	10.7				U	1
Calcium	55800			295000			3E+05		
Chromium		U	6		U	6		U	6
Cobalt		U	6	19.4	B			U	6
Copper	6.8	B		39.1				U	4
Iron	1130			41500			21100		
Lead	113			152				UW	2
Magnesium	17600			32500			31300		
Manganese	292			2160			2020		
Nickel	21.8	B		31.9	B		13.4	B	
Potassium	10900			29400			24300		
Sodium	22800			26500			25700		
Vanadium		U	5	83.2				U	5
Zinc	106			1100			448		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	986			13200			93600		
Arsenic		UW	4	37.6			114		
Barium	131	B		391			1670		
Beryllium		U	2	3.5	B		20.8		
Calcium	50800			131000			4E+05		
Chromium	9.6	B		16			83.4		
Cobalt		U	7	18.3	B		55.8		
Copper	19.7	B		52			102		
Cyanide		U	10		U	10		U	10
Iron	2190	E		19200	E		2E+05	E	
Lead		U	2	44.4			70.8		
Magnesium	15400			20500			59000		
Manganese	98			829			3590		
Mercury		U	0.2		U	0.2	0.22		
Nickel		U	25		U	25	98.5		
Potassium	8510			21300			44700		
Selenium		UWN	4		UWN	20		UWN	20
Sodium	18500			23100			23000		
Vanadium		U	8	58.2			345		
Zinc	267			449			1720		

Note : 1. Only compounds detected are shown.
2. NA indicates compound was not analyzed.
3. Sample number designation
All Administration area hydropunch sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "JH2"-"003"-"082" for sample JH2-003-082.
Field 1 : indicates the level at which the sample was collected (IH2 for shallow and JH2 for deep).
Field 2 : The last two digits indicates the grid point where the sample was collected.
A zero as the first digit indicates the sample was filtered using a Baxter filter. Dissolved metals samples were filtered using both a Baxter filter and a 45 u filter.
A six as the first digit indicates the sample was not filtered using a Baxter filter. Dissolved metals samples were filtered using both a Baxter filter and a 45 u filter.
Field 3 : The last digit denotes the year in which the sample was collected.
The first two digits denotes the month when the sample was collected.
For instance, "082" denotes the sample was collected in 8/92.
A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.
4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for data qualifier definition

COE 031701

Table 4-18A
Landfill Area Groundwater Monitoring Well Results
of Explosives, VOC, SVOC, Pesticides/PCB, Water Quality, and Field Parameter Analyses

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX	3.1			0.37			4.8		
HMX	0.92	-		0.48			1.9		
PESTICIDES/PCB (ug/l)									
Alpha chlordane	0.014	JP		0.0028	JP		0.01	JP	
Alpha-BHC		U	0.05		U	0.05	0.0024	JP	
Dieldrin		U	0.1	0.0033	JP			U	0.1
Gamma chlordane	0.0075	JP			U	0.05	0.0071	JP	
p,p'-Methoxychlor	0.0098	JP			U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
Di-n-butyl phthalate	1	J			U	10		U	10
Diethyl phthalate	2	BJ			U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Phenol		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	5	BJ		2	BJ		4	BJ	
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1	3		
Chloroform		U	1		U	1		U	1
Cis-1,2-Dichloroethene	2			2			2		
Methylene chloride	0.6	BJ			U	2	1	BJ	
Toluene		U	1	0.6	J			U	1
Trichloroethene	3			1			8		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			84			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	160			120			210		
Nitrate-Nitrite-N	100			220				U	0.2
Total Dissolved Solids (TDS)	230			190			260		
Total Suspended Solids (TSS)		U	5	20			10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	290			215			321		
Temperature (Celsius)	12.5			12.5			12.3		
pH	6.72			6.83			6.68		

COE 031702

Table 4-18A
Landfill Area Groundwater Monitoring Well Results
of Explosives, VOC, SVOC, Pesticides/PCB, Water Quality, and Field Parameter Analyses

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
RDX	4.2			0.91				U	0.15
HMX	0.91				U	0.25		U	0.25
PESTICIDES/PCB (ug/l)									
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
Di-n-butyl phthalate	1	J			U	10		U	10
Diethyl phthalate	1	J			U	10	1	BJ	
N-Nitrosodiphenylamine(1)	1	J			U	10		U	10
Phenol	4	BJ		1	J		2	J	
bis(2-Ethylhexyl)phthalate	12	B		2	BJ		4	BJ	
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)	10				NA			NA	
Acetone		U	10		U	5		U	5
Carbon disulfide		U	10		U	1		U	1
Chloroform	4	J			U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Methylene chloride	2	BJ		1	BJ		1	BJ	
Toluene		U	10	0.6	J			U	1
Trichloroethene	97				U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	160			180			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4.9		
Hardness as Calcium Carbonate	240			170			180		
Nitrate-Nitrite-N	6.5			4			1.3		
Total Dissolved Solids (TDS)	320			290			360		
Total Suspended Solids (TSS)	10			5			2600		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	370			334				NA	
Temperature (Celsius)	11.9			12.2				NA	
pH	6.31			6.55				NA	

COE 031703

Table 4-18A
Landfill Area Groundwater Monitoring Well Results
of Explosives, VOC, SVOC, Pesticides/PCB, Water Quality, and Field Parameter Analyses

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)						
RDX	0.52			0.24		
HMX		U	0.25		U	0.25
PESTICIDES/PCB (ug/l)						
Alpha chlordane		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05
p,p'-Methoxychlor		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)						
Di-n-butyl phthalate		U	10		U	10
Diethyl phthalate		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10
Phenol	1	J		1	J	
bis(2-Ethylhexyl)phthalate	9	BJ		6	BJ	
VOLATILES (VOC) (ug/l)						
1,2-Dichloroethene(Total)		NA			NA	
Acetone		U	5	6		
Carbon disulfide		U	1		U	1
Chloroform		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1
Methylene chloride	0.8	BJ		0.9	BJ	
Toluene		U	1		U	1
Trichloroethene		U	1		U	1
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	200			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3
Hardness as Calcium Carbonate	190			180		
Nitrate-Nitrite-N	3.3			3.6		
Total Dissolved Solids (TDS)	310			280		
Total Suspended Solids (TSS)	9				U	5
FIELD PARAMETERS						
Specific Conductance (umhos/cm)	350			290		
Temperature (Celsius)	11.8			11.7		
pH	6.6			6.41		

COE 031704

Table 4-18A
Landfill Area Groundwater Monitoring Well Results
of Explosives, VOC, SVOC, Pesticides/PCB, Water Quality, and Field Parameter Analyses

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)						
RDX	0.91			0.67		
HMX		U	0.25	0.43		
PESTICIDES/PCB (ug/l)						
Alpha chlordane		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05
p,p'-Methoxychlor		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)						
Di-n-butyl phthalate		U	10		U	10
Diethyl phthalate		U	10	1	BJ	
N-Nitrosodiphenylamine(1)		U	10		U	10
Phenol		U	10	3	BJ	
bis(2-Ethylhexyl)phthalate	4	BJ		3	BJ	
VOLATILES (VOC) (ug/l)						
1,2-Dichloroethene(Total)		NA			U	10
Acetone		U	5		U	10
Carbon disulfide		U	1		U	10
Chloroform		U	1		U	10
Cis-1,2-Dichloroethene		U	1		NA	
Methylene chloride	0.7	J		1	BJ	
Toluene		U	1		U	10
Trichloroethene		U	1	11		
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	180			150		
Biochemical Oxygen Demand (BOD)		U	3		U	3
Hardness as Calcium Carbonate	180			410		
Nitrate-Nitrite-N	3.9			13		
Total Dissolved Solids (TDS)	300			630		
Total Suspended Solids (TSS)		U	5	15		
FIELD PARAMETERS						
Specific Conductance (umhos/cm)	338			759		
Temperature (Celsius)	11.7			11.2		
pH	6.61			6.35		

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW" for "A" well);

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for data qualifier definitions.

COE 031705

Table 4-18B Landfill Area Groundwater Monitoring Well Inorganics Results

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	118	B		148	B			U	41
Arsenic		U	4		U	4	5.1	B	
Barium	197	B		152	B		153	B	
Calcium	42400			28300			57000		
Magnesium	12600			8520			13300		
Manganese	82.6			76.9			2.9	B	
Potassium	11100			6410			8390		
Sodium	12900			11600			13000		
Zinc	5	B		4.7	B		4.5	B	
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		U	1		U	1		U	1
Gross Beta (Radioactivity)	10.21			5.69			6.42		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	120	B*		397	*		174	B*	
Arsenic		UW	4		U	4		UW	4
Barium	166	B		140	B		138	B	
Calcium	37500			27100			54200		
Iron		U*	46	206	*		58	B*	
Lead		U	2		U	2		U	2
Magnesium	10700			8050			12700		
Manganese	73.3			82			10.7	B	
Nickel		U	10		U	10		U	10
Potassium	9620			6180			7930		
Sodium	10800	E		11000	E		12700	E	
Vanadium		U	5		U	5		U	5
Zinc	5	B		4.8	B		4.1	B	

COE 031706

Table 4-18B Landfill Area Groundwater Monitoring Well Inorganics Results

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	115	B			U	41	88.7	B	
Arsenic	8.6	BW			U	4	4.1	BW	
Barium	191	B		221			413		
Calcium	57100	-		51200			43400		
Magnesium	19000	-		12200			13900		
Manganese	14.1	B		6	B		1010		
Potassium	9910			6720			8190		
Sodium	18500			20500			13100		
Zinc	13.6	B		4.8	B		50.4		
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		U	1		U	1	1.38		
Gross Beta (Radioactivity)	8.27			6.79			8.69		
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	211	*		149	B*		1820	*	
Arsenic	7.8	B			UW	4		U	4
Barium	177	B		214			434		
Calcium	53000			49900			42700		
Iron	58	B*			U*	46	1280	*	
Lead		UW	2		U	2		U	2
Magnesium	17900			11900			13800		
Manganese	20.9			7	B		1090		
Nickel		U	10		U	10	11.1	B	
Potassium	9000			6600			7930		
Sodium	18000	E		20100	E		14000	E	
Vanadium		U	5		U	5	5.5	B	
Zinc	30.6			4.3	B		47.1		

COE 031707

Table 4-18B Landfill Area Groundwater Monitoring Well Inorganics Results

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum	104	B		107	B	
Arsenic	4	BW		4.3	BW	
Barium	149	B		260		
Calcium	57700			47000		
Magnesium	12700			11200		
Manganese	7.3	B		19.1		
Potassium	7680			6910		
Sodium	21400			15400		
Zinc	6.2	B		5.1	B	
GROSS Alpha/Beta (pCi/l)						
Gross Alpha (Radioactivity)		U	1		U	1
Gross Beta (Radioactivity)	3.65			5.18		
TOTAL METALS / CYANIDE (ug/l)						
Aluminum	191	B*		190	B*	
Arsenic		UW	4		UW	4
Barium	130	B		243		
Calcium	52700			44400		
Iron	77.3	B*			U*	46
Lead		U	2		U	2
Magnesium	11600			10600		
Manganese	9.1	B		16.8		
Nickel		U	10		U	10
Potassium	7200			6320		
Sodium	19800	E		14700	E	
Vanadium		U	5		U	5
Zinc	14.5	B			U	3

COE 031708

Table 4-18B Landfill Area Groundwater Monitoring Well Inorganics Results

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum	142	B		139	B	
Arsenic	4.4	B		5.9	BW	
Barium	150	B		483		
Calcium	52800			111000		
Magnesium	12100			33900		
Manganese	9.4	B		25.7		
Potassium	7260			5720		
Sodium	20600			34800		
Zinc	10.1	B		7.7	B	
GROSS Alpha/Beta (pCi/l)						
Gross Alpha (Radioactivity)		U	1	5.12		
Gross Beta (Radioactivity)	6.42			2.36		
TOTAL METALS / CYANIDE (ug/l)						
Aluminum	137	B*		243		
Arsenic		UW	4	5	BWN	
Barium	135	B		450		
Calcium	49600			99600		
Iron		U*	46	75.8	B	
Lead		UW	2	2.6	BWN*	
Magnesium	11300			31200		
Manganese	8.8	B		25.2		
Nickel		U	10		U	10
Potassium	6770			5280		
Sodium	18900	E		32900		
Vanadium		U	5		U	5
Zinc	5.1	B		5.5	B	

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW" for "A" well);

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for data qualifier definitions.

COE 031709

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	AMW-011-082			AMW-018-082			BMW-018-082			CMW-018-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX	33				U	0.15		U	0.15	1.9		
HMX	3.7				U	0.25		U	0.25	0.26		
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	1		U	1		U	1		U	10
1,2-Dichloroethene(Total)		NA			NA			NA		3	J	
Acetone	7				U	5		U	5		U	10
Carbon disulfide		U	1	1				U	1		U	10
Chloroform		U	1		U	1		U	1	15		
Methylene chloride	1	BJ		1	BJ		1	BJ		1	BJ	
Toluene		U	1		U	1		U	1		U	10
Trichloroethene		U	1		U	1		U	1	76		
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	160			250			180			120		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3	10		
Hardness as Calcium Carbonate	170			390			190			290		
Nitrate-Nitrite-N		U	0.2		U	0.2	3			38		
Total Dissolved Solids (TDS)	220			860			320			570		
Total Suspended Solids (TSS)	14				U	5	12			1300		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	281			936			351				NA	
Temperature (Celsius)	12.3			12.9			12.2				NA	
pH	7.05			6.89			6.72				NA	

MECOEK 3562

COE 031710

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	AMW-019-082			BMW-019-082			CMW-019-082			AMW-040-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX		U	0.15		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	1		U	1		U	1		U	10
1,2-Dichloroethene(Total)		NA			NA			NA			U	10
Acetone		U	5		U	5		U	5		U	10
Carbon disulfide		U	1		U	1		U	1		U	10
Chloroform		U	1		U	1		U	1		U	10
Methylene chloride	8	B		4	B		2	B		5	BJ	
Toluene		U	1	1			1				U	10
Trichloroethene		U	1		U	1		U	1	22		
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	240			280			110			280		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3		U	3
Hardness as Calcium Carbonate	600			440			300			300		
Nitrate-Nitrite-N		U	0.2		U	0.2	37				U	0.2
Total Dissolved Solids (TDS)	1400	*		900	*		670	*		470		
Total Suspended Solids (TSS)	6				U	5	61			13		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	1337			921			558			517		
Temperature (Celsius)	12.9			12.3			12.9			5.3		
pH	7.09			7.02			6.37			6.99		

MECOEK 3563

COE 031711

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	BMW-040-082			AMW-041-082			BMW-041-082			DMW-041-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX		U	0.15		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	170		U	1		U	1		U	1
1,2-Dichloroethene(Total)		U	170		NA			NA			NA	
Acetone		U	170		U	5		U	5		U	5
Carbon disulfide		U	170		U	1		U	1		U	1
Chloroform		U	170		U	1		U	1		U	1
Methylene chloride	43	BJ		1	BJ		1	BJ		0.9	BJ	
Toluene		U	170		U	1		U	1	0.8	J	
Trichloroethene	1800				U	1		U	1		U	1
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	160			260			190			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3		U	3
Hardness as Calcium Carbonate	230			240			320			270		
Nitrate-Nitrite-N	7.2				U	0.2	36				U	0.2
Total Dissolved Solids (TDS)	310			370	*		550	*		390	*	
Total Suspended Solids (TSS)	13				U	5	32				U	5
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	329			440			487			454		
Temperature (Celsius)	5.2			12.3			12.3			12.5		
pH	6.68			6.93			6.75			7.02		

MECOEK 3564

COE 031712

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	AMW-042-082			BMW-042-082			DMW-042-082			AMW-043-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX	0.73			0.26			1.2				U	0.15
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	1		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA			NA	
Acetone		U	5		U	5		U	5		U	5
Carbon disulfide	1			0.8	J			U	1	1		
Chloroform		U	1		U	1		U	1		U	1
Methylene chloride	1	BJ		2	B		0.8	BJ		5	B	
Toluene		U	1		U	1	0.6	J			U	1
Trichloroethene		U	1		U	1		U	1		U	1
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	190			130			200			260		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4		U	4
Hardness as Calcium Carbonate	220			160			200			330		
Nitrate-Nitrite-N	150			160			100			570		
Total Dissolved Solids (TDS)	360			310			460			610		
Total Suspended Solids (TSS)		U	5		U	5	90			30		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	287			318			315			589		
Temperature (Celsius)	12.4			12.3			12.5			12.6		
pH	6.47			6.27			6.53			6.75		

MECOEK 3565

COE 031713

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	BMW-043-082			DMW-043-082			AMW-044-082			BMW-044-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX	18				U	0.15	0.73			1.6		
HMX	3.8				U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane	2	J			U	1		U	10		U	1
1,2-Dichloroethene(Total)	2	J			NA		1	J			NA	
Acetone		U	10		U	5		U	10		U	5
Carbon disulfide	5	J		2			1	J		4		
Chloroform		U	10		U	1		U	10		U	1
Methylene chloride	3	BJ		3	B		3	BJ		7	B	
Toluene		U	10		U	1		U	10		U	1
Trichloroethene	46				U	1	180				U	1
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	180			260			190			180		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4		U	4
Hardness as Calcium Carbonate	240			260			220			170		
Nitrate-Nitrite-N	150			130			410			480		
Total Dissolved Solids (TDS)	720			520			410			360		
Total Suspended Solids (TSS)	260			9				U	5	950		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	541			541			335				NA	
Temperature (Celsius)	12.5			12.5			12.3				NA	
pH	6.84			6.84			6.68				NA	

MECOEK 3566

COE 031714

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	DMW-044-082			AMW-045-082			BMW-045-082			DMW-045-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX		U	0.15	0.67			0.79			0.44		
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	1		U	10	1	J			U	10
1,2-Dichloroethene(Total)		NA			U	10	1	J			U	10
Acetone		U	5		U	10		U	10		U	10
Carbon disulfide	9			6	J		3	J			U	10
Chloroform		U	1		U	10		U	10		U	10
Methylene chloride	1	BJ		18	B		2	BJ		2	BJ	
Toluene	0.5	J		30				U	10		U	10
Trichloroethene	7			26			99			50		
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	250			200			200			240		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4		U	4
Hardness as Calcium Carbonate	270			230			220			270		
Nitrate-Nitrite-N	510			6.5			7			3.4		
Total Dissolved Solids (TDS)	500			380			340			450		
Total Suspended Solids (TSS)	8				U	5		U	5	8		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	562			405			510			500		
Temperature (Celsius)	12.5			12			11.9			12.3		
pH	6.76			6.68			6.68			6.78		

MECOEK 3567

COE 031715

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	AMW-046-082			BMW-046-082			DMW-046-082			AMW-058-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX		U	0.15		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	1		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA			NA	
Acetone		U	5		U	5		U	5		U	5
Carbon disulfide		U	1	0.6	J			U	1		U	1
Chloroform		U	1		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		1	BJ		2	B	
Toluene		U	1		U	1		U	1	0.8	J	
Trichloroethene		U	1		U	1		U	1		U	1
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	210			200			210			290		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4		U	3
Hardness as Calcium Carbonate	210			220			190			340		
Nitrate-Nitrite-N	60			590				U	0.2		U	0.2
Total Dissolved Solids (TDS)	420			370			440			490		
Total Suspended Solids (TSS)	14			5			140			13		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	392			336			285			491		
Temperature (Celsius)	12.4			11.8			12			12.2		
pH	6.73			6.75			6.67			6.98		

MECOEK 3568

COE 031716

Table 4-19 Atlas Missile Area Groundwater Monitoring Well Results

	BMW-058-082			AMW-059-082			BMW-059-082			DMW-059-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)												
RDX		U	0.15		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)												
1,1,1-Trichloroethane		U	10		U	1		U	1		U	1
1,2-Dichloroethene(Total)	1	J			NA			NA			NA	
Acetone		U	10		U	5		U	5		U	5
Carbon disulfide		U	10		U	1		U	1		U	1
Chloroform		U	10		U	1		U	1		U	1
Methylene chloride	2	BJ		4	B		2	B		2	B	
Toluene	1	J			U	1	1				U	1
Trichloroethene	130				U	1		U	1		U	1
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	200			300			100			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3		U	3
Hardness as Calcium Carbonate	270			270			340			230		
Nitrate-Nitrite-N	16				U	0.2	63				U	0.2
Total Dissolved Solids (TDS)	390			430	*		640	*		450	*	
Total Suspended Solids (TSS)		U	5	6			16			75		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	468			398			524			410		
Temperature (Celsius)	12.5			12.3			12.1			12.5		
pH	6.82			6.76			6.16			6.76		

Note : 1. Only compounds detected are shown.
2. NA indicates compound was not analyzed.
3. Sample number designation
All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.
Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW" for "A" well);
Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.
A zero as the first digit indicates original sample for analysis by the contractor laboratory.
A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.
A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.
Field 3 : The last digit denotes the year in which the sample was collected.
The first two digits denotes the month when the sample was collected.
For instance, "082" denotes the sample was collected in 8/92.
A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.
4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

MECOEK 3569
COE 031717

Table 4-20 Atlas Missile Area ("G2") Explosive Compound Results from Hydropunch Groundwater Samples

	G2-26J		G2-27J		G2-30J		G2-31J		G2-32J		G2-34J		G2-39J	
	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier
EXPLOSIVES (ug/l)														
1,3,5-Trinitrobenzene (TNB)		ND		ND		ND		ND		ND		ND		ND
1,3-Dinitrobenzene (DNB)		ND		ND		ND		ND		ND		ND		ND
2,4,6-Trinitrotoluene (TNT)		ND		ND		ND		ND		ND		ND		ND
2,4-Dinitrotoluene (24DNT)		ND		ND		ND		ND		ND		ND		ND
2,6-Dinitrotoluene (26DNT)		ND		ND		ND		ND		ND		ND		ND
2-Nitrotoluene (2NT)		ND		ND		ND		ND		ND		ND		ND
3-Nitrotoluene (3NT)		ND		ND		ND		ND		ND		ND		ND
4-Nitrotoluene (4NT)		ND		ND		ND		ND		ND		ND		ND
RDX		ND		ND	0.28			ND		ND	0.47			ND
Tetryl		ND		ND		ND		ND		ND		ND		ND
Nitrobenzene (NB)		ND		ND		ND		ND		ND		ND		ND
HMX		ND		ND		ND		ND		ND		ND		ND

Note : 1. ND indicates compound was not detected at the quantitation limit..

2. Quantitation limit of the various compounds are as follows,

TNB, DNB, TNT, 2,4-DNT, Nitrobenzene, and HMX : 0.25 ug/L

2,6-DNT, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene, and Tetryl : 0.5 ug/L

RDX : 0.15 ug/L

COE 031718

MECOEK 3570

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-001-082			BMW-001-082			AMW-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15	0.17		
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			U	10
1,2-Dichloropropane		U	1		U	1		U	10
Acetone		U	5		U	5		U	10
Carbon disulfide		U	1		U	1		U	10
Chloroform		U	1		U	1		U	10
Methylene chloride		U	2	1	BJ			U	10
Tetrachloroethene		U	1		U	1		U	10
Toluene		U	1		U	1		U	10
Trichloroethene		U	1		U	1	130		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	300			170			180		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	370			190			250		
Nitrate-Nitrite-N		U	0.2	4.9			0.65		
Total Dissolved Solids (TDS)	650			280			340		
Total Suspended Solids (TSS)	11			5			9		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	650			300			424		
Temperature (Celsius)	12.3			12.3			12.5		
pH	6.91			6.44			7.01		

COE 031719

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-002-082			AMW-003-082			BMW-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	2.2				U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)	6.5				U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	6.7			0.48			0.26		
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5	2	J		6		
Carbon disulfide		U	1		U	1		U	1
Chloroform	5				U	1		U	1
Methylene chloride		U	2	1	BJ		1	BJ	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.6	J			U	1
Trichloroethene	11				U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	190			190			230		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4		
Hardness as Calcium Carbonate	230			280			280		
Nitrate-Nitrite-N	4.2			11			17		
Total Dissolved Solids (TDS)	330			410			470		
Total Suspended Solids (TSS)	16			6				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	393			348			523		
Temperature (Celsius)	12.6			12.7			12.7		
pH	6.55			6.7			6.46		

COE 031720

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-004-082			BMW-004-082			AMW-005-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	0.16			4.5				U	0.15
HMX		U	0.25	1.3				U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		6	B		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.8	J		0.6	J		0.7	J	
Trichloroethene		U	1		U	1	4		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			170			200		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	240			210			260		
Nitrate-Nitrite-N		U	0.2	4.4				U	0.2
Total Dissolved Solids (TDS)	350			320			370		
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	427			373			426		
Temperature (Celsius)	12.5			12.7			12.6		
pH	7			6.78			7.01		

COE 031721

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-005-082			AMW-006-082			BMW-006-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	2				U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)	20				U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)	0.97	-			U	0.25		U	0.25
RDX	98	-			U	0.15		U	0.15
HMX	45				U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1	0.6	J			U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		0.5	BJ			U	2
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	170			200			160		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	250			240			210		
Nitrate-Nitrite-N	6.8			3			6.3		
Total Dissolved Solids (TDS)	310			320			290		
Total Suspended Solids (TSS)	6			14			14		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	294			403			390		
Temperature (Celsius)	12.6			12.5			12.6		
pH	6.61			6.83			6.48		

COE 031722

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-007-082			BMW-007-082			AMW-008-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25	0.39				U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25	7.5				U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	0.18			1.9				U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5	12				U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		0.9	BJ	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.5	J		1		
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			170			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	230			420			270		
Nitrate-Nitrite-N	1.8			11			4		
Total Dissolved Solids (TDS)	370			290			340		
Total Suspended Solids (TSS)		U	5		U	5	6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	440			350			437		
Temperature (Celsius)	12.8			12.6			12.6		
pH	6.9			6.72			6.67		

COE 031723

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-008-082			AMW-009-082			BMW-009-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	4.7				U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA		2	J			U	10
1,2-Dichloropropane		U	1		U	17		U	10
Acetone		U	5		U	17		U	10
Carbon disulfide		U	1		U	17		U	10
Chloroform		U	1		U	17	26		
Methylene chloride	1	BJ		3	BJ		2	BJ	
Tetrachloroethene		U	1		U	17		U	10
Toluene	1				U	17	1	J	
Trichloroethene		U	1	300			31		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	220			200			130		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	220			270			180		
Nitrate-Nitrite-N	5.3			6			4.2		
Total Dissolved Solids (TDS)	290			380			260		
Total Suspended Solids (TSS)	11			5			510		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	334			455			289		
Temperature (Celsius)	12.4			6.3			4.9		
pH	6.64			7.02			6.68		

COE 031724

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	DMW-009-082			DMW-009-082-RE			AMW-010-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
RDX		U	0.15		NA			U	0.15
HMX		U	0.25		NA			U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		U	10		U	16		NA	
1,2-Dichloropropane		U	10		U	16		U	1
Acetone		U	10		U	16		U	5
Carbon disulfide		U	10		U	16		U	1
Chloroform		U	10		U	16		U	1
Methylene chloride	2	BJ		3	BDJ		1	BJ	
Tetrachloroethene		U	10		U	16		U	1
Toluene		U	10		U	16		U	1
Trichloroethene	240	E		220	D			U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260				NA		180		
Biochemical Oxygen Demand (BOD)		U	3		NA		4		
Hardness as Calcium Carbonate	250				NA		180		
Nitrate-Nitrite-N	5.4				NA		3.1		
Total Dissolved Solids (TDS)	420				NA		260		
Total Suspended Solids (TSS)	15				NA			U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	394				NA		322		
Temperature (Celsius)	5.1				NA		12.1		
pH	7.09				NA		6.82		

COE 031725

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-010-082			AMW-012-082			AMW-013-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			U	10		NA	
1,2-Dichloropropane		U	1		U	10		U	1
Acetone		U	5		U	10		U	5
Carbon disulfide		U	1		U	10		U	1
Chloroform		U	1		U	10		U	1
Methylene chloride	1	BJ		1	BJ			U	2
Tetrachloroethene		U	1		U	10		U	1
Toluene		U	1		U	10	0.7	J	
Trichloroethene		U	1	30				U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	110			100			120		
Biochemical Oxygen Demand (BOD)	5				U	3		U	3
Hardness as Calcium Carbonate	130			200			140		
Nitrate-Nitrite-N	6.7			17			6		
Total Dissolved Solids (TDS)	230			280			200		
Total Suspended Solids (TSS)	16			170			140		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	259			245			281		
Temperature (Celsius)	12.1			13.2			13.3		
pH	6.51			6.57			6.79		

COE 031726

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-014-082			AMW-015-082			BMW-016-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane	25	E			U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform	3				U	1		U	1
Methylene chloride	1	BJ		5	B		1	BJ	
Tetrachloroethene		U	1		U	1	3		
Toluene		U	1	0.6	J			U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	290			300			270		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	300			260			300		
Nitrate-Nitrite-N	9.7			2.3				U	0.2
Total Dissolved Solids (TDS)	420			330			430	*	
Total Suspended Solids (TSS)	280			100			6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	591				NA		512		
Temperature (Celsius)	13.5				NA		12.2		
pH	7.02				NA		6.87		

COE 031727

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	CMW-016-082			AMW-017-082			BMW-017-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	0.91			0.16				U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	3	B		6	B		8	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	1			1		
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			230			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	400			340			180		
Nitrate-Nitrite-N	46				U	0.2	2.5		
Total Dissolved Solids (TDS)	710	*		900			300		
Total Suspended Solids (TSS)	9			10				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	692			1032			331		
Temperature (Celsius)	12.3				NA		12.7		
pH	6.21			6.89			6.97		

COE 031728

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	CMW-017-082			AMW-020-082			BMW-020-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1	14			1		
Chloroform		U	1		U	1		U	1
Methylene chloride	0.9	BJ		0.9	BJ		3	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.7	J			U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	90			200			210		
Biochemical Oxygen Demand (BOD)		U	3		U	4		U	4
Hardness as Calcium Carbonate	110			250			200		
Nitrate-Nitrite-N		U	0.2		U	0.2		U	0.2
Total Dissolved Solids (TDS)	180			470	*		350	*	
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	203			596			414		
Temperature (Celsius)	12.7			12.7			12.6		
pH	6.2			6.95			7.01		

COE 031729

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	CMW-020-082			AMW-021-082			BMW-021-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25	0.57		
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15	10		
HMX		U	0.25		U	0.25	0.94		
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			U	10
1,2-Dichloropropane		U	1		U	1		U	10
Acetone		U	5		U	5		U	10
Carbon disulfide		U	1		U	1		U	10
Chloroform		U	1		U	1		U	10
Methylene chloride	2	B		2	B		2	BJ	
Tetrachloroethene		U	1		U	1		U	10
Toluene		U	1	0.7	J			U	10
Trichloroethene		U	1		U	1	140		
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	56			260			160		
Biochemical Oxygen Demand (BOD)		U	4		U	3		U	3
Hardness as Calcium Carbonate	200			420			190		
Nitrate-Nitrite-N	22				U	0.2	4.7		
Total Dissolved Solids (TDS)	330	*		340			270		
Total Suspended Solids (TSS)	1600			5				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	596			350			323		
Temperature (Celsius)	12.7			12.1			12.2		
pH	6.95			6.97			6.7		

COE 031730

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	DMW-021-082			AMW-022-082			BMW-022-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15	0.25		
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		0.8	BJ		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	250			280			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	290			280			250		
Nitrate-Nitrite-N		U	0.2		U	0.2	1.5		
Total Dissolved Solids (TDS)	330			380	*		350	*	
Total Suspended Solids (TSS)	38				U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	327			490			420		
Temperature (Celsius)	12.1			12.4			12.7		
pH	6.93			6.99			6.9		

COE 031731

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-023-082			BMW-023-082			AMW-024-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			U	10		NA	
1,2-Dichloropropane		U	1		U	10		U	1
Acetone		U	5		U	10		U	5
Carbon disulfide	5				U	10		U	1
Chloroform		U	1		U	10		U	1
Methylene chloride	1	BJ		1	BJ			U	2
Tetrachloroethene		U	1		U	10		U	1
Toluene	0.5	J			U	10		U	1
Trichloroethene		U	1	97			0.9	J	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260			270			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	310			290			250		
Nitrate-Nitrite-N		U	0.2	1.6				U	0.2
Total Dissolved Solids (TDS)	430			450			510	*	
Total Suspended Solids (TSS)	31				U	5	56		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	513			601			521		
Temperature (Celsius)	12.7			12.9			12.4		
pH	6.93			7.38			7.02		

COE 031732

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-024-082			AMW-025-082			BMW-025-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	0.32				U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	0.46				U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5	3	J			U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	0.8	BJ		0.8	BJ		1	BJ	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.7	J		0.8	J			U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	140			260			150		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	180			250			140		
Nitrate-Nitrite-N	10				U	0.2	6.2		
Total Dissolved Solids (TDS)	290	*		430			330		
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	329			436			376		
Temperature (Celsius)	12.6			12.5			13.8		
pH	6.46			6.98			6.58		

COE 031733

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	DMW-025-082			AMW-026-082			BMW-026-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1	0.8	J		0.9	J	
Chloroform		U	1		U	1		U	1
Methylene chloride	0.7	BJ		1	BJ		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	1				U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			220			210		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	680			270			240		
Nitrate-Nitrite-N		U	0.2	1.1			9.1		
Total Dissolved Solids (TDS)	1900			390			380		
Total Suspended Solids (TSS)		U	5	35				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	1894			454			447		
Temperature (Celsius)	12.8			12.7			12.4		
pH	6.94			7.14			6.75		

COE 031734

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-027-082			BMW-027-082			AMW-028-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5	2	J			U	5
Carbon disulfide	0.8	J			U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	0.8	BJ		0.9	BJ		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.5	J	
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	240			180			240		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	280			220			230		
Nitrate-Nitrite-N		U	0.2	19				U	0.2
Total Dissolved Solids (TDS)	380			540			390		
Total Suspended Solids (TSS)	72			91			10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	427			519			423		
Temperature (Celsius)	12.4			12.3			12.5		
pH	7.01			6.43			7.06		

COE 031735

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-028-082			DMW-028-082			AMW-029-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15	4.4		
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1	1		
Chloroform		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			260			230		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	4
Hardness as Calcium Carbonate	220			260			230		
Nitrate-Nitrite-N	10				U	0.2	6.18		
Total Dissolved Solids (TDS)	320			350			410	*	
Total Suspended Solids (TSS)		U	5		U	5	24		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	408			433			435		
Temperature (Celsius)	12.5			12.4			12.6		
pH	6.51			7.08			6.77		

COE 031736

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-029-082			AMW-030-082			BMW-030-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide	6				U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	2	B			U	2	0.9	J	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.9	J	
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	120			280			150		
Biochemical Oxygen Demand (BOD)		U	4		U	3		U	3
Hardness as Calcium Carbonate	240			240			210		
Nitrate-Nitrite-N	25				U	0.2	8.4		
Total Dissolved Solids (TDS)	610	*		390			300		
Total Suspended Solids (TSS)		U	5		U	5	10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	457			462			313		
Temperature (Celsius)	12.5			4.9			11.8		
pH	6.32			7.08			6.53		

COE 031737

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-031-082			BMW-031-082			AMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15	4.7			3.9		
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone	4	J		16				U	5
Carbon disulfide		U	1		U	1	0.7	J	
Chloroform		U	1		U	1		U	1
Methylene chloride	0.8	BJ		1	BJ		2	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.6	J			U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			120			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	4
Hardness as Calcium Carbonate	180			150			210		
Nitrate-Nitrite-N	4.7			9.8			3.57		
Total Dissolved Solids (TDS)	300			240			320	*	
Total Suspended Solids (TSS)	11			11				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	351			273			328		
Temperature (Celsius)	12.2			11.9			12.4		
pH	6.9			6.51			6.87		

COE 031738

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	BMW-032-082			BMW-032-082-RE			DMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
RDX	0.16	-			NA		0.72		
HMX		U	0.25		NA			U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	2		U	1
Acetone		U	5		U	10		U	5
Carbon disulfide	34	E		24			16		
Chloroform		U	1		U	2		U	1
Methylene chloride		U	2	5	B		2	B	
Tetrachloroethene		U	1		U	2		U	1
Toluene		U	1		U	2		U	1
Trichloroethene		U	1		U	2		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	140				NA		180		
Biochemical Oxygen Demand (BOD)		U	4		NA			U	4
Hardness as Calcium Carbonate	360				NA		220		
Nitrate-Nitrite-N	14.3				NA		2.54		
Total Dissolved Solids (TDS)	610	*			NA		310	*	
Total Suspended Solids (TSS)	300				NA			U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	300				NA		282		
Temperature (Celsius)	12.4				NA		12.5		
pH	6.63				NA		6.87		

COE 031739

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-033-082			BMW-033-082			DMW-033-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	9.2			1.8				U	0.15
HMX	0.98				U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		3	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.6	J		0.8	J	
Trichloroethene	1				U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	180			190			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	210			130			250		
Nitrate-Nitrite-N	2.9			3.8				U	0.2
Total Dissolved Solids (TDS)	440			280			600		
Total Suspended Solids (TSS)	50				U	5	12		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	440			582			582		
Temperature (Celsius)	13.6			16			16		
pH	6.68			7.06			7.06		

COE 031740

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-034-082			BMW-034-082			DMW-034-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15	0.91				U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide	2				U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	0.9	BJ		1	BJ		0.8	BJ	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.5	J			U	1	0.5	J	
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	250			180			250		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	250			180			280		
Nitrate-Nitrite-N		U	0.2	3.17				U	0.2
Total Dissolved Solids (TDS)	390	*		600	*		460	*	
Total Suspended Solids (TSS)	16			180			29		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	369			275			405		
Temperature (Celsius)	12.8			12.9			12.6		
pH	7.14			6.67			6.94		

COE 031741

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-035-082			BMW-035-082			DMW-035-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX	0.34				U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone	2	J			U	5		U	5
Carbon disulfide	1				U	1	0.6	J	
Chloroform		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		1	BJ	
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.5	J			U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			120			180		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	185			150			200		
Nitrate-Nitrite-N	6.6			8.9			2.6		
Total Dissolved Solids (TDS)	320			320			390		
Total Suspended Solids (TSS)		U	5	20				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	337			277			413		
Temperature (Celsius)	13.2			12.9			12.6		
pH	6.66			6.59			6.65		

COE 031742

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-036-082			BMW-036-082			DMW-036-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)	1	J		1	J			NA	
1,2-Dichloropropane		U	10		U	10		U	1
Acetone		U	10		U	10		U	5
Carbon disulfide	25			5	J		7		
Chloroform		U	10		U	10		U	1
Methylene chloride	2	BJ		2	BJ		1	BJ	
Tetrachloroethene		U	10		U	10		U	1
Toluene	1	J			U	10		U	1
Trichloroethene	25			25				U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			200			250		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	230			220			320		
Nitrate-Nitrite-N	510			330			280		
Total Dissolved Solids (TDS)	430			380			710		
Total Suspended Solids (TSS)	33			5			6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	436			418			771		
Temperature (Celsius)	11.6			11.6			11.6		
pH	6.65			6.67			6.78		

COE 031743

Table 4-21 Load Lines 1, 2, 3, and 4 Groundwater Monitoring Well Results

	AMW-037-082			BMW-037-082			DMW-037-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
RDX		U	0.15		U	0.15		U	0.15
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
Acetone		U	5		U	5		U	5
Carbon disulfide	3				U	1		U	1
Chloroform		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		3	B	
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.9	J			U	1		U	1
Trichloroethene		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	130			150			150		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	150			170			190		
Nitrate-Nitrite-N	660			110			110		
Total Dissolved Solids (TDS)	280			310			290		
Total Suspended Solids (TSS)	6			6			26		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	270			335			249		
Temperature (Celsius)	12.4			12.6			12.4		
pH	6.58			6.57			6.78		

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW" for "A" well):

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

4. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definition

COE 031744

Table 4-22 Platte River Alluvial Aquifer Groundwater Monitoring Well Results

	AMW-038-082			DMW-038-082			AMW-039-082			DMW-039-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)												
Methylene chloride	5	B		0.6	BJ			U	2		U	2
WATER QUALITY (mg/l)												
Alkalinity as Calcium Carbonate	230			230			210			270		
Biochemical Oxygen Demand (BOD)		U	3	5				U	3		U	3
Hardness as Calcium Carbonate	210			210			230			360		
Nitrate-Nitrite-N	2.6				U	0.2		U	0.2		U	0.2
Total Dissolved Solids (TDS)	370			360			410			630		
Total Suspended Solids (TSS)	25			20				U	5	28		
FIELD PARAMETERS												
Specific Conductance (umhos/cm)	432			324			419			764		
Temperature (Celsius)	12.2			12.2			10			11.5		
pH	6.8			6.73			7.01			6.85		

Note : 1. Only compounds detected are shown.
2. NA indicates compound was not analyzed.
3. Quantitation limit of the various compounds are as follows,
TNB, DNB, TNT, 2,4-DNT, Nitrobenzene, and HMX : 0.25 ug/L
2,6-DNT, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene, and Tetryl : 0.5 ug/L
4. Sample number designation
All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.
Field 1 : indicates which well of the well cluster the sample was collected from (e.g. "AMW" for "A" well);
Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.
A zero as the first digit indicates original sample for analysis by the contractor laboratory.
A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.
A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.
Field 3 : The last digit denotes the year in which the sample was collected.
The first two digits denotes the month when the sample was collected.
For instance, "082" denotes the sample was collected in 8/92.
A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.
5. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

MECOEK 3597

COE 031745

Table 4-23 Platte River Alluvial Aquifer Hydropunch ("H") Groundwater Results

Sample ID	RDX Results	RDX Qualifier	cis-1,2-Dichloroethene Results	cis-1,2-Dichloroethene Qualifier
H-01I-68	1.5			ND
H-01J-88	0.95			ND
H-02I-22		ND	0.2	
H-02J-48		ND	1.5	
H-03I-24		ND	1.7	
H-04I-69		ND	0.3	
H-04J-95		ND	6.5	
H-05I-29		ND	0.3	
H-05J-50		ND	0.7	
H-06J-48		ND	1.2	
H-07I-29		ND	0.3	
H-07J-53.5		ND	1.4	

Note : 1. Only samples and compounds which have detection are shown.
2. All concentrations are in ug/L
3. ND indicates compound was not detected at the quantitation limit.
4. Quantitation limit of the various compounds are as follows,
RDX : 0.15 ug/L
cis-1,2-Dichloroethene : 0.1 ug/L
5. VOC screening was performed by PES mobile laboratory on site.

MECOEK 3598

COE 031746

Table 4-24 Bomb Booster Area Groundwater Monitoring Well Results

	BMW-057-082		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)			
Methylene chloride	6	B	
WATER QUALITY (mg/l)			
Alkalinity as Calcium Carbonate	68		
Hardness as Calcium Carbonate	330		
Nitrate-Nitrite-N	57		
Total Dissolved Solids (TDS)	670		
Total Suspended Solids (TSS)	18		
FIELD PARAMETERS			
Specific Conductance (umhos/cm)	667		
Temperature (Celsius)	12.8		
pH	6.13		

Note : 1. Only compounds detected are shown.

2. NA indicates compound was not analyzed.

3. Quantitation limit of the various compounds are as follows,

TNB, DNB, TNT, 2,4-DNT, Nitrobenzene, and HMX : 0.25 ug/L

2,6-DNT, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene, and Tetryl : 0.5 ug/L

4. Sample number designation

All monitoring well sample numbers consist of three fields, "field 1"-"field2"-field 3", such as "AMW"-"209"-"082" for sample AMW-209-082.

Field 1 : indicates which well of the well cluster the sample was collected from (e.g. A well for "AMW");

Field 2 : The last two digits indicates the well number of the well cluster where the sample was collected.

A zero as the first digit indicates original sample for analysis by the contractor laboratory.

A two as the first digit indicates a field QC sample for analysis by the contractor laboratory.

A four as the first digit indicates a field QA sample for analysis by the MRD laboratory.

Field 3 : The last digit denotes the year in which the sample was collected.

The first two digits denotes the month when the sample was collected.

For instance, "082" denotes the sample was collected in 8/92.

A suffix "RE" appended to a sample number indicates a reextracted sample of the original sample.

5. Refer to appropriate EPA Contract Laboratory Program (CLP) Statement of Work (SOW) or Laboratory Data Validation Functional Guidelines for Evaluating Organics/Inorganics Analyses for correct data qualifier Definitions.

TABLE 4-25

DATA QUALIFIERS FOR ORGANIC AND EXPLOSIVE ANALYSES

Data Qualifier	Explanation
U	Indicates compound was analyzed for, but not detected. The numerical value is the sample quantitation limit and must be corrected for dilution. For example, 5 U for phenol in water if the sample final volume is the protocol-specified final volume. If a 1 to 10 dilution of the extract is necessary, the reported limit is 50 U.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria, but the result is less than the sample quantitation limit, but greater than zero. For example, if the sample quantitation limit is 10 µg/L, but a concentration of 3 µg/L is calculated, report it as 3J. The sample quantitation limit must be adjusted for dilution as discussed for the U flag.
N	Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as a chlorinated hydrocarbon, the N code is not used.
B	This flag is used on the sample Form I when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified target compound.
E	This flag identifies compounds whose concentrations exceed the initial calibration range of the instrument for that specific analysis. If one or more compounds have a response that exceed the initial calibration range, the sample or extract must be diluted and reanalyzed according to the specifications in Exhibit D. All such compounds should have the concentration flagged with an "E" on the Form I for the original analysis. The dilution of the extract may cause some compounds identified in the first analysis to be below the calibration range in the second analysis. The results of both analyses shall be reported on separate Forms I. The Form I for the diluted sample shall have the "DL" (or "DL2") (for pesticide samples only) suffix appended to the EPA Sample Number. Note: For total xylenes, where three isomers are quantified as two peaks, the calibration range of each peak should be considered separately, e.g., a diluted analysis is not required for total xylenes unless the concentration of the peak representing the single isomer exceeds 25 µg/L or the peak representing the two coeluting isomers on that GC column exceeds 50 µg/L.
D	If a sample or extract is diluted and re-analyzed, as in the "E" flag above, all concentration values reported on that Form I are flagged with the "D" flag. The "DL" or "DL2" (for pesticide samples only) suffix is appended to the EPA Sample Number on the Form I for the diluted sample.
A	This flag is not used under this contract, but is reserved.
P	This flag is used for a pesticide/Aroclor target analyte when there is greater than 25 percent difference between the concentration calculated from the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
NA	Indicates compound was not analyzed.

TABLE 4-26

DATA QUALIFIERS FOR TARGET ANALYTE LIST ANALYSES

Data Qualifier	Explanation
B	The reported value was obtained from a reading that was less than the Contract Required Quantitation Limit (CRQL). but greater than or equal to the Method Detection Limit (MDL).
U	The reported value was obtained from a reading that was less than the MDL.
E	The reported value is estimated because of the presence of interference.
I	The sum of the values of the interference correction(s) is greater than the result concentration.
M	Duplicate injection/exposure precision not met.
W	Spike recovery is less than 85 percent or greater than 115 percent.
N	Spiked sample recovery not within control limits.
S	The reported value was determined by the Method of Standard Additions (MSA).
*	Duplicate analysis not within control limits.
+	Correlation coefficient for the MSA is less than 0.995.
NA	Indicates compound was not analyzed.

COE 031749

TABLE 4-27

DATA QUALIFIERS FOR GENERAL WATER QUALITY ANALYSES AND FIELD PARAMETERS

Data Qualifier	Explanation
U	Indicates compound was analyzed for. but not detected. The numerical value is the sample quantitation limit.
*	Indicates no quality control.
NA	Indicates analysis was not required.

COE 031750

Table 5-1 Physical and Chemical Properties of Selected Compounds

Compound	Molecular Formula	Molecular Weight	Melting Point (Centigrade)	Boiling Point (Centigrade)	Density (g/ml unless noted)	Vapor Pressure (mm Hg @25C unless noted)	Solubility in Water (mg/L @25C unless noted)	Henry's Constant (atm-m3/mole @25C unless noted)	Log Octanol Water Part Coefficient (Log Kow)
Volatile Organic Compounds (VOCs)									
Acetone	CH3COCH3	58.08	-95.35	56.2	0.788 @ 20/25C	270 @ 20C	Miscible	3.67E-05	-0.24
Benzene	C6H6	78.11	-5.5	80.1	0.879 @ 20/4C	95	1791 @ 20C	5.43E-03	2.13
Carbon Disulfide	CS2	76.13	-112	46.2	1.271@ 20/4C	298 @ 20C	2100 @20C	1.4E-3 @20C	2.16
Chloroform	CHCL3	119.37	-63.5	61.26	1.498 @ 15/4C	246	7950	4.35E-03	1.97
1,1-Dichloroethane (1,1-DCA)	C2H4CL2	98.96	-97	57.3	1.176 @ 20/4C	227	5060	5.87E-03	1.79
1,2-Dichloroethane (1,2-DCA)	C2H4CL2	98.96	-35.3	83.5	NA	79	8527	9.97E-04	1.48
cis-1,2-Dichloroethene	C2H2CL2	96.94	-80.5	60	1.28 @ 20/4C	202	3500	3.37E-03	1.86
1,2-Dichloropropane	C3H6CL2	112.99	-100.4	96.4	1.159 @ 25/25C	50	2740	2.07E-03	1.99
Ethylbenzene	C8H10	106.16	-95	136.2	0.866 @ 25/25C	9.5	161	8.44E-03	3.15
Methylene Chloride	CH2CL2	84.93	-95.1	40	1.325 @ 20/4C	429	1.67	3.19E-03	1.25
Tetrachloroethene (PCE)	C2CL4	165.82	-19	121.1	1.623 @ 20/4C	19	150	1.50E-03	3.4
Toluene	C7H8	92.13	-95	110.6	0.866 @ 20/4C	28	535	5.94E-03	2.73
1,1,1-Trichloroethane	C2H3CL3	133.42	-30.4	74.1	1.338 @ 20/4C	124	1495	8.00E-03	2.49
Trichloroethene (TCE)	C2HCL3	131.4	-73	86.7	1.465 @ 20/4C	69	1100	1.03E-02	2.42
Xylenes	C8H10	106.16	NA	137	0.8640 @ 20/4C	NA	152	7.10E-03	2.95
m-Xylene	C8H10	106.16	-47.4	139.3	0.8684 @ 15/4C	6 @ 20C	200	NA	3.2
o-Xylene	C8H10	106.16	-25	144	0.8801 @ 20/4C	5 @ 20C	175 @ 20C	5.27E-03	2.77
p-Xylene	C8H10	106.16	13	137	0.8614 @ 20/4C	6.5 @ 20C	198	NA	3.15
Explosives									
2,4-Dinitrotoluene	C7H6N2O4	182.14	71	Exp@300	1.321@70C	1.1E-4 @ 20C	180	1.86E-07	1.98
2,6-Dinitrotoluene	C7H6N2O4	182.14	66	285	1.2833@111C	3.5E-4 @ 20C	206	4.86E-07	1.89
RDX	C3H6N6O6	222.13	204	NA	1.83	4.03E-9 torr	60	1.96E-11	0.81
HMX	C4H8N8O8	296.17	286	NA	1.9	3E-9 @ 100C	6.63 @ 20C	NA	NA
Tetryl	NA	NA	NA	NA	NA	5.69E-9 torr	80	2.69E-11	1.65
2,4,6-Trinitrotoluene (TNT)	C7H5N3O6	227.13	80.1	Exp@240	1.64@20C	4.6E-2 @ 82C	150	1.10E-08	1.86

NA = Data not availble

Sources:
VOCs: Howard, 1990
Explosives: Burrows, et al, 1989

TABLE 5-2

INITIAL CONTAMINANT CONCENTRATIONS USED FOR TRANSPORT SIMULATION

Area	Contaminant	Assumed date of release	S mg/l	H ft	L ft	C_0 mg/l
Load Line 1	TCE	1959	1100	67	450	20
Load Line 1	TNT	1943	123	67	700	3
Load Line 2	RDX	1943	44	66	1200	2
Load Line 2	TNT	1943	123	66	1200	5
Atlas Missile	TCE	1959	1100	96	1200	30

Notes:

S = solubility of the contaminant in water at 20 C.
H = saturated thickness of the Pleistocene aquifer.
L = length of the saturated area shown in Drawing 5-2 parallel to the groundwater gradient.
C_0 = initial concentration of the contaminant as given by the following equation:

$$C_0 = \frac{Mass\,of\,Contaminant}{Volume\,of\,Water} = \frac{ISL}{qH}$$

where
I = annual infiltration (2.3 in/yr),
q = specific discharge or darcy velocity (0.3 ft/d).

Note:

Unit conversion was used to compute the shown values of C_0.

COE 031752

TABLE 5-3

RETARDATION FACTORS USED FOR TRANSPORT SIMULATION

Contaminant	K_{OC} (ml/g)	Literature Source for K_{OC}	R
RDX	104.5	Spanggord, et.al. 1980b	1.25
TCE	120	Mehran, et.al. 1987	1.29
TNT	780	Elmore, 1991	2.86

Notes:

K_{OC} = distribution coefficient normalized for organic carbon content.
R = retardation factor as given by the following equation:

$$R = 1 + \frac{B_d K_{OC} foc}{n}$$

where

B_d = bulk density of porous media (1.4 gm/cm^3),
foc = fraction of organic carbon (0.000255),
n = porosity (0.15).

Note:

R is shown to two decimal places for comparison purposes only. The number of significant digits is two.

COE 031753

Table 5-4 Comparison of Simulated and Measured TCE Concentrations at Load Line 1

Monitoring Well	Simulated TCE			Measured TCE (ug/l)	C/Measured
	C/Co	Co (ug/l)	C (ug/l)		
MW-2A	0.5	20,000	10000	130	77
MW-3A	0.000005	20,000	0.1	ND	(0.1)
MW-10A	0.08	20,000	1600	ND	(1600)
MW-12A	0.15	20,000	3000	30	100
MW-21B	0.1	20,000	2000	140	14
MW-22A	0	20,000	0	ND	1
MW-23B	1	20,000	20000	97	206
MW-24A	0.08	20,000	1600	0.9	1778
MW-25A	0	20,000	0	ND	1
MW-26A	0	20,000	0	ND	1
MW-28A	0	20,000	0	ND	1

Co = initial concentration used during simulation
C = simulated concentration
Measured = concentration quantified from sample collected at the monitoring well

Note:
1. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison.
2. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated bo be greater than zero, the value given in the table is the ratio of the measured concentration (which is assigned the value of 1 ug/l corresponding to the low-level detection limit) to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parantheses.

COE 031754

Table 5-5 Comparison of Simulated and Measured TNT Concentrations at Load Line 1

Monitoring Well	Simulated TNT			Measured TNT (ug/l)	C/Measured
	C/Co	Co (ug/l)	C (ug/l)		
MW-2B	0.00001	3,000	0.03	6.5	0
MW-3A	0	3,000	0	ND	1
MW-4A	0	3,000	0	ND	1
MW-10A	0.15	3,000	450	ND	(450)
MW-12A	0.00001	3,000	0.03	ND	(0.03)
MW-21A	0.3	3,000	900	ND	(900)
MW-24A	0.00001	3,000	0.03	ND	(0.03)
MW-25A	0	3,000	0	ND	1
MW-26A	0	3,000	0	ND	1
MW-28A	0	3,000	0	ND	1

Co = initial concentration used during simulation
C = simulated concentration
Measured = concentration quantified from sample collected at the monitoring well

Note:
1. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison.
2. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated bo be greater than zero, the value given in the table is the ratio of the measured concentration (which is assigned the value of 1 ug/l corresponding to the low-level detection limit) to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parantheses.

COE 031755

Table 5-6 Comparison of Simulated and Measured RDX Concentrations at Load Line 2

Monitoring Well	Simulated RDX			Measured RDX (ug/l)	C/Measured
	C/Co	Co (ug/l)	C (ug/l)		
MW-4B	0.00005	2.000	0.1	4.5	0
MW-5B	0.4	2.000	800	98	8
MW-6A	0	2.000	0	ND	1
MW-7B	0	2.000	0	1.9	0
MW-28A	0	2.000	0	ND	1
MW-30A	0	2.000	0	ND	1
MW-31B	0.45	2.000	900	4.7	191
MW-32A	0.000001	2.000	0.002	3.9	0
MW-33A	0	2.000	0	9.2	0
MW-34B	0.08	2.000	160	0.91	176
MW-35A	0	2.000	0	0.35	0
MW-37A	0.007	2.000	14	ND	(14)

Co = initial concentration used during simulation
C = simulated concentration
Measured = concentration quantified from sample collected at the monitoring well

Note:
1. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison.
2. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated bo be greater than zero, the value given in the table is the ratio of the measured concentration (which is assigned the value of 1 ug/l corresponding to the low-level detection limit) to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parantheses.

COE 031756

Table 5-7 Comparison of Simulated and Measured TNT Concentrations at Load Line 2

Monitoring Well	Simulated TNT			Measured TNT (ug/l)	C/Measured
	C/Co	Co (ug/l)	C (ug/l)		
MW-4A	0.00001	5,000	0.05	ND	(0.05)
MW-5B	0.4	5,000	2000	20	100
MW-6A	0	5,000	0	ND	1
MW-7B	0	5,000	0	7.5	0
MW-28A	0	5,000	0	ND	1
MW-30A	0	5,000	0	ND	1
MW-31A	0.3	5,000	1500	ND	(1500)
MW-32A	0.000001	5,000	0.005	ND	0
MW-33A	0	5,000	0	ND	1
MW-34A	0	5,000	0	ND	1

Co = initial concentration used during simulation
C = simulated concentration
Measured = concentration quantified from sample collected at the monitoring well

Note:
1. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison.
2. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated bo be greater than zero, the value given in the table is the ratio of the measured concentration (which is assigned the value of 1 ug/l corresponding to the low-level detection limit) to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parantheses.

COE 031757

Table 5-8 Comparison of Simulated and Measured TCE Concentrations at the Atlas Missile Area

Monitoring Well	Simulated TCE			Measured TCE (ug/l)	C/Measured
	C/Co	Co (ug/l)	C (ug/l)		
MW-1A	0	30,000	0	ND	1
MW-9A	0	30,000	0	300	0
MW-11A	0.35	30,000	10500	ND	(10500)
MW-15A	0.000001	30,000	0.03	ND	(0.03)
MW-18C	0.4	30,000	12000	76	158
MW-36A	0	30,000	0	25	0
MW-40B	0.9	30,000	27000	1800	15
MW-41A	0.12	30,000	3600	ND	(3600)
MW-42A	0	30,000	0	ND	1
MW-43B	0.3	30,000	9000	46	196
MW-44A	0.00005	30,000	1.5	180	0
MW-45B	0	30,000	0	99	0
MW-46A	0	30,000	0	ND	1
MW-52A	0.4	30,000	12000	3	4000
MW-53B	0.3	30,000	9000	97	93
MW-54A	0.001	30,000	30	ND	(30)
MW-55A	0.01	30,000	300	ND	(300)
MW-56B	0.03	30,000	900	11	82
MW-58B	1	30,000	30000	130	231
MW-59A	0.000001	30,000	0.03	ND	(0.03)

Co = initial concentration used during simulation
C = simulated concentration
Measured = concentration quantified from sample collected at the monitoring well

Note:
1. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated as zero, the ratio is unity by definition for the purposes of the comparison.
2. For the case where the greatest measured concentration at a cluster is below quantitation limits and the simulated concentration is estimated bo be greater than zero, the value given in the table is the ratio of the measured concentration (which is assigned the value of 1 ug/l corresponding to the low-level detection limit) to the simulated concentration. To differentiate the use of this inverse ratio, the value is enclosed in parantheses.

COE 031758

Table 6-1 Data Summary of Unsaturated Soil Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
METALS / CYANIDE (mg/kg)							
Aluminum	7	7	7032.86	2310	1310	16700	ADS-010-03B
Arsenic	7	6	6.14	5.25	0.94	13.3	ADS-005-06B
Barium	7	7	140.1	27.4	15.2	333	ADS-010-03B
Beryllium	7	3	0.81	0.76	0.71	0.96	ADS-010-03B
Calcium	7	7	2420.57	883	471	5130	ADS-010-03B
Chromium	7	7	8.59	2.7	2	20.1	ADS-010-03B
Cobalt	7	4	9.875	12.05	1.3	14.1	ADS-005-06B
Copper	7	7	10.04	3.3	1.1	22.2	ADS-010-03B
Iron	7	7	9997.14	2840	1340	22600	ADS-010-03B
Lead	7	7	8.96	2.6	1.6	19.4	ADS-022-06B
Magnesium	7	7	2429.86	727	446	5380	ADS-010-03B
Manganese	7	7	410.44	62.1	23	1160	ADS-005-06B
Nickel	7	5	21.42	28	2.3	43.7	ADS-005-06B
Potassium	7	7	1318	556	338	2800	ADS-010-03B
Sodium	7	7	140.1	103	68.8	239	ADS-022-06B
Vanadium	7	7	18.01	5.4	2.9	44.1	ADS-010-03B
Zinc	7	7	37.33	11.3	7.4	79.6	ADS-010-03B
VOLATILES (ug/kg)							
Acetone	53	45	44.31	28	7	220	ATL-086-18B-RE
Benzene	53	13	2.08	2	2	3	LL1-048-06B
Methylene chloride	53	53	26.38	23	7	82	ATL-086-18B-RE
Trichloroethene	53	4	7	7	4	10	LL1-048-06B , LL1-054-06B

Note : 1. Only detected concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

MECOEK 3611

COE 031759

Table 6-2 Data Summary of Saturated Soil Samples

	Number of Samples	Number of Detections	CONCENTRATION (1)				Maximum Concentration Sample Number
			Average	Median	Minimum	Maximum	
TOTAL ORGANIC CARBON (mg/kg)							
Total Organic Carbon (TOC)	36	36	350.68	223	79.1	2990	MWD-034-124
VOLATILES (ug/kg)							
2-Butanone	36	1	3	3	3	3	MWA-058-125
Acetone	36	29	73.45	43	16	450	MWB-031-059-RE
Benzene	36	2	2	2	2	2	MWC-033-048 , MWD-031-112
Chloroform	36	1	1	1	1	1	MWA-058-125
Methylene chloride	36	36	27.42	23.5	7	89	MWD-044-051
Trichloroethene	36	1	1	1	1	1	MWB-040-059

Note : 1. Only detected concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

COE 031760

MECOEK 3612

Table 6-3 Data Summary of Site-Wide Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
DISSOLVED METALS (ug/l)							
Aluminum	15	13	108.44	115	45.5	148	BMW-052-082
Arsenic	15	12	9.07	7.25	4	20.6	DMW-048-082
Barium	15	15	210.47	153	122	483	BMW-056-082
Calcium	15	15	63360	57100	28300	111000	BMW-056-082
Iron	15	4	1387.5	1380	1020	1770	BMW-047-082
Magnesium	15	15	15101.333	13300	8520	33900	BMW-056-082
Manganese	15	15	181.83	25.7	2.9	1010	BMW-054-082
Potassium	15	15	8859.33	8390	5720	11200	AMW-047-082
Sodium	15	15	21440	20600	11600	48200	AMW-047-082
Vanadium	15	1	11.7	11.7	11.7	11.7	BMW-048-082
Zinc	15	15	9.87	6.4	4.5	50.4	BMW-054-082
EXPLOSIVES (ug/l)							
1,3,5-Trinitrobenzene (TNB)	128	5	1.10	0.57	0.32	2.2	BMW-002-082
2,4,6-Trinitrotoluene (TNT)	128	3	11.33	7.5	6.5	20	BMW-005-082
2,4-Dinitrotoluene (24DNT)	128	1	0.97	0.97	0.97	0.97	BMW-005-082
RDX	128	44	5.23	0.91	0.16	98	BMW-005-082
HMX	128	12	5.05	0.96	0.26	45	BMW-005-082
GROSS Alpha/Beta (pCi/l)							
Gross Alpha (Radioactivity)	10	2	3.25	3.25	1.38	5.12	BMW-056-082
Gross Beta (Radioactivity)	10	10	6.37	6.42	2.36	10.21	AMW-052-082
SEMIVOLATILES (ug/l)							
Di-n-butyl phthalate	15	4	1	1	1	1	AMW-052-082 , BMW-047-082 , BMW-053-082 , DMW-048-082
Diethyl phthalate	15	7	1.43	1	1	2	AMW-052-082 , BMW-047-082 , DMW-048-082
N-Nitrosodiphenylamine(1)	15	1	1	1	1	1	BMW-053-082
Phenol	15	8	2.25	2.5	1	4	BMW-053-082
bis(2-Ethylhexyl)phthalate	15	15	6.4	4	2	20	DMW-048-082

COE 031761

MECOEK 3613

B07NE003702-04035

Table 6-3 Data Summary of Site-Wide Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
TOTAL METALS / CYANIDE (ug/l)							
Aluminum	15	15	325.73	210	120	1820	BMW-054-082
Arsenic	15	7	12.47	11.9	5	19.8	DMW-048-082
Barium	15	15	198.53	140	116	450	BMW-056-082
Calcium	15	15	59806.67	53000	27100	99600	BMW-056-082
Iron	15	11	675.41	206	58	1840	BMW-047-082
Lead	15	1	2.6	2.6	2.6	2.6	BMW-056-082
Magnesium	15	15	14256.67	12700	8050	31200	BMW-056-082
Manganese	15	15	183.98	25.2	7	1090	BMW-054-082
Nickel	15	1	11.1	11.1	11.1	11.1	BMW-054-082
Potassium	15	15	8335.33	7930	5280	10900	AMW-047-082
Sodium	15	15	20546.667	19800	10800	46700	AMW-047-082
Vanadium	15	2	8.4	8.4	5.5	11.3	BMW-048-082
Zinc	15	14	10.83	5.05	4.1	47.1	BMW-054-082
VOLATILES (ug/l)							
1,1,1-Trichloroethane	128	2	1.5	1.5	1	2	BMW-043-082
1,2-Dichloroethene(Total)	20	9	2.44	1	1	10	BMW-053-082
1,2-Dichloropropane	128	1	25	25	25	25	AMW-014-082
Acetone	128	10	6	5	2	16	BMW-031-082
Carbon disulfide	128	32	4.74	2	0.6	25	AMW-036-082
Chloroform	128	5	10.6	5	3	26	BMW-009-082
Cis-1,2-Dichloroethene	108	3	2	2	2	2	AMW-052-082 , AMW-053-082 , BMW-052-082
Methylene chloride	128	117	2.37	1	0.5	43	BMW-040-082
Tetrachloroethene	128	1	3	3	3	3	BMW-016-082
Toluene	128	39	1.50	0.7	0.5	30	AMW-045-082
Trichloroethene	128	28	127.53	30.5	0.9	1800	BMW-040-082

Table 6-3 Data Summary of Site-Wide Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1)				Maximum Concentration Sample Number
			Average	Median	Minimum	Maximum	
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	128	128	198.66	200	56	300	AMW-001-082 , AMW-015-082 , AMW-047-082 , AMW-059-082 , BMW-047-082
Biochemical Oxygen Demand (BOD)	128	7	5.3	4.9	4	10	CMW-018-082
Hardness as Calcium Carbonate	128	128	248.09	240	110	680	DMW-025-082
Nitrate-Nitrite-N	128	90	71.78	7.8	0.63	660	AMW-037-082
Total Dissolved Solids (TDS)	128	128	425.23	380	180	1900	DMW-025-082
Total Suspended Solids (TSS)	128	85	116.71	14	5	2600	BMW-054-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	124	124	451.05	418.5	203	1894	DMW-025-082
Temperature (Celsius)	123	123	12.12	12.4	4.9	16	BMW-033-082 , DMW-033-082
pH	124	124	6.76	6.765	6.13	7.38	BMW-023-082

Note : 1. Only detected concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

COE 031763

MECOEK

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Table 6-4 Data Summary of Administration Area Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
DISSOLVED METALS (ug/l)							
Aluminum	5	5	89.6	102	45.5	120	AMW-048-082
Arsenic	5	5	14.48	15	9.2	20.6	DMW-048-082
Barium	5	5	157.6	141	122	244	BMW-048-082
Calcium	5	5	80500	79100	74700	89700	BMW-047-082
Iron	5	4	1387.5	1380	1020	1770	BMW-047-082
Magnesium	5	5	15420	14900	13000	18300	BMW-048-082
Manganese	5	5	294.68	320	14.4	428	AMW-047-082
Potassium	5	5	10920	10900	10600	11200	AMW-047-082
Sodium	5	5	27960	24200	20900	48200	AMW-047-082
Vanadium	5	1	11.7	11.7	11.7	11.7	BMW-048-082
Zinc	5	5	7.18	7.1	5.6	9.7	BMW-048-082
SEMIVOLATILES (SVOC) (ug/l)							
Di-n-butyl phthalate	5	2	1	1	1	1	BMW-047-082 , DMW-048-082
Diethyl phthalate	5	3	1.67	2	1	2	BMW-047-082 , DMW-048-082
Phenol	5	2	3	3	3	3	BMW-047-082 , DMW-048-082
bis(2-Ethylhexyl)phthalate	5	5	9	5	2	20	DMW-048-082
TOTAL METALS / CYANIDE (ug/l)							
Aluminum	5	5	250.8	230	168	416	BMW-047-082
Arsenic	5	5	14.9	15.5	9.3	19.8	DMW-048-082
Barium	5	5	150.2	134	116	234	BMW-048-082
Calcium	5	5	77280	75700	73000	85200	BMW-047-082
Iron	5	5	1134.88	1310	64.4	1840	BMW-047-082
Magnesium	5	5	14820	14500	12300	17900	BMW-048-082
Manganese	5	5	283.18	309	14.9	416	AMW-047-082
Potassium	5	5	10440	10400	10200	10900	AMW-047-082
Sodium	5	5	27060	23500	20400	46700	AMW-047-082
Vanadium	5	1	11.3	11.3	11.3	11.3	BMW-048-082
Zinc	5	5	6.12	4.9	4.3	11.7	DMW-048-082
VOLATILES (VOC) (ug/l)							
Methylene chloride	5	4	1.05	0.75	0.7	2	AMW-048-082

COE 031764

MECOEK 3616

B07NE003702-04038

Table 6-4 Data Summary of Administration Area Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1)				Maximum Concentration Sample Number
			Average	Median	Minimum	Maximum	
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	5	5	242	250	110	300	AMW-047-082 , BMW-047-082
Biochemical Oxygen Demand (BOD)	5	1	4.2	4.2	4.2	4.2	AMW-048-082
Hardness as Calcium Carbonate	5	5	266	270	240	300	BMW-047-082
Nitrate-Nitrite-N	5	4	35.16	43.5	0.63	53	BMW-047-082
Total Dissolved Solids (TDS)	5	5	422	420	360	520	BMW-048-082
Total Suspended Solids (TSS)	5	5	8.6	8	5	16	BMW-047-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	5	5	492.8	494	441	550	AMW-047-082
Temperature (Celsius)	5	5	12.44	12.4	12	12.8	AMW-047-082 , DMW-048-082
pH	5	5	6.902	6.94	6.51	7.16	AMW-048-082

Note : 1. Only detection concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

MECOEK 3617

COE 031765

Table 6-5 Data Summary of Administration Area Hydropunch ("H2") Groundwater Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
DISSOLVED METALS (ug/l)							
Aluminum	12	8	900.74	325	52.7	5140	JH2-004-082
Arsenic	12	8	18.16	7.85	4.4	71.8	JH2-004-082
Barium	12	12	259.42	143	80	997	JH2-004-082
Beryllium	12	1	10.7	10.7	10.7	10.7	JH2-004-082
Calcium	12	12	107608.33	71950	47500	307000	JH2-604-082
Chromium	12	1	49	49	49	49	JH2-003-082
Cobalt	12	3	11.07	7.6	6.2	19.4	JH2-004-082
Copper	12	5	20.46	6.8	4.9	46.2	JH2-003-082
Iron	12	12	8853.25	3300	639	41500	JH2-004-082
Lead	12	3	89.5	113	3.5	152	JH2-004-082
Magnesium	12	12	19900	17350	15100	32500	JH2-004-082
Manganese	12	12	745	516.5	145	2160	JH2-004-082
Nickel	12	11	23.2	21.8	12.9	33.4	JH2-002-082
Potassium	12	12	14095	11850	9240	29400	JH2-004-082
Sodium	12	12	26816.667	26100	19700	36300	JH2-001-082
Vanadium	12	1	83.2	83.2	83.2	83.2	JH2-004-082
Zinc	12	12	297.18	196	52.8	1100	JH2-004-082
EXPLOSIVES (ug/l)							
RDX	12	1	0.15	0.15	0.15	0.15	JH2-004-082

COE 031766

MECOEK 3618

Table 6-5 Data Summary of Administration Area Hydropunch ("H2") Groundwater Samples

	Number of Samples	Number of Detections	CONCENTRATION (1)				Maximum Concentration Sample Number
			Average	Median	Minimum	Maximum	
SEMIVOLATILES (ug/l)							
4-Nitrophenol	12	2	3	3	1	5	JH2-604-082
Di-n-butyl phthalate	12	6	2.33	1	1	7	JH2-004-082-RE
Diethyl phthalate	12	7	1.43	1	1	2	JH2-004-082 , JH2-604-082 , JH2-003-082
Dimethyl phthalate	12	2	1	1	1	1	JH2-004-082 , JH2-604-082
N-Nitrosodiphenylamine(1)	12	1	1	1	1	1	JH2-004-082
Phenol	12	7	2.71	2	1	5	JH2-004-082 , JH2-604-082
bis(2-Ethylhexyl)phthalate	12	11	4.73	3	1	12	JH2-003-082
TOTAL METALS / CYANIDE (ug/l)							
Aluminum	12	12	10113.917	1163	263	93600	JH2-604-082
Arsenic	12	6	30.28	9.95	5	114	JH2-604-082
Barium	12	12	294.92	149	113	1670	JH2-604-082
Beryllium	12	2	12.15	12.15	3.5	20.8	JH2-604-082
Calcium	12	12	96175	66950	43700	397000	JH2-604-082
Chromium	12	11	28.59	15.4	9.6	95.8	JH2-603-082
Cobalt	12	3	27.07	18.3	7.1	55.8	JH2-604-082
Copper	12	7	41.97	32.3	19.7	102	JH2-604-082
Cyanide	12	1	13.8	13.8	13.8	13.8	JH2-001-082
Iron	12	12	21896.67	7750	2190	160000	JH2-604-082
Lead	12	4	30.33	23.75	3	70.8	JH2-604-082
Magnesium	12	12	19875	15800	14400	59000	JH2-604-082
Manganese	12	12	732.3	498.5	79.6	3590	JH2-604-082
Mercury	12	1	0.22	0.22	0.22	0.22	JH2-604-082
Nickel	12	8	45.41	41.15	26.9	98.5	JH2-604-082
Potassium	12	12	14217.5	11045	7770	44700	JH2-604-082
Selenium	12	2	34.6	34.6	26	43.2	JH2-003-082
Sodium	12	12	23225	23050	18200	31700	JH2-001-082
Vanadium	12	3	137.93	58.2	10.6	345	JH2-604-082
Zinc	12	12	432.25	299.5	130	1720	JH2-604-082

COE 031767

MECOEK 3619

Table 6-5 Data Summary of Administration Area Hydropunch ("H2") Groundwater Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
VOLATILES (ug/l)							
Acetone	16	5	8.2	6	3	14	JH2-004-082
Carbon disulfide	16	4	1.95	1.5	0.8	4	JH2-001-082
Methylene chloride	16	14	2.04	2	0.8	4	JH2-601-082 , JH2-603-082
Toluene	16	1	0.7	0.7	0.7	0.7	JH2-004-082
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	12	12	335	250	160	1220	JH2-604-082
Biochemical Oxygen Demand (BOD)	12	5	9.2	6	4	19	JH2-603-082
Hardness as Calcium Carbonate	12	12	295.83	280	210	480	JH2-002-082
Nitrate-Nitrite-N	12	7	76	6.3	5.8	490	JH2-604-082
Total Dissolved Solids (TDS)	12	12	519.17	410	300	1500	JH2-604-082
Total Suspended Solids (TSS)	12	12	4567.92	47	15	50000	JH2-604-082

Note : 1. Only detected concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

3. When both the VOC CLP Analyses and the Low Level VOC CLP Analyses were performed to a sample, results from the Low Level VOC CLP Analyses were used in the calculations.

COE 031768

MECOEK 3620

Table 6-6 Data Summary of Landfill Area Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
DISSOLVED METALS (ug/l)							
Aluminum	10	8	120.21	116.5	88.7	148	BMW-052-082
Arsenic	10	7	5.2	4.4	4	8.6	BMW-053-082
Barium	10	10	236.9	194	149	483	BMW-056-082
Calcium	10	10	54790	52000	28300	111000	BMW-056-082
Magnesium	10	10	14942	12650	8520	33900	BMW-056-082
Manganese	10	10	125.4	16.6	2.9	1010	BMW-054-082
Potassium	10	10	7829	7470	5720	11100	AMW-052-082
Sodium	10	10	18180	16950	11600	34800	BMW-056-082
Zinc	10	10	11.21	5.65	4.5	50.4	BMW-054-082
EXPLOSIVES (ug/l)							
RDX	10	9	1.75	0.91	0.24	4.8	AMW-053-082
HMX	10	5	0.928	0.91	0.43	1.9	AMW-053-082
GROSS Alpha/Beta (pCi/l)							
Gross Alpha (Radioactivity)	10	2	3.25	3.25	1.38	5.12	BMW-056-082
Gross Beta (Radioactivity)	10	10	6.368	6.42	2.36	10.21	AMW-052-082
SEMIVOLATILES (ug/l)							
Di-n-butyl phthalate	10	2	1	1	1	1	AMW-052-082 , BMW-053-082
Diethyl phthalate	10	4	1.25	1	1	2	AMW-052-082
N-Nitrosodiphenylamine(1)	10	1	1	1	1	1	BMW-053-082
Phenol	10	6	2	1.5	1	4	BMW-053-082
bis(2-Ethylhexyl)phthalate	10	10	5.1	4	2	12	BMW-053-082

MECOEK 3621

COE 031769

Table 6-6 Data Summary of Landfill Area Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
TOTAL METALS / CYANIDE (ug/l)							
Aluminum	10	10	363.2	190.5	120	1820	BMW-054-082
Arsenic	10	2	6.4	6.4	5	7.8	BMW-053-082
Barium	10	10	222.7	171.5	130	450	BMW-056-082
Calcium	10	10	51070	49750	27100	99600	BMW-056-082
Iron	10	6	292.52	76.55	58	1280	BMW-054-082
Lead	10	1	2.6	2.6	2.6	2.6	BMW-056-082
Magnesium	10	10	13975	11750	8050	31200	BMW-056-082
Manganese	10	10	134.38	18.85	7	1090	BMW-054-082
Nickel	10	1	11.1	11.1	11.1	11.1	BMW-054-082
Potassium	10	10	7283	6985	5280	9620	AMW-052-082
Sodium	10	10	17290	16350	10800	32900	BMW-056-082
Vanadium	10	1	5.5	5.5	5.5	5.5	BMW-054-082
Zinc	10	9	13.44	5.1	4.1	47.1	BMW-054-082
VOLATILES (ug/l)							
1,2-Dichloroethene(Total)	2	1	10	10	10	10	BMW-053-082
Acetone	10	1	6	6	6	6	BMW-055-082
Carbon disulfide	10	1	3	3	3	3	AMW-053-082
Chloroform	10	1	4	4	4	4	BMW-053-082
Cis-1,2-Dichloroethene	8	3	2	2	2	2	AMW-052-082 , AMW-053-082 , BMW-052-082
Methylene chloride	10	9	1	1	0.6	2	BMW-053-082
Toluene	10	2	0.6	0.6	0.6	0.6	AMW-054-082 , BMW-052-082
Trichloroethene	10	5	24	8	1	97	BMW-053-082
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	10	10	165.4	175	84	200	AMW-055-082
Biochemical Oxygen Demand (BOD)	10	1	4.9	4.9	4.9	4.9	BMW-054-082
Hardness as Calcium Carbonate	10	10	204	180	120	410	BMW-056-082
Nitrate-Nitrite-N	10	9	39.51	4	1.3	220	BMW-052-082
Total Dissolved Solids (TDS)	10	10	317	295	190	630	BMW-056-082
Total Suspended Solids (TSS)	10	7	381.29	10	5	2600	BMW-054-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	9	9	363	334	215	759	BMW-056-082
Temperature (Celsius)	9	9	11.98	11.9	11.2	12.5	AMW-052-082 , BMW-052-082
pH	9	9	6.56	6.6	6.31	6.83	BMW-052-082

Note : 1. Only detected concentrations are considered.

COE 031770

MECOEK 3622

B07NE003702-04044

Table 6-7 Data Summary of Atlas Missile Area Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
EXPLOSIVES (ug/l)							
RDX	32	11	5.39	0.79	0.26	33	AMW-011-082
HMX	32	3	2.59	3.7	0.26	3.8	BMW-043-082
VOLATILES (VOC) (ug/l)							
1,1,1-Trichloroethane	32	2	1.5	1.5	1	2	BMW-043-082
1,2-Dichloroethene(Total)	9	5	1.6	1	1	3	CMW-018-082
Acetone	32	1	7	7	7	7	AMW-011-082
Carbon disulfide	32	12	2.87	1.5	0.6	9	DMW-044-082
Chloroform	32	1	15	15	15	15	CMW-018-082
Methylene chloride	32	32	4.15	2	0.8	43	BMW-040-082
Toluene	32	9	4.08	1	0.5	30	AMW-045-082
Trichloroethene	32	10	243.6	63	7	1800	BMW-040-082
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	32	32	210.63	200	100	300	AMW-059-082
Biochemical Oxygen Demand (BOD)	32	1	10	10	10	10	CMW-018-082
Hardness as Calcium Carbonate	32	32	268.75	250	160	600	AMW-019-082
Nitrate-Nitrite-N	32	21	167.96	63	3	590	BMW-046-082
Total Dissolved Solids (TDS)	32	32	502.5	445	220	1400	AMW-019-082
Total Suspended Solids (TSS)	32	22	139.77	14	5	1300	CMW-018-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	30	30	493.93	461	281	1337	AMW-019-082
Temperature (Celsius)	30	30	11.89	12.3	5.2	12.9	AMW-018-082 , AMW-019-082 , CMW-019-082
pH	30	30	6.75	6.755	6.16	7.09	AMW-019-082

Note : 1. Only detected concentrations are considered.

COE 031771

MECOEK 3623

Table 6-8 Data Summary of Load Lines 1, 2 , 3, and 4 Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1) Average	Median	Minimum	Maximum	Maximum Concentration Sample Number
EXPLOSIVES (ug/l)							
1,3,5-Trinitrobenzene (TNB)	76	5	1.096	0.57	0.32	2.2	BMW-002-082
2,4,6-Trinitrotoluene (TNT)	76	3	11.33	7.5	6.5	20	BMW-005-082
2,4-Dinitrotoluene (24DNT)	76	1	0.97	0.97	0.97	0.97	BMW-005-082
RDX	76	24	6.46	0.91	0.16	98	BMW-005-082
HMX	76	4	12.055	1.14	0.94	45	BMW-005-082
VOLATILES (VOC) (ug/l)							
1,2-Dichloroethene(Total)	9	3	1.33	1	1	2	AMW-009-082
1,2-Dichloropropane	76	1	25	25	25	25	AMW-014-082
Acetone	76	8	5.875	3.5	2	16	BMW-031-082
Carbon disulfide	76	19	6.02	2	0.6	25	AMW-036-082
Chloroform	76	3	11.33	5	3	26	BMW-009-082
Methylene chloride	76	69	1.73	1	0.5	8	BMW-017-082
Tetrachloroethene	76	1	3	3	3	3	BMW-016-082
Toluene	76	28	0.74	0.7	0.5	1	AMW-008-082 , AMW-017-082 , AMW-026-082 , AMW-036-082 , BMW-008-082 , BMW-009-082 , BMW-017-082
Trichloroethene	76	13	78.07	30	0.9	300	AMW-009-082
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	76	76	194.95	190	56	300	AMW-001-082 , AMW-015-082
Biochemical Oxygen Demand (BOD)	76	3	4.33	4	4	5	BMW-010-082
Hardness as Calcium Carbonate	76	76	242.70	235	110	680	DMW-025-082
Nitrate-Nitrite-N	76	54	44.02	6.19	0.65	660	AMW-037-082
Total Dissolved Solids (TDS)	76	76	403.03	350	180	1900	DMW-025-082
Total Suspended Solids (TSS)	76	47	86	15	5	1600	CMW-020-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	75	75	437	413	203	1894	DMW-025-082
Temperature (Celsius)	74	74	12.24	12.5	4.9	16	BMW-033-082 , DMW-033-082
pH	75	75	6.79	6.79	6.2	7.38	BMW-023-082

Note : 1. Only detected concentrations are considered.

2. When a reextracted sample was analyzed, results of the original sample were neglected in the calculations.

Table 6-9 Data Summary of Platte River Alluvial Aquifer Groundwater Monitoring Well Samples

	Number of Samples	Number of Detections	CONCENTRATION (1)				Maximum Concentration Sample Number
			Average	Median	Minimum	Maximum	
VOLATILES (VOC) (ug/l)							
Methylene chloride	4	2	2.8	2.8	0.6	5	AMW-038-082
WATER QUALITY (mg/l)							
Alkalinity as Calcium Carbonate	4	4	235	230	210	270	DMW-039-082
Biochemical Oxygen Demand (BOD)	4	1	5	5	5	5	DMW-038-082
Hardness as Calcium Carbonate	4	4	252.5	220	210	360	DMW-039-082
Nitrate-Nitrite-N	4	1	2.6	2.6	2.6	2.6	AMW-038-082
Total Dissolved Solids (TDS)	4	4	442.5	390	360	630	DMW-039-082
Total Suspended Solids (TSS)	4	3	24.33	25	20	28	DMW-039-082
FIELD PARAMETERS							
Specific Conductance (umhos/cm)	4	4	484.75	425.5	324	764	DMW-039-082
Temperature (Celsius)	4	4	11.475	11.85	10	12.2	AMW-038-082 , DMW-038-082
pH	4	4	6.8475	6.825	6.73	7.01	AMW-039-082

Note : 1. Only detected concentrations are considered.

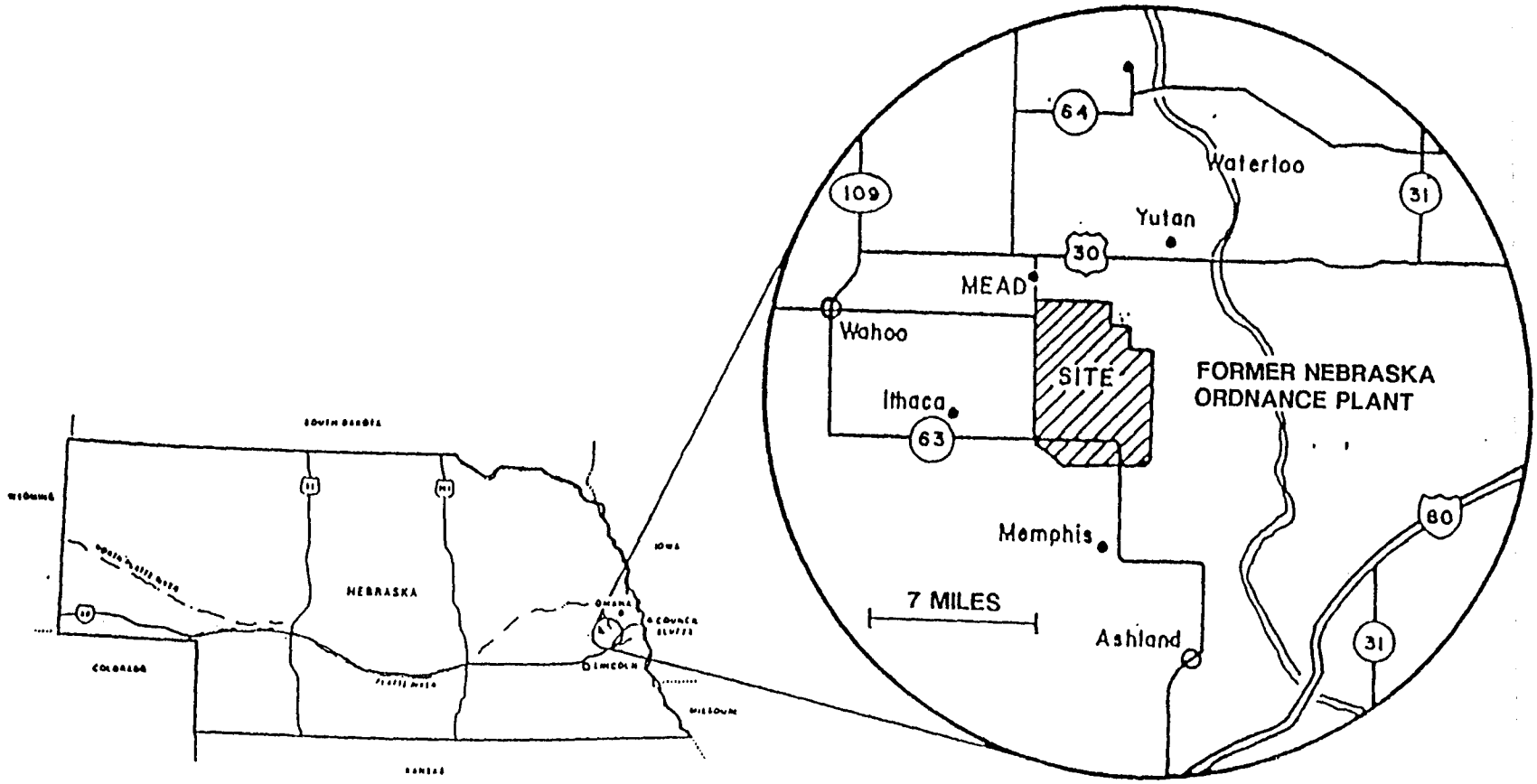
COE 031773

MECOEK 3625

DRAWINGS

COE 031774

MECOEK 3626



Revisions			
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KANSAS CITY, MISSOURI

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Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RPS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

GENERAL SITE LOCATION MAP

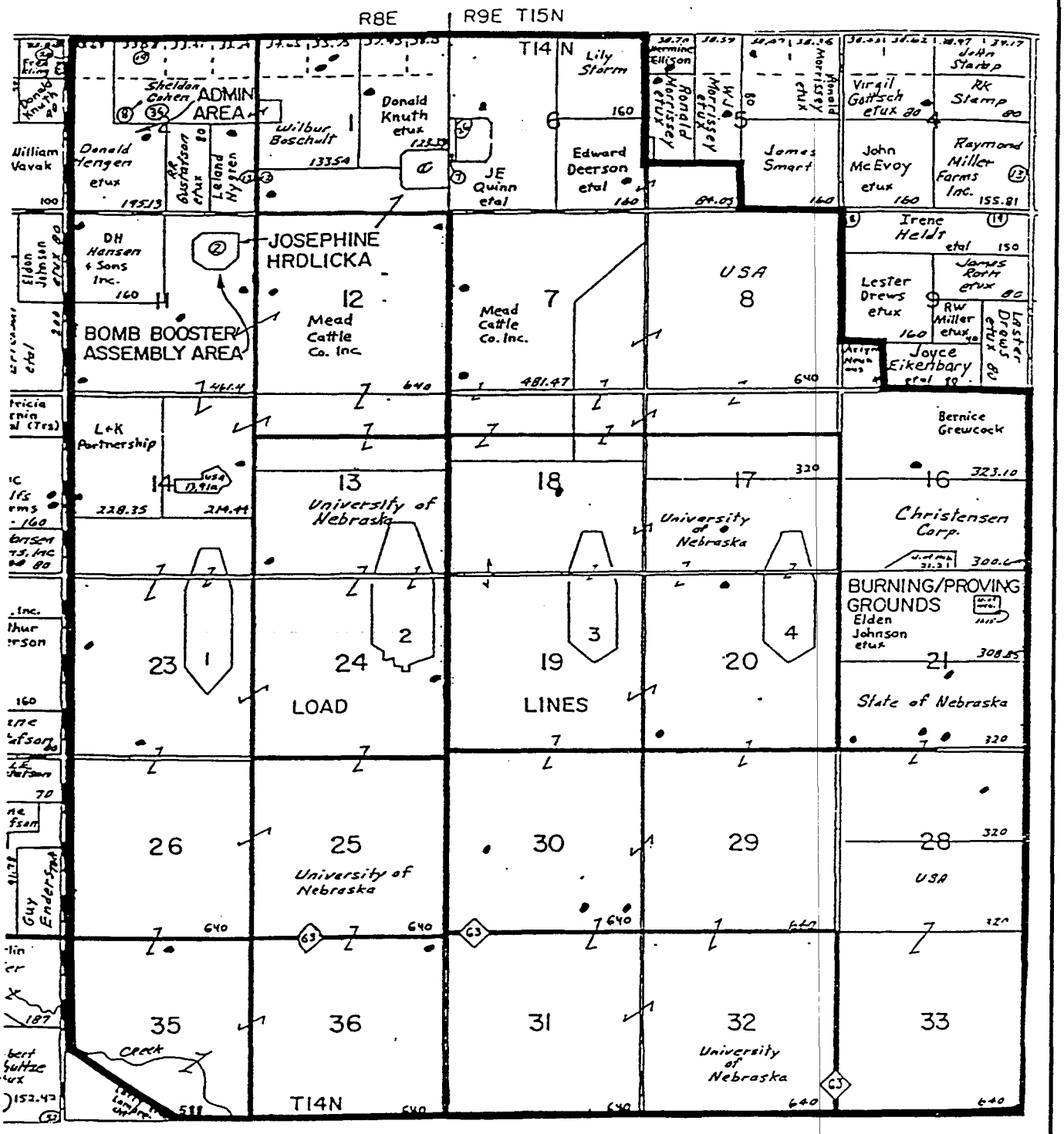
Scale: AS NOTED
Date: MAY, 1991
Dwg. No.: 1-1
Sheet number: 1

SOURCE: TCT, 1991

MECOEK 3627

COE 031775

B07NE003702-04049



LEGEND:

PROPERTY BOUNDARY OF FORMER NEBRASKA ORDNANCE PLANT

35 SECTION

4000 0 4000 8000

SCALE FEET

N

SOURCE: PLAT MAPS OF SAUNDERS COUNTY, NEBRASKA, 1990

Revisions			
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U.S. Army Corps of Engineers

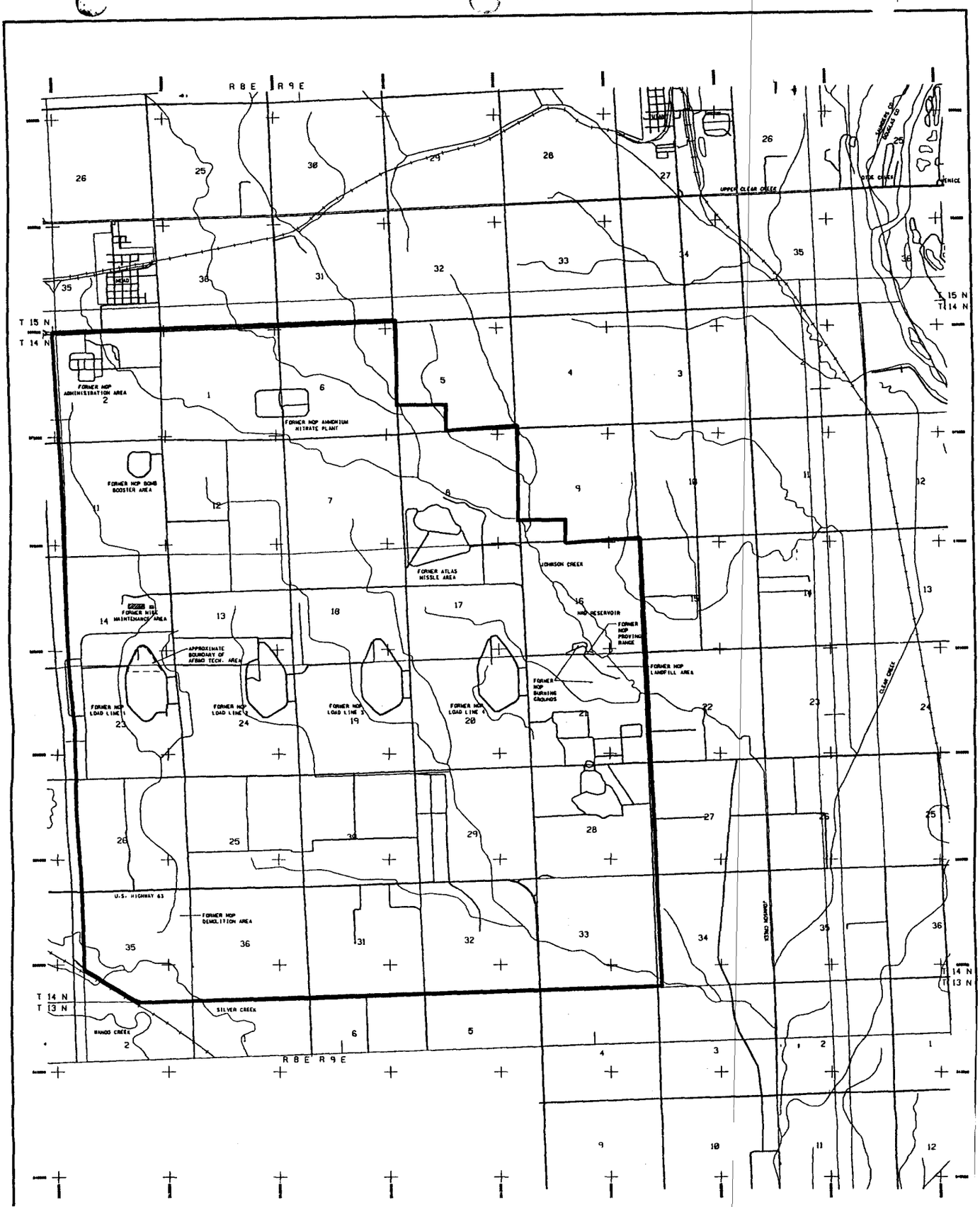
REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CURRENT PROPERTY DIVISIONS

Scale: 1 INCH = 4000 FEET
Date: MAY, 1993
Dwg. No.: 1-2
Sheet number: 1

COE 031776 MECOEK 3628

B07NE003702-04050



COE 031777

LEGEND:

FORMER NOP SITE BOUNDARY

36 SECTION

T 14 N TOWNSHIP 14 NORTH

R 9 E RANGE 9 EAST

NOTE: NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

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SCALE 1:24000

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Submitted by: 178

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

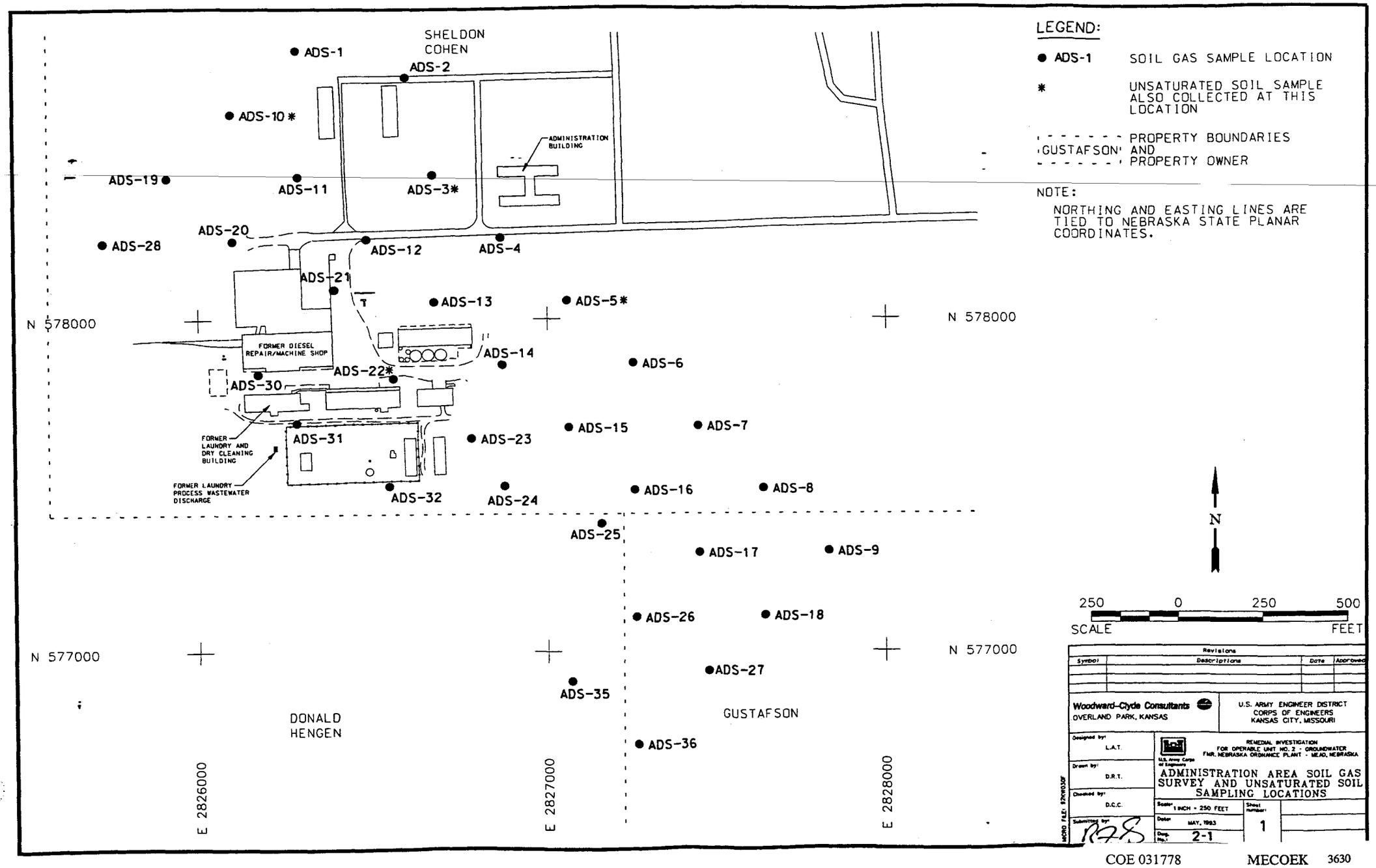
SITE MAP

Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 1-3
Sheet number: 1

MICRO FILE: 92KW030

MECOEK 3629

B07NE003702-04051



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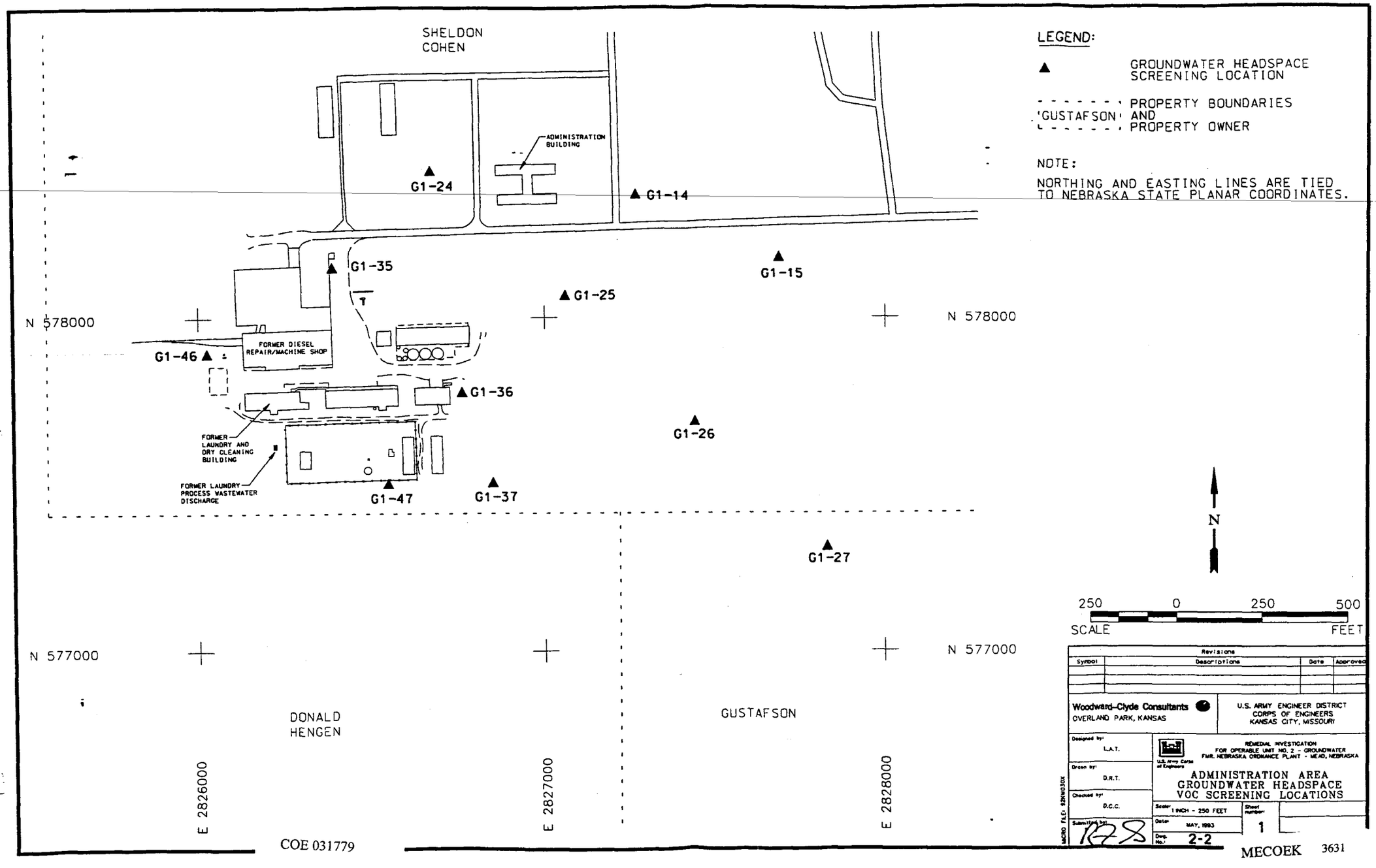

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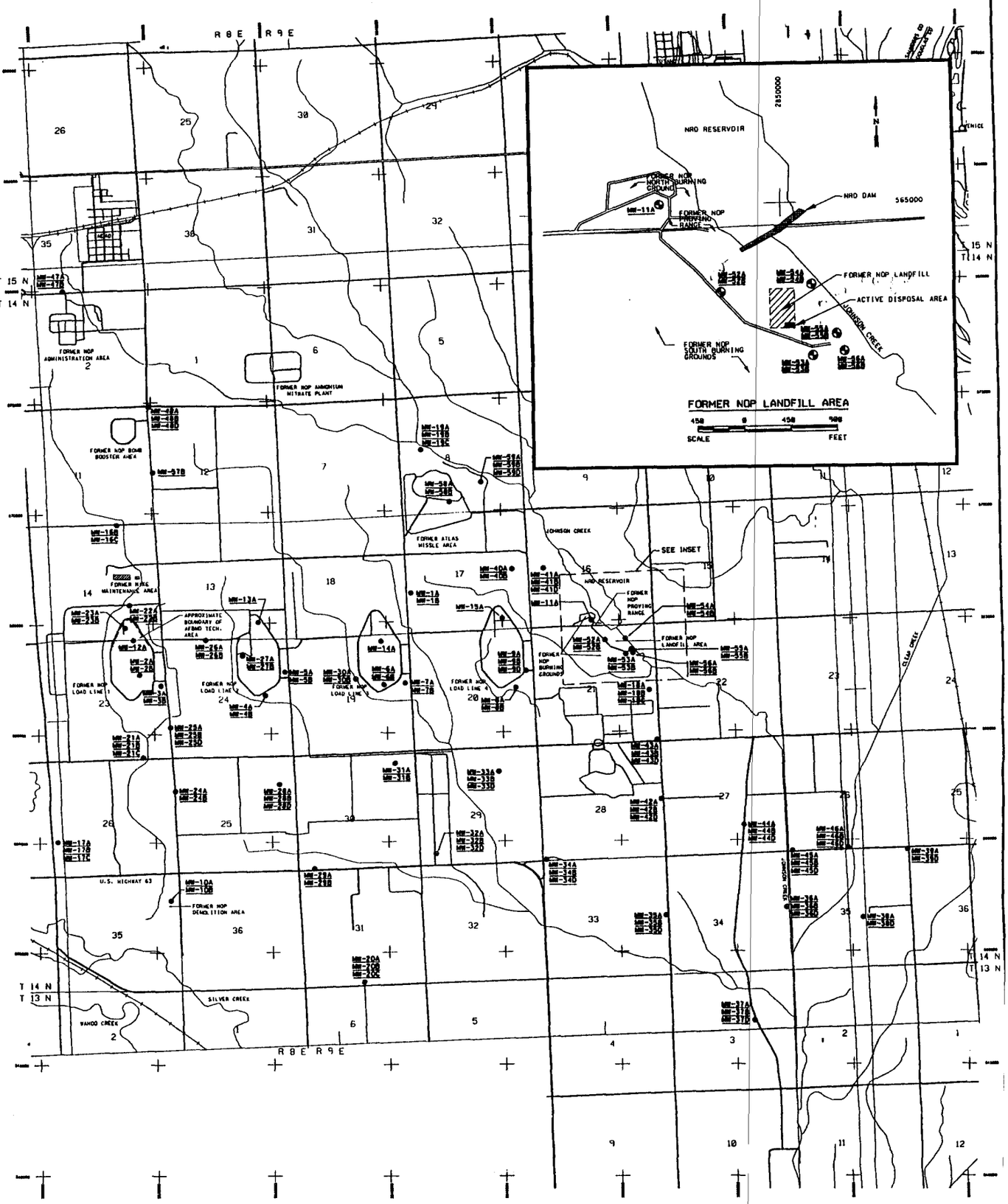

LEGEND:

- MW-10A / MW-10B — GROUNDWATER MONITORING WELL CLUSTER LOCATION (SEE NOTE 1)
- 36 — SECTION
- T 14 N — TOWNSHIP 14 NORTH
- R 9 E — RANGE 9 EAST

NOTES:

1. FOR MONITORING WELL CLUSTER MW-16 THROUGH MW-20 SHALLOW WELLS ARE DESIGNATED BY "C", INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS "B" REPRESENTS SHALLOW WELLS. "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELLS. MONITORING WELLS MW-12A THROUGH MW-15A ARE VERY SHALLOW WELLS.
2. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

SCALE 1:24000

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Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

LOCATIONS OF GROUNDWATER MONITORING WELLS

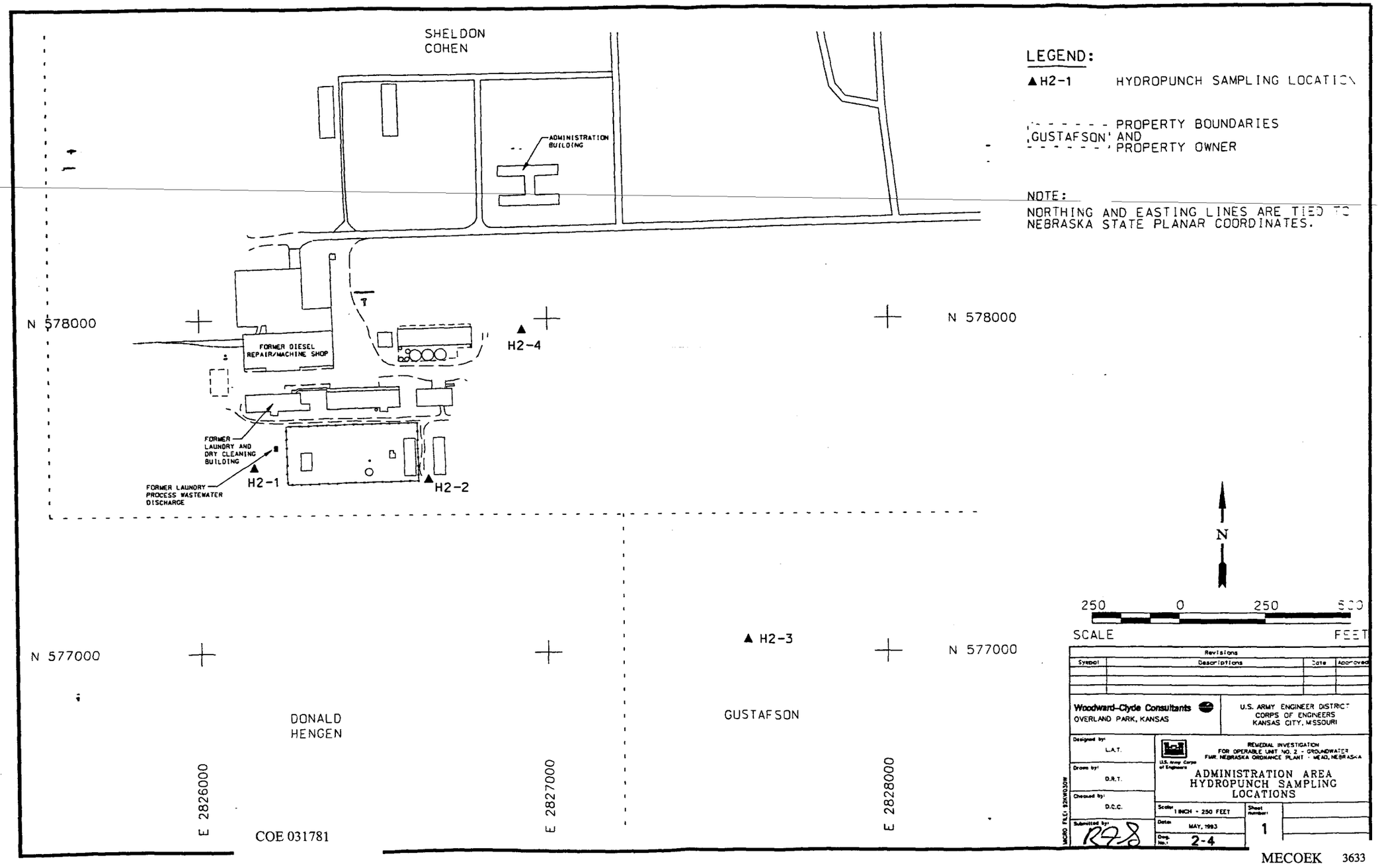
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 2-3
Sheet number: 1

MICRO FILE: 92KW030A

COE 031780

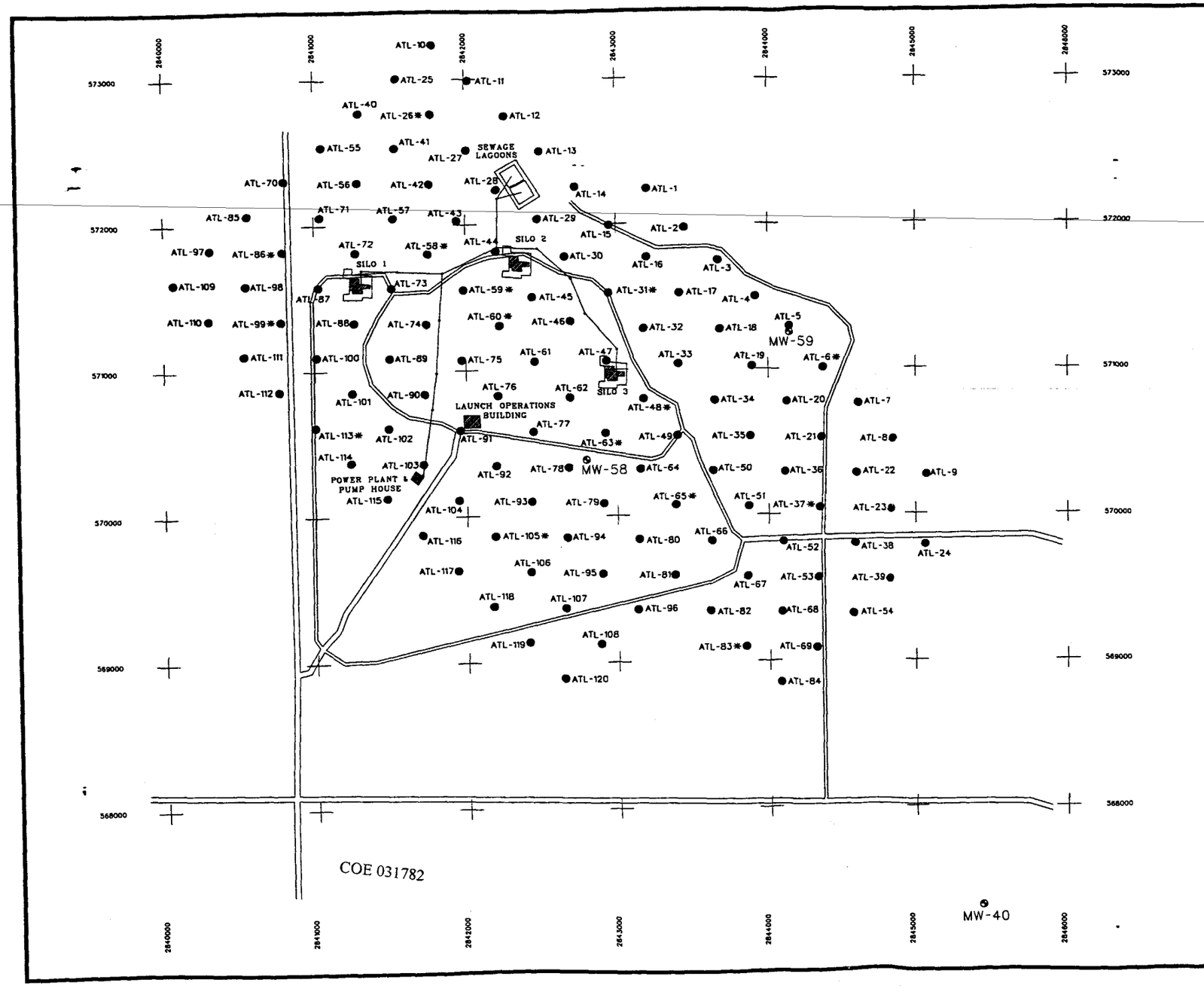
MECOEK 3632

B07NE003702-04054



MECOEK 3633

B07NE003702-04055



LEGEND:

- ATL-25 SOIL GAS SAMPLE LOCATION
- MW-59 GROUNDWATER MONITORING WELL CLUSTER
- * UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS LOCATION
- SEWER LINES

NOTE:

NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

650 0 650 1300

SCALE FEET

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U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

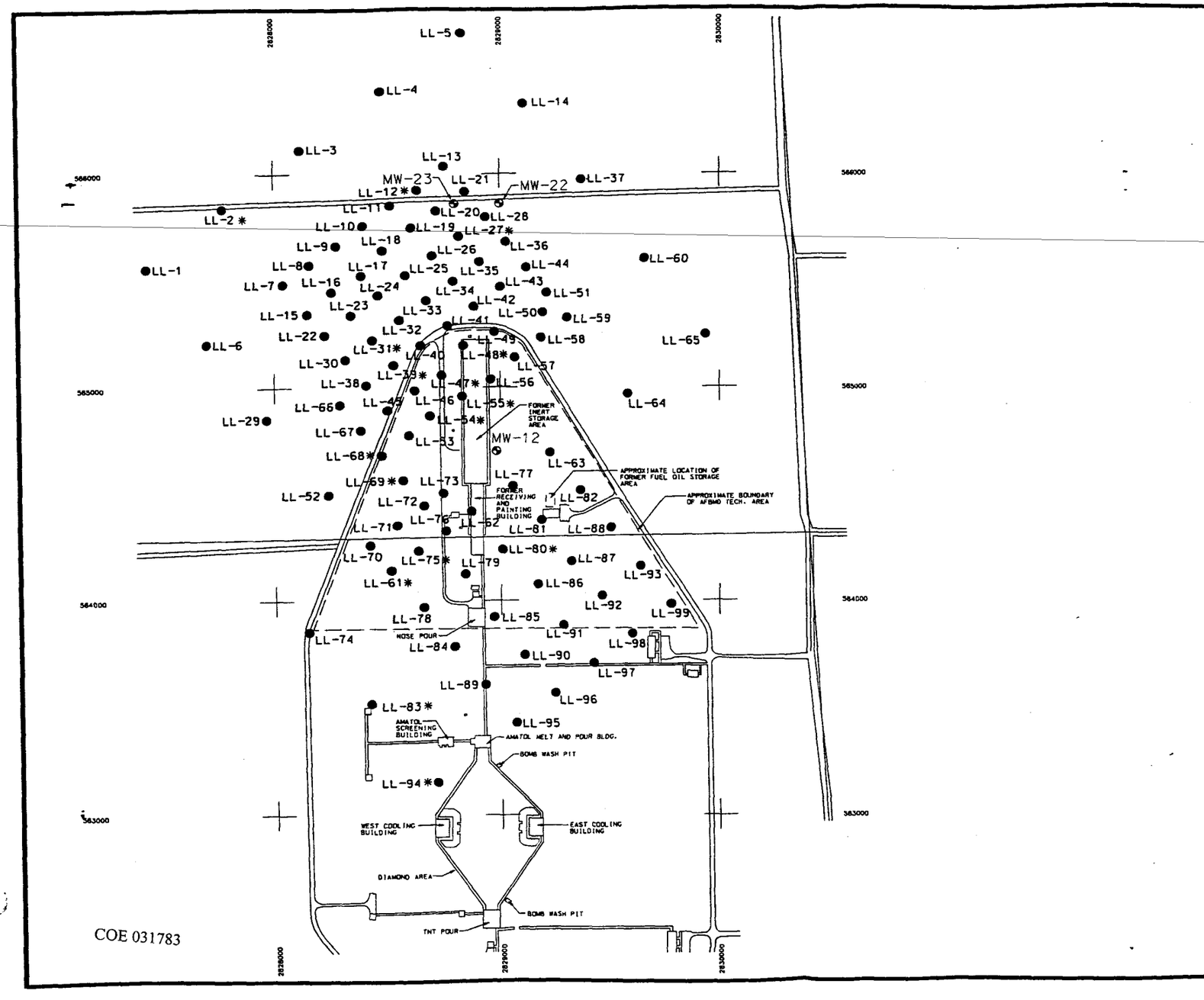
ATLAS MISSILE AREA SOIL GAS SURVEY AND UNSATURATED SOIL SAMPLING LOCATIONS

Scale: 1 INCH = 650 FEET
Date: MAY, 1993
Sheet number: 1
Dwg. No.: 2-5

MICRO FILE: 92KW030J

MECOEK 3634

B07NE003702-04056



COE 031783

LEGEND:

● LL-60 SOIL GAS SAMPLE LOCATION

* UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS LOCATION

⊗MW-12 GROUNDWATER MONITORING WELL CLUSTER

NOTE:

NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

450 0 450 900

SCALE FEET

Revisions			
Symbol	Descriptions	Date	Approved

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U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

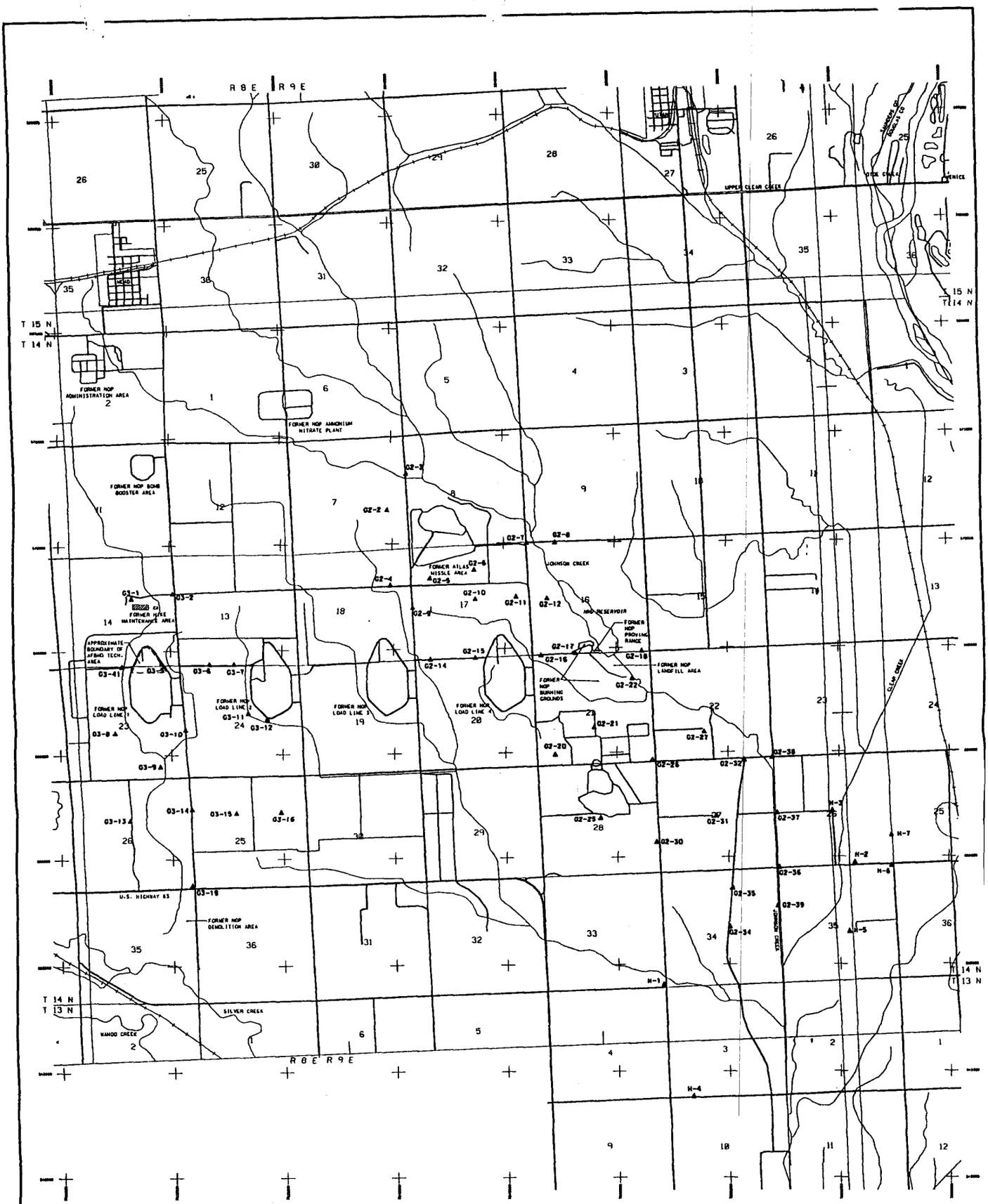
LOAD LINE 1 SOIL GAS SURVEY AND UNSATURATED SOIL SAMPLING LOCATIONS

Scale: 1 INCH = 450 FEET
Date: MAY, 1993
Dwg. No.: 2-6
Sheet number: 1

MICRO FILE: 92KW03OL

MECOEK 3635

B07NE003702-04057



LEGEND:

▲G3-19	GROUNDWATER HEADSPACE VOC SCREENING LOCATION
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

NOTE:
NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WAHN 1927 NAD, 1929 NGVD

COE 031784

N

SCALE 1:24000

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Submitted by: 1/98

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

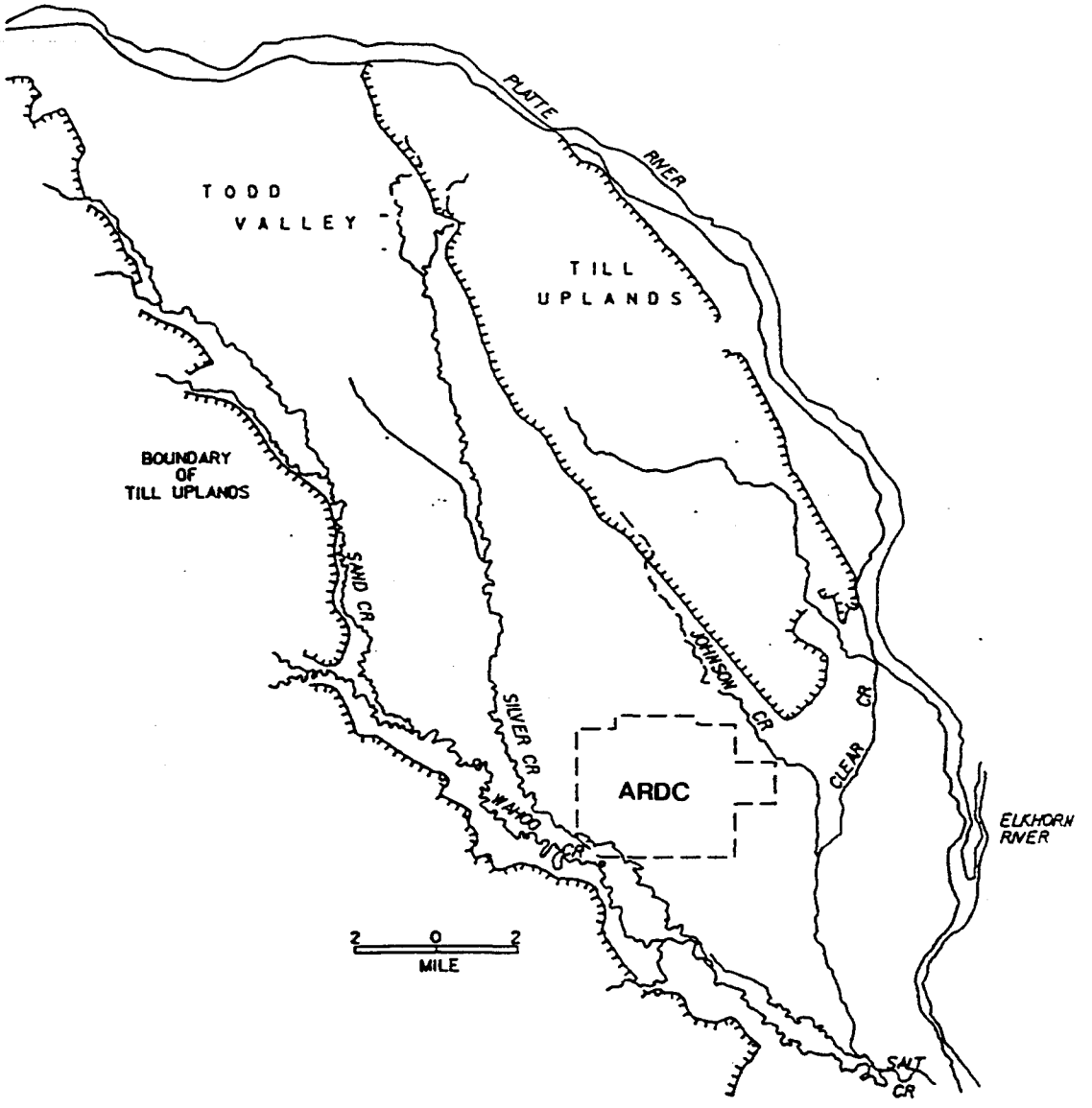
GROUNDWATER HEADSPACE VOC SCREENING LOCATIONS FOR ATLAS MISSILE AREA, LOAD LINES 1-4, AND PLATTE RIVER ALLUVIAL AQUIFER

Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 2-7
Sheet number: 1

MICRO FILE: 92KW03OE

MECOEK 3636

B07NE003702-04058



SURFACE HYDROLOGY OF TODD VALLEY

SOURCE: SEC DONOHUE, 1991

N

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KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: M.D.L.
Checked by: D.C.C.
Submitted by: RZS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

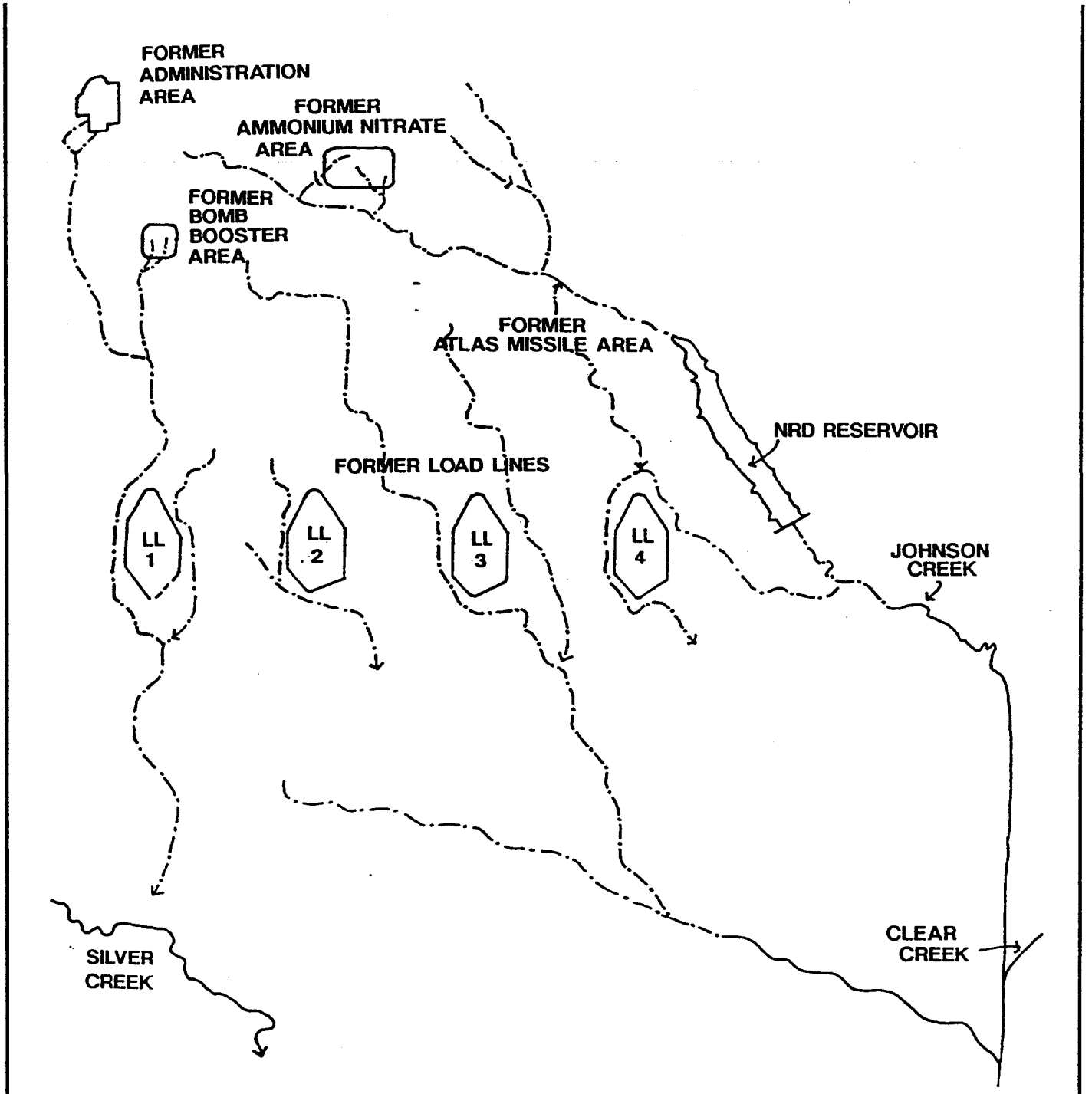
PHYSIOGRAPHIC SETTING

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-1
Sheet number: 1

COE 031785

MECOEK 3637

B07NE003702-04059



2000 0 2000 4000

SCALE APPROXIMATE FEET

N

SOURCE: USACE, 1991

COE 031786

Revisions			
Symbol	Descriptions	Date	Approved

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KANSAS CITY, MISSOURI

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Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RZS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

SURFACE DRAINAGE ACROSS FORMER NOP

Scale: 1 INCH - 2000 FEET
Date: MAY, 1993
Dwg. No.: 3-2
Sheet number: 1

MECOEK 3638

B07NE003702-04060

ERA	SYSTEM	GROUP OR SERIES	FORMATION OR MEMBER	THICKNESS	LITHOLOGY	GENERAL DESCRIPTION
CENOZOIC	Quaternary	Pleistocene to Recent		15-25'		ALLUVIUM-sand and gravel
						LOESS-clayey silt, silt, and silty clay w/occasional fine sand, yellow brown w/gray
			Grand Island (Kansan) and Crete (Illinoian) Members	30-90'		SAND-very fine to coarse, light gray to pale orange, coarser at base, well sorted at top to poorly sorted at base, gravelly at base.
				0-55'		SANDY GRAVEL-fine to coarse, light gray to yellow-brown poorly to moderately sorted, occasional boulder clay, occasional clay and sandy silty clay balls at base, more gravelly at base.
MESOZOIC	Cretaceous	Dakota Gp.	Omadi Fm.	0-110'		SHALE FACIES-moderately hard, brown-yellow to green-gray w/red mottling, clayey, non-calcareous, micaceous occasional silt and sand lenses
				40-110'		SANDSTONE FACIES-light yellow-brown to pale orange, mostly clear, white and iron stained quartz grains, poor to moderately cemented, fine to medium grained, well sorted, sub-round to round; grades to blue gray at base, occasional shale and silt lenses.
PALEOZOIC	Pennsylvanian	Undifferentiated		0-30'		SHALE- moderately hard, green-gray, silty, calcareous
				300-550'		LIMESTONE-hard, white to blue-gray, shaley w/shale interbeds, fossiliferous

Revisions			
Symbol	Descriptions	Date	Approved

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OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E./A.W.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

GENERALIZED GEOLOGIC COLUMN

Scale: NONE
Date: MAY, 1993
Dwg. No.: 3-3
Sheet number: 1

MICRO FILE: RNE403-3

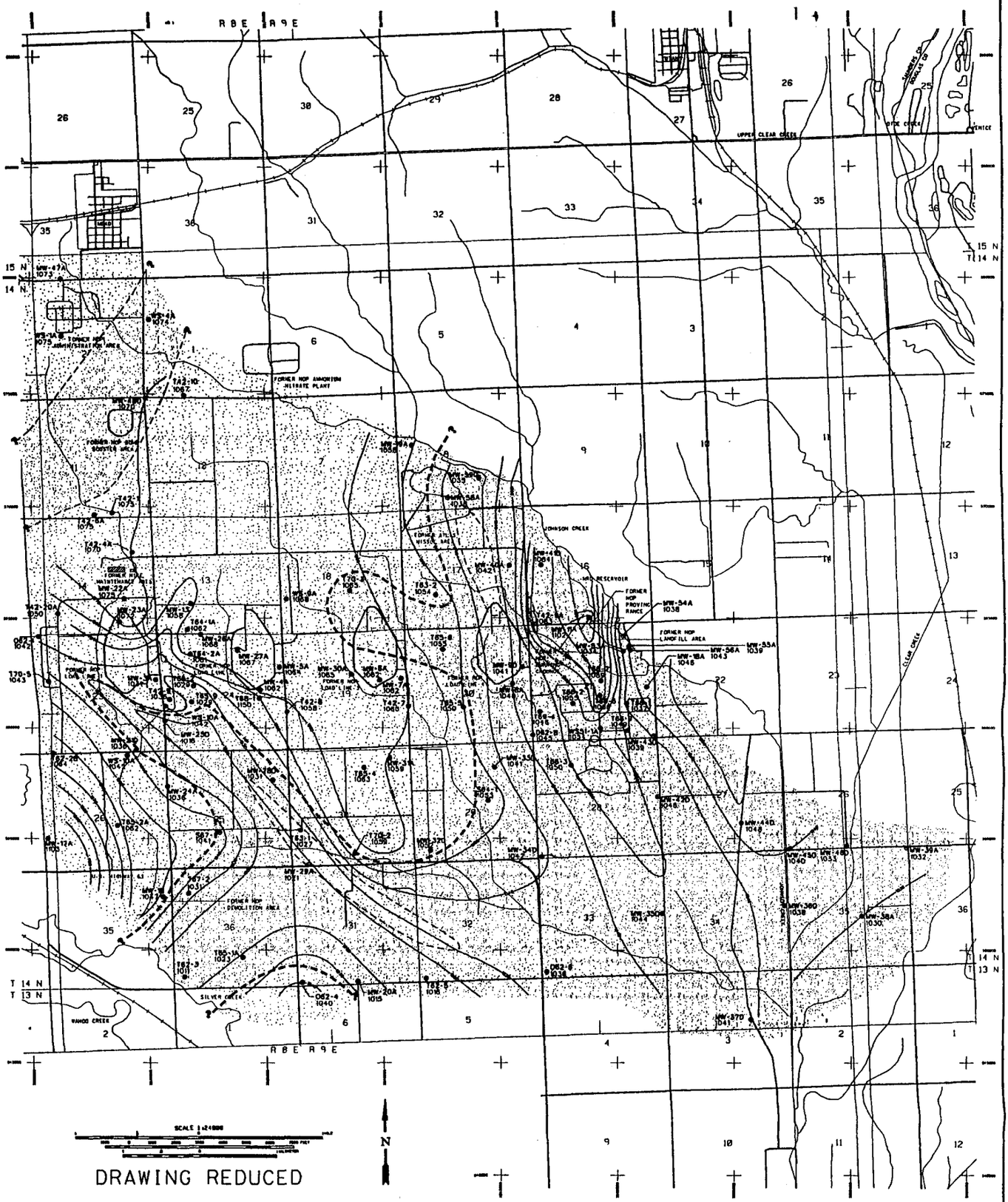
COE 031787

MODIFIED AFTER PISKIN (1971)

MECOEK 3639

B07NE003702-04061

COE 031788



DRAWING REDUCED

LEGEND:

- OMADI SHALE
- OMADI SANDSTONE
- APPROXIMATE EXTENT OF THE SUBCROP OF THE OMADI SHALE FACIES
- APPROXIMATE POSITION OF LITHOLOGIC BOUNDARIES WHICH ARE NOT FACIES BOUNDARIES
- MW-10 1047 — GROUNDWATER MONITORING WELL LOCATION WITH ELEVATION OF TOP OF OMADI FORMATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
- T70-5 1043 — ARDC TEST HOLE LOCATION (PISKIN, 1971) WITH ELEVATION OF TOP OF OMADI FORMATION IN FEET ABOVE MSL
- STRUCTURAL CONTOUR OF TOP OF OMADI FORMATION IN FEET ABOVE MSL
- 36 — SECTION
- T 14 N — TOWNSHIP 14 NORTH
- R 9 E — RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WAHN 1927 NAD, 1929 NGVD

NOTES:

1. GEOLOGIC CONDITIONS ARE INTERPRETIVE, AND ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS AND ARDC TEST HOLE LOGS (PISKIN 1971).
2. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.W.
Drawn by: D.R.T.
Checked by: G.W.W.
Submitted by: RFS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

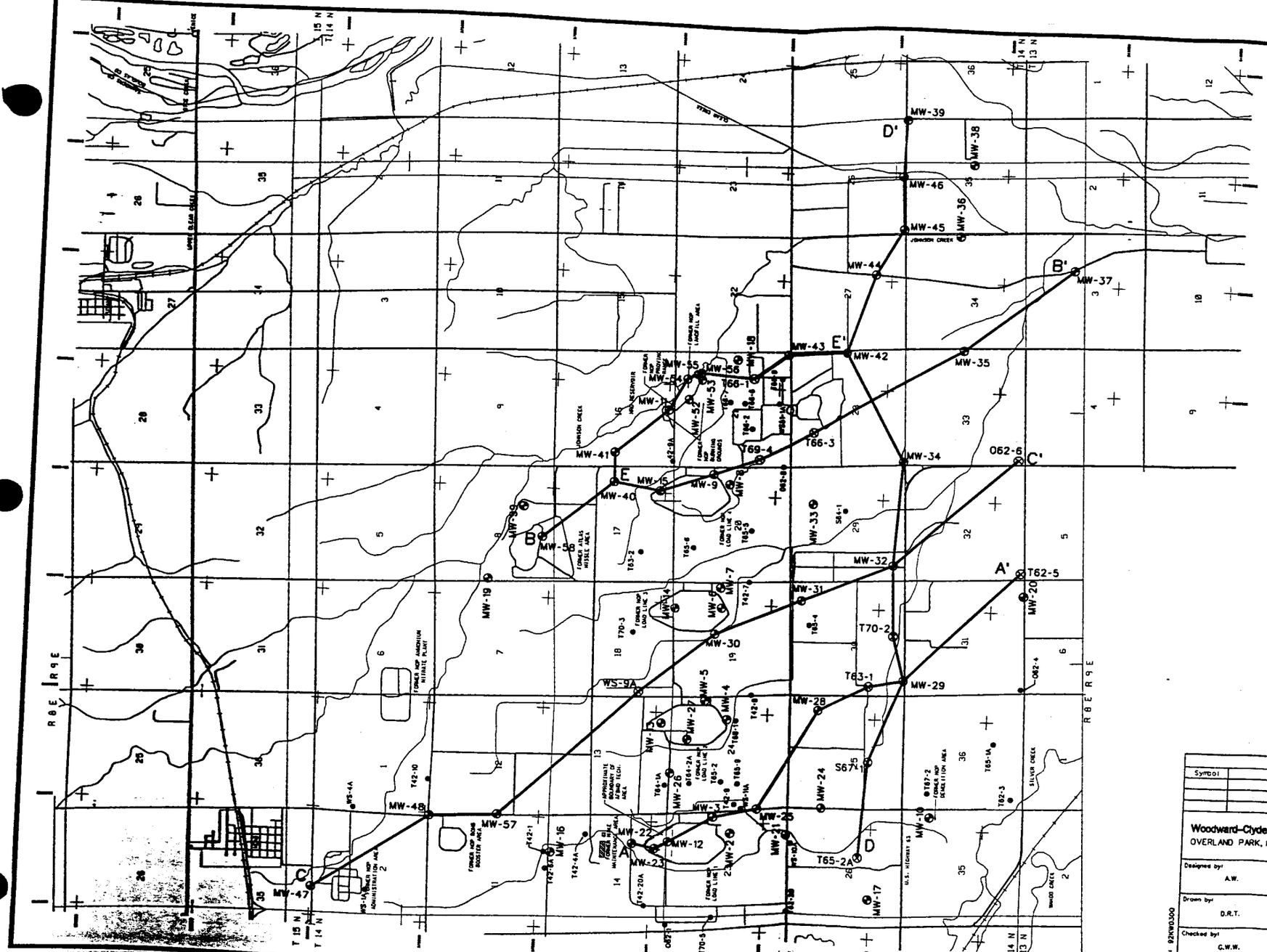
EROSIONAL SURFACE CONTOUR MAP OF THE TOP OF THE OMADI FORMATION

Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 3-4
Sheet number: 1

MICRO FILE: 92KW030N

MECOEK 3640

B07NE003702-04062



LEGEND:

- MW-28 MONITORING WELL LOCATIONS
- T70-5 AROC TEST HOLE LOCATION (PISKIN, 1971)
- 36 SECTION
- T 14 N TOWNSHIP 14 NORTH
- R 9 E RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

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KANSAS CITY, MISSOURI

Designed by: A.W.
Drawn by: D.R.T.
Checked by: G.W.W.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

LOCATIONS OF GEOLOGIC CROSS-SECTIONS

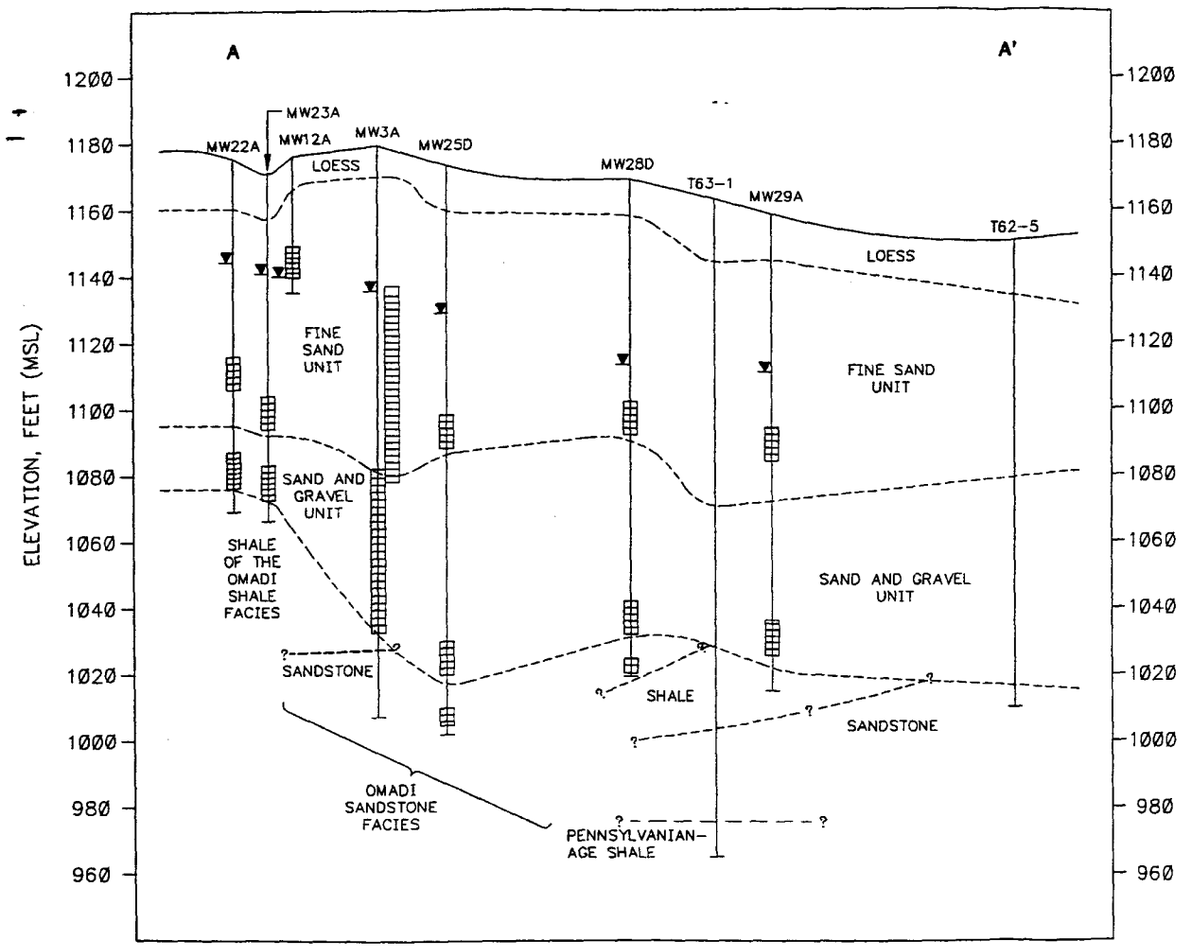
Scale: 1 INCH = 4000 FEET
Date: MAY, 1993
Dwg. No.: 3-5
Sheet number: 1

MICRO FILE: 92KW0300

COE 031789

MECOEK 3641

B07NE003702-04063



LEGEND:

MW22A	LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER
T63-1	ARDC TEST HOLE LOCATION (PISKIN, 1971)
▤	SCREENED INTERVAL FOR EACH WELL IN CLUSTER
▼	GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCT. 14, 1992

NOTES:

1. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS, DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS, AND ARDC TEST HOLE LOGS (PISKIN, 1971). GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
2. SEE DRAWING 3-5 FOR CROSS-SECTION LOCATIONS.
3. VERTICAL EXAGGERATION 100X.

4000 0 4000 8000
SCALE FEET

Revisions

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

U.S. Army Corps of Engineers

GEOLOGIC CROSS-SECTION A-A'

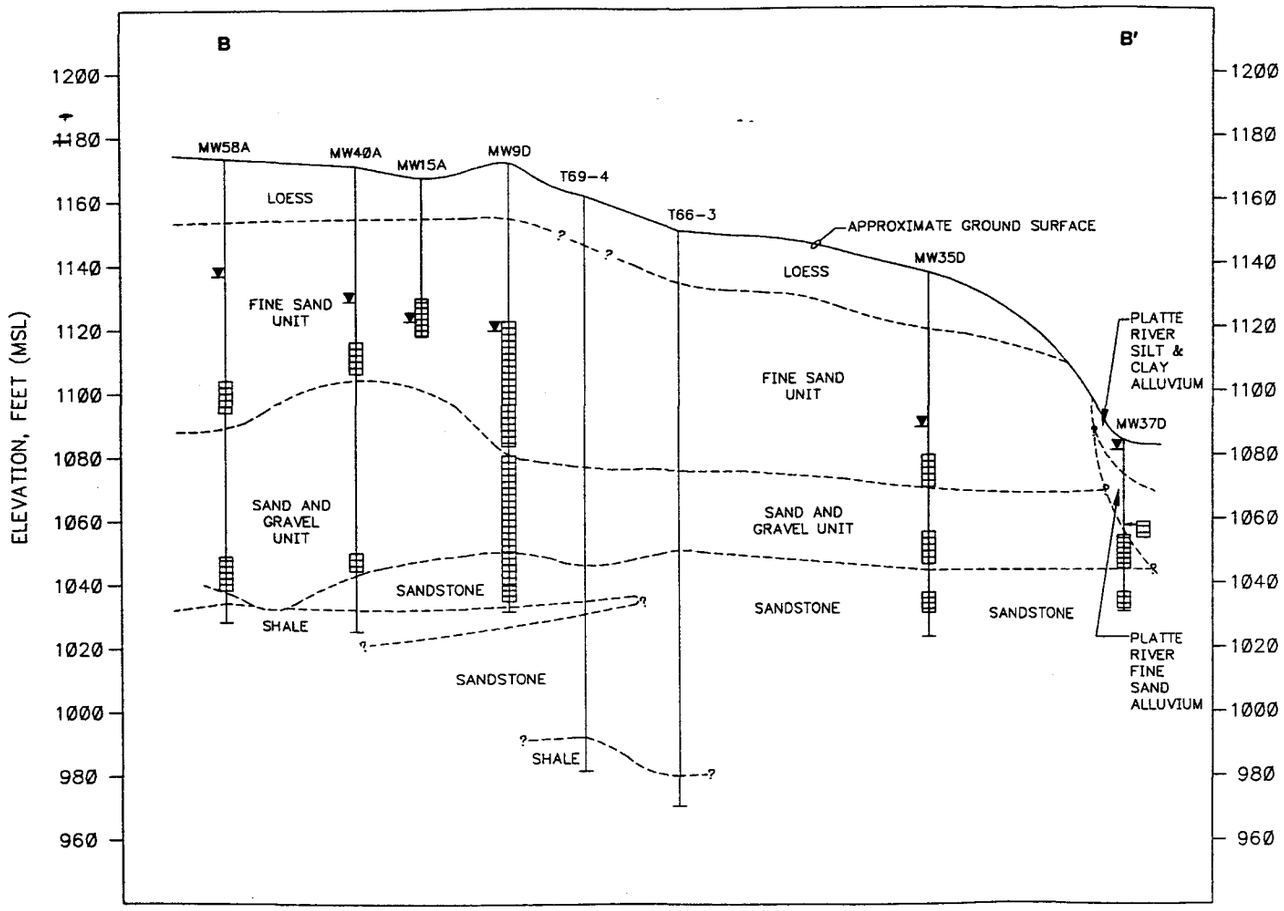
Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by:
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-6
Sheet number: 1

ACAD FILE: 92KW030D

COE 031790

MECOEK 3642

B07NE003702-04064



LEGEND:

MW58A	LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER
T69-4	ARDC TEST HOLE LOCATION (PISKIN, 1971)
▤	SCREENED INTERVAL FOR EACH WELL IN CLUSTER
▼	GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCT. 14, 1992

NOTES:

1. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS, DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS, AND ARDC TEST HOLE LOGS (PISKIN, 1971). GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
2. SEE DRAWING 3-5 FOR CROSS-SECTION LOCATIONS.
3. VERTICAL EXAGGERATION 100X.
4. ALL SANDSTONES AND SHALES IN THIS CROSS-SECTION ARE PART OF THE OMADI SANDSTONE FACIES.
5. THE UPPER SCREENED INTERVAL OF THE MW-37 CLUSTER IS SHOWN OFFSET FROM THE WELL.

4000 0 4000 8000
SCALE FEET

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

U.S. Army Corps of Engineers

GEOLOGIC CROSS-SECTION B-B'

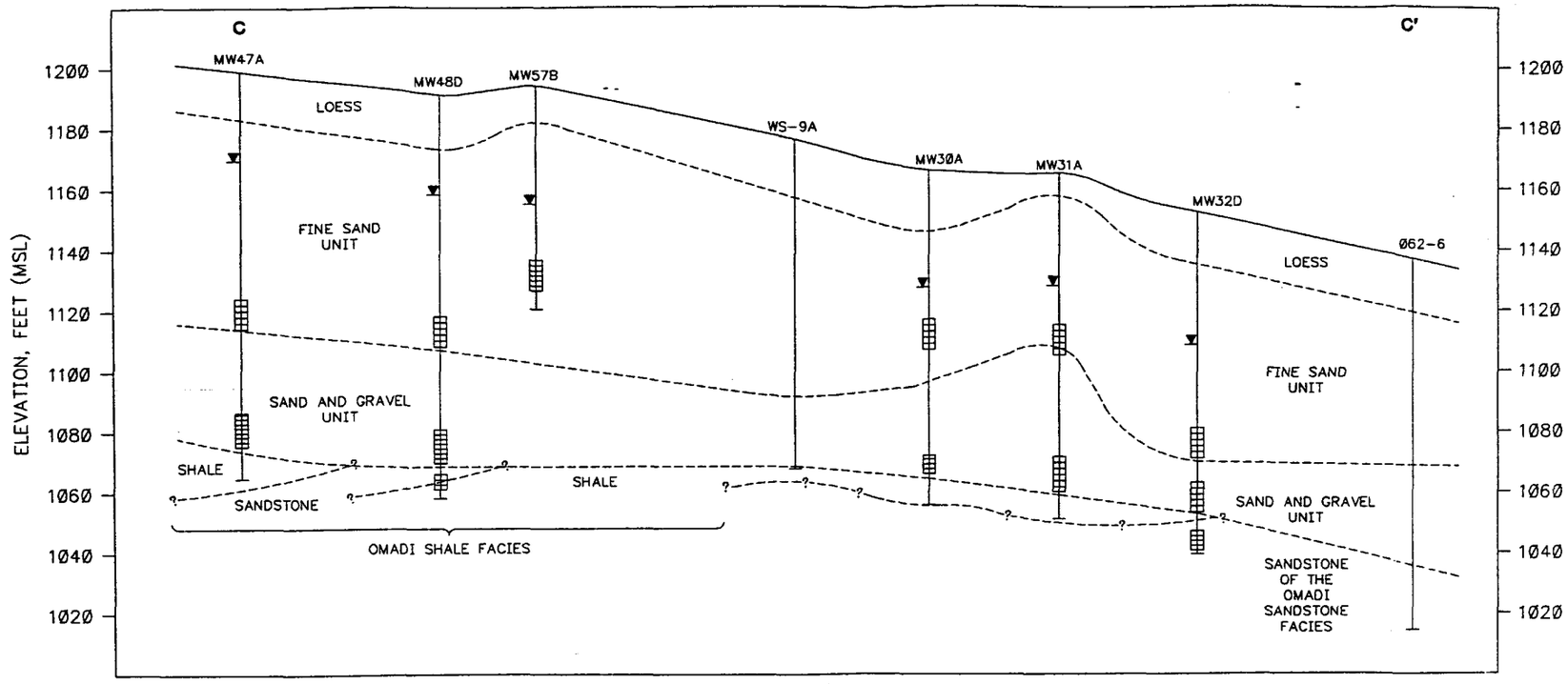
Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by: RJS
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-7
Sheet number: 1

ACAD FILE: 92KW030E

COE 031791

MECOEK 3643

B07NE003702-04065



4000 0 4000 8000

SCALE FEET

LEGEND:

MW47A	LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER
WS-9A	ARDC TEST HOLE LOCATION (PISKIN, 1971)
▤	SCREENED INTERVAL FOR EACH WELL IN CLUSTER
▼	GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCT. 14, 1992

NOTES:

1. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS, DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS, AND ARDC TEST HOLE LOGS (PISKIN, 1971). GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
2. SEE DRAWING 3-5 FOR CROSS-SECTION LOCATIONS.
3. VERTICAL EXAGGERATION 100X.

Revisions

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KANSAS CITY, MISSOURI

Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by: RJS

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

U.S. Army Corps of Engineers

GEOLOGIC CROSS-SECTION C-C'

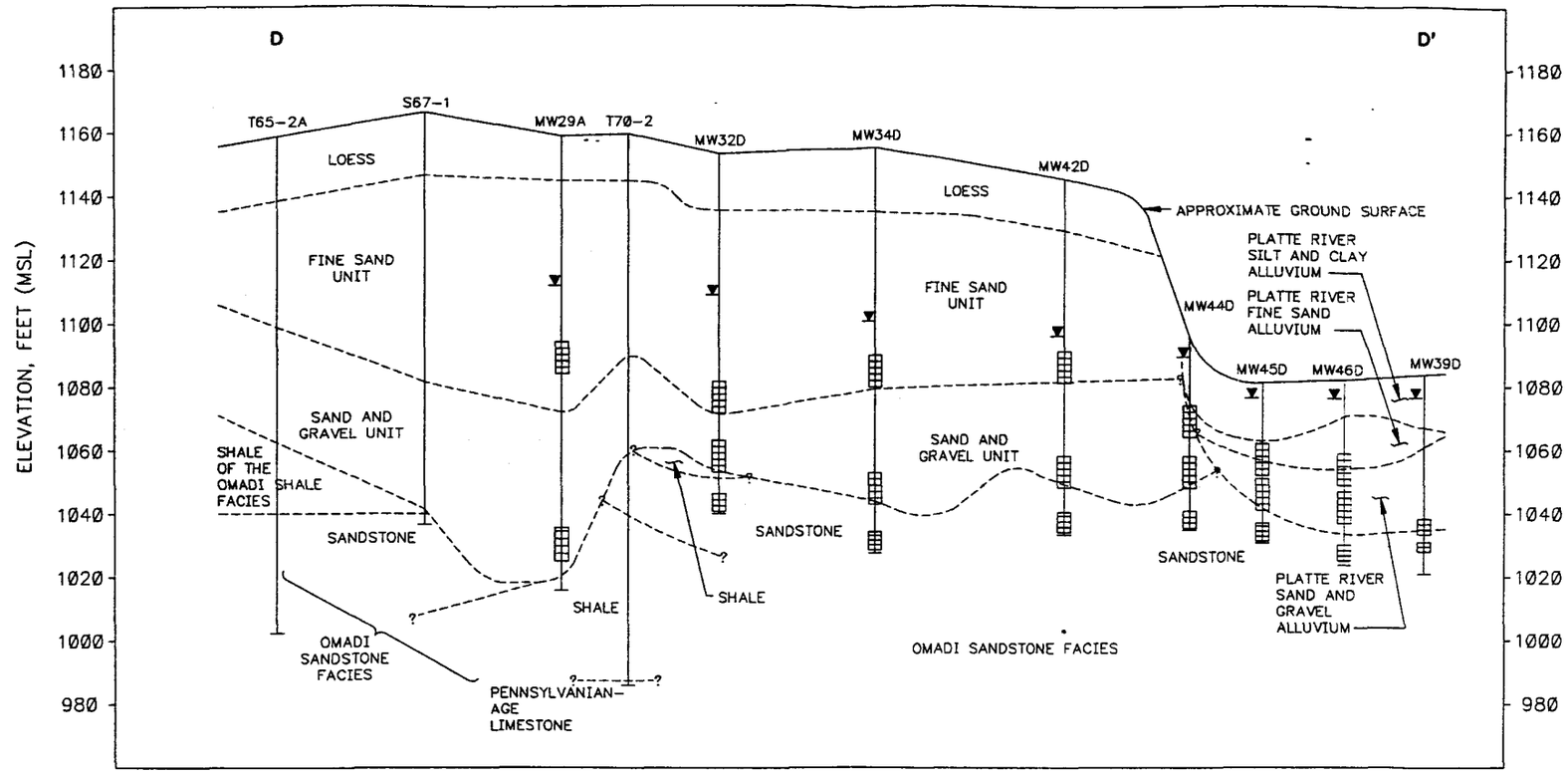
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-8
Sheet number: 1

ACAD FILE: 92KW030F

COE 031792

MECOEK 3644

B07NE003702-04066



4000 0 4000 8000

SCALE FEET

LEGEND:

MW29A	LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER
T70-2	ARDC TEST HOLE LOCATION (PISKIN, 1971)
▥	SCREENED INTERVAL FOR EACH WELL IN CLUSTER
▼	GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCT. 14, 1992

NOTES:

1. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS, DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS, AND ARDC TEST HOLE LOGS (PISKIN, 1971). GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
2. SEE DRAWING 3-5 FOR CROSS-SECTION LOCATIONS.
3. VERTICAL EXAGGERATION 100X.

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

U.S. Army Corps of Engineers

GEOLOGIC CROSS-SECTION D-D'

Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by:
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-9
Sheet number: 1

ACAD FILE: 92KW030B

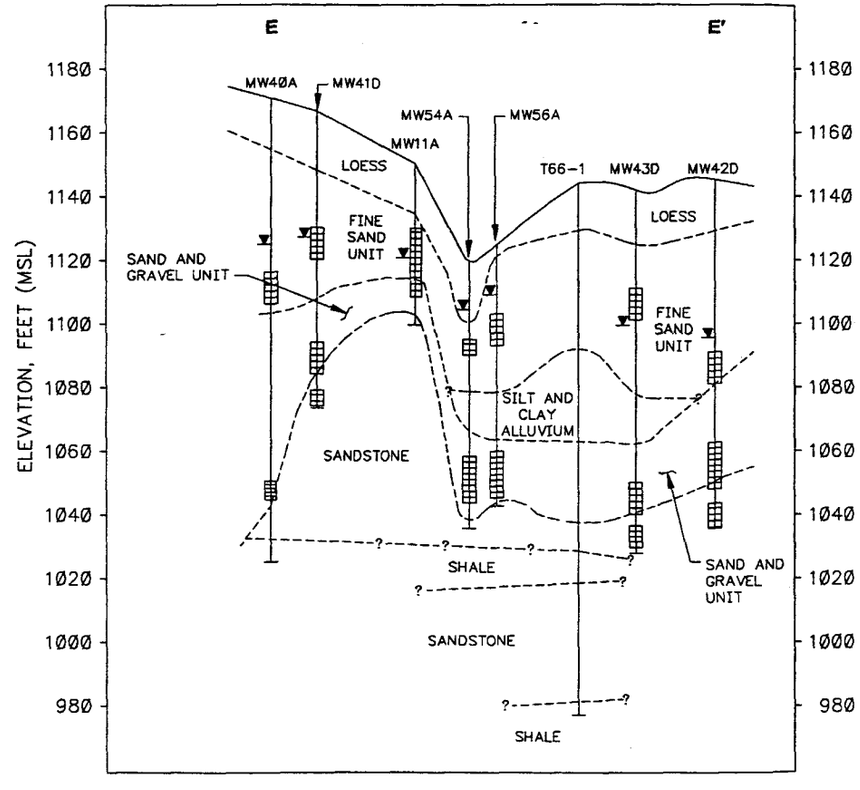
COE 031793

05/18/93 15:15

M.A.L. SC: 1=1

MECOEK 3645

B07NE003702-04067



LEGEND:

MW40A — LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

T66-1 — ARDC TEST HOLE LOCATION (PISKIN, 1971)

▤ — SCREENED INTERVAL FOR EACH WELL IN CLUSTER

▼ — GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCT. 14, 1992

NOTES:

1. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS, DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS, AND ARDC TEST HOLE LOGS (PISKIN, 1971). GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
2. SEE DRAWING 3-5 FOR CROSS-SECTION LOCATIONS.
3. VERTICAL EXAGGERATION 100X.
4. ALL SANDSTONES AND SHALES IN THIS CROSS-SECTION ARE PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000
SCALE FEET

Revisions

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 – GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT – MEAD, NEBRASKA

U.S. Army Corps of Engineers

GEOLOGIC CROSS-SECTION E-E'

Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by: RJS
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-10
Sheet number: 1

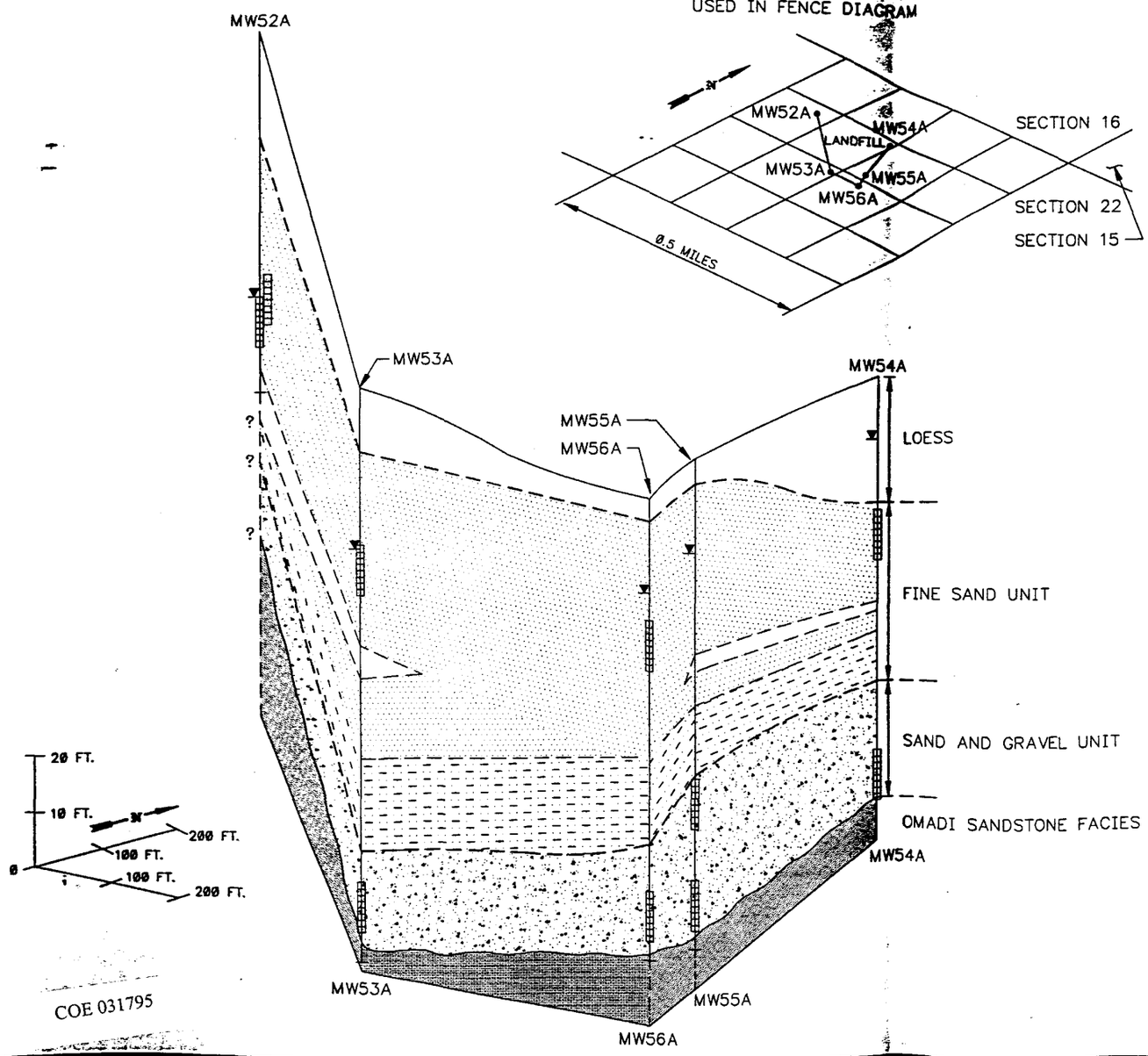
ACAD FILE: 92KW030C

COE 031794

MECOEK 3646

B07NE003702-04068

INDEX MAP OF NE 1/4, SECTION 21, T14N, R9E
SHOWING BASELINE PROFILE OF BOREHOLE LOGS
USED IN FENCE DIAGRAM



LEGEND:

MW52A LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL FOR EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST ("A") WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

UNIT CONTACT

CLAY / LOESS

SAND

SILT

COARSE SAND AND GRAVEL

SANDSTONE

NOTE:
SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON SAMPLE DESCRIPTIONS FROM MONITORING WELL BORING LOGS AND DOWNHOLE GEOPHYSICAL LOGS OF MONITORING WELLS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.

VERTICAL EXAGGERATION 8X

Revisions			
Symbol	Descriptions	Date	Apprv'd

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KANSAS CITY, MISSOURI

Designed by: A.W.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 – GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT – MEAD, NEBRASKA

FENCE DIAGRAM OF
LANDFILL AREA WELL LOGS

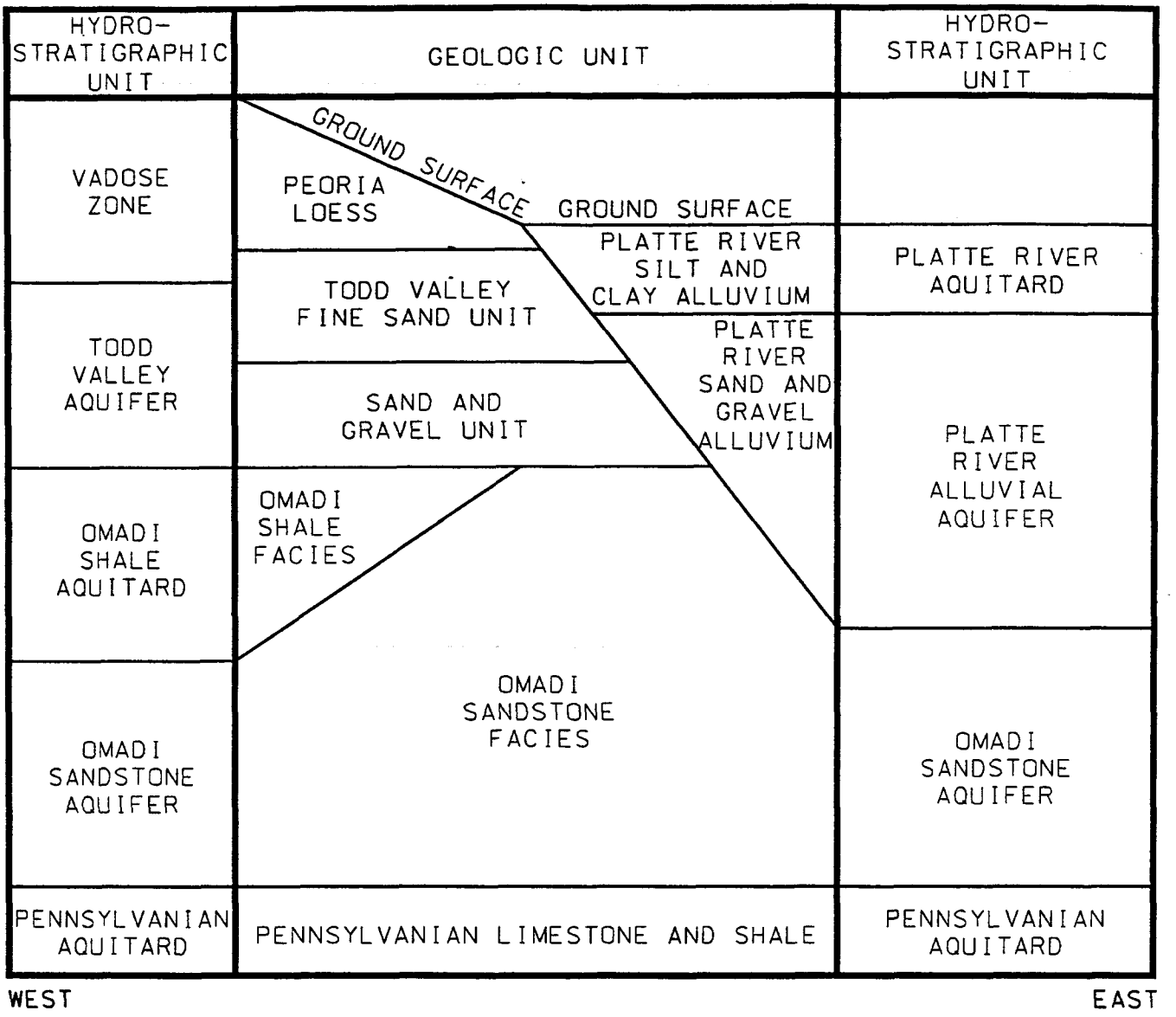
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-11
Sheet number: 1

ACAD FILE: 92KW030H

COE 031795

MECOEK 3647

B07NE003702-04069



Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
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Designed by: M.E.W.
Drawn by: M.A.L.
Checked by: D.C.C.
Submitted by: RFS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

SCHEMATIC REPRESENTATION OF THE HYDROSTRATIGRAPHIC UNITS IN THE SITE VICINITY

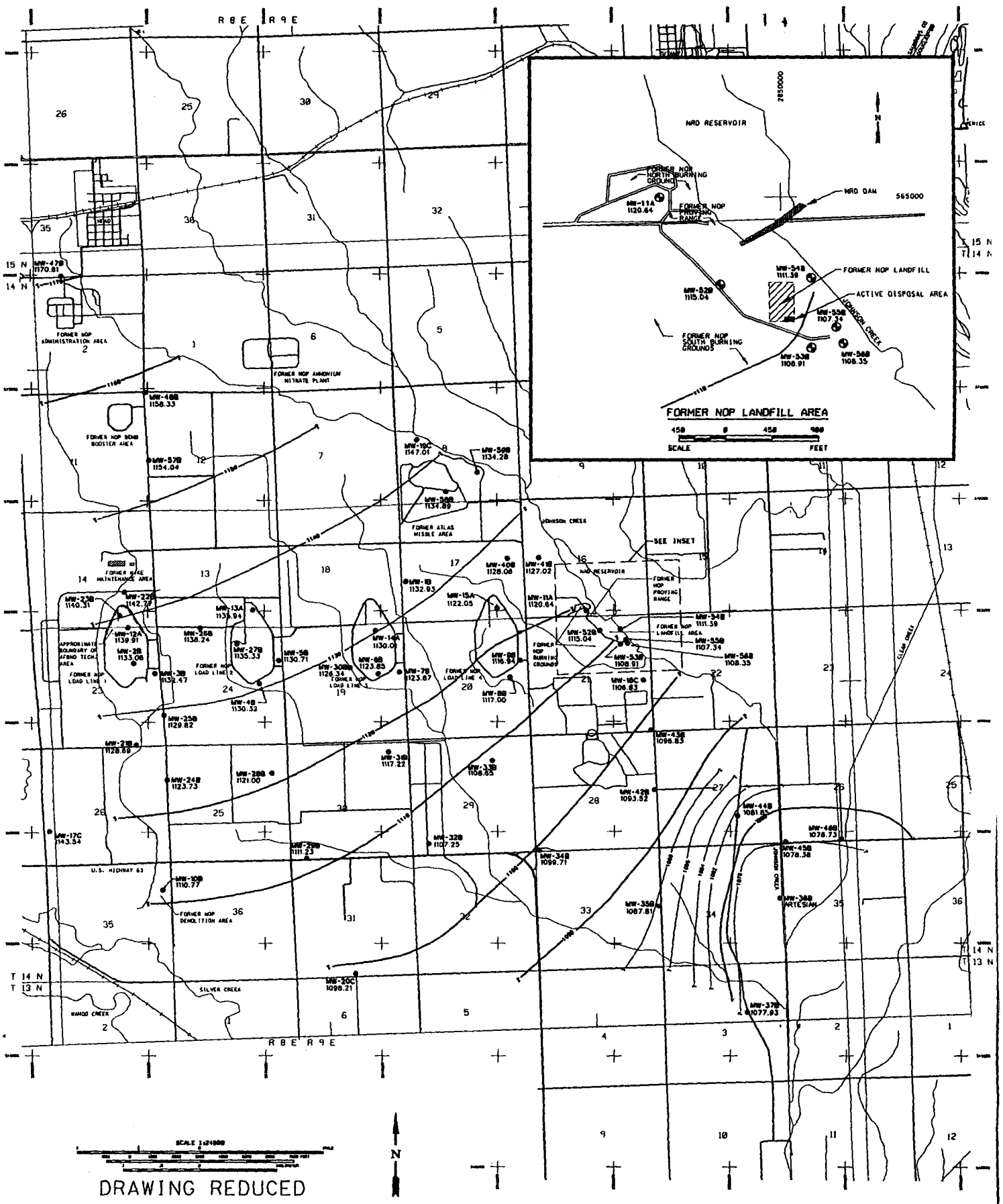
Scale: NOT TO SCALE
Date: MAY, 1993
Dwg. No.: 3-12
Sheet number: 1

MCKO FILE: ME403-12

MECOEK 3648

B07NE003702-04070

COE 031796



LEGEND:

- ●MW-10B 1110.77 — GROUNDWATER MONITORING WELL LOCATION AND WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL) (SEE NOTE 2)
- 1100 — GROUNDWATER SURFACE ELEVATION
- 36 — SECTION
- T 14 N — TOWNSHIP 14 NORTH
- R 9 E — RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. GROUNDWATER ELEVATION AS MEASURED ON SEPTEMBER 9, 1992.
2. FOR MONITORING WELL CLUSTERS MW-16 THROUGH MW-20, SHALLOW WELLS ARE DESIGNATED BY "C", INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS, "B" REPRESENTS SHALLOW WELLS, "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELL. MONITORING WELLS MW-12A THROUGH MW-15A ARE VERY SHALLOW WELLS.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
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KANSAS CITY, MISSOURI

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Checked by: D.C.C.
Submitted by: RCF

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

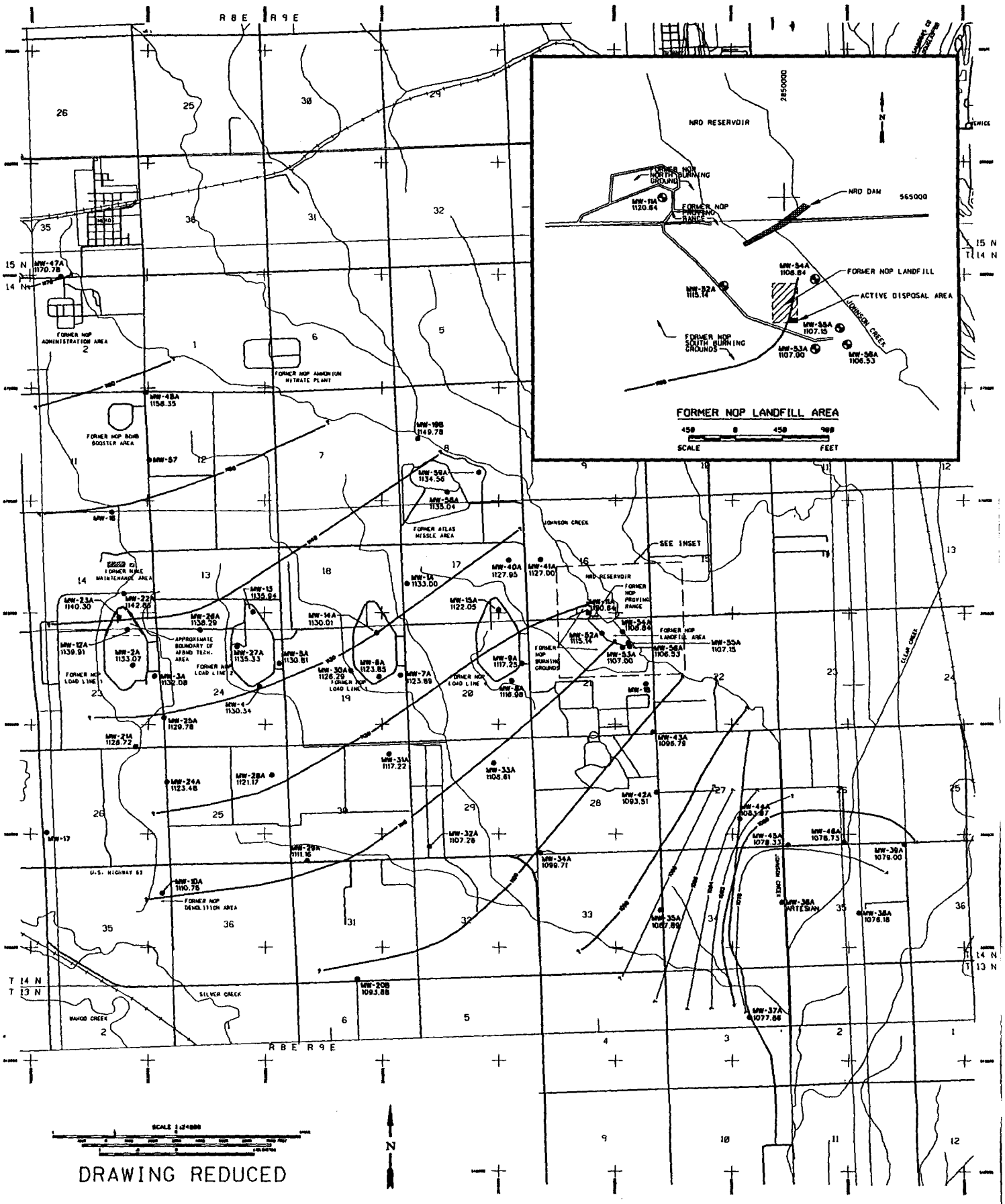
GROUNDWATER SURFACE FOR SHALLOW GROUNDWATER MONITORING WELLS SEPTEMBER 1992

Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 3-13
Sheet number: 1

MICRO FILE: 92KW03.DP

MECOEK 3649

B07NE003702-04071



LEGEND:

- ⊕MW-31A 1099.71 — GROUNDWATER MONITORING WELL LOCATION AND WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL) (SEE NOTE 2)
- 1130 — GROUNDWATER SURFACE ELEVATION
- 36 — SECTION
- T 14 N — TOWNSHIP 14 NORTH
- R 9 E — RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. GROUNDWATER ELEVATION AS MEASURED ON SEPTEMBER 9, 1992.
2. FOR MONITORING WELL CLUSTERS MW-16 THROUGH MW-20, SHALLOW WELLS ARE DESIGNATED BY "C", INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS, "B" REPRESENTS SHALLOW WELLS, "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELL. MONITORING WELLS MW-12A THROUGH MW-15A ARE VERY SHALLOW WELLS.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

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REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

GROUNDWATER SURFACE FOR INTERMEDIATE GROUND-WATER MONITORING WELLS, SEPTEMBER 1992

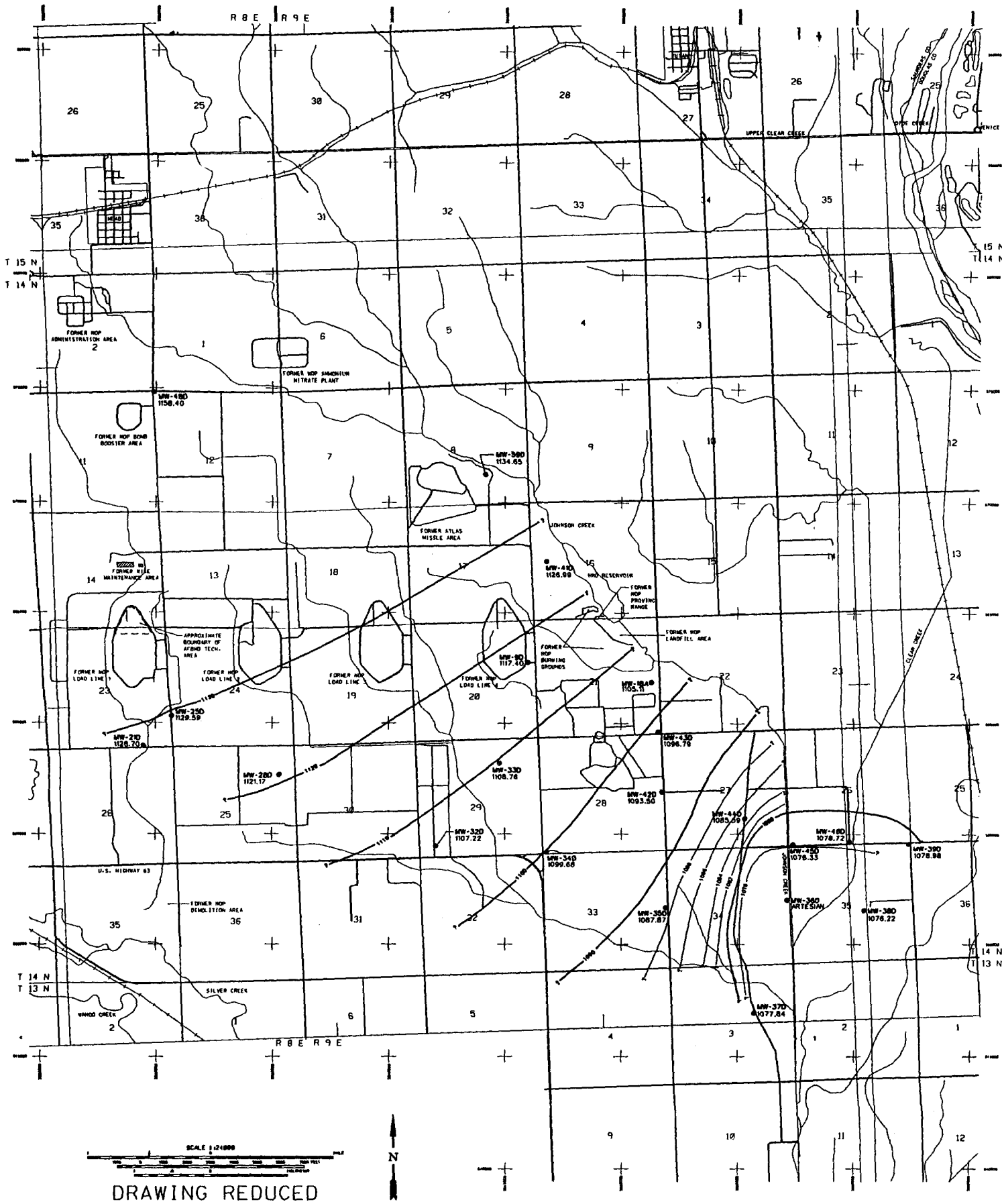
Designed by:	A.W.
Drawn by:	D.R.T.
Checked by:	D.C.C.
Submitted by:	RFS
Scale:	1 IN = 2000 FT
Date:	MAY, 1993
Drg. No.:	3-14
Sheet number:	1

MICRO FILE: 92KW0305

COE 031797

MECOEK 3650

B07NE003702-04072



LEGEND:

⊕MW-21D 1128.70	GROUNDWATER MONITORING WELL LOCATION AND WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL) (SEE NOTE 2)
1120	GROUNDWATER SURFACE ELEVATION
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. GROUNDWATER ELEVATION AS MEASURED ON SEPTEMBER 9, 1992.
2. FOR MONITORING WELL CLUSTERS MW-16 THROUGH MW-20, SHALLOW WELLS ARE DESIGNATED BY "C", INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS, "B" REPRESENTS SHALLOW WELLS, "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELL. MONITORING WELLS MW-12A THROUGH MW-15A ARE VERY SHALLOW WELLS.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

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CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.W.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

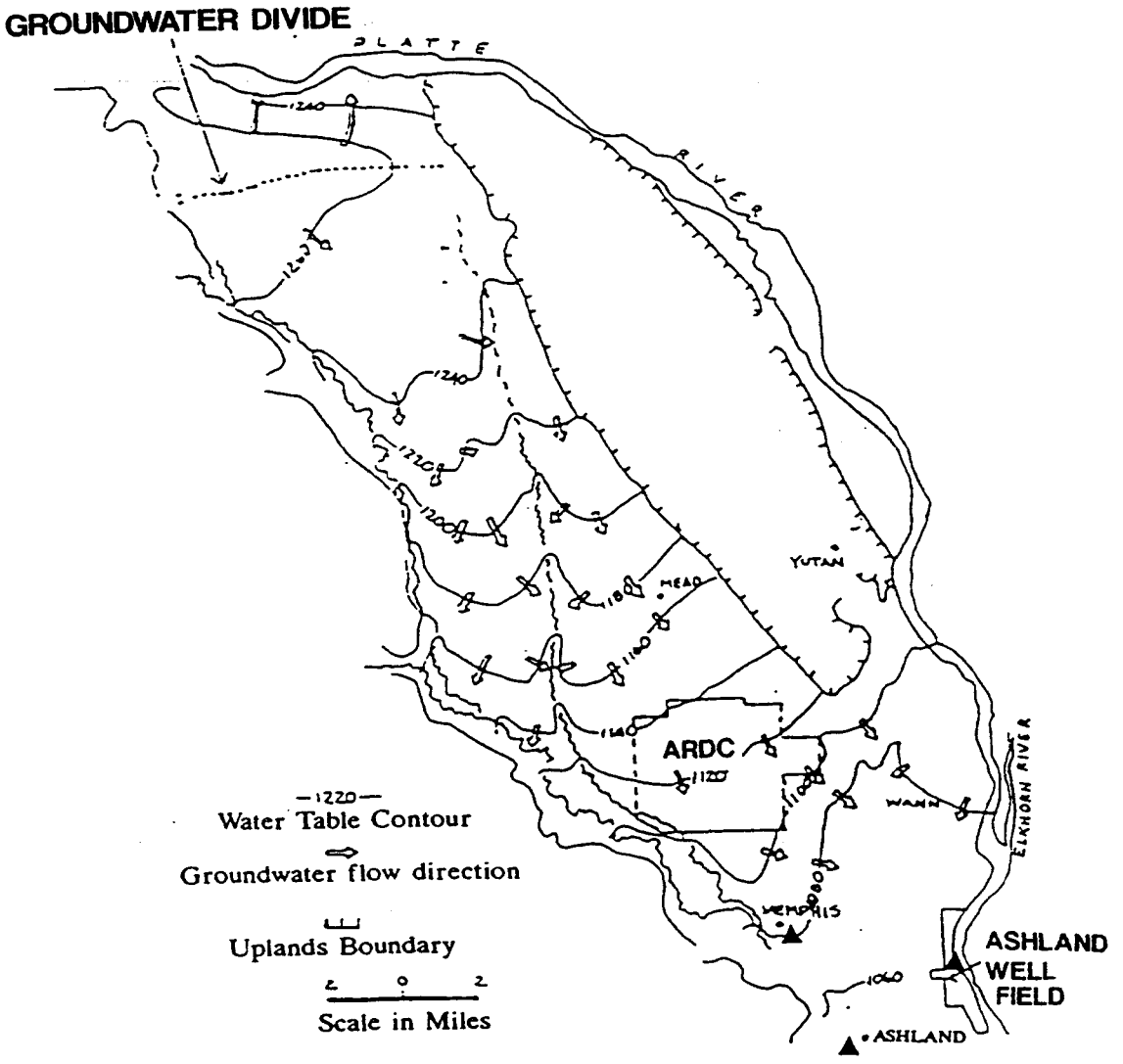
GROUNDWATER SURFACE FOR DEEP GROUNDWATER MONITORING WELLS, SEPTEMBER 1992

Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 3-15
Sheet number: 1

MICRO FILE: 92KW0307

COE 031798

B07NE003702-04073



TODD VALLEY GROUNDWATER FLOW DIRECTIONS AND GROUNDWATER DIVIDE (from Souders, 1967).

▲ PUBLIC WATER SUPPLY WELL FIELDS

SOURCE: USGS, 1969

COE 031799

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CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: S.B.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

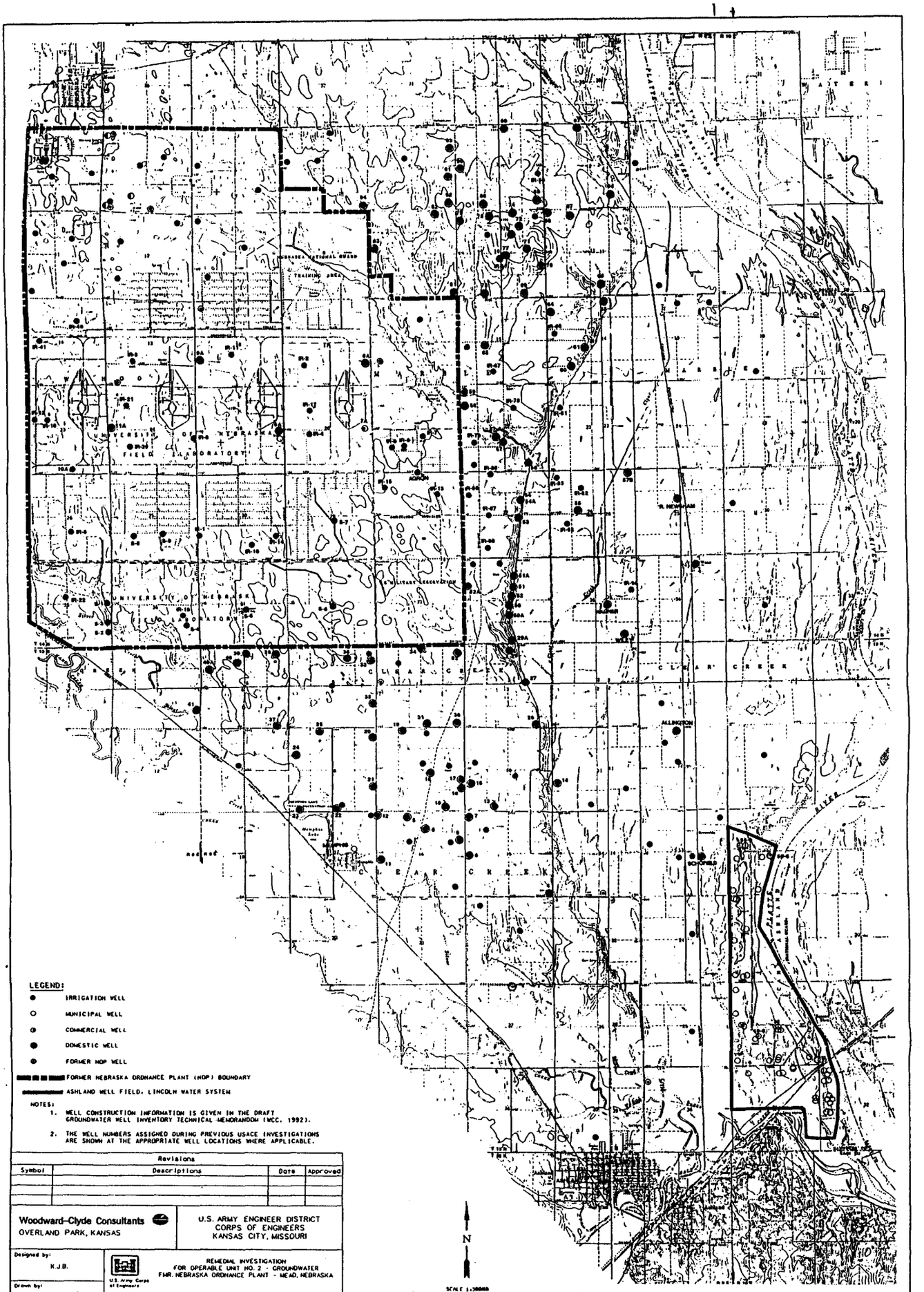
REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

REGIONAL GROUNDWATER FLOW DIRECTION

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 3-16
Sheet number: 1

MECOEK 3652

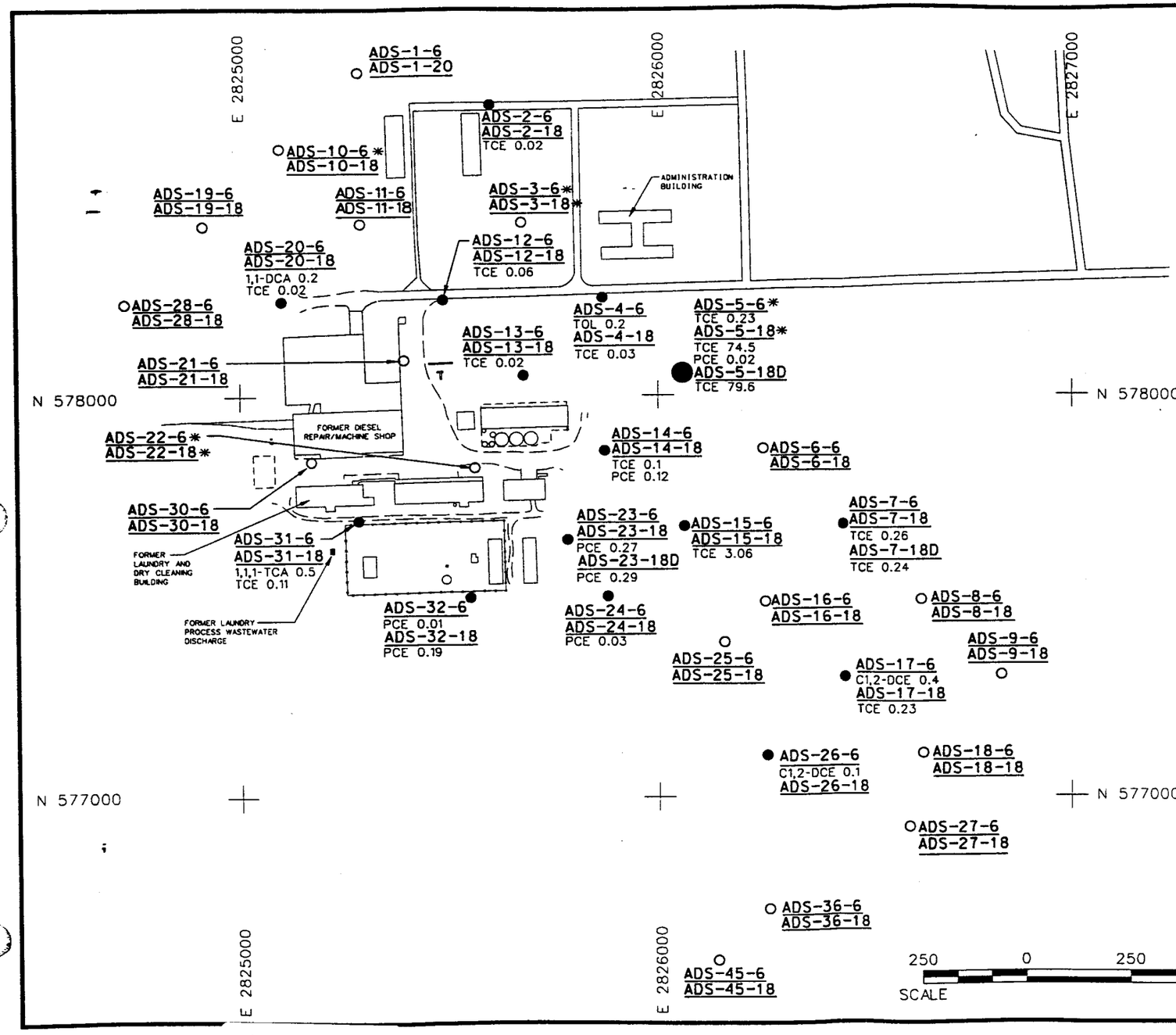
B07NE003702-04074



COE 031800

MECOEK 3653

B07NE003702-04075



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
○	NOT DETECTED
●	< 10
●	10 - 100
*	UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS INTERVAL (SEE NOTE 5 FOR RESULTS)
ADS-5-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE (BGS)
ADS-5-18	SOIL GAS SAMPLE FROM 18 FEET BGS
ADS-5-18D	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. C1,2-DCE = CIS 1,2-DICHLOROETHENE
   1,1-DCA = 1,1-DICHLOROETHANE
   1,1,1-TCA = 1,1,1-TRICHLOROETHANE
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
   TOL = TOLUENE
3. ALL SOIL GAS SAMPLES WERE ANALYZED FOR CIS-1,2-DICHLOROETHANE, 1,1-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHENE, TETRACHLOROETHENE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE, EXCEPT FOR UNSATURATED SOIL BORINGS WHICH WERE ANALYZED FOR TCL VOCs.
4. ALL ANALYTES ARE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE GIVEN IN µg/L BELOW THE INTERVAL IN WHICH IT WAS OBSERVED. DETECTION LIMITS FOR ALL ANALYTES ARE 0.1 µg/L, EXCEPT FOR TCE AND PCE, WHICH ARE 0.01 µg/L.
5. ALL ANAYLTES FOR UNSATURATED SOIL SAMPLES ARE NON-DETECT.
6. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: M.E.W.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

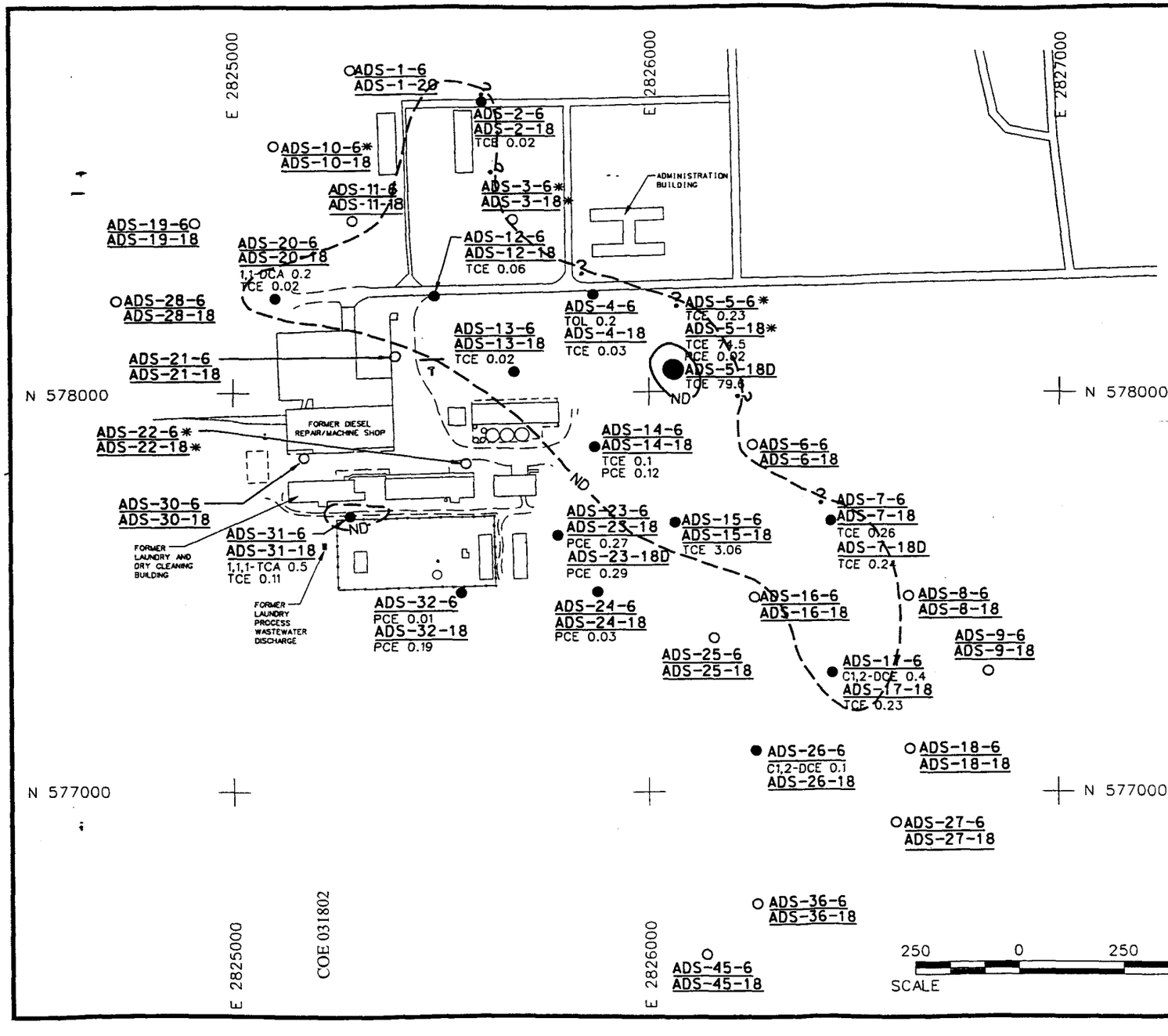
U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

ADMINISTRATION AREA SOIL GAS SURVEY AND UNSATURATED SOIL SAMPLING RESULTS

Scale: 1 INCH = 250 FEET
Date: MAY, 1993
Sheet number: 1
Dwg. No.: 4-1

MICRO FILE: 9210W03OC



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
○	NOT DETECTED
●	< 10
●	10 - 100
*	UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS INTERVAL (SEE NOTE 5 FOR RESULTS)
———	APPROXIMATE SHALLOW TCE CONCENTRATION CONTOUR IN µg/L
— — —	APPROXIMATE DEEP TCE CONCENTRATION CONTOUR IN µg/L
ADS-5-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE (BGS)
ADS-5-18	SOIL GAS SAMPLE FROM 18 FEET BGS
ADS-5-18D	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. C1,2-DCE = CIS 1,2-DICHLOROETHENE
   1,1-DCA = 1,1-DICHLOROETHANE
   1,1,1-TCA = 1,1,1-TRICHLOROETHANE
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
   TOL = TOLUENE
3. ALL SOIL GAS SAMPLES WERE ANALYZED FOR CIS-1,2-DICHLOROETHANE, 1,1-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHENE, TETRACHLOROETHENE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE, EXCEPT FOR UNSATURATED SOIL BORINGS WHICH WERE ANALYZED FOR TCL VOCs.
4. ALL ANALYTES ARE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE GIVEN IN µg/L BELOW THE INTERVAL IN WHICH IT WAS OBSERVED. DETECTION LIMITS (ND) FOR ALL ANALYTES ARE 0.1 µg/L, EXCEPT FOR TCE AND PCE, WHICH ARE 0.01 µg/L.
5. ALL ANALYTES FOR UNSATURATED SOIL SAMPLES ARE NON-DETECT.
6. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

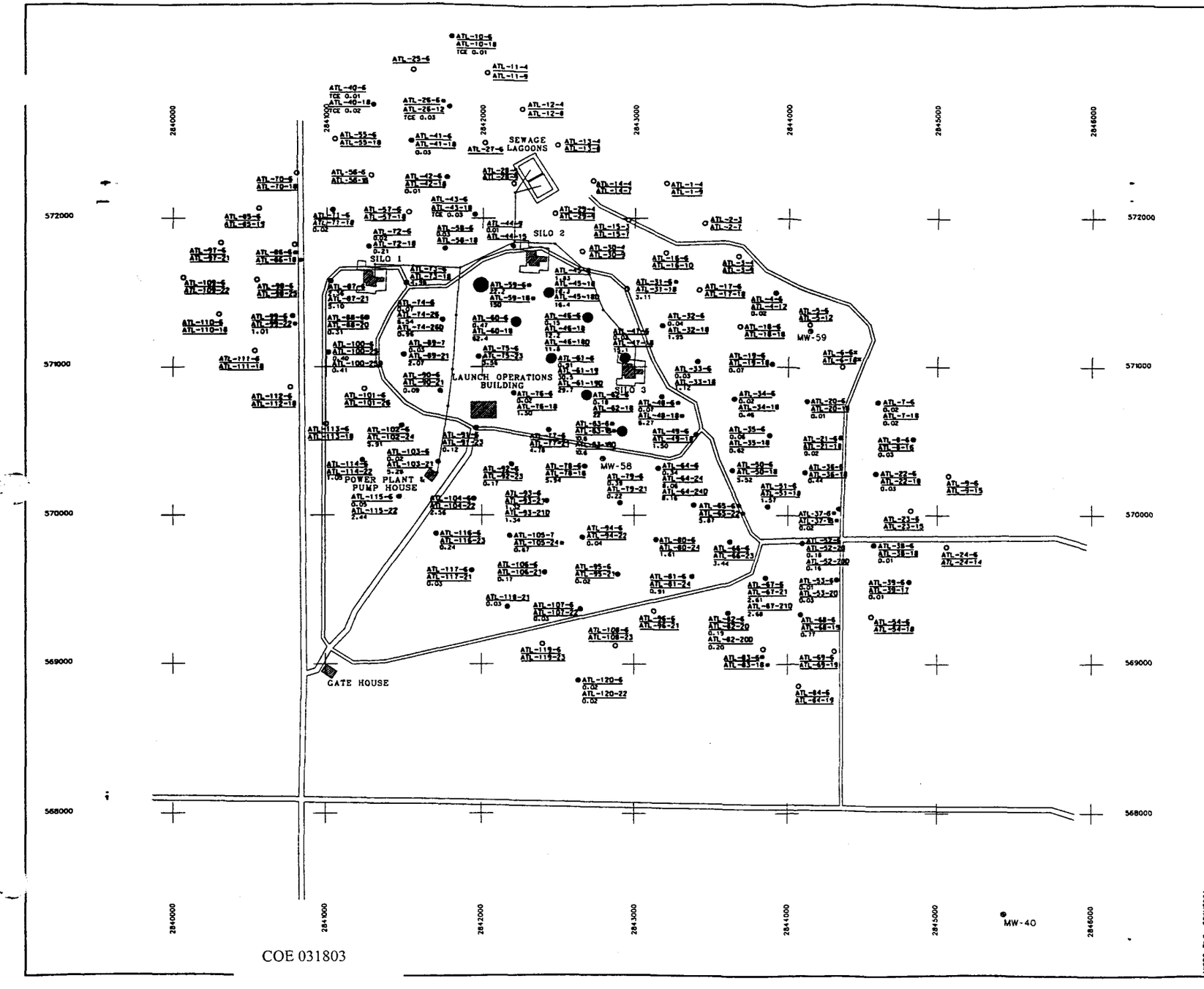
U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN SOIL GAS AT THE ADMINISTRATION AREA

Scale: 1 INCH = 250 FEET
Date: MAY, 1993
Dwg. No.: 4-2
Sheet number: 1

MECOEK 3655



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
○	NOT DETECTED (SEE NOTE 3)
●	< 10
●	10 - 100
●	>100
ATL-31-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE(BGS)
ATL-31-18	SOIL GAS SAMPLE FROM 18 FEET BGS
ATL-31-18D	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS
⊕MW-59	GROUNDWATER MONITORING WELL CLUSTER LOCATION
■	UNSATURATED SOIL SAMPLE COLLECTED AT THIS INTERVAL (SEE NOTE 5 FOR RESULTS)
——	SEWER LINES

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. ALL SOIL GAS SAMPLES WERE ANALYZED FOR TRICHLOROETHENE (TCE) ONLY.
3. TCE WAS NOT DETECTED UNLESS INDICATED. IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE INTERVAL IT WAS OBSERVED. DETECTION LIMIT FOR TCE IS 0.01 µg/L.
4. NO SOIL GAS SAMPLE WAS COLLECTED AT ATL-25-18 AND ATL-27-18 DUE TO SATURATED SOIL. NO SOIL GAS SAMPLE WAS COLLECTED AT ATL-118-6 DUE TO IMPERMEABILITY.
5. ALL UNSATURATED SOIL SAMPLES WERE ANALYZED FOR TCL VOCs.
6. ALL UNSATURATED SOIL SAMPLE LOCATIONS ARE NON-DETECT WITH THE EXCEPTION OF ATL-59-6 AND ATL-59-18 WHICH EXHIBITED 4 µg/kg OF TCE.
7. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

300 0 300 600
SCALE FEET

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

ATLAS MISSILE AREA SOIL GAS SURVEY AND UNSATURATED SOIL SAMPLING RESULTS

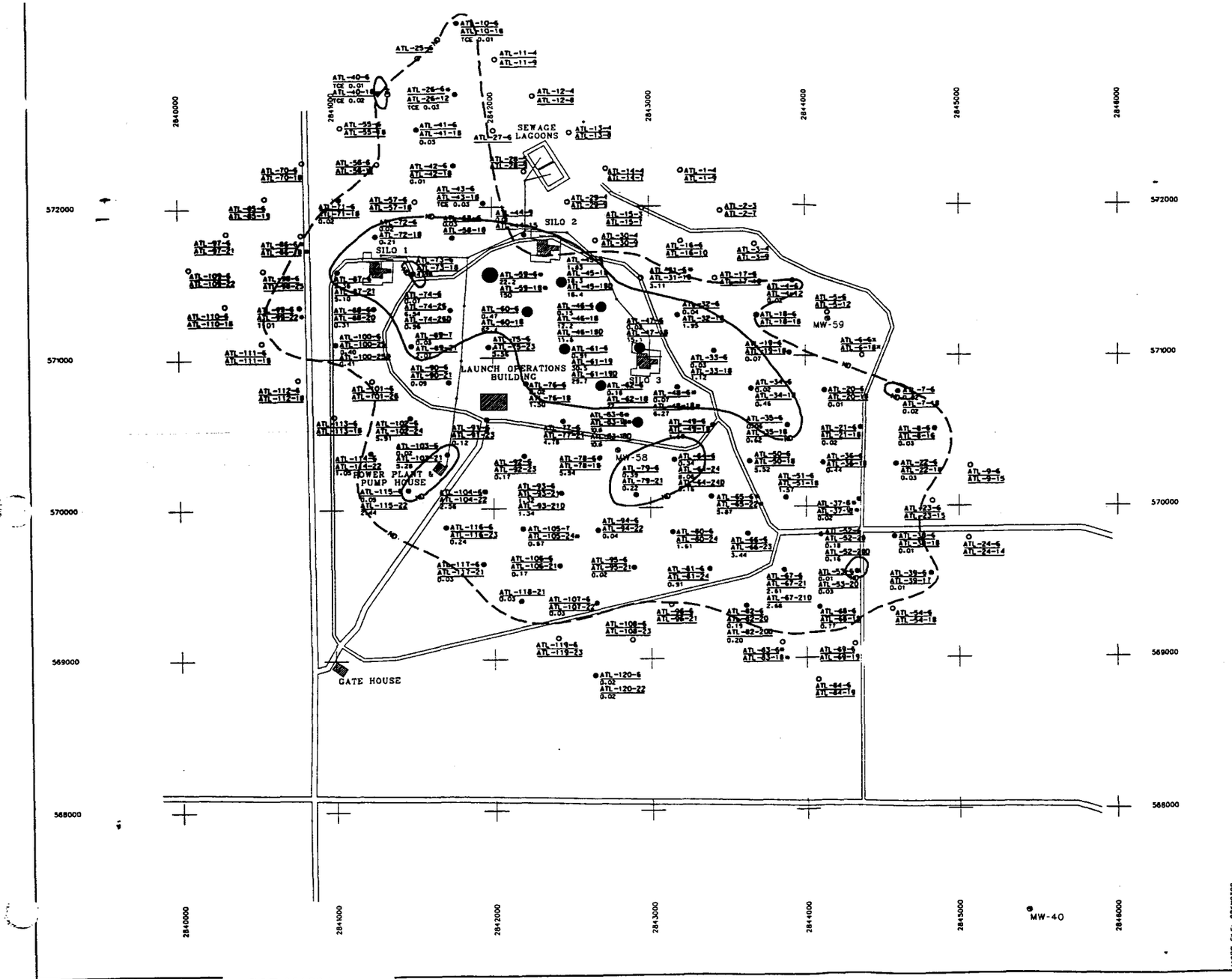
Scale: 1 INCH = 300 FEET
Date: MAY, 1993
Dwg. No.: 4-3
Sheet number: 1

MICRO FILE: 92K00301

COE 031803

MECOEK 3656

B07NE003702-04078



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
○	NOT DETECTED (SEE NOTE 3)
●	< 10
●	10 - 100
●	> 100
———	APPROXIMATE SHALLOW TCE CONCENTRATION CONTOUR IN µg/L
— — —	APPROXIMATE DEEP TCE CONCENTRATION CONTOUR IN µg/L
ATL-31-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE (BGS)
ATL-31-18	SOIL GAS SAMPLE FROM 18 FEET BGS
ATL-31-18D	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS
⊕MW-59	GROUNDWATER MONITORING WELL CLUSTER LOCATION
●	UNSATURATED SOIL SAMPLE COLLECTED AT THIS INTERVAL (SEE NOTE 6 FOR RESULTS)
———	SEWER LINES

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. ALL SOIL GAS SAMPLES WERE ANALYZED FOR TRICHLOROETHENE (TCE) ONLY.
3. TCE WAS NOT DETECTED UNLESS INDICATED. IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE INTERVAL IT WAS OBSERVED. DETECTION LIMIT (ND) FOR TCE IS 0.01 µg/L.
4. NO SOIL GAS SAMPLE WAS COLLECTED AT ATL-25-18 AND ATL-27-18 DUE TO SATURATED SOIL. NO SOIL GAS SAMPLE WAS COLLECTED AT ATL-118-6 DUE TO IMPERMEABILITY.
5. ALL UNSATURATED SOIL SAMPLES WERE ANALYZED FOR TCL VOCs.
6. ALL UNSATURATED SOIL SAMPLE LOCATIONS ARE NON-DETECT WITH THE EXCEPTION OF ATL-59-6 AND ATL-59-18 WHICH EXHIBITED 4 µg/kg OF TCE.
7. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

300 0 300 600
SCALE FEET

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FWR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN SOIL GAS AT THE ATLAS MISSILE AREA

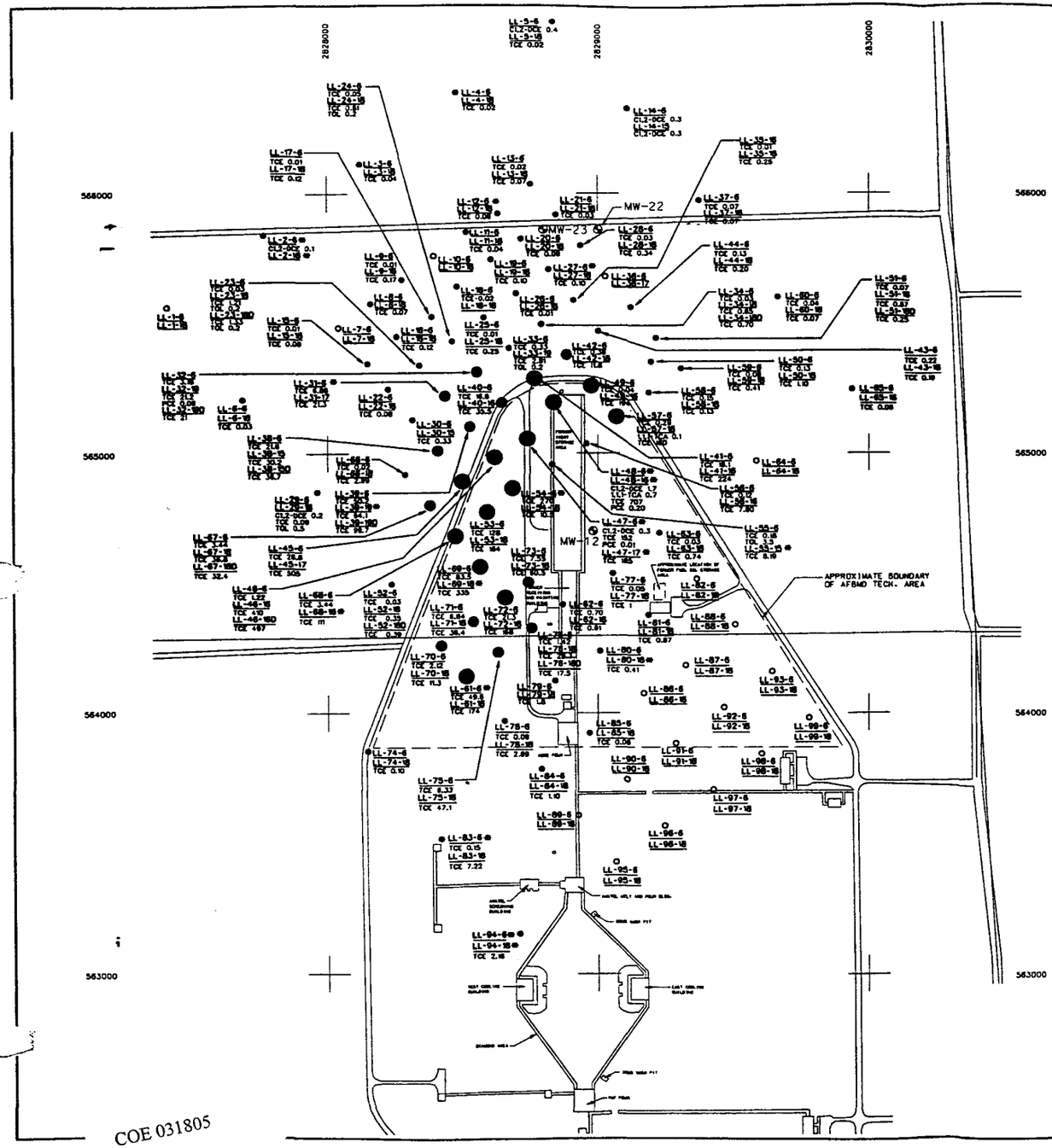
Scale: 1 INCH = 300 FEET
Date: MAY, 1993
Dwg. No.: 4-4
Sheet number: 1

MICRO FILE: 926N03GG

COE 031804

MECOEK 3657

B07NE003702-04079



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
o	NOT DETECTED (SEE NOTE 4)
•	< 10
●	10 - 100
●	> 100
LL-23-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE (BGS)
LL-23-18	SOIL GAS SAMPLE FROM 18 FEET BGS
LL-23-180	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS
⊕ MW-22	GROUNDWATER MONITORING WELL CLUSTER LOCATION
■	UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS INTERVAL (SEE NOTE 6 FOR RESULTS)

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. C1,2-DCE = CIS 1,2-DICHLOROETHENE
   1,1,1-TCA = 1,1,1-TRICHLOROETHANE
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
   TOL = TOLUENE
3. ALL SOIL GAS SAMPLES WERE ANALYZED FOR CIS-1,2-DICHLOROETHENE, 1,1-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHENE, TETRACHLOROETHENE, BENZENE, TOLUNE, ETHYLBENZENE, AND XYLENE SAMPLE LOCATIONS LL1-66 THROUGH LL1-99 WERE ANALYZED FOR TCE ONLY.
4. ALL ANALYTES WERE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE INTERVAL IN WHICH IT WAS OBSERVED. DETECTION LIMITS FOR ALL ANALYTES ARE 0.1 µg/L, EXCEPT FOR TCE AND PCE, WHICH ARE 0.01 µg/L.
5. ALL UNSATURATED SOIL SAMPLES WERE ANALYZED FOR TCL VOCs.
6. ALL UNSATURATED SOIL SAMPLE LOCATIONS ARE NON-DETECT WITH THE EXCEPTION OF LL-34-6 WHICH EXHIBITED 10 µg/kg OF TCE.
7. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

200 0 200 400
SCALE FEET

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

LOAD LINE 1 SOIL GAS SURVEY AND UNSATURATED SOIL SAMPLING RESULTS

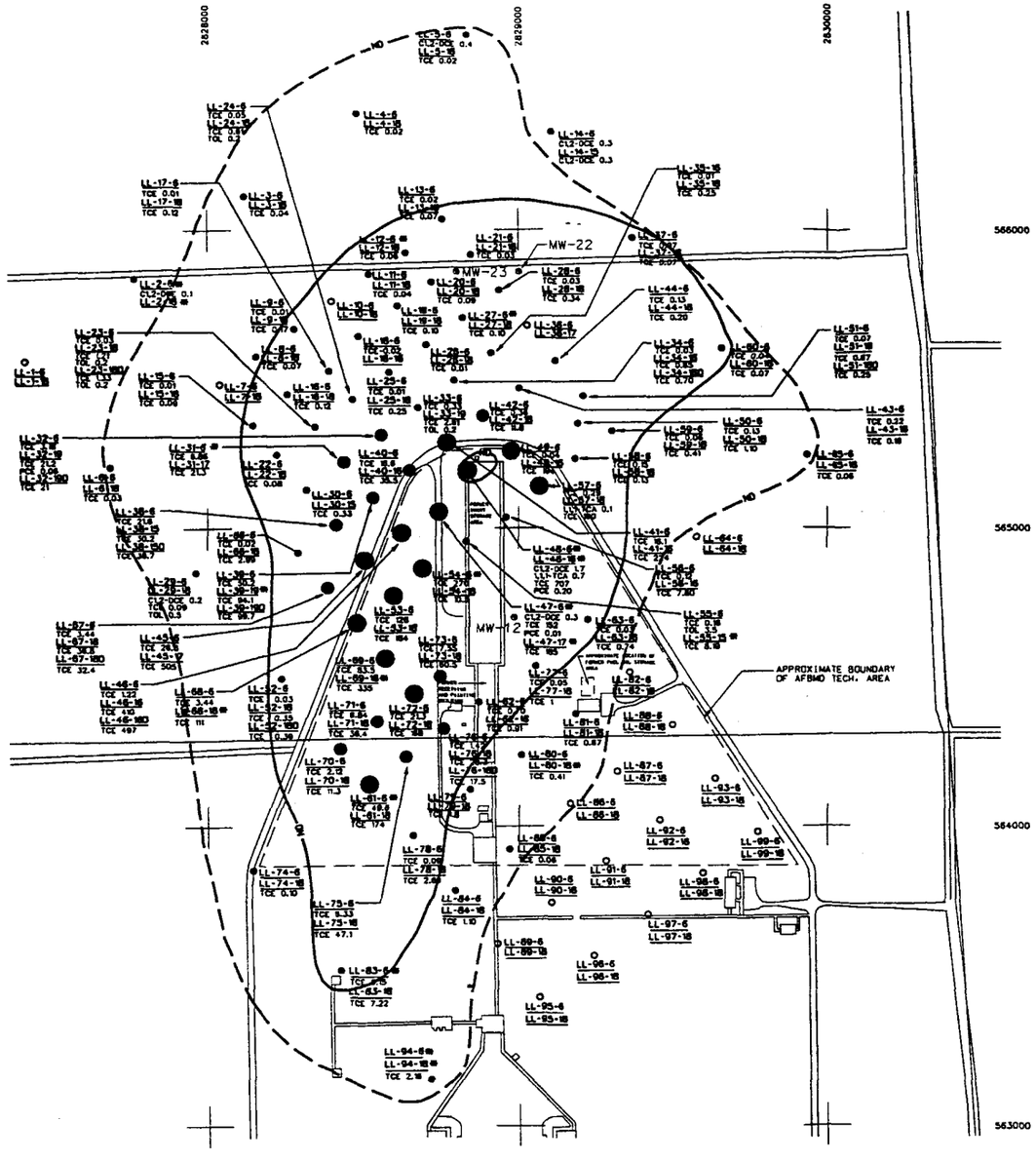
Scale: 1 INCH = 200 FEET
Date: MAY, 1993
Dwg. No.: 4-5
Sheet number: 1

MICRO FILE: S2KW03OM

COE 031805

MECOEK 3658

B07NE003702-04080



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
○	NOT DETECTED (SEE NOTE 4)
●	< 10
●	10 - 100
●	> 100
———	APPROXIMATE SHALLOW TCE CONCENTRATION CONTOUR IN µg/L
— —	APPROXIMATE DEEP TCE CONCENTRATION CONTOUR IN µg/L
LL-23-6	SOIL GAS SAMPLE FROM 6 FEET BELOW GROUND SURFACE (BGS)
LL-23-18	SOIL GAS SAMPLE FROM 18 FEET BGS
LL-23-180	DUPLICATE SOIL GAS SAMPLE FROM 18 FEET BGS
● MW-22	GROUNDWATER MONITORING WELL CLUSTER LOCATION
■	UNSATURATED SOIL SAMPLE ALSO COLLECTED AT THIS INTERVAL (SEE NOTE 6 FOR RESULTS)

NOTES:

1. SAMPLES WERE COLLECTED FROM 6 FEET AND 18 FEET BGS UNLESS OTHERWISE INDICATED.
2. C1,2-DCE = CIS 1,2-DICHLOROETHENE
   1,1,1-TCA = 1,1,1-TRICHLOROETHANE
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
   TOL = TOLUENE
3. ALL SOIL GAS SAMPLES WERE ANALYZED FOR CIS-1,2-DICHLOROETHENE, 1,1-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHENE, TETRACHLOROETHENE, BENZENE, TOLUNE, ETHYLBENZENE, AND XYLENE SAMPLE LOCATIONS LL1-66 THROUGH LL1-99 WERE ANALYZED FOR TCE ONLY.
4. ALL ANALYTES WERE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE INTERVAL IN WHICH IT WAS OBSERVED. DETECTION LIMITS (ND) FOR ALL ANALYTES ARE 0.1 µg/L, EXCEPT FOR TCE AND PCE, WHICH ARE 0.01 µg/L.
5. ALL UNSATURATED SOIL SAMPLES WERE ANALYZED FOR TCL VOCs.
6. ALL UNSATURATED SOIL SAMPLE LOCATIONS ARE NON-DETECT WITH THE EXCEPTION OF LL-54-6 WHICH EXHIBITED 10 µg/kg OF TCE.
7. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

200 0 200 400
SCALE FEET

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN SOIL GAS AT LOAD LINE 1

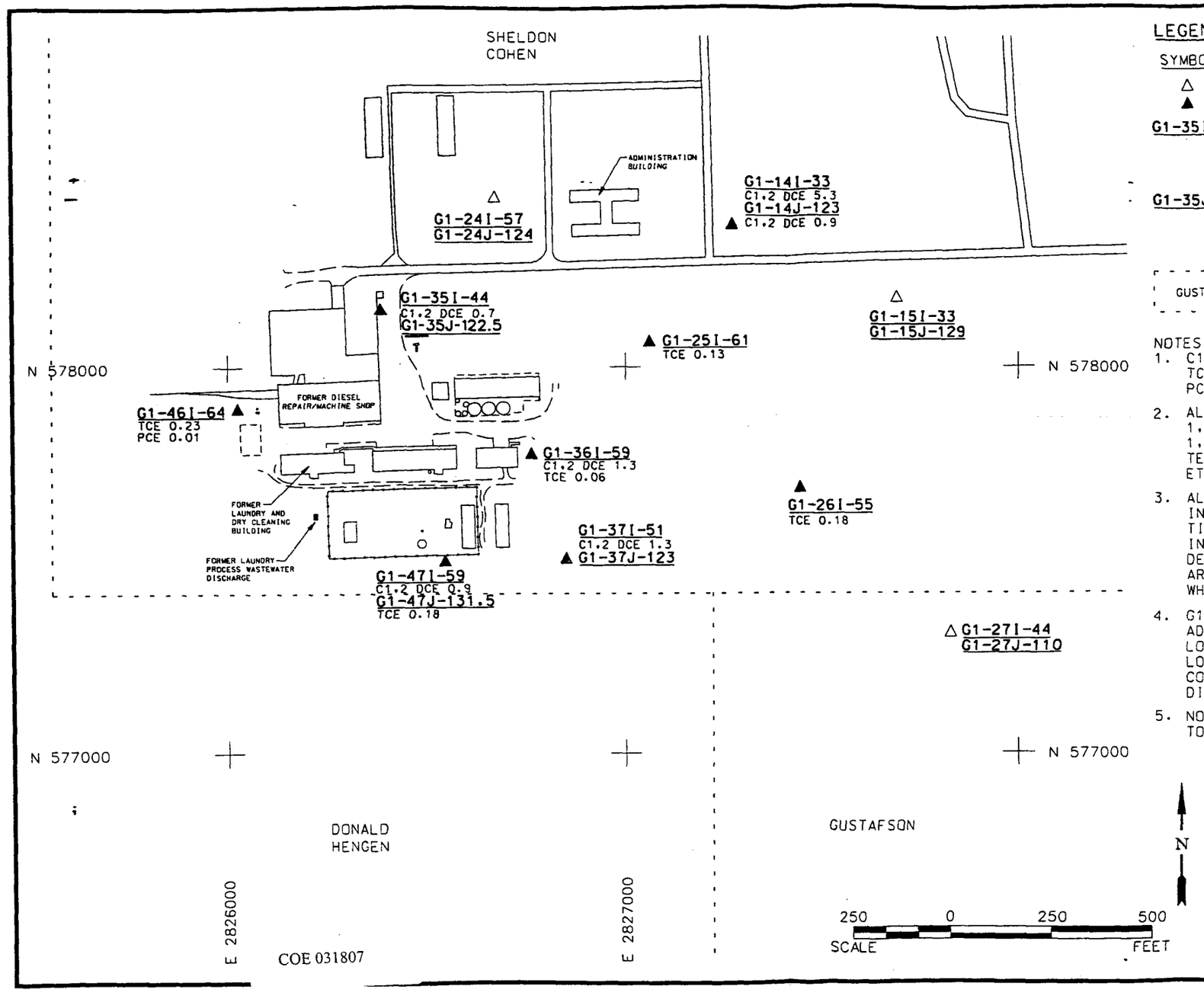
Scale: 1 INCH = 200 FEET
Date: MAY, 1993
Dwg. No.: 4-6
Sheet number: 1

MICRO FILE: 926W0311

COE 031806

MECOEK 3659

B07NE003702-04081



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (μg/L) DETECTED AT EACH LOCATION
△	NOT DETECTED (SEE NOTE 3)
▲	< 10
G1-35I-44	SHALLOW SAMPLE FROM BASE OF FINE SAND UNIT (INDICATED BY "I") AT 44 FEET BELOW GROUND SURFACE (BGS)
G1-35J-122.5	DEEP SAMPLE FROM BASE OF SAND AND GRAVEL UNIT (INDICATED BY "J") AT 122.5 FEET BGS
GUSTAFSON	PROPERTY BOUNDARIES AND PROPERTY OWNER

NOTES:

1. C1.2 DCE = CIS 1,2-DICHLOROETHENE
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
2. ALL SAMPLES WERE ANALYZED FOR CIS 1,2-DICHLOROETHANE, 1,1-DICHLOROETHANE, 1,1,1-TRICHLOROETHANE, TRICHLOROETHANE, TETRACHLOROETHENE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE.
3. ALL ANALYTES ARE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE GIVEN IN μg/L BELOW THE INTERVAL IN WHICH IT WAS OBSERVED. DETECTION LIMITS FOR ALL ANALYTES ARE 0.1 μg/L, EXCEPT FOR TCE AND PCE, WHICH ARE 0.01 μg/L.
4. G1 REPRESENTS THE GRID FOR THE ADMINISTRATION AREA. STARTING SAMPLE LOCATION OF G1 WAS BASED ON THE LOCATION OF THE HIGHEST TCE SOIL GAS CONCENTRATION. THE RATIONALE IS DISCUSSED IN SECTION 2.0.
5. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FWR NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

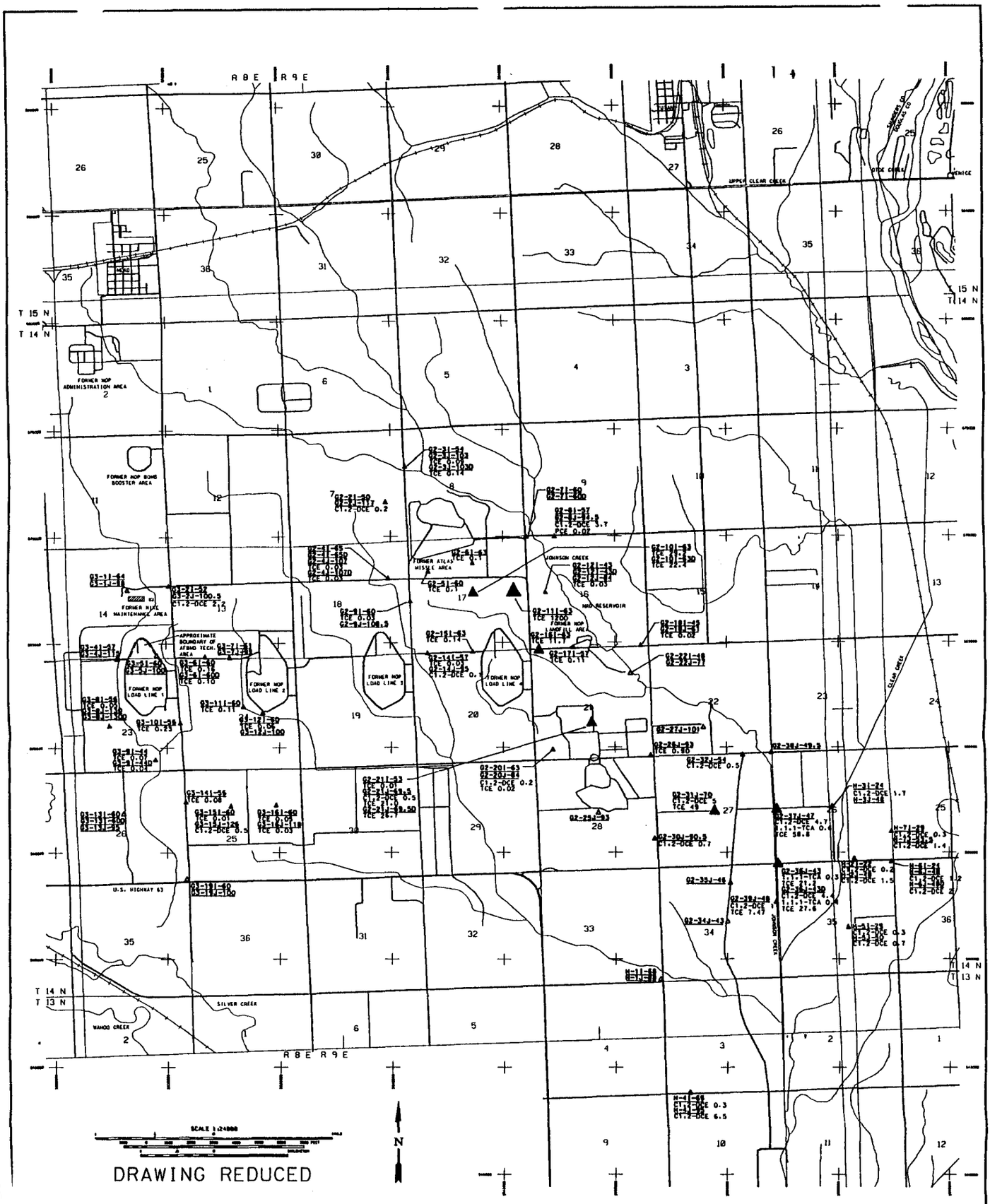
ADMINISTRATION AREA
GROUNDWATER HEADSPACE
VOC SCREENING RESULTS

Scale: 1 INCH - 250 FEET
Date: MAY, 1993
Dwg. No.: 4-7
Sheet number: 1

MICRO FILE: 92KW03OR

MECOEK 3660

B07NE003702-04082



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH LOCATION
△	NOT DECTECTED (SEE NOTE 4)
▲	<10
▲	10 - 100
▲	>100
2-S01-60	SHALLOW SAMPLE FROM BASE OF FINE SAND UNIT (INDICATED BY "1") AT 60 FEET BELOW GROUND SURFACE (BGS)
G2-S01-60D	DUPLICATE SAMPLE INDICATED BY "D"
G2-S0J-100	DEEP SAMPLE FROM BASE OF SAND AND GRAVEL UNIT (INDICATED BY "J") AT 100 FEET BGS
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. C1,2-DCE = CIS-1,2-DICHLORDETHENE
   1,1,1-TCA = 1,1,1-TRICHLORDETHANE
   TCE = TRICHLORDETHENE
   PCE = TETRACHLORDETHENE
2. ALL SAMPLES WERE ANALYZED FOR TCE. THE FOLLOWING SAMPLES WERE ALSO ANALYZED FOR C1,2-DCE; 1,1-DICHLORDETHANE; 1,1,1-TCA; PCE; BENZENE; TOLUENE; ETHYLBENZENE; AND XYLENE: G2-2J, G2-8J, G2-12J, G2-14J, G2-18J, G2-20J, G2-21J, G2-21J-D, G2-22J, G2-25J, G2-26J, G2-27J, G2-30J, G2-31J, G2-32J, G2-34J, G2-35J, G2-36I, G2-36I-D, G2-37J, G2-38J, G2-39J, G3-2J, G3-15J, G3-16J, AND ALL OF THE "H" SAMPLES.
3. G2 REPRESENTS THE GROUNDWATER HEADSPACE VOC SCREENING GRID FOR THE ATLAS MISSILE AREA. G3 REPRESENTS THE GROUNDWATER HEADSPACE VOC SCREENING GRID FOR LOAD LINE 1. H REPRESENTS HYDROPUNCH SAMPLING LOCATIONS FOR THE PLATTE RIVER ALLUVIAL AQUIFER. SAMPLING OF G2 AND G3 LOCATIONS WERE DEPENDENT UPON DETECTION OF ANALYTES ON ADJACENT NODES. THE RATIONALE IS DISCUSSED INSECTION 2.0. ALL H LOCATIONS WERE SAMPLED WITHOUT REGARD TO A GRID.
4. ALL ANALYTES WERE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE INTERVAL IN WHICH THEY WERE DETECTED. DETECTION LIMITS FOR ALL ANALYTES WERE 0.1 µg/L, EXCEPT FOR TCE AND PCE, WHICH WAS 0.01 µg/L.
5. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: M.E.W.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: R.S.

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

GROUNDWATER HEADSPACE VOC SCREENING RESULTS FOR ATLAS MISSILE AREA, LOAD LINES 1-4, AND PLATTE RIVER ALLUVIAL AQUIFER

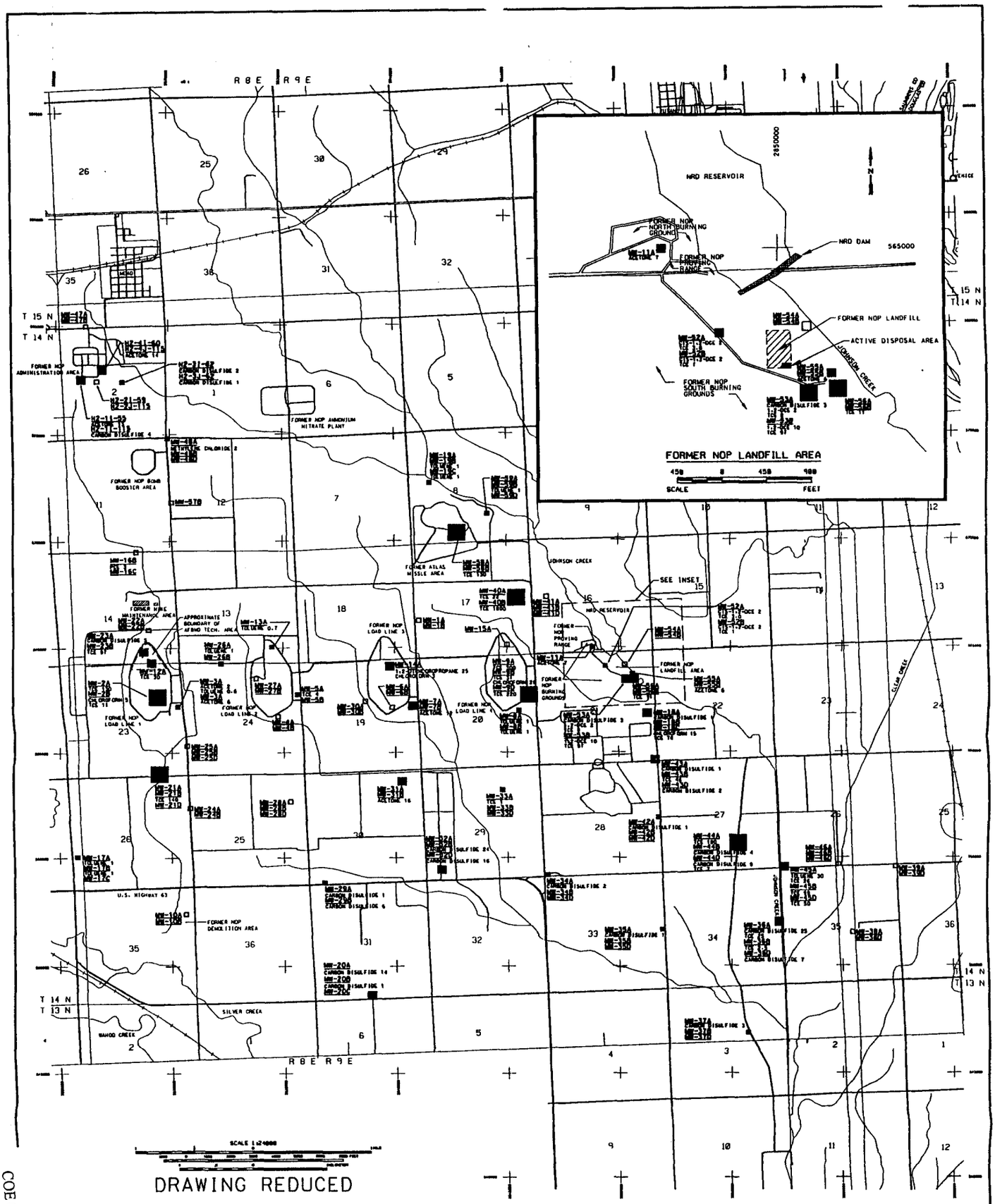
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 4-8
Sheet number: 1

MICRO FILE: 92KN0JOH

COE 031808

MECOEK 3661

B07NE003702-04083



LEGEND:

SYMBOL	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH MONITORING WELL CLUSTER
□	NOT-DETECTED (SEE NOTE 4)
■	< 10
■	10 - 100
■	> 100
MW-43A MW-43B MW-43C	GROUNDWATER MONITORING WELL DESIGNATIONS (SEE NOTE 5)
H2-11-55	HYDROPUNCH SAMPLE COLLECTED AT 55 FEET BELOW GROUND SURFACE(BGS)
H2-11-115	HYDROPUNCH SAMPLE COLLECTED AT 115 FEET BGS
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. 1,2-DCE = 1,2 - DICHLOROETHENE (TOTAL)
   TCE = TRICHLOROETHENE
   PCE = TETRACHLOROETHENE
2. ALL SAMPLES WERE ANALYZED FOR VOCs LISTED ON THE TARGET COMPOUND LIST (TCL) QUANTITATION LIMITS ARE GIVEN IN TABLE 12-2, CDAP PART III.
3. ALL DETECTIONS OF METHYLENE CHLORIDE, 1,2 - DICHLOROETHENE (TOTAL), 1,2 - DICHLOROPROPANE, TRICHLOROETHENE, CIS-1,2, - DICHLOROETHENE, ACETONE, CARBON DISULFIDE, TETRACHLOROETHENE TOLUENE, CHLOROFORM, NOT INDICATED ON MAP WERE BELOW QUANTIFICATION LIMITS AND/OR FOUND IN THE BLANKS.
4. ALL ANALYTES WERE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE IN µg/L BELOW THE WELL IN WHICH THEY WERE DETECTED.
5. FOR MONITORING WELL CLUSTERS MW-16 THROUGH MW-20, SHALLOW WELLS ARE DESIGNATED BY "C", INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS, "B" REPRESENTS SHALLOW WELLS, "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELLS. MONITORING WELLS MW-12A THROUGH MW-15A ARE SHALLOW WELLS.
6. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

N

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER

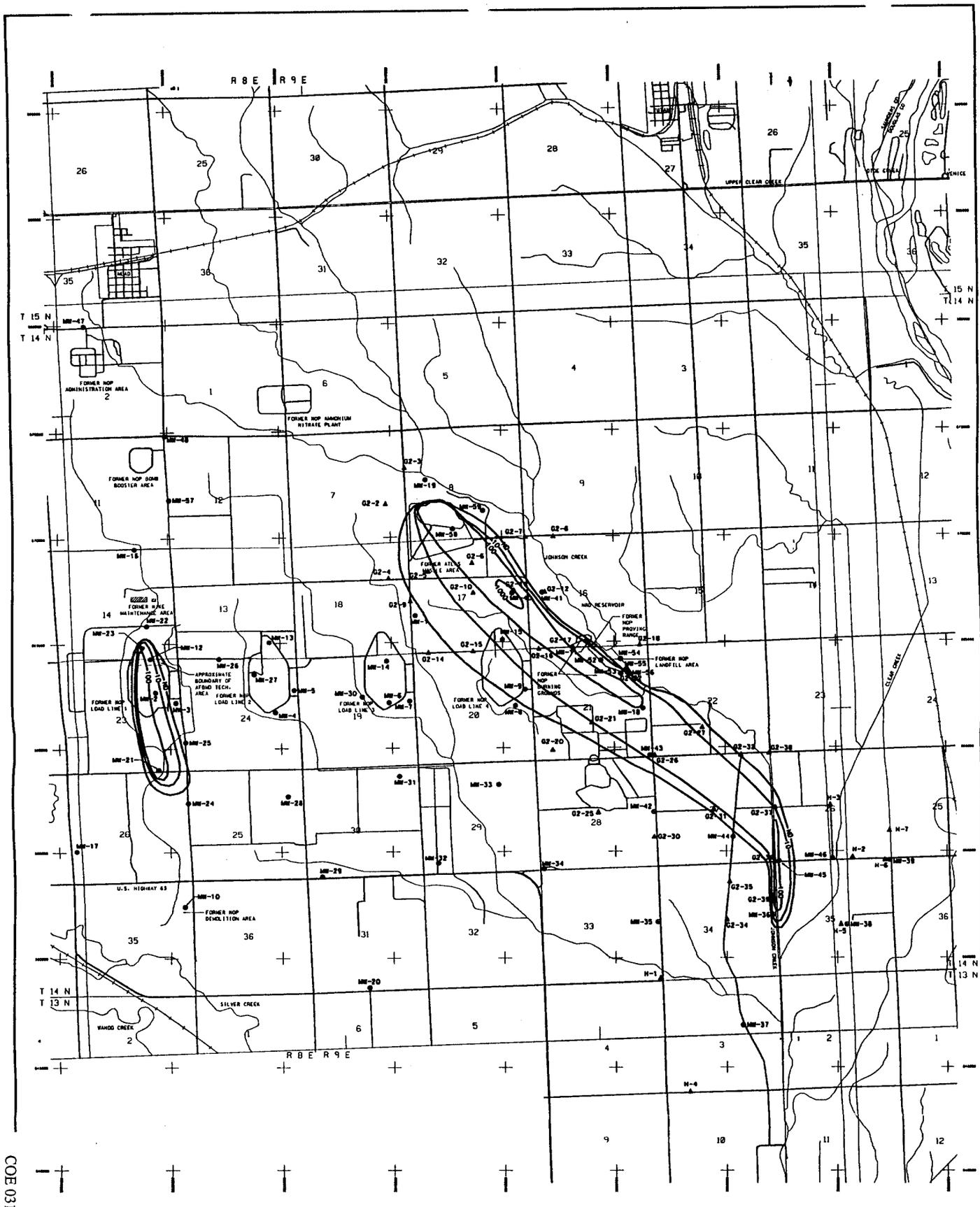
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 4-9
Sheet number: 1

MICRO FILE: 92KW0308

COE 031809

MECOEK 3662

B07NE003702-04084



LEGEND:

———	APPROXIMATE TCE CONCENTRATION CONTOUR IN µg/L
● MW-10	GROUNDWATER MONITORING WELL CLUSTER LOCATION
▲ G2-30	GROUNDWATER HEADSPACE SCREENING LOCATION
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

NOTES:

1. TCE CONCENTRATIONS SHOWN ON THIS DRAWING REPRESENT AUGUST 1992 GROUNDWATER SAMPLING DATA.
2. DETECTION LIMIT (ND) FOR TCE IS 1.0 µg/L.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

SCALE 1:24000

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN SHALLOW GROUNDWATER

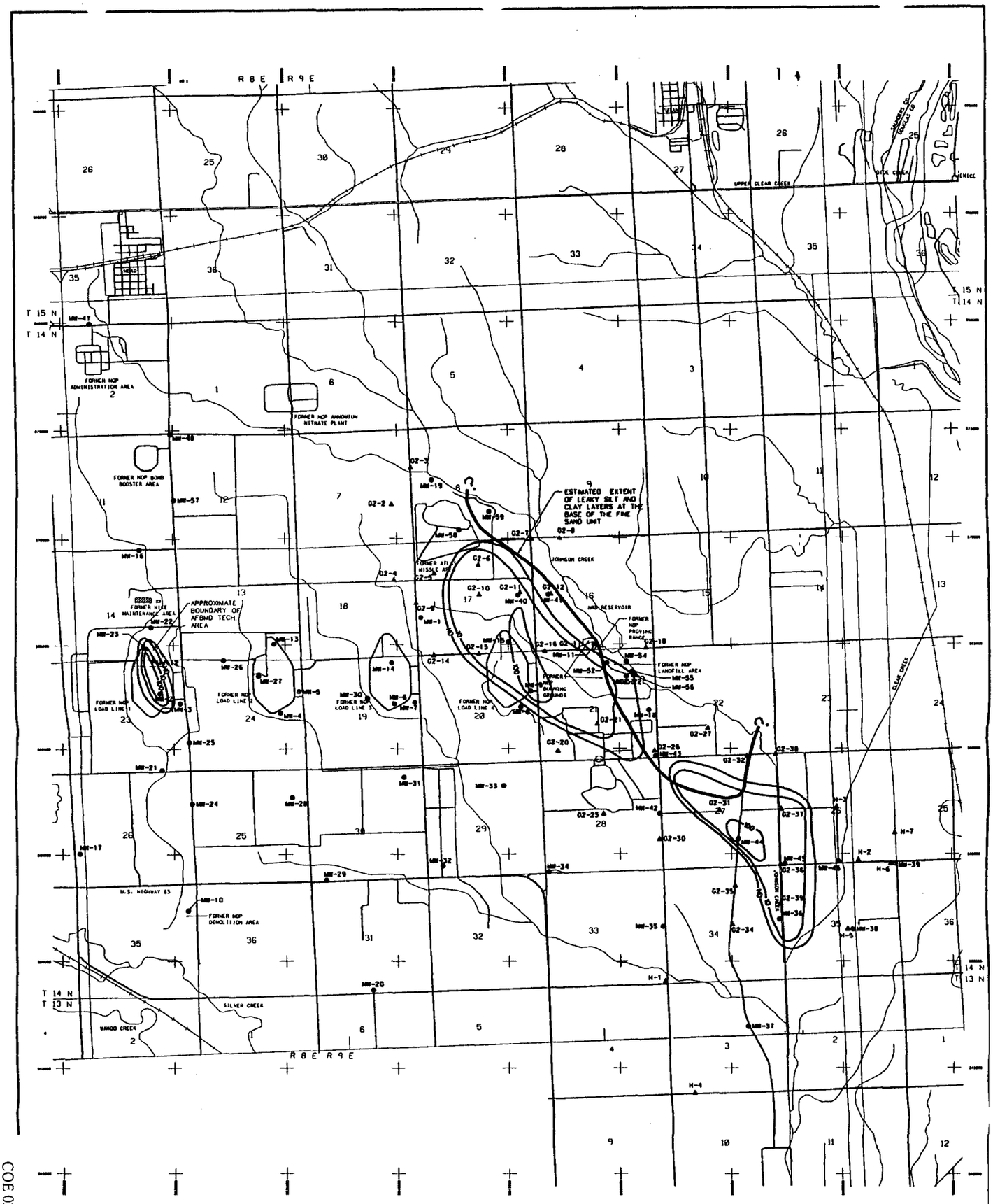
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 4-10
Sheet number: 1

MICRO FILE: 92K003AA

COE 031810

MECOEK 3663

B07NE003702-04085



LEGEND:

- ——— APPROXIMATE TCE CONCENTRATION CONTOUR IN µg/L
- ● MW-10 GROUNDWATER MONITORING WELL CLUSTER LOCATION
- ▲ G2-30 GROUNDWATER HEADSPACE SCREENING LOCATION
- 36 SECTION
- T 14 N TOWNSHIP 14 NORTH
- R 9 E RANGE 9 EAST

NOTES:

1. TCE CONCENTRATIONS SHOWN ON THIS DRAWING REPRESENT AUGUST 1992 GROUNDWATER SAMPLING DATA.
2. DETECTION LIMIT (ND) FOR TCE IS 1.0 µg/L.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

SCALE 1:24000

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Revisions			
Symbol	Descriptions	Date	Approved

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KANSAS CITY, MISSOURI

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN INTERMEDIATE GROUNDWATER

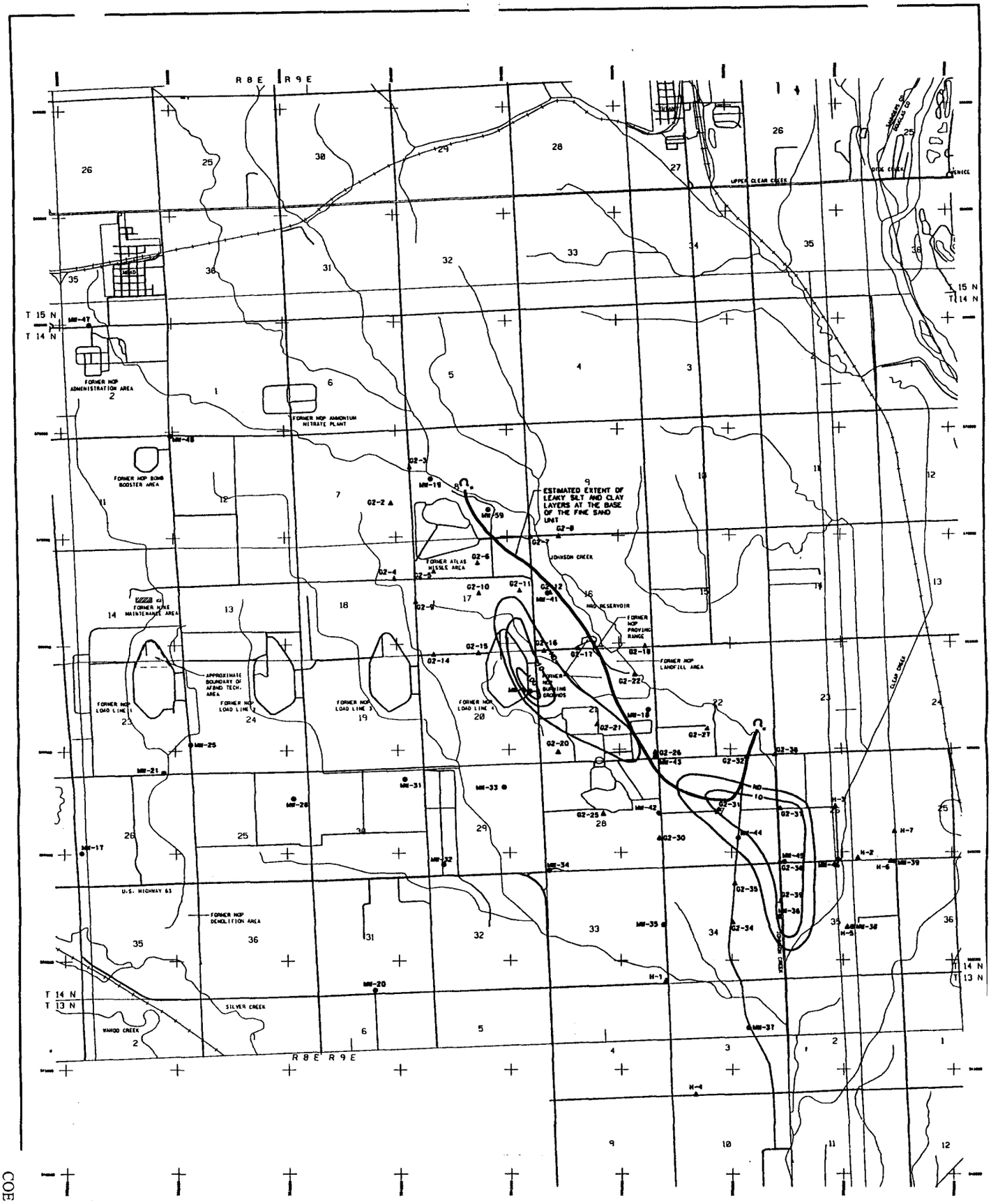
Designed by: A.C.E.	Scale: 1 IN = 2000 FT	Sheet number: 1	
Drawn by: D.R.T.	Date: MAY, 1993		
Checked by: D.C.C.	Dwg. No.: 4-11		
Submitted by:			

MICRO FILE: 92WO388

COE 031811

MECOEK 3664

B07NE003702-04086



LEGEND:

———	APPROXIMATE TCE CONCENTRATION CONTOUR IN µg/L
● MW-10	GROUNDWATER MONITORING WELL CLUSTER LOCATION
▲ G2-30	GROUNDWATER HEADSPACE SCREENING LOCATION
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

NOTES:

1. TCE CONCENTRATIONS SHOWN ON THIS DRAWING REPRESENT AUGUST 1992 GROUNDWATER SAMPLING DATA.
2. DETECTION LIMIT (ND) FOR TCE IS 1.0 µg/L.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

SCALE 1:24000

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Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
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KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RGS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF TCE IN DEEP GROUNDWATER

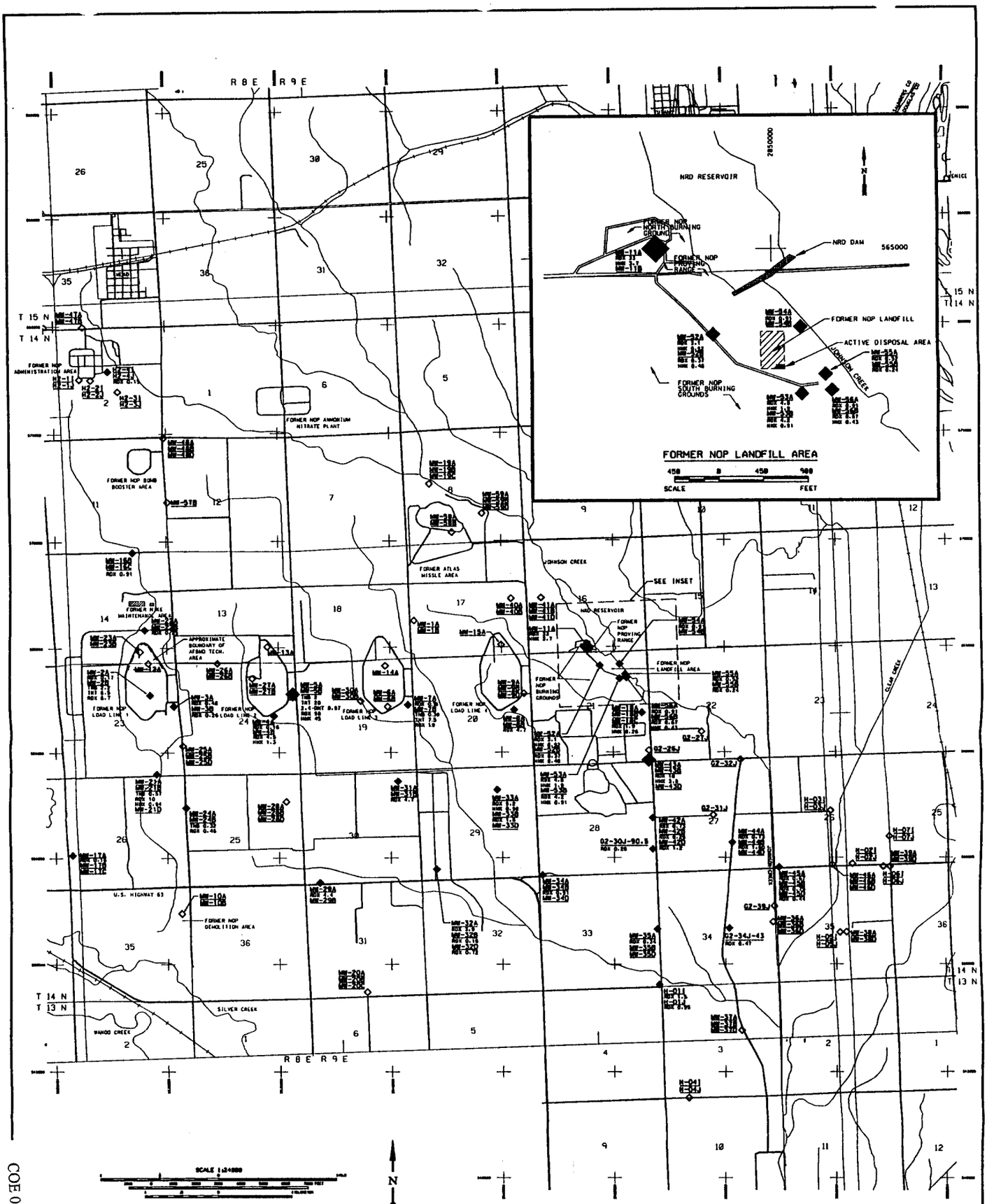
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 4-12
Sheet number: 1

MCRC FILE: 92KWOJCC

COE 031812

MECOEK 3665

B07NE003702-04087



DRAWING REDUCED

LEGEND:

SYMBOL	
	HIGHEST CONCENTRATION (µg/L) DETECTED AT EACH MONITORING WELL CLUSTER
◇	NOT DETECTED (SEE NOTE 3)
◆	< 10
◆	10 - 100
MW-43A MW-43B MW-43D	GROUNDWATER MONITORING WELL DESIGNATIONS (SEE NOTE 4)
36	SECTION
T 14 N	TOWNSHIP 14 NORTH
R 9 E	RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD. 1929 NGVD

NOTES:

1. RDX = HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE
   TNB = 1,3,5-TRINITROBENZENE
   TNT = 2,4,6-TRINITROTOLUENE
   HMX = OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE
   2,4-DNT = 2,4-DINITROTOLUENE
2. ALL SAMPLES ANALYZED FOR RDX; TNB; TNT; HMX; AND 2,4-DNT.
3. ALL EXPLOSIVE ANALYTES WERE NOT DETECTED UNLESS INDICATED, IN WHICH CASE CONCENTRATIONS ARE GIVEN IN µg/L BELOW THE WELL IN WHICH THEY WERE DETECTED. DETECTION LIMITS FOR ALL ANALYTES WERE 0.25 µg/L, EXCEPT FOR RDX, WHICH WAS 0.15 µg/L.
4. FOR MONITORING WELL CLUSTERS MW-16 THROUGH MW-20, SHALLOW WELLS ARE DESIGNATED BY "C". INTERMEDIATE WELLS BY "B", AND DEEP WELLS BY "A". FOR ALL OTHER MONITORING WELL CLUSTERS, "B" REPRESENTS SHALLOW WELLS, "A" REPRESENTS INTERMEDIATE WELLS, AND "D" REPRESENTS DEEP WELL. MONITORING WELLS MW-12A THROUGH MW-15A ARE VERY SHALLOW WELLS.
5. HYDROPUNCH LOCATIONS H2-1 THROUGH H2-4 WERE SAMPLED IN SUBSTITUTION FOR MONITORING WELLS AT THE ADMINISTRATION AREA. G2 LOCATIONS REPRESENT ATLAS MISSILE AREA HYDROPUNCH SAMPLES.
6. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

EXPLOSIVE COMPOUNDS DETECTED IN GROUNDWATER

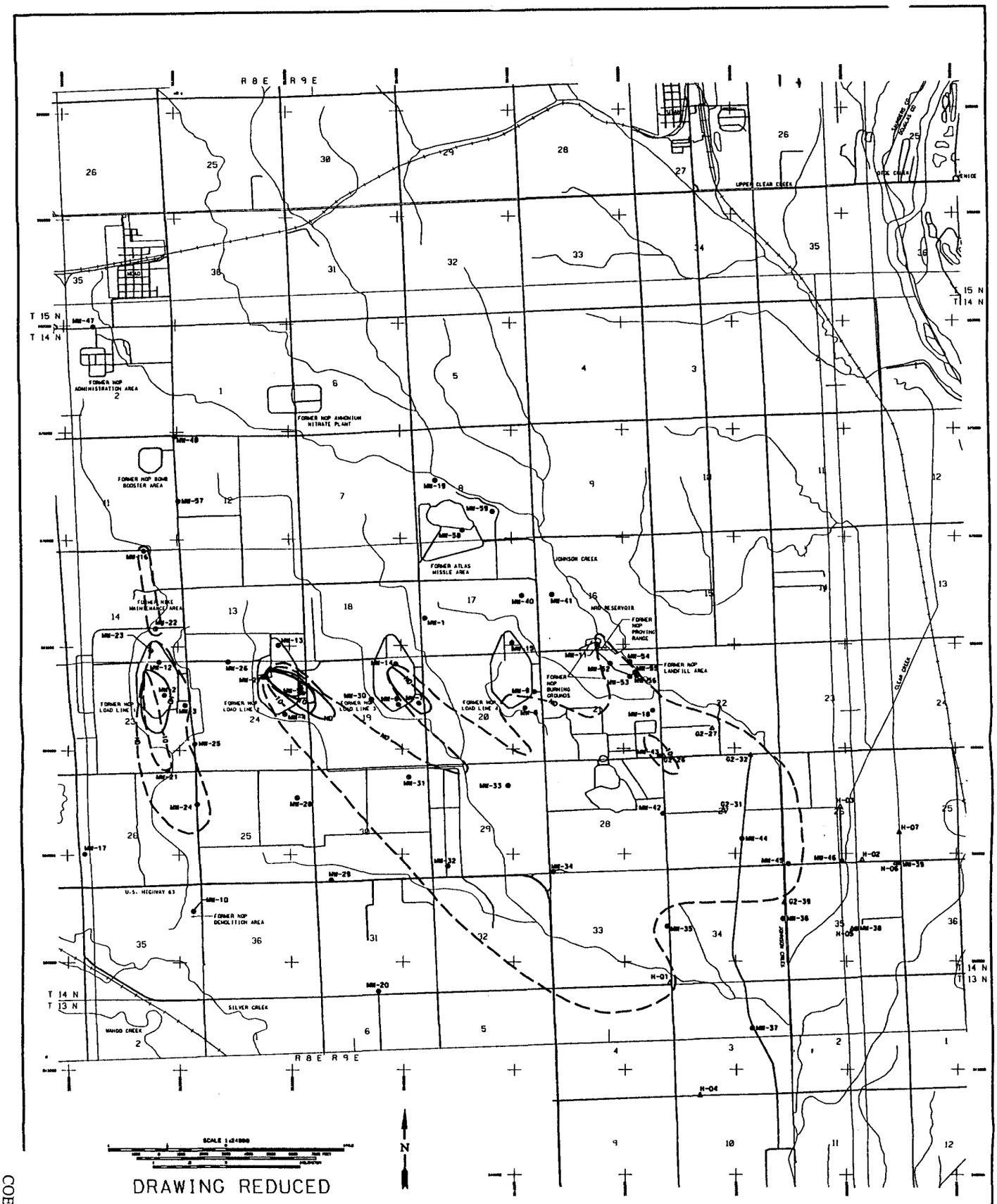
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 4-13
Sheet number: 1

MICRO FILE: 92KW030U

COE 031813

MECOEK 3666

B07NE003702-04088



LEGEND:

- APPROXIMATE TNT CONCENTRATION CONTOUR IN µg/L
- APPROXIMATE RDX CONCENTRATION CONTOUR IN µg/L
- ● MW-10 GROUNDWATER MONITORING WELL CLUSTER LOCATION
- △ G2-30 GROUNDWATER HEADSPACE SCREENING LOCATION
- △ H-01 HYDROPUNCH SAMPLING LOCATION
- 36 SECTION
- T 14 N TOWNSHIP 14 NORTH
- R 9 E RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. RDX AND TNT CONCENTRATIONS SHOWN ON THIS DRAWING REPRESENT AUGUST 1992 GROUNDWATER SAMPLING DATA.
2. DETECTION LIMIT (ND) FOR RDX IS 0.15 µg/L. DETECTION LIMIT (ND) FOR TNT IS 0.25 µg/L.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

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KANSAS CITY, MISSOURI

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF EXPLOSIVES IN SHALLOW GROUNDWATER

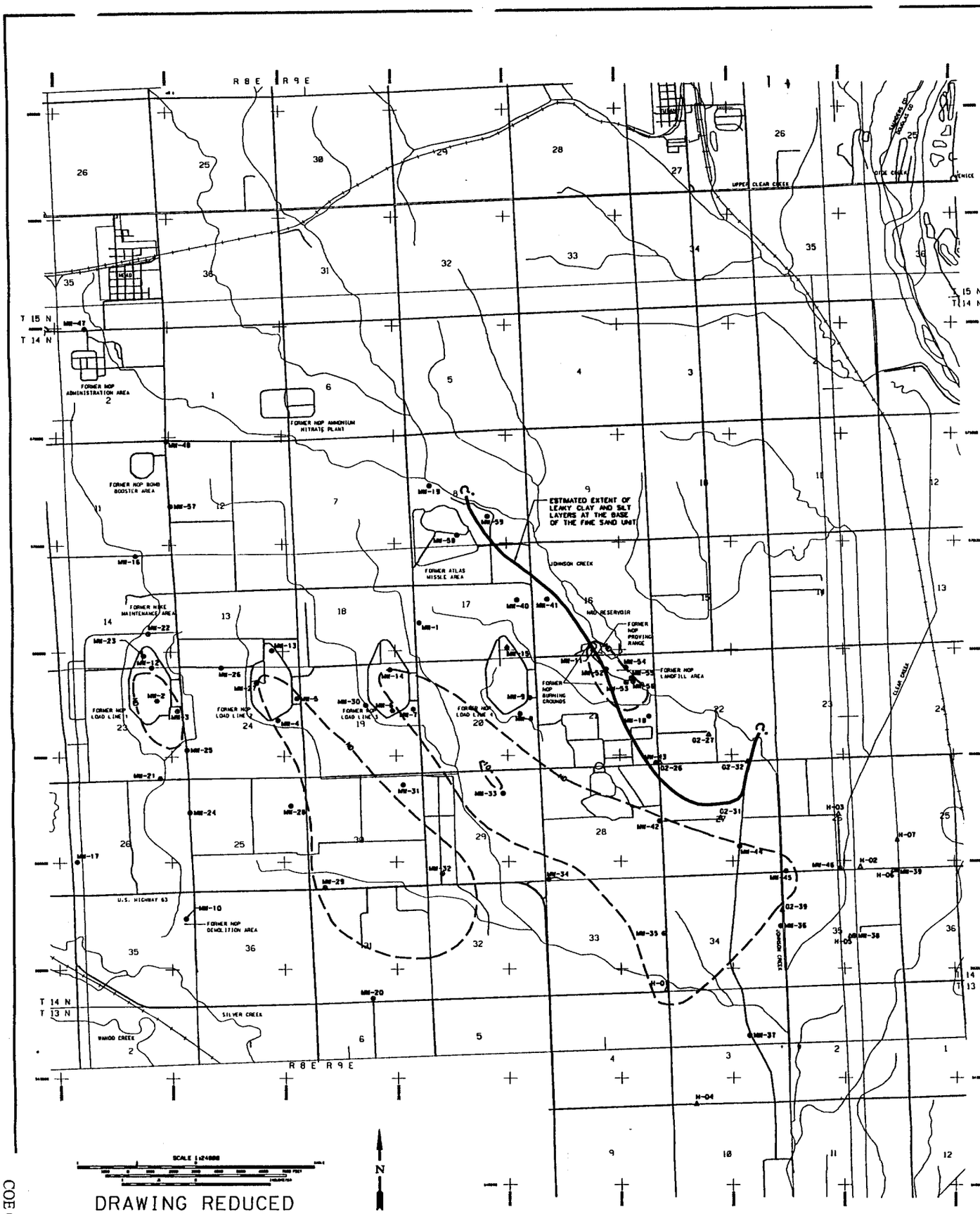
Designed by: A.C.E.	Scale: 1 IN = 2000 FT	Sheet number: 1	
Drawn by: D.R.T.	Date: MAY, 1993		
Checked by: D.C.C.	Dwg. No.: 4-14		
Submitted by: RGS			

MICRO FILE: 92KW0300

COE 031814

MECOEK 3667

B07NE003702-04089



DRAWING REDUCED

LEGEND:

- APPROXIMATE RDX CONCENTRATION CONTOUR IN µg/L
- MW-10 GROUNDWATER MONITORING WELL CLUSTER LOCATION
- G2-30 GROUNDWATER HEADSPACE SCREENING LOCATION
- H-01 HYDROPUNCH SAMPLING LOCATION
- 36 SECTION
- T 14 N TOWNSHIP 14 NORTH
- R 9 E RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

NOTES:

1. TCE CONCENTRATIONS SHOWN ON THIS DRAWING REPRESENT AUGUST 1992 GROUNDWATER SAMPLING DATA.
2. DETECTED LIMIT (ND) FOR RDX IS 0.15 µg/L.
3. TNT WAS NOT DETECTED IN INTERMEDIATE GROUNDWATER
4. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

Revisions			
Symbol	Descriptions	Date	Approve

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

APPROXIMATE AREAL EXTENT OF EXPLOSIVES IN INTERMEDIATE GROUNDWATER

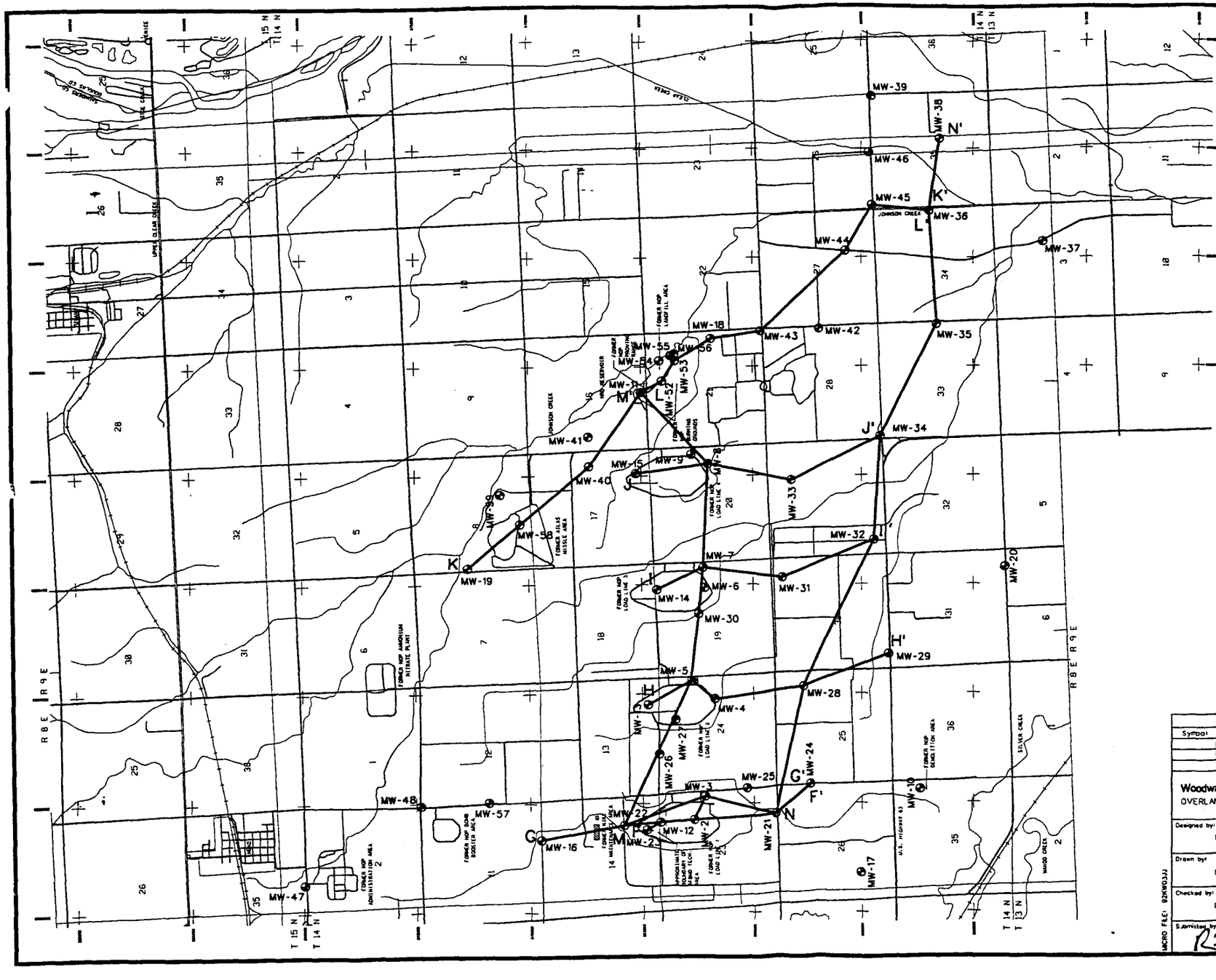
Scale: 1IN = 2000 FT
Date: MAY, 1993
Dwg No.: 4-15
Sheet number: 1

WORD FILE: 22KW02EE

COE 031815

MECOEK 3668

B07NE003702-04090



LEGEND:

⊕ MW-28 MONITORING WELL LOCATIONS

36 SECTION

T 14 N TOWNSHIP 14 NORTH

R 9 E RANGE 9 EAST

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND WANN 1927 NAD, 1929 NGVD

N

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: L.A.T.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RAS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

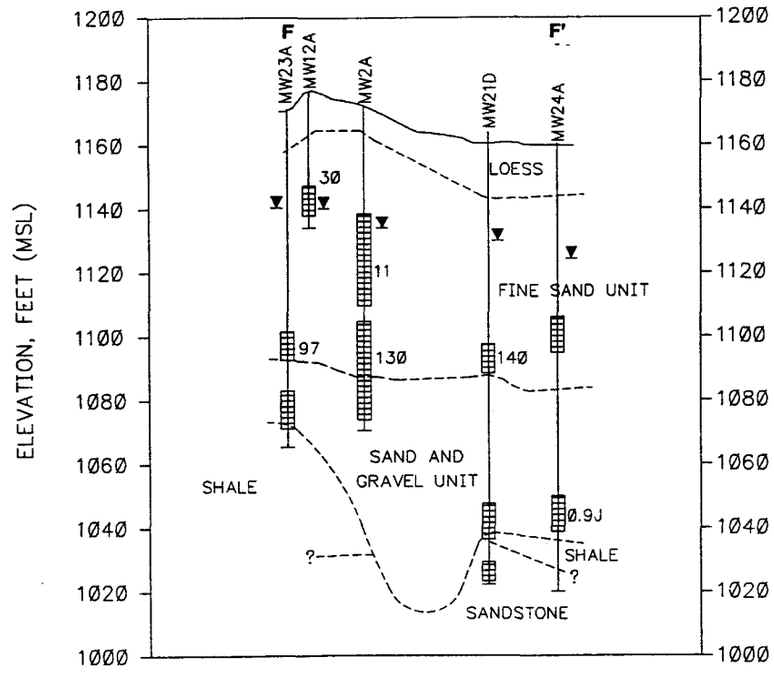
LOCATIONS OF RDX AND TCE VERTICAL EXTENT CROSS-SECTIONS

Scale: 1 INCH = 4000 FEET
Date: MAY, 1993
Dwg. No.: 4-16
Sheet number: 1

MACRO FILE: 92KW03JJ

COE 031816 MECOEK 3669

B07NE003702-04091



LEGEND:

MW23A — LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

▤ — SCREENED INTERVAL OF EACH WELL IN CLUSTER

▼ — GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.9J — TCE CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 1.0 $\mu g/L$). "J" INDICATES CONCENTRATION BELOW QUANTIFICATION LIMIT.

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SHALE IN THIS CROSS-SECTION IS PART OF THE OMADI SHALE FACIES.
6. ALL SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000

SCALE FEET

Revisions

Symbol	Descriptions	Date	Apprv'd

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by: RJS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF TCE DETECTED IN GROUNDWATER CROSS-SECTION F-F'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-17
Sheet number: 1

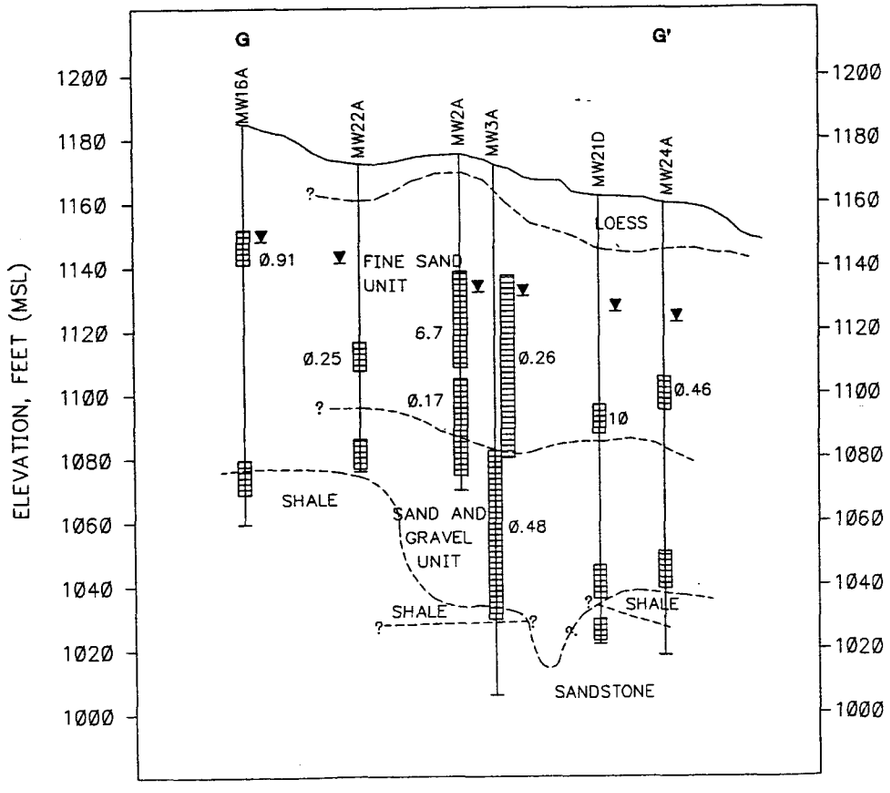
ACAD FILE: 92KW030S

ACAD FILE: 92KW030S
M.A.L. SC: 1=1

COE 031817

MECOEK 3670

B07NE003702-04092



LEGEND:

MW16A LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL OF EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.25 RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-15 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SHALE IN THIS CROSS-SECTION IS PART OF THE OMADI SHALE FACIES.
6. ALL SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000

SCALE FEET

Revisions

Symbol	Descriptions	Date	Apprv'd

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR, NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION G-G'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-16
Sheet number: 1

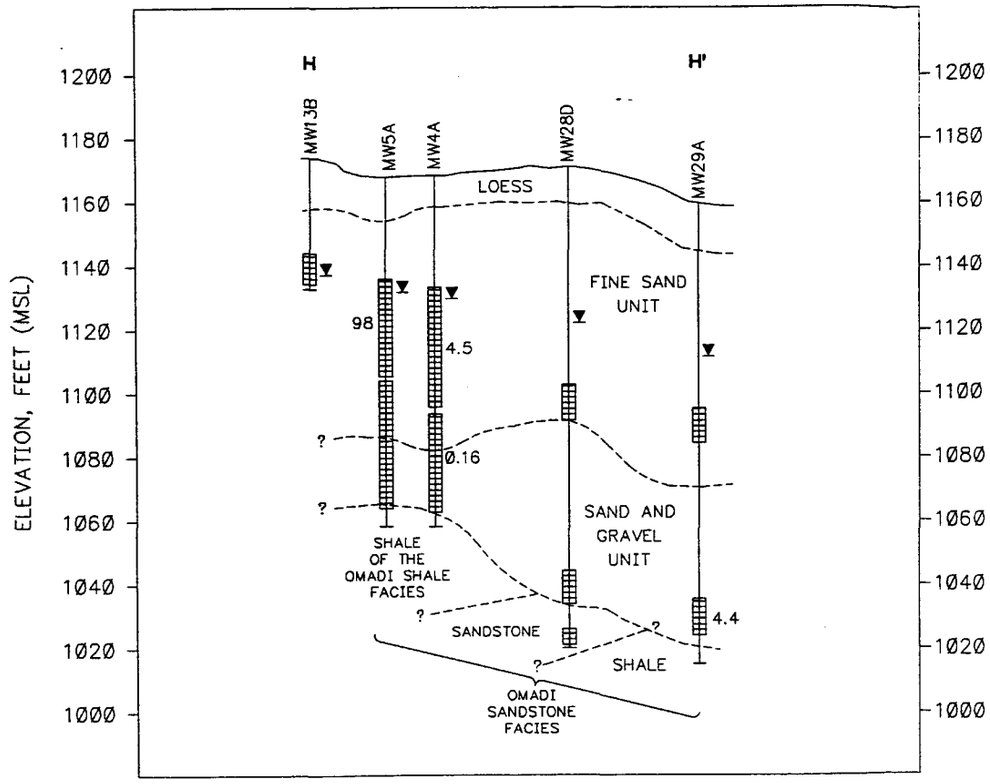
ACAD FILE: 92KW030V

COE 031818

ACAD FILE: 92KW030V
M.A.L. SC: 1=1

MECOEK 3671

B07NE003702-04093



LEGEND:

MW13B — LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

▤ — SCREENED INTERVAL OF EACH WELL IN CLUSTER

▼ — GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.16 — RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.

4000 0 4000 8000
SCALE FEET

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION H-H'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-19
Sheet number: 1

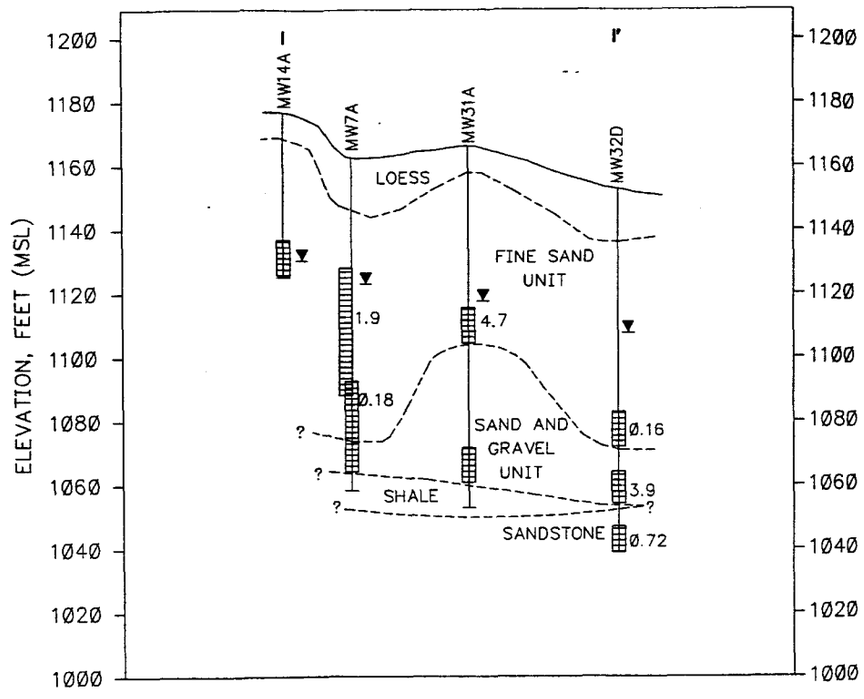
ACAD FILE: 92KW030U

COE 031819

ACAD FILE: 92KW030U
M.A.L. SC: 1=1

MECOEK 3672

B07NE003702-04094



LEGEND:

MW14A LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL OF EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.16 RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SHALE IN THIS CROSS-SECTION IS PART OF THE OMADI SHALE FACIES.
6. ALL SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000

SCALE FEET

Revisions			
Symbol	Descriptions	Date	Apprv'd

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION I-I'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-20
Sheet number: 1

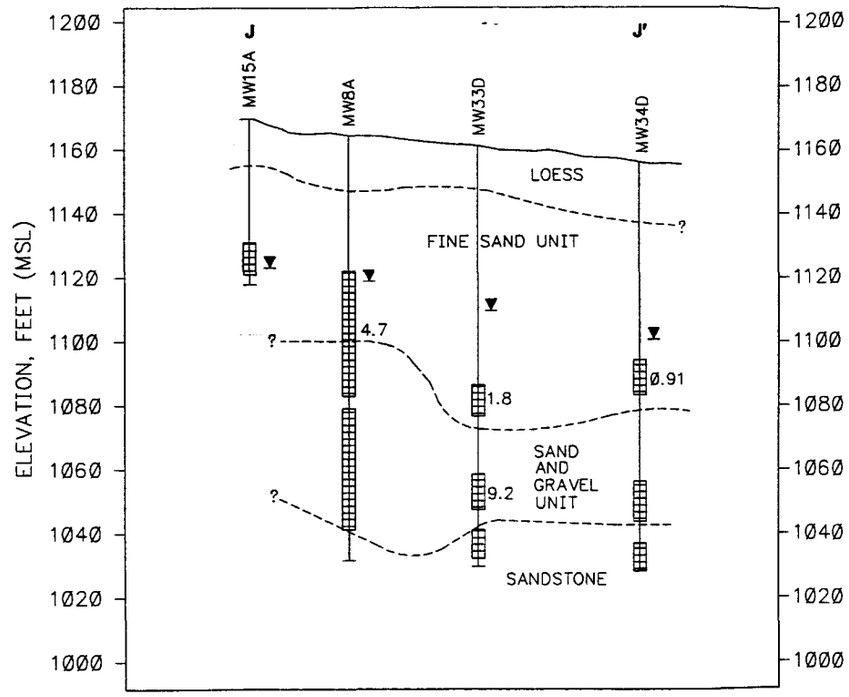
ACAD FILE: 92KW030W

COE 031820

ACAD FILE: 92KW030W
M.A.L. SC: 1=1

MECOEK 3673

B07NE003702-04095



LEGEND:

MW15A — LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

▥ — SCREENED INTERVAL OF EACH WELL IN CLUSTER

▼ — GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.91 — RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. THE SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000
SCALE FEET

Revisions			
Symbol	Descriptions	Date	Apprv'd

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION J-J'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-21
Sheet number: 1

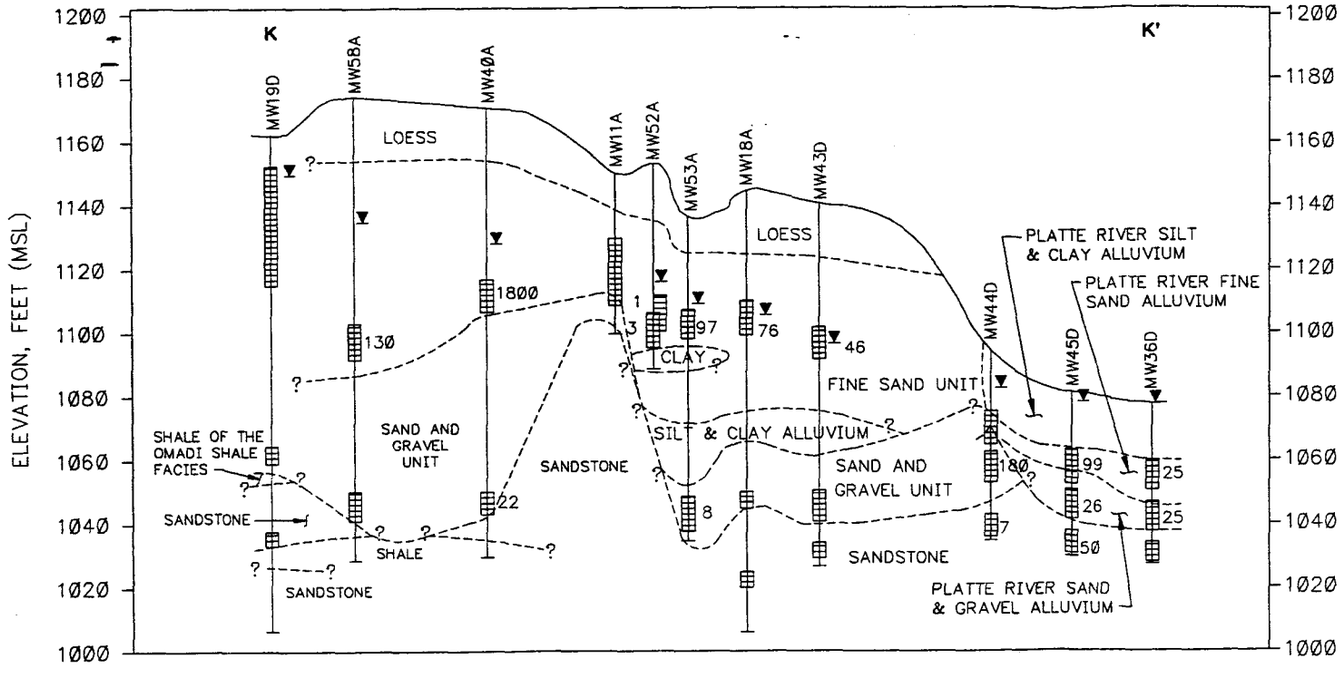
ACAD FILE: 92KW030N

COE 031821

05/05/93 18:41
ACAD FILE: 92KW030N
M.A.L. SC: 1=1

MECOEK 3674

B07NE003702-04096



LEGEND:

MW19D LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL OF EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

25 TCE CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 1.0 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SANDSTONES AND SHALES IN THIS CROSS-SECTION ARE PART OF THE OMADI SANDSTONE FACIES UNLESS OTHERWISE NOTED.

4000 0 4000 8000

SCALE FEET

Revisions			
Symbol	Descriptions	Date	Apprv'd

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by: RES

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF TCE DETECTED IN GROUNDWATER CROSS-SECTION K-K'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-22
Sheet number: 1

ACAD FILE: 92KW030P

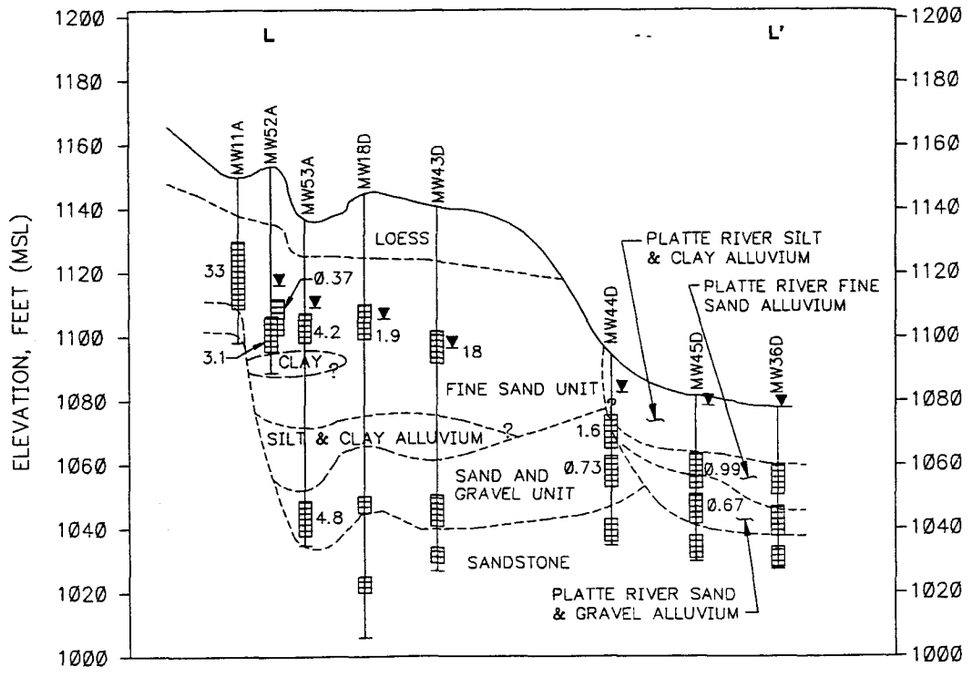
COE 031822

05/05/93 18:46:

ACAD FILE: 92KW030P
M.A.L. SC: 1=1

MECOEK 3675

B07NE003702-04097



COE 031823

LEGEND:

MW52A LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

▤ SCREENED INTERVAL OF EACH WELL IN CLUSTER

▼ GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.37 RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.

4000 0 4000 8000

SCALE FEET

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION L-L'

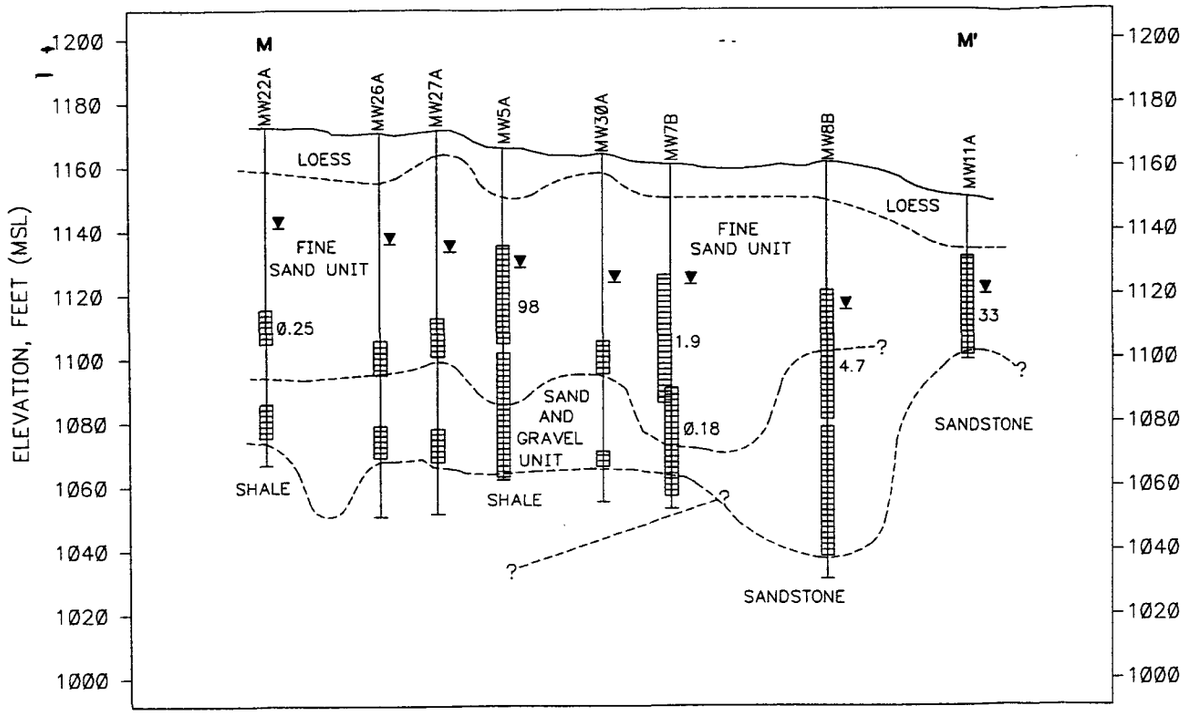
Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-23
Sheet number: 1

ACAD FILE: 92KW030X

ACAD FILE: 92KW030P
M.A.L. SC: 1=1

MECOEK 3676

B07NE003702-04098



LEGEND:

MW22A LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL OF EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

0.25 RDX CONCENTRATION DETECTED IN GROUNDWATER IN $\mu g/L$ (LIMIT OF DETECTION 0.15 $\mu g/L$).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.
5. ALL SANDSTONE IN THIS CROSS-SECTION IS PART OF THE OMADI SANDSTONE FACIES.
6. ALL SHALE IN THIS CROSS-SECTION IS PART OF THE OMADI SHALE FACIES.

4000 0 4000 8000
SCALE FEET

Revisions

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Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: G.P.
Drawn by: C.H.
Checked by: G.W.W.
Submitted by: RFS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF RDX DETECTED IN GROUNDWATER CROSS-SECTION M-M'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-24
Sheet number: 1

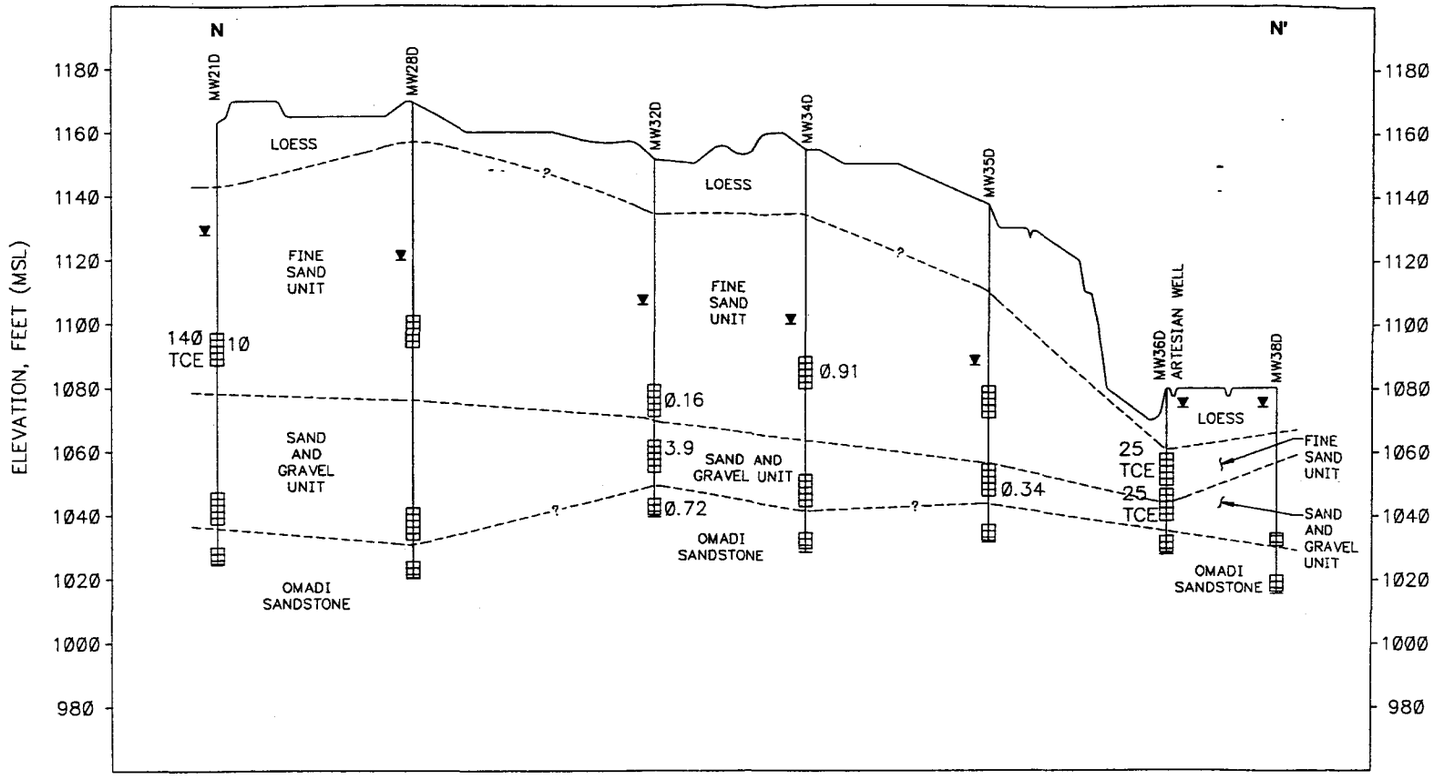
ACAD FILE: 92KW030M

COE 031824

ACAD FILE: 92KW030M
M.A.L. SC: 1=1

MECOEK 3677

B07NE003702-04099



4000 0 4000 8000
SCALE FEET

LEGEND:

MW21D LOCATION OF DEEPEST MONITORING WELL BORING IN EACH CLUSTER

SCREENED INTERVAL OF EACH WELL IN CLUSTER

GROUNDWATER LEVEL FOR DEEPEST WELL IN CLUSTER AS MEASURED ON OCTOBER 14, 1992

10 RDX CONCENTRATION DETECTED IN GROUNDWATER IN µg/L (LIMIT OF DETECTION 0.15 µg/L).

140 TCE TCE CONCENTRATION DETECTED IN GROUNDWATER IN µg/L (LIMIT OF DETECTION 1.0 µg/L).

NOTES:

1. SEE DRAWING 4-16 FOR VERTICAL EXTENT CROSS-SECTION LOCATIONS.
2. ALL CONCENTRATIONS NOT DETECTED UNLESS INDICATED.
3. SUBSURFACE GEOLOGIC CONDITIONS ARE BASED ON MONITORING WELL BORING LOGS. GEOLOGIC CONDITIONS SHOWN AWAY FROM BORINGS ARE INTERPRETIVE.
4. VERTICAL EXAGGERATION 100X.

Revisions

Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
Overland Park, Kansas

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: R.G.P.
Drawn by: M.A.L.
Checked by: G.W.W.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO.2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

CONCENTRATIONS OF TCE AND RDX DETECTED IN GROUNDWATER CROSS-SECTION N-N'

Scale: AS NOTED
Date: MAY, 1993
Dwg. No.: 4-25
Sheet number: 1

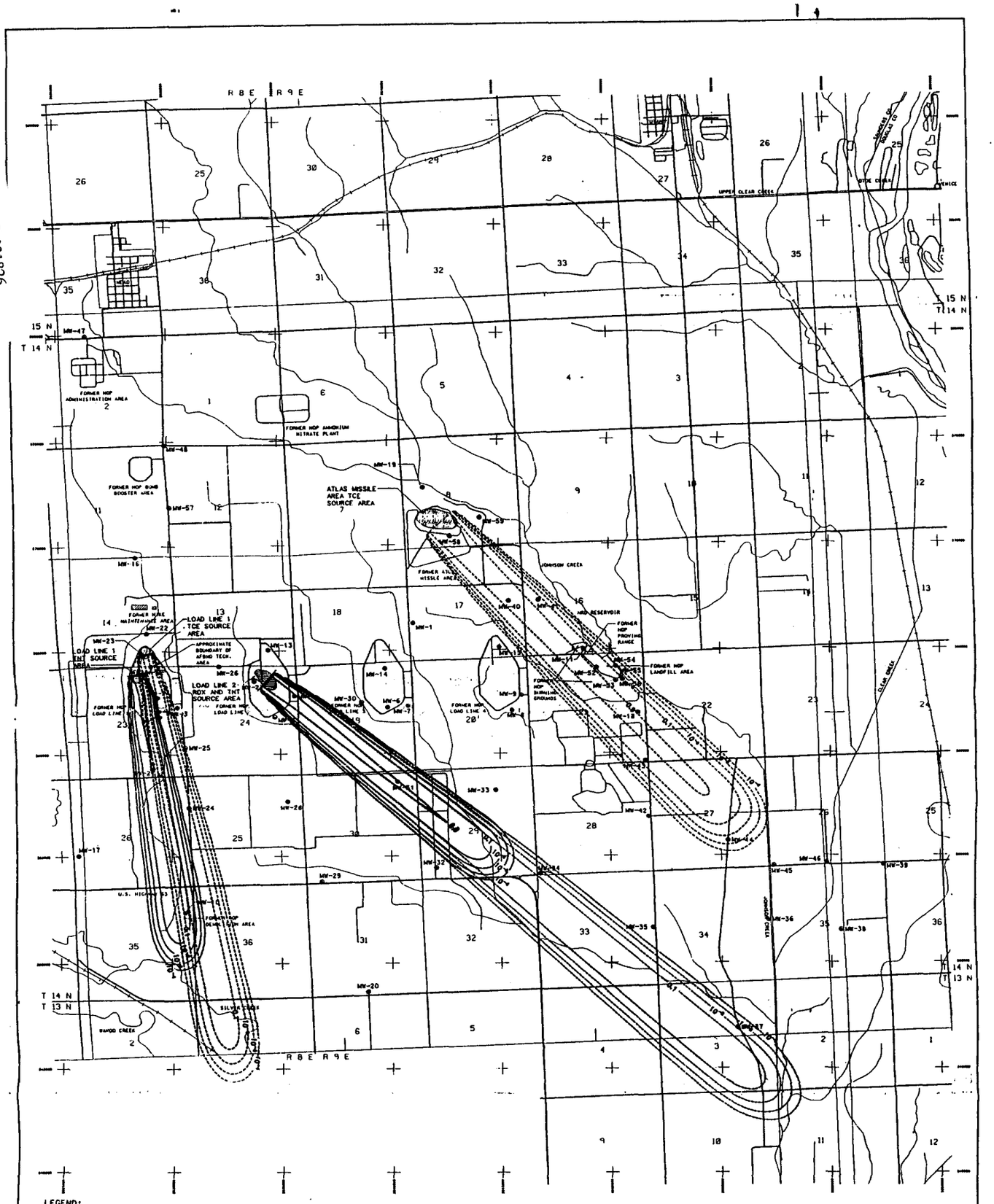
ACAD FILE: 92KW030G

COE 031825

MECOEK 3678

05/11/93 13:02:51
M.A.L. SC: 1=1

B07NE003702-04100



LEGEND:

- ●MW-10 GROUNDWATER MONITORING WELL CLUSTER LOCATION
- RDX AND/OR TNT SOURCE AREA
- TCE SOURCE AREA
- 36 SECTION
- T 14 N TOWNSHIP 14 NORTH
- R 9 E RANGE 9 EAST
- —0.9— SIMULATED UNITIZED TNT CONCENTRATION
- ---0.9--- SIMULATED UNITIZED TCE CONCENTRATION
- —0.9— SIMULATED UNITIZED RDX CONCENTRATION

NOTES:

1. THE SIMULATED UNITIZED CONCENTRATION IS THE RATIO (C/C_0) OF THE SIMULATED CONCENTRATION (C) TO THE SIMULATED INITIAL CONCENTRATION AT THE SOURCE (C_0).
2. THE SIMULATIONS USED ESTIMATE TRANSPORT PARAMETERS DISCUSSED IN SECTION 5.
3. NORTHING AND EASTING LINES ARE TIED TO NEBRASKA STATE PLANAR COORDINATES.

SOURCE: USGS 7.5 MIN QUADRANGLES (1969) FOR MEAD, ASHLAND EAST, ASHLAND WEST, AND MANN 1927 NAD, 1929 NGVD

N

SCALE 1:24000

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by:

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

SIMULATED GROUNDWATER TRANSPORT OF RDX, TNT, AND TCE

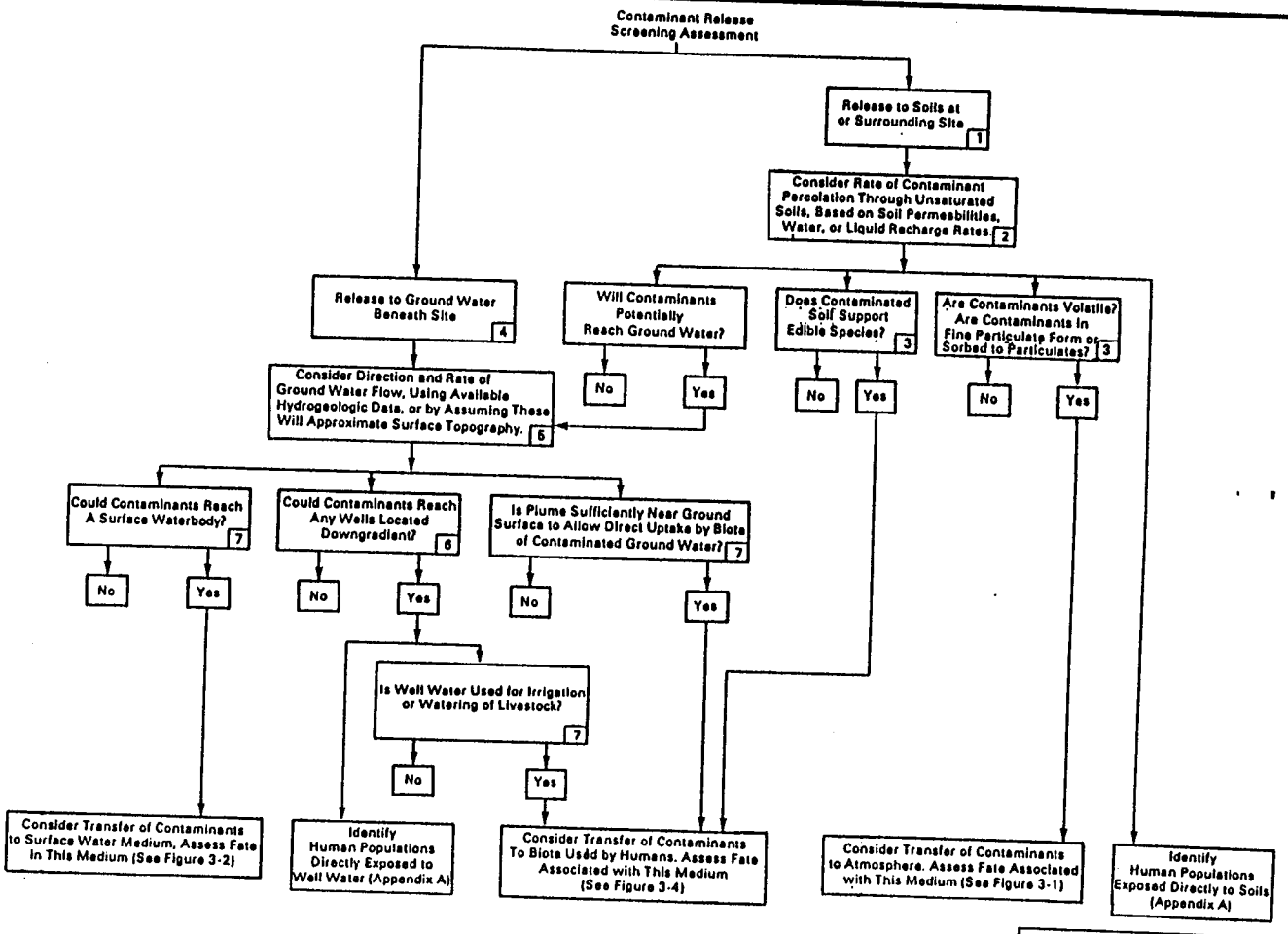
Scale: 1 IN = 2000 FT
Date: MAY, 1993
Dwg. No.: 5-3
Sheet number: 1

MICRO FILE: 93K#03FF

COE 031826

MECOEK 3679

B07NE003702-04101



Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

Designed by: A.C.E.
Drawn by: S.B.
Checked by: D.C.C.
Submitted by: RAS

U.S. Army Corps of Engineers

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FMR. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

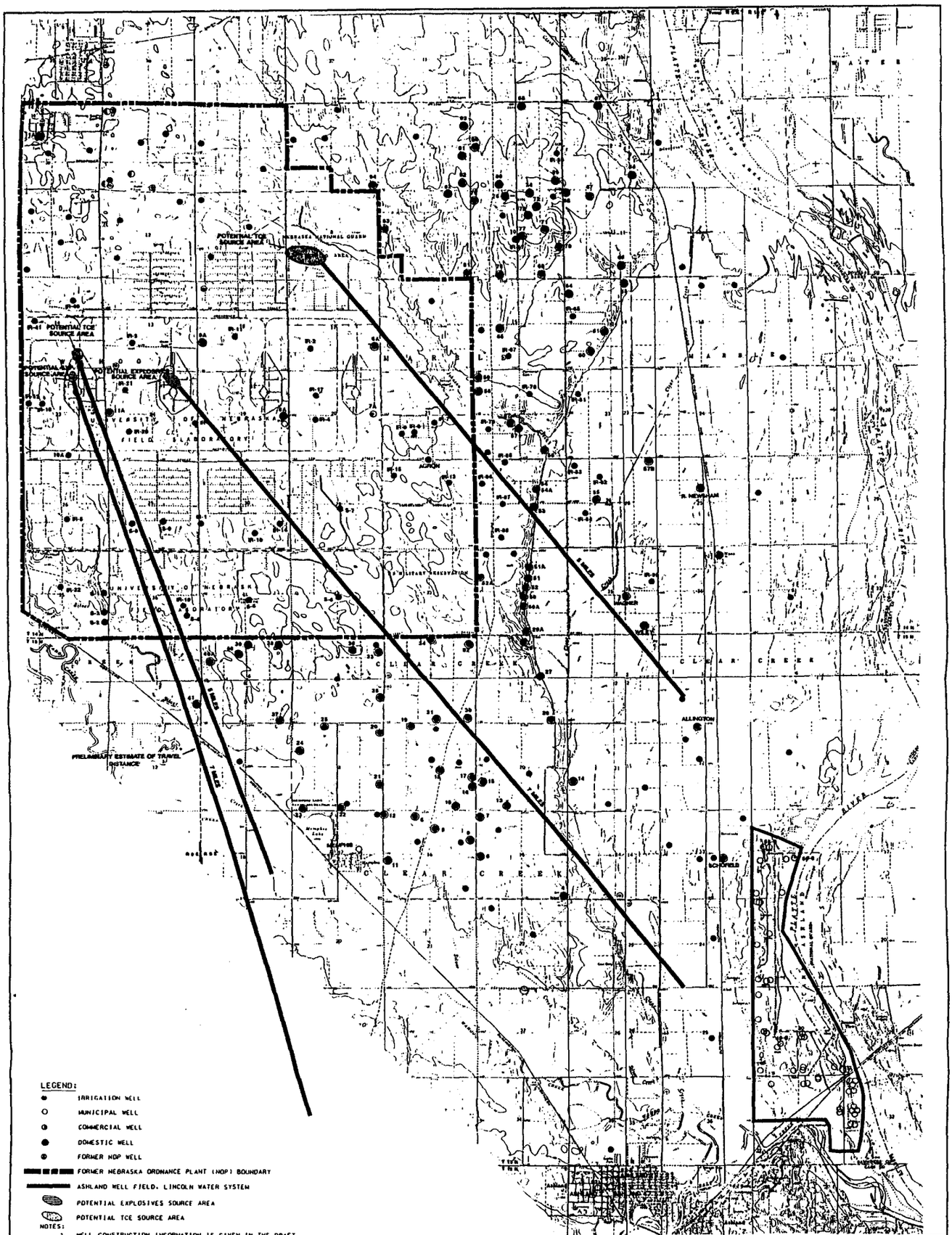
ENVIRONMENTAL FATE SCREENING ASSESSMENT DECISION NETWORK:SOILS AND GROUNDWATER (USEPA, 1988b)

Scale: NONE
Date: MAY, 1993
Dwg. No.: 5-1
Sheet number: 1

MECOEK 3680

COE 031827

B07NE003702-04102



LEGEND:

- IRRIGATION WELL
- MUNICIPAL WELL
- COMMERCIAL WELL
- DOMESTIC WELL
- FORMER NOP WELL
- FORMER NEBRASKA ORDNANCE PLANT (NOP) BOUNDARY
- ASHLAND WELL FIELD, LINCOLN WATER SYSTEM
- POTENTIAL EXPLOSIVES SOURCE AREA
- POTENTIAL TCE SOURCE AREA

NOTES:

1. WELL CONSTRUCTION INFORMATION IS GIVEN IN THE DRAFT GROUNDWATER WELL INVENTORY TECHNICAL MEMORANDOM (WCC, 1992).
2. THE WELL NUMBERS ASSIGNED DURING PREVIOUS USACE INVESTIGATIONS ARE SHOWN AT THE APPROPRIATE WELL LOCATIONS WHERE APPLICABLE.

N

SCALE 1:30000

SOURCE: USGS QUADRANGLES MEAD, WANN, ASHLAND EAST & WEST, SAUNDERS COUNTY NEBRASKA

DRAWING REDUCED

Revisions			
Symbol	Descriptions	Date	Approved

Woodward-Clyde Consultants
OVERLAND PARK, KANSAS

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
KANSAS CITY, MISSOURI

REMEDIAL INVESTIGATION
FOR OPERABLE UNIT NO. 2 - GROUNDWATER
FORM. NEBRASKA ORDNANCE PLANT - MEAD, NEBRASKA

PRELIMINARY ANALYSIS OF GROUNDWATER CONTAMINATION MIGRATION

Designed by: A.C.E.
Drawn by: D.R.T.
Checked by: D.C.C.
Submitted by: RSB
Scale: 1IN = 3500 FT
Date: MAY, 1993
Dwg. No.: 5-2
Sheet Number: 1

MECOEK 3681

COE 031828

B07NE003702-04103

DRAFT REPORT

REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA

DACA 41-92-C-0023

Prepared for
Department of the Army
U.S. Army Engineers District
Kansas City District
Corps of Engineers
Kansas City, Missouri

February 1993

Woodward-Clyde

Woodward-Clyde Consultants
5055 Antioch Road
P.O. Box 3777
Overland Park, Kansas 66203-0777

Volume II of IV

APPENDIX A
BORING LOGS

APPENDIX A TABLE OF CONTENTS

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OCH 7/14/92

HTW DRILLING LOG

HOLE NO. ADS-03 B

SHEET 1 OF 3 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578433-E.2826673
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾" HSA 0'-18'; 3" O.D. Stainless Steel Split Spoon 6'-8', 18'-20'	8. HOLE LOCATION: NW 1/4, SE 1/4, NE 1/4 ADS-003 sec 2, T14N, R8E
	9. SURFACE ELEVATION: 1201.48
	10. DATE STARTED: 7-10-92/1007
	11. DATE COMPLETED: 7-10-92/1035
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None Detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
ADS-003-06B ADS-003-18B	X	X	Semi-VOC X	Pest/PCB X	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X	NA	NA	Robert R Mallinc

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	~~Fat~~ LEAN Clay (CL) firm, medium brown, moist, with some fine grained sand and CaCO3 nodules (Loess)					Boring advanced with 7¾" HSA. Boring logged by cuttings.
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ADS-03B B1 1

HTW DRILLING LOG

HOLE NO. ADS-03B

Remedial Investigation Mead NOP | INSPECTOR Robert R Mallisee | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) loosed, light brown, ~~moist~~ dry, Fine grained sand. (Alluvium)					
	6		~~BZ=BKG~~ ~~Sample~~ ~~HS=~~ ~~ND~~ HNU: Breathing zone (BZ), sample head space (HS) = BG (back-ground)	6'	~~ADS-03-06B~~	P	Pushed 3" O.D. Stainless Steel split spoon 6'-8' Recovery 24/24" Collected Sample @ 1020 7-10-92
	7						
	8			8'			
	9						
	10						
	11						
	12						
	13						
	14						

ICUHPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-03B 2

HTW DRILLING LOG

HOLE NO. ADS-03B

Remedial Investigation Mead NOP | INSPECTOR Robert Mallice | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, dry, Fine grained sand. (Alluvium)					
	15						
	16						
	17						
	18		B2= BKGBG sample HS= ND	18	ADS-003 - 18B	15	Drove 3" O.D. stainless steel split spoon from 18'-20'
						16	Recovery D#1 P=2.0 22/24" R=1.8
	19					25	Collect sample @ 1045 7-10-92
						35	20.0'
	20			20			B.O.B @ 20'
	21						Note: Boring backfilled with cuttings + bentonite from 20-2' + grout bentonite from 2' to surface.
	22						Completed @ 1050 7-10-92
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-03B

3

ICONPS4-18-92

CEA 7/1/92

HTW DRILLING LOG

HOLE NO. ADS-05B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578056 - E.2827059
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" HSA 0'-18'; 3" O.D. Stainless Steel Split Spoon 6'-8', 18'-20'	8. HOLE LOCATION: NW 1/4, SE 1/4 sec. 2 ~~ADS-005~~ T14N, R8E
	9. SURFACE ELEVATION: 1198.66
	10. DATE STARTED: 7-10-92/1117
	11. DATE COMPLETED: 7-10-92/1240
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ N			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ADS-04B~~ ~~ADS-05B~~ 2	X	X	Pest/PCB X	Semi-VOC X	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X	NA	NA	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean Clay (CL) firm, dark brown, dry (Topsoil)					Boring advanced with 7 7/8" HSA. Boring logged by cuttings.
	1						
	2						
	3	LEAN 3.5' ~~Fat~~ Clay (CL) firm medium brown, dry (Loess)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 ADS-05B 4

HTW DRILLING LOG

HOLE NO. ADS-05B

Remedial Investigation Mead NOP | INSPECTOR Robert R Mallucci | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Fat clay (CL) firm, medium brown, dry					
	6		HNU: BZ = BG Sample HS = ND	6	ADS-05S -06B	P	Pushed 3" O.D. Stainless Steel Split Spoon 6-8' D#1 Recovery P=2.0 3/4 R=2.0 Collected Soil Sample @ 1142 7-10-92
	7						
	8			8			
	9						
	10						
	11						
	12						
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92K0030

HOLE NO.: ADS-05B

ICOMPS/4-16-92

HTW DRILLING LOG

HOLE NO. ADS-05B

Remedial Investigation, Mead NOP | INSPECTOR Robert R Mallise | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL) firm, brown, dry					
	15						
	16						
	17						
		17.5'					
		Poorly Graded SAND (SP) loose, light brown, moist, Fine grained, sand	HNV: BG B2=BKG Sample HS= ND		ADS-005-18B	8	Prove 3" O.D. Stainless Steel Split Spoon 18-20' Recovery ~~20 feet~~ D# 2 P = 2.0' R = 1.7' collected Soil sample @ 1214 7-10-92
	18					15	
	19					19	
						23	
							20.0'
	20						B.O.B. @ 20' Note: Boring backfilled with cuttings & bentonite from 20'-2' & granular bentonite from 2' to surface. Completed @ 1245 7-10-92
	21						
	22						
	23						

ICOHPW4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-05B 6

See "Remarks". This additional Hole was drilled in order to obtain Required Sample Volume RCH 7/14/92

HTW DRILLING LOG

HOLE NO. ADS-5B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578056-E.2827059
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾" HSA 0-18'; 3" O.D. Stainless Steel Split Spoon 18-20'	8. HOLE LOCATION: ADS-~~00~~5B - 2nd BORING
	9. SURFACE ELEVATION: 1198.66
	10. DATE STARTED: 7-10-92/1220
	11. DATE COMPLETED: 7-10-92/1240
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
ADS-005-18B	X	X	Semi-Voc X	Pest/PCB X	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X	NA	NA	Robert R Mallieo

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ clay (CL) firm dark brown, dry (Topsoil)					Boring advanced with 7¾" HSA. Boring logged by cuttings. Note- 2nd boring drilled at ADS-5B for additional sample volume.
	1						
	2						
	3						
		3.5' LEAN ~~Silty~~ clay (CL) firm, medium brown, dry (Loess)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1

HTW DRILLING LOG

HOLE NO. ADS-5B

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Silty~~ clay (CL) firm medium brown, dry (LOESS)					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-

HTW DRILLING LOG

HOLE NO. ADS-5B

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15						
	16						
	17						
		17.5' Poorly Graded SAND (SP) loose, light brown, moist Fine grained, ~~sand~~ (Alluvium)					
	18				ADS-005-18B	11	Drove 3" Stainless Steel split spoon 18-20' ~~Recovery 22/24~~ D#1 P=2.0' R=1.8'
						12	collected soil sample at 7-10-92/1214
	19					17	
						21	
	20						B.O.B. Note: Boring backfilled with cuttings + bentonite from 20-2' + granular bentonite to surface completed 7-10-92/1245
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-

CRM 7/12/92

HTW DRILLING LOG

HOLE NO. ADS-10B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578618 - E.2826098
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾" HSA 0'-3'; 3" O.D. Stainless Steel Split Spoon 3'-5'	8. HOLE LOCATION: NW 1/4, SE 1/4 Sec. 2 T14N, R8E; ~~ADS-010~~
	9. SURFACE ELEVATION: 1201.65
	10. DATE STARTED: 7-10-92/0915
	11. DATE COMPLETED: 7-10-92/0935
12. OVERBURDEN THICKNESS: ~~NA~~ 5.0'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ADS-010-03B~~ 1	X	X	Semi-VOC X	Pest/PCB X	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with bentonite & cuttings	X	NA	NA	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Fat~~ Clay (CL), firm, medium brown, moist (Loess)					Boring advanced with 7¾" HSA. Boring logged by cuttings.
	1						
	2						
	3		HNU: BZ= BKG Sample HS= NO	3	ADS-010-03B	P	Pushed 3" O.D. Stainless Steel Split Spoon 3-5' D#1 ~~Recovery 18 1/4"~~ P=2.0 R=1.5
	4						Collected Soil Sample @ 0935 7-10-92
	5			5			

/CORPS/6-18-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: ADS-10B | B1 10

HTW DRILLING LOG

HOLE NO. ADS-10B

Remedial Investigation Mead NOP | INSPECTOR Robert R Mallise | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6						B.O.B. @ ~~20'~~ 5.0' NOTE: Boring backfilled with bentonite from 2'-Surface. Completed @ 09~~10~~ 7-10-92 cuttings backfilled from 5'-2'
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICONPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-10B

OMA 7/11/92 (4)

HTW DRILLING LOG

HOLE NO. ADS-22B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.577821 - E.2826559
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 3/8" HSA 0'-18'; 3" O.D. Stainless Steel Split Spoon 6'-8', 18'-20'	8. HOLE LOCATION: NW 1/4 SE 1/4 sec. 2 ~~ADS-022~~ T14N, R8E
	9. SURFACE ELEVATION: 1202.92'
	10. DATE STARTED: 7-10-92 / 1322
	11. DATE COMPLETED: 7-10-92 / 1343
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ADS-022-06B~~ ~~ADS-022-18B~~ 2	X	X	Semi-VOC X	Pest/PCB X	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings + bentonite	X	NA	NA	Robert R Mallesie

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Fat~~ Clay (CL), Firm, medium brown, moist (Loess)					Boring Advanced with 8 3/4" HSA. Boring logged by cuttings.
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ADS-22B B1 12

HTW DRILLING LOG

HOLE NO. ADS-22B

Remedial Investigation Mead NOP

INSPECTOR Robert R Mallirel

SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Fat Clay (CL) Firm, medium brown, moist. (Loess)					
	6		HNU BZ=ND Sample HS=ND	6	ADS-022-06B	P	Pushed 3" O.D. Stainless Steel split spoon 6-8' Recovery 24/24" Collected soil sample @ 1335 7-10-92
	7						
	8			8			
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-22B 13

HTW DRILLING LOG

ADS-22B

Remedial Investigation, Mead NOP | Robert R Mallice | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Fat~~ Clay (CL) Firm, medium brown, moist.					
	15						
		16.5' Poorly Graded SAND (SP) loose, light brown, (moist) Fine grained, ~~Sandy~~ (Alluvium)					
	16						
	17						
			HNU				
	18		BZ=~~ND~~ BG Sample HS=ND	18	ADS-022-18B	8	Drove 3" O.D. Stainless Steel split Spoon 18'-20' D#2 ~~Recovery 18/24~~ P=2.0 R=1.5
						18	
	19					27	collected sample @ 1347 7-10-92
						36	
	20			20			20.0' B.O.B. @ 20'
	21						NOTE: Boring backfilled with cuttings & bentonite from 20'-2' + granular bentonite from 2' to Surface. Completed @ 1350 7-10-92
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ADS-22B 14

ICOHPW4-18-82

HTW DRILLING LOG

HOLE NO. ATL-06B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571006 - E.2844377
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-18'; 3" OD split spoon 6'-8', 18'-20'	8. HOLE LOCATION: ~~ATL-06~~ SE 1/4 SW 1/4 Sec. 8 T14N, R9E
	9. SURFACE ELEVATION: 1166.57
	10. DATE STARTED: 6-12-92 0800
	11. DATE COMPLETED: 6-12-92 0830
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
ATL006060 @ 6', ATL006180 @ 18'	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X	NA	NA	J. O'Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, very dark brown, moist, (Topsoil) ~~medium plastic~~					WC ≥ PL; Boring advanced with 7¼" HSA. Boring logged by cuttings.
	2	LEAN (CL) 2.0' ~~FAT~~ CLAY ~~(CH)~~, firm, medium brown, moist (LOESS)					WC > PL
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-06B

15

B07NE003702-04121

HTW DRILLING LOG

ATL-06B

Remedial Investigation, Mead NOP | INSPECTOR: J. Mealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, light brown and gray, dry with black specks and iron staining (LOESS)					WC<PL
	6		HNU: Sample HS= ND	6	ATL06068	P	Pushed 3" OD split spoon 6-8'. ~~Recovery 16/24.~~ Collected soil @ 0820 hours. D#1 P=2.0 R=1.3
	7						
	8		BZ= ~~ND~~ BG	8			
	9						
	10						
	11						
	12	POORLY GRADED SAND (SP) med dense, light tan (moist) ~~damp~~, fine grained (ALLUVIUM) 12.0'					
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: ATL-6B

/CORPS/4-18-82

HTW DRILLING LOG

ATL-06B

Remedial Investigation, Mead NOP | INSPECTOR: J. Nealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), med. dense, light tan, ~~damp~~, fine grained, (ALLUVIUM)					
	15	moist					
	16						
	17						
	18		Sample HS = ND	18	ATL006 18B	13	Drove 3" OD split spoon 18'-20'.
	19					19	Recovery 21/24. D#2 P=2.0' R=1.75'
						26	Collected soil sample @ 0840 hours.
	20	20.0	~~B2=ND~~ BG	20		29	Bottom of Boring @ 20'
	21						NOTE: Boring backfilled with cuttings and bentonite from 20'-2', and with granular bentonite from 2' to surface. Completed at 0852 hours 6-12-92.
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-06B

HTW DRILLING LOG

HOLE NO. ATL-26B

SHEET 1 OF 2 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.572759-E.2841779
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME 55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-6'; 3" OD Split Spoon 6'-8'	8. HOLE LOCATION: ~~ATL-26~~ SE 1/4 NW 1/4 sec. 2 T14N, R8E
	9. SURFACE ELEVATION: 1152.57
	10. DATE STARTED: 6-10-92 1021 / 11. DATE COMPLETED: 6-10-92 1027
12. OVERBURDEN THICKNESS: ~~NA~~ 8'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-26-6B @ 6'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X	NA	NA	John D Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, very dark brown, moist (TOPSOIL)					Boring advanced with 7¼" HSA. Boring logged by cuttings.
	1						
	2						
	3	Becoming brown to dark brown					WC ≈ PL
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-26B

HTW DRILLING LOG

HOLE NO. ATL-26B

Remedial Investigation, Mead NOP | INSPECTOR J. Nealon | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, brown to dark brown, moist (Topsoil)	HNU: BZ=~~ND~~ BG Sample HS=ND				WC<PL
	6	LEAN CLAY (CL), firm, brown, moist to wet (LOESS)		6	ATL-26-6B	P	WC>PL R# 1 Recovery 10/24.0 P=2.0' R=0.8' Used 3"OD split spoon to obtain sample at 1030 hours.
	7						
	8	8.0		8			Bottom of Boring @ 8'.
	9						
	10					vol clay	NOTE: Boring backfilled with cuttings and bentonite mixture from 8 to 2' and grout from 2' to surface. Completed @ 1042 hours, 6-10-92.

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-26B

HTW DRILLING LOG

HOLE NO. ATL-31B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571526-E.2842948
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-6'; 3" OD Split Spoon 6'-8'	8. HOLE LOCATION: ATL-31B SW 1/4 NE 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1170.05
	10. DATE STARTED: 6-10-92 1130
	11. DATE COMPLETED: 6-10-92 1136
12. OVERBURDEN THICKNESS: ~~NA~~ 8.0'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~NONE~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-31-6B @ 6'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings, bentonite	X	NA	NA	J. Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, brown, dry with roots (topsoil)					WC<PL Boring advance with 7¼" HSA. Boring logged with cuttings. WC<PL
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-31B

20

HTW DRILLING LOG

HOLE NO. ATL-31B

Remedial Investigation, Mead NOP | INSPECTOR J. Nealon | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		CLEAN CLAY (CL), firm, light brown, dry with black specks and iron staining (LOESS)	HNV BG BZ=~~ND~~ Sample HS=ND				WC<PL
	6			6	ATL-031-06B	P	Collected soil sample at 6.0' @ 1140 hours. Used 3" OD split spoon. ~~Recovery~~ D# ~~22/24~~ P=2.0' R=1.8'
	7						
	8	8.0		8			Bottom of Boring @ 8'.
	9						NOTE: Boring backfilled with cuttings/bentonite mixture from 8' to 2' and volclay grout from 2' to surface. Completed @ 1149 hours 6-10-92.
	10						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-31B

HTW DRILLING LOG

HOLE NO. ATL-37B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR:
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.570044 - E.2844351
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-6'; 3" OD split spoon 6'-8'	8. HOLE LOCATION: ATL-37 SE¼, SW¼ sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1171.36
	10. DATE STARTED: 6-11-92 1423 / 11. DATE COMPLETED: 6-11-92 1428
12. OVERBURDEN THICKNESS: ~~NA~~ 8'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-037-06B~~ 1	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X	NA	NA	J. Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS (CL)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~LEAN~~ ~~FAT~~ CLAY ~~(CH)~~, ~~[illegible]~~ hard brown, damp to moist, with roots, (FILL) ~~medium plasticity~~ (CL)					~~[illegible]~~ WC>PL
	1	LEAN ~~FAT~~ ~~[illegible]~~ CLAY ~~(CH)~~, ~~[illegible]~~, hard, very dark brown, moist, (Topsoil) ~~medium plasticity~~					~~[illegible]~~ WC>PL
	2						Boring advanced with 7¼" HSAs. Boring logged by cuttings
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~NA~~ ATL-37B

22

HTW DRILLING LOG

HOLE NO. ATL-37B

Remedial Investigation, Mead NOP

INSPECTOR S. Nealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~FAT~~ LEAN CLAY (CL), hard, brown, moist, with roots, (LOESS)					WC → PL
	6		HNU: Sample HS=ND	6	ATL-037-06B	P	Pushed 3" OD split spoon 6-8'. D#1 P=2.0' R=1.4' ~~Recovery~~ ~~17/24~~ Collected soil sample at 1435 hours.
	7						
	8	8.0	BZ=~~ND~~ BG	8			Bottom of Boring @ 8'.
	9					NOTE:	Boring backfilled with cuttings and bentonite from 8' to 2' and with granular bentonite from 2' to surface. Completed 1440 at hours, 6-11-92.
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-37B

HTW DRILLING LOG

HOLE NO. ATL-48B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.570798 - E.2844179
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-18'; 3" OD split spoon 18-20'; 6'-8'	8. HOLE LOCATION: ATL-48 sec. 8 T14N, R9E
	9. SURFACE ELEVATION: 1171.58
	10. DATE STARTED: 6-10-92 1300
	11. DATE COMPLETED: 6-10-92 1359
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-048-198-0-18'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			J. Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm to hard, very dark brown, dry to moist (Topsoil)					WC<PL; Advanced boring with 7¼" HSA. Boring logged by cuttings
	2	LEAN CLAY (CL), firm to hard, brown, dry to moist (LOESS)					WC<PL
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-48B

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HTW DRILLING LOG

HOLE NO. ATL-48B

Remedial Investigation Mead NOP | INSPECTOR J. Mealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(~~[illegible]~~) LEAN CLAY, (CL), firm to hard, brown, dry to moist (LOESS)					WC<PL
	6			Sample ④ HS=ND	ATL-048-06B	P	~~[illegible]~~ Pushed 3" OD split spoon ~~[illegible]~~ 6-8'. Recovery 22/24. Collected first soil sample @ 1310 hrs.
	7		HNU BZ=BG sample HS=ND				P#1 P=2.0 R=1.8
	8			BZ=ND ③			
	9						Collected second soil sample at 6'-8' @ 1400 hours about 5' ~~[illegible]~~ south of ATL-48B. ⑥ 1400 hrs. Discarded first sample.
	10						
	11	Becomes moist					
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: ATL-48B

HTW DRILLING LOG

ATL-48B

Sheet 3 of 3 Sheets

Remedial Investigation, Mead NOP

Inspector: S. Mealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm to hard, moist (LOESS)					WC > PL
	15						
	16	POORLY GRADED SAND (SP), dense, light tan, fine grained (ALLUVIUM)					
	17						
	18		HNU Sample HS = 0.4 ppm	18	ATL-048-18B	7 / 8	Drove 3" OD split spoon 18'-20'. D=2 Recovery 24/24. P=2.0 R=2.0
	19					33	Collected soil sample @ 1320 hours.
			BG B2=ND			42	
	20	20.0		20			Bottom of Boring @ 20'.
	21						NOTE: Boring backfilled with cuttings/bentonite mixture up to 2 feet, and with volclay grout from 2' to surface. Completed @ 1445
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-48B

/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. ATL-58B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571798-E.2841753
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-18'; 2"OD SS 6'-8'; 3"OD SS 18'-20'	8. HOLE LOCATION: SW 1/4 NW 1/4 ~~ATL-58~~ sec. 8 T14N, R9E
	9. SURFACE ELEVATION: 1171.26
	10. DATE STARTED: 6-9-92 1106
	11. DATE COMPLETED: 6-9-92 1125
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: none detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~None~~	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
2 ~~ATL-58-6'-8' @ 6'~~ ~~ATL-58-18'-20' @ 18'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled w/ cuttings & bentonite	X	NA	NA	

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, brown, moist (LOESS)					WC > PL Boring advanced with 7¼" HSA. Boring logged by cuttings.
	2						
	3						
	4						
	5						

ICORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-58B

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HTW DRILLING LOG

ATL-58B

Remedial Investigation Mead NOP | INSPECTOR: John S Mealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm, brown, moist (LOESS)					WC > PL
	6				ATL-58-6B	P	D#1 P=2.0' R=0.8' Recovery 9/24. Not enough recovery for HS sample.
	7		HNU: BZ=0.3ppm				Pushed 2" OD split spoon 6'-8'
	8						Collected soil sample at 1115 hours.
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-58B 28

HTW DRILLING LOG

HOLE NO. ATL-58B

Remedial Investigation Mead NOP | INSPECTOR [illegible] | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm, brown, moist (LOESS)					WC > PL
	15						
	16	POORLY GRADED SAND (SP), dense, light tan, damp, fine grained (ALLUVIUM)					
	17						D # 2, P = 2.0', R = 2.0'
	18			18		9	Recovery 24/24.
	19				ATL-058-18B	21	Drove 3" OD split spoon 18'-20'.
						34	
	20	20.0	B2 = BG [redacted]	20		37	Collected soil sample at 1135 hours.
							Bottom of Boring @ 20'
	21						NOTE: Boring backfilled with cuttings and bentonite from 20' to 2' and with granular bentonite from 2' to surface. Completed at 1137 hours, 6-9-92.
	22						
	23						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: ATL-58B

HTW DRILLING LOG

HOLE NO. ATL-59B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.571551 - E.2891986
5. NAME OF INSPECTOR: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-18'; 2" OD split spoon 6'-8'; 3" OD split spoon 18'-20'	8. HOLE LOCATION: ATL-59 SW¼, NE¼ sec. 8 T14N, R9E
	9. SURFACE ELEVATION: 1172.10
	10. DATE STARTED: 6-9-92 1300 / 11. DATE COMPLETED: 6-9-92 1323
12. OVERBURDEN THICKNESS: NA 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
ATL-59-6B @ 6'; ATL-59-18B @ 18'	X	NA	NA	NA		NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X	NA	NA	J. Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, light brown, dry (FILL)					WC<PL; Boring advanced with 7¼" HSA. Boring logged by cuttings.
	1	LEAN CLAY (CL), firm, very dark brown, dry, with roots (TOPSOIL)					WC<PL
	2	LEAN CLAY (CL), dark reddish brown, dry (LOESS) — hard					WC<PL
	3					OK	
	4	Becomes moist and brown					
	5						

CORFs 5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-59B

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B07NE003702-04136

HTW DRILLING LOG

ATL-59 B

Remedial Investigation, Mead NOP | INSPECTOR: John Mealor | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), hard, brown, moist (LOESS)	HNU				
	6		~~BZ=0.3 ppm~~ Sample HS=0.4 ppm	6	ATL-59-06B	P	Pushed 2"OD split spoon 6'-8'. ~~Rec=12/24.~~ Every D#1 P=2.0 R=1.0 Collected soil sample at 1310. Sample was rejected, and new sample obtained at about 5' from ATL-59B at 1615 hours. Sample HS of second sample = 2 ppm.
	7						
	8			8		6'-8'	
	9	Becomes firm					
	10						
	11						
	12						
	13						
	14						

ICORPS/6-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-59B

HTW DRILLING LOG

HOLE NO. ATL-59B

Remedial Investigation Mead NOP | INSPECTOR John Nealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, brown, moist (LOESS)					
	15						
	16						
	17						
	18		HNU: BZ=BG Sample HS=[redacted] ND	18	ATL-059-18B	10	Drove 3"OD split spoon 18'-20'.
						7	~~Recovery=~~ 24/24. D#2 P=2.0' R=2.0'
	19					8[redacted]	Collected soil sample at 1320.
		19.8				8	
	20	POORLY GRADED SAND (SP) dense, light tan, ~~damp~~, fine grained, moist (ALLUVIUM)		20			Bottom of Boring @ 20'.
	21						NOTE: Boring backfilled with cuttings and bentonite from 20' to 2', and with granular bentonite from 2' to surface. Completed at 1350 hours, 6-9-92.
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-59B

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. ATL-60B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571304 - E.2842220
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" CFA 0-18; 3" OD SS 18-20	8. HOLE LOCATION: ATL-60 SW 1/4 SE 1/4 sec 8 T14N, R9E
	9. SURFACE ELEVATION: 1172.74
	10. DATE STARTED: 6-9-92 1437 — 11. DATE COMPLETED: 6-9-92 1450
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ none detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-60 18B @ 18'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings and bentonite	X	NA	NA	J. Malon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL), firm, brown to dark brown, dry to moist (LOESS)	HNU BZ=~~ND~~ BG				WC<PL
	1						Boring advanced with 9¼" HSA. Boring logged by cuttings.
	2	Becomes medium brown to brown. Plasticity increasing.					
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-60B

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HTW DRILLING LOG

ATL-60B

Remedial Investigation Mead NOP | INSPECTOR J. Mealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm, medium brown to brown, dry to moist (LOESS)					
	6						
		Becomes moist					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-60B

HTW DRILLING LOG

HOLE NO. ATL-60B

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, medium brown to brown, moist (LOESS)					
	15						
	16						
	17						
	18		HNU BG BZ=ND Sample HS=0.8 ppm	18	ATL-60-18B	14	3" OD split spoon driven from 18'-20' P#1, P=2.0, R=2.0
		18.5 POORLY GRADED SAND (SP), dense, light tan, (moist) ~~damp~~, fine grained, (ALLUVIUM)				20	~~Recovery 24/24~~
	19					35	Collected soil sample at 1455 hours.
						49	
	20	20.0		20			Bottom of Boring @ 20'.
	21						NOTE: Boring backfilled with cuttings and bentonite from 20' to 2' and with granular bentonite from 2' to surface. Completed at 1520 hours, 6-9-92.
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-60B

HTW DRILLING LOG

HOLE NO. ATL-63B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.570564 - E.2842922
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-18'; 3" OD split spoon 6-8', 18-20'	8. HOLE LOCATION: ATL 63 SW 1/4, SE 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1174.28
	10. DATE STARTED: 6-10-92 1533 — 11. DATE COMPLETED: 6-10-92 1603
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
2 ~~ATL-063-06B @ 6'~~ ~~ATL-063-18B @ 18'~~	X	NA	NA	NA		NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X	NA	NA	John Meadon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), hard, very dark brown, dry, (Topsoil) with roots					WC<PL Boring advanced with 7¼" HSA. Logged by cuttings.
	1						
	2						
	3	3.0' LEAN CLAY (CL), firm, brown, dry to moist ~~(B horizon)~~ (LOESS)					WC<PL
	4						
	5	Becomes moist					WC>PL

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-63B

HTW DRILLING LOG

ATL-63B

Remedial Investigation, Mead NOP | INSPECTOR: John A Nealon | SHEET OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, brown, moist, with black specks and iron staining (LOESS)					WC > PL
	6	Becomes moist to wet	Sample HS=ND	6	ATL-063-06B	P	Pushed 3" split spoon from 6 to 8 feet. ~~Recovery 22/24.~~ Collected soil samples at 1540 hours. D#1 P=2.0' R=1.8'
	7				ATL-263-06B		
					ATL-463-06B		
	8		BG B2=~~ND~~	8			
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: ATL-63B37

HTW DRILLING LOG

ATL-63B

Remedial Investigation Mead NOP | INSPECTOR: John Mealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm, brown, moist to wet, (LOESS) with black specks and iron staining					WC>PL
	15						
	16						
	17						
	18	POORLY GRADED SAND (SP), dense, light tan, fine grained (ALLUVIUM)	18 B2=ND Sample HS=ND	18	ATL-063-18B	12	Drove 3" split spoon from 18 to 20 feet. D#2 P=2.0 R=2.0
	19				ATL-263-18B	21	Recovery ~~24/24~~
					ATL-463-18B	25	Collected Soil samples at about 1605 hours.
	20		2.0	20		36	Bottom of Boring @ 20'
	21						NOTE: Boring backfilled with cuttings/bentonite mixture from 20' to 2' and with volclay grout from 2' to surface.
	22						
	23				Completed @		1635 hrs, 6-10-92

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-63B

38

HTW DRILLING LOG

HOLE NO. ATL-65B

SHEET 1 OF 4 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.570070 - E.2843390
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-22; 3" OD split spoon 6'-8', 22'-24'	8. HOLE LOCATION: ~~ATL-65~~ SE¼, SW¼ Sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1176.40
	10. DATE STARTED: 6-11-92 1151 / 11. DATE COMPLETED: 6-11-92 1220
12. OVERBURDEN THICKNESS: ~~NA~~ 24'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
2 ~~ATL-065-068@06~~ ATL-065 22B @ 22'	X	NA	NA	NA		NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with volclay grout	X	NA	NA	John Nealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, very dark brown, ~~damp~~ dry to ~~to~~ moist, with roots, (Topsoil) medium plastic					WC ≤ PL Boring advanced with 7¼" HSAs. Boring logged by cuttings.
	2						
	3	LEAN CLAY (CL), firm to hard medium brown, ~~damp~~ dry to moist, ~~medium plastic~~ (LOESS)					WC < PL
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-65B

HTW DRILLING LOG

ATL-65B

Remedial Investigation, Mead NOP | INSPECTOR: John Mealon | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, medium brown, ~~damp~~ dry to moist (LOESS) to hard	HNU				WC < PL
	6		Sample HS= ND	6	ATL-065-06B	P	Pushed 3" OD split spoon 6'-8'. D#-1 ~~Recovery~~ P = 2.0' ~~21/24.~~ R = 1.8' Collected soil sample at 1205 hours.
	7						
	8		BZ=~~ND~~ BG	8			
	9						
	10						
	11						
	12						
	13						
	14	~~Broke Mine Boundary~~ Soft					WC > PL

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-65B

HTW DRILLING LOG

ATL-65B

Remedial Investigation, Mead NOP | INSPECTOR: J O'Neal | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), soft, light brown, wet (ALLUVIUM)					WC>PL
	15						
	16						
	17	POORLY GRADED SAND (SP), dense, light tan, fine grained, (ALLUVIUM) moist					
	18						
	19						
	20						
	21						D # 2 P = 2.0' R = 2.0'
	22		Sample HS= ND	22	ATL-065-22B	10 22	Drove 3" OD split spoon 22'-24'. Recovery 24/24.
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-65B 41

ICORPS/4-16-92

HTW DRILLING LOG

ATL-65B

Remedial Investigation, Mead NOP | INSPECTOR: J. Nealon | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan, ~~damp~~, fine grained (ALLUVIUM)				26	Collected soil sample at 1230 hours.
						43	
	24	moist	BZ=ND	24			Bottom of Boring @ 24.
	25					NOTE:	Boring backfilled with volclay grout from 24' to surface. Completed at 1546 hours 6-11-92.
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-65B 42

HTW DRILLING LOG

HOLE NO. ATL-83B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.569096 - E.2843844
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0' - 18'; 3" OD Split Spoon 6'-8', 18'-20'	8. HOLE LOCATION: ~~ATL-83~~ NE¼, NW¼ SEC 17, T14N, R9E
	9. SURFACE ELEVATION: 1173.08
	10. DATE STARTED: 06/12/92 0952
	11. DATE COMPLETED: 06/12/92 11:15
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: NONE
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
ATL083008 @ 6', ATL083008 @ 18'	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
BACKFILLED w/ CUTTINGS & BENTONITE	X	NA	NA	JC Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), ~~Soft~~ Firm Dark Brown, moist (TOPSOIL)					Boring Advanced with 7¼" HSA; Boring Logged By cuttings
	1						
		Becoming Medium Plastic					
	2						
	3	3.0 LEAN CLAY (CL), Firm, Brown, moist (LOESS) with GREY AND BROWN MOTTLING, SOME ROOTS.					WL & PL
	4						
	5						

/CORPS/5-18-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-83B B1 43

HTW DRILLING LOG

ATL-83B

Remedial Investigation, Mead NOP | INSPECTOR: [illegible] | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: ~~LEAN CLAY (CL), FIRM, BROWN, MOIST (LOESS)~~					
			HNU:				
	6	LEAN CLAY (CL), FIRM TO HARD, BROWN WITH GRAY AND LIGHT BROWN MOTTLING, MOIST, WITH SOME ROOTS. (LOESS)	BG 82.~~100~~ SAMPLER HS = ND	6	ATL083068	P	Pushed 3" OD SPLITSPOON 6'-8' ~~Recovery 21/24~~ collected soil @ 10:10 hrs D #1 P = 2.0' R = 1.8'
	7						
	8			8			
		~~Becoming Less Plastic~~ Plasticity decreasing					
	9						
	10						
	11	BECOMING SOFT					WC > PL
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-83B

HTW DRILLING LOG

ATL-83B

Remedial Investigation Mead NOP | INSPECTOR K. Johnson | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: LEAN CLAY (CL), SOFT, BROWN, ~~MOIST~~ (LOESS) ~~MOIST~~ moist					
	15						
	16	16.0' POORLY GRADED (SP) SAND, DENSE, TAN WITH IRON STAINING, MOIST, FINE GRAINED (ALLUVIUM)	BZ=ND				
	17						
	18		SAMPLE HS = ND	18	ATL083B5	7	TIME 10:27 DROVE 3" OD SPLITSPOON 18'-20' ~~RECOVERY 22/24~~ D#2 P=2.0 R=1.8
						19	
	19		BZ=ND			38	COLLECTED SOIL SAMPLE AT 10:31
						51	~~SAMPLE RECOVERED~~
	20	20.0		20			BOTTOM OF BORING @ 20'
	21						NOTE: BORING BACKFILLED WITH CUTTINGS AND GRANULAR BENTONITE FROM 20'-2' AND BENTONITE 2' TO SURFACE @ 11:00 6-12-92
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-83B45

HTW DRILLING LOG

HOLE NO. ATL-86B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WOODWARD-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571824 - E.2810791
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-18'; 2" OD SS 6-8'; 3" OD SS 18-20'	8. HOLE LOCATION: ~~ATL-86~~ SW ¼, NW ¼ sec 8 T14N, R9E
	9. SURFACE ELEVATION: 1173.63
	10. DATE STARTED: 6-9-92 0930
	11. DATE COMPLETED: 6-9-92 0950
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-086-NOB @ 0'~~ ~~ATL-086-18B @ 18'~~ 2	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled w/ cuttings and bentonite	X	NA	NA	J. Meaton

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, very dark brown, moist to wet, with roots (TOPSOIL) 1.0'					WC > PL Boring advanced with 7¼" HSA. Boring logged by cuttings
	1	LEAN CLAY (CL), hard, medium brown and gray, dry (LOESS)					WC < PL
	2						
	3						
	4	Becomes ~~soft and very moist~~					
	5						

/CORPS/5 15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~ATL~~ ATL-86B46

HTW DRILLING LOG

Remedial Investigation, Mead NOP | INSPECTOR: John Mealor | HOLE NO.: ATL-86B | SHEET 2 OF 3 SHEETS

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
		(same as above) LEAN CLAY (CL), soft, medium brown and gray, ~~very~~ moist (LOESS)					
	6			6 B2=86 Sample HS=ND	ATL-86-06B	P	Pushed. 2" split spoon 6'-8' ~~Recovery 24/24~~ Collected soil sample at 0940 hours.
	7						
	8			8			D#1 P = 2.0' R = 2.0
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-86B 47

HTW DRILLING LOG

HOLE NO. ATL-86B
SHEET 3 OF 3 SHEETS

Remedial Investigation, Mead NOP
INSPECTOR John Mealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(same as above) LEAN CLAY (CL), soft, medium brown and gray, very moist (LOESS)					
	16	16.0' POORLY GRADED SAND (SP), ~~medium~~ dense, light tan, ~~damp~~, fine grained (ALLUVIUM) moist					
	17						D # 2 P = 2.0 R = 2.0 Drove 3" split spoon 18'-20'.
	18		BZ=0.2 ppm	18	ATL-86-18B	P	
						15	Recovery 24/24
	19					19	Collected soil sample at 1000.
						24	
	20	20.0		20			Bottom of Boring @ 20'.
	21						NOTE: Boring backfilled with cuttings and bentonite from 20' to 2', and with granular bentonite from 2' to surface. Completed at 1030 hours, 6-9-92.
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-86B 48

ATL-86B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. ATL-99B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 4 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.571343 - E.2840778
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-22'; 3" OD split spoon 22-24	8. HOLE LOCATION: ~~ATL-099~~ SW 1/4 SW 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1179.38
	10. DATE STARTED: 6-11-92 0825 — 11. DATE COMPLETED: 6-11-92 0845
12. OVERBURDEN THICKNESS: ~~NA~~ 24'	15. DEPTH GROUNDWATER ENCOUNTERED: None
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 24'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-099-22B 0-22'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with Volclay grout	X	NA	NA	John Nelson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, very dark brown, dry to ~~moist~~ ~~damp~~ moist, with roots (Topsoil)					WC<PL Boring advanced with 7¼" HSA. Boring logged by cuttings.
	2	LEAN CLAY (CL), firm, medium brown, ~~[illegible]~~ moist, ~~[illegible]~~ medium plastic (LOESS)	Bz=ND				WC≤PL
	3						
	4						
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~A1~~ ATL-99~~B~~A9

HTW DRILLING LOG

HOLE NO. ATL-99B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, medium brown, moist, medium plastic ~~(LOESS)~~ (LOESS)					WC<PL
	6						
	7	~~Becomes soft and wet~~ 7 LEAN CLAY (CL), soft, medium brown, wet, low plastic (LOESS)					WC>PL
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-99B 50

HTW DRILLING LOG

HOLE NO. ATL-99B

Remedial Investigation, Mead NOP | INSPECTOR J S Nealon | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), soft, medium brown, wet, ~~loess, plastic~~ (LOESS)					WC > PL
	15						
	16	16 POORLY GRADED SAND (SP), dense, light tan, damp, fine grained, (ALLUVIUM) moist					
	17						
	18						
	19						
	20						
	21						
	22		Sample HS = ND	22	ATL-099-22B	12	D #1 P = 2.0 R = 1.8 Drove 3" OD ~~split spoon 22-24.~~ Recovery 22/24.
	23					20	

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-99B

HTW DRILLING LOG

HOLE NO. ATL-99B

SHEET 4 OF 4 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR J. Mealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan, fine grained (ALLUVIUM)				27	Collected soil sample at 0855 hours.
						34	
	24	240	B2=ND	24			Bottom of Boring @ 24'.
		moist					
	25	~~Sand~~,				NOTE:	Boring backfilled with volclay grout. Completed at 1621 hours, 6-11-92
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-99B

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/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. ATL-105 B

SHEET 1 OF 4 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0'-24'; 3" OD split spoon 24'-26'	8. HOLE LOCATION: ATL-105 SW 1/4, SE 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1175.76
	10. DATE STARTED: 6-11-92 1022 / 11. DATE COMPLETED: 6-11-92 1050
12. OVERBURDEN THICKNESS: ~~NA~~ 26'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 26'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-105-24B 24'~~ 1	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with volclay grout	X	NA	NA	John J Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, very dark brown, ~~damp~~, (Topsoil) medium plastic, moist 1.5'					WC<PL Boring advanced with 7¼" HSA. Logged boring by cuttings.
	2	LEAN CLAY (CL), firm, medium brown, ~~damp~~, medium plastic, moist, (LOESS)					
	3						
	4						
	5		BZ=ND				

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 ATL-105 B

HTW DRILLING LOG

HOLE NO. ATL-105 B

Remedial Investigation, Mead NOP | INSPECTOR J. O'Neal | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, medium brown, ~~damp, medium plastic~~ moist ~~(B horizon)~~ (LOESS)					WC=PL
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14	Becomes soft and wet and low plastic					

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-105 B

HTW DRILLING LOG

HOLE NO. ATL 105 B

Remedial Investigation, Mead NOP

INSPECTOR J S Nealon

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), soft, medium brown, wet, low plastic (ALLUVIUM)					WC > PL
	15						
	16	16.0' POORLY GRADED SAND (SP), dense, light tan, ~~damp~~, fine grained, moist (ALLUVIUM)					
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: ATL-105B

HTW DRILLING LOG

HOLE NO. ATL-105B

Remedial Investigation, Mead NOP | INSPECTOR J. Mealon | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan, fine grained (ALLUVIUM) ~~Sample~~ moist					D #1 P = 2.0' R = 1.8'
	24		Sample HS = ND	24	ATL-105-24B	15	Drove 3" OD Split Spoon 24-26'. ~~Recovery 22/24~~
						23	
	25					26	Collected soil sample at 1100.
						26	
	26	26.0	BZ= 0.2 ppm	26			~~Bottom of Boring~~ @ 26'
	27					NOTE:	Boring backfilled with cold lay grout from 26' to surface. Completed at 1602 hours 6-11-92.
	28						
	29						
	30						
	31						
	32						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL 105B

HTW DRILLING LOG

HOLE NO. ATL-113B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.570616 - E.2840999
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-18'; 3" OD Split Spoon, 18-20'; 68'	8. HOLE LOCATION: ~~ATL-113~~ SW 1/4, SW 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: 1181.49
	10. DATE STARTED: 6-10-92 0817 / 11. DATE COMPLETED: 6-10-92 0840
12. OVERBURDEN THICKNESS: ~~NA~~ 20.0'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~none~~	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~ATL-113-6B @ 6'~~ 12 ~~ATL-113-18B @ 18'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X	NA	NA	J S Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, medium brown, moist (LOESS)	HNU: B2=B6				Advanced boring with 7¼" HSAs. Logged boring by cuttings. WC>PL
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ATL-113B

57

HTW DRILLING LOG

HOLE NO. ATL-113B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John S Mealor

SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, medium brown, moist (LOESS)					D #1 P = 2.0' R = 1.5'
	6			6	ATL-113-06B	P	Recovery 18/24. Used Pushed 3" OD Split Spoon to obtain soil sample at 0830 hours.
	7						
	8		8 BZ=ND	8			
		POORLY GRADED SAND (SP), ~~dense~~ medium, light tan, ~~damp~~, fine grained, moist (ALLUVIUM)					
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ATL-113B 58

HTW DRILLING LOG

HOLE NO.: ATL-113B

Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, ~~damp~~, fine grained, (ALLUVIUM) moist					
	15						
	16						
	17						D #2 P = 2.0' R = 1.7'
	18		Sample HS = ND	18	ATL-113-18B	8	Used 3" OD split spoon to obtain soil sample at 0845. ~~Recovery 20/24.~~
	19					12 19	
	20	20.0	BZ = ND	20		21	Bottom of Boring @ 20
	21						NOTE: Boring backfilled with cuttings and bentonite mixture from 20' to 2' and grout ~~[illegible]~~ from 2' to surface. Completed @ 0904 hrs 6-10-92.
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: ATL-113B

HTW DRILLING LOG

HOLE NO. LLI-02B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0'-18'; 3" OD split spoon 6'-8', 18'-20'	8. HOLE LOCATION: N.565839 - LLI-002 - E.2827766
	9. SURFACE ELEVATION: 1179.47
	10. DATE STARTED: 6-16-92 0959
	11. DATE COMPLETED: 6-16-92 1020
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LLI-002-06B 6' LLI-002-18B	X					NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			John Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	FAT CLAY (CH), firm to hard, very dark brown, moist (Topsoil)					WC ≈ PL Boring advanced with 7¼" HSA. Boring logged by cuttings. HNU affected by humidity.
	2	LEAN CLAY (CL), soft to firm, light brown and gray, with iron staining and black inclusions (LOESS) wet,					WC > PL
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LLI-02B 60

HTW DRILLING LOG

HOLE NO. LLI-02B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), soft to firm, light brown & gray, wet, with iron staining and black inclusions (LOESS)					WC>PL
	6		Sample HS=ND	6	LLI-002-06B	P	Pushed 3" OD split spoon 6'-8'. Recovery 24/24. Collected soil sample at 6' @ 1015 hours.
	7						
	8			8			
	9						
	10						
	11						
	12						
	13	POORLY GRADED SAND (SP), ~~damp~~ moist, medium dense, light tan, fine grained (ALLUVIUM)					
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: LLI-02B 61

HTW DRILLING LOG

HOLE NO. LLI-02B

Remedial Investigation, Mead NOP | INSPECTOR J Nealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GROUNDER SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), med. dense, light tan, moist, fine grained (ALLUVIUM)					
	15						
	16						
	17						
	18			18			Drove 3" OD split spoon 18'-20'.
					LLI-002-18B	12	
						23	Recovery 22/24.
	19					26	Collected soil sample at 1030 hrs at 18'.
						32	
	20			20			Bottom of Boring 20'.
							NOTE: Backfilled with bentonite & cuttings, from 20' to 2' and with granular bentonite from 2' to surface. Completed at 10 hrs, 6-16-92.
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-02B 62

HTW DRILLING LOG

HOLE NO. LLI-[redacted]12B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING CONTRACTOR: [redacted] Woodward Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0-6'; 3" OD split spoon 6-8'	8. HOLE LOCATION: N.565922 - LLI-012 - E. 2828634
	9. SURFACE ELEVATION: 1179.12 25
	10. DATE STARTED: 6-16-92 0852 / 11. DATE COMPLETED: 6-16-92 0900
12. OVERBURDEN THICKNESS: ~~NA~~ 8.2'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8.2	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LLI-012-06B @ 6'	X					NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			John Healon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		FAT CLAY (CH), firm, dark brown, ~~damp to~~ moist (TOPSOIL)					WC<PL Boring advanced with 7¼" HSA. Boring logged by cuttings. HNO affected by humidity.
	1						
	2	LEAN CLAY (CL), firm, medium brown, ~~damp to~~ moist (LOESS)					WC<PL
	3						
	4	Becomes soft to firm and wet					WC>PL
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LLI-[redacted]12B

63

B07NE003702-04169

HTW DRILLING LOG

HOLE NO. LLI-[redacted]B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealan

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), soft to firm, medium brown, wet (LOESS)					WC > PL
	6			6	LLI-012-06B	P	Pushed 3" OD split spoon 6-8'. Recovery 2.6/2.0. Collected soil sample at 6 at 0905 hrs.
	7						
	8			8.2			Bottom of Boring at 8.2'
	9					NOTE:	Boring backfilled with cuttings from 8' to 2' and with granular bentonite from 2' to surface. Completed at 0910 hours, 6-16-92.
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 12 LLI-[redacted]64

HTW DRILLING LOG

HOLE NO. LLI-27B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0-6'; 3" OD Split Spoon 6'-8'	8. HOLE LOCATION: N.565706 - LLI-027 - E.2828819
	9. SURFACE ELEVATION: 1178.04
	10. DATE STARTED: 6-16-92 0744 / 11. DATE COMPLETED: 6-16-92 0750
12. OVERBURDEN THICKNESS: NA 8'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LLI-027-06B 6'	X					NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled with cuttings & bentonite	X			John Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) firm, very dark brown, dry to ~~damp~~ (Topsoil) with rootholes	moist				WC<PL Boring advanced w/ 7¼" OD HSA. Boring logged by cuttings.
	2	FAT CLAY (CH), hard, very dark brown, dry to ~~damp~~ moist (Topsoil)					WC<PL
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LLI-27B

HTW DRILLING LOG

HOLE NO. LLI-27B

Remedial Investigation, Mead NOP | INSPECTOR John S Medlon | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) FAT CLAY (CH), hard, very dark brown, dry to ~~damp~~ moist, with rootlets (Topsoil) 5.5					WC<PL
	6	LEAN CLAY (CL), very hard, light gray and brown, mottled, with roots and black specks (LOESS) dry,		6	LLI-027-06B	P	Pushed 3" OD split spoon 6'-8'. Recovery 15/24. Collected soil sample @ 6' at 0755 hours.
	7						
	8			BZ= BG 8			Bottom of Boring @ 8'.
	9						NOTE: Boring backfilled from 8' to 2' with cuttings & bentonite and with granular bentonite from 2' to surface. Completed @ 0807 hours, 6-16-92.
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-27B 66

HTW DRILLING LOG

HOLE NO. LL1-031B

SHEET 1 OF 2 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP
4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber
6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0'-6'; 3" OD split spoon 6'-8'
8. HOLE LOCATION: N.565220 - LL1-031- E.2828437
9. SURFACE ELEVATION: 1175.95
10. DATE STARTED: 6-15-92 1545
11. DATE COMPLETED: 6-15-92 1555
12. OVERBURDEN THICKNESS: ~~NA~~ 8'
13. DEPTH DRILLED INTO ROCK: NA
14. TOTAL DEPTH OF HOLE: 8'
15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA
18. GEOTECHNICAL SAMPLES: none — DISTURBED: — UNDISTURBED: — 19. TOTAL NUMBER OF CORE BOXES: NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LL1-031-06B @ 6'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with bentonite & cuttings	X			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, brown, ~~damp~~ moist (FILL)	B2=BG				WC<PL Boring advanced with 7¼" HSA. Boring loaded by cuttings
	2	Becomes light to medium brown					
	3						
	4						
	5						

/CORPS/5 15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LL1-31B

67

HTW DRILLING LOG

HOLE NO. LL-31B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~[illegible]~~, LEAN CLAY (CL), firm to hard, light brown, ~~damp~~, moist, with black specks (LOESS)					WC < PL
	6			Sample 6 HS= ND	LL1-031-06B	P	Pushed 3" OD split spoon 6-8'. Recovery 15/24. Collected soil sample at 6' at 1555 hours.
	7						
	8			BZ= 8 BG			Bottom of Boring @ 8'.
	9					NOTE:	Backfilled boring with bentonite and cuttings from 8' to 2' and with bentonite granular from 2' to surface. Completed at 1600 hours, 6-15-92.
	10						
	11						
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL1-31B

HTW DRILLING LOG

HOLE NO. LL1-39B

SHEET 1 OF 3 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-19'; 3" OD split spoon 19'-20'	8. HOLE LOCATION: N.565745 - LL1-019 - E.2828608
	9. SURFACE ELEVATION: 1177.65
	10. DATE STARTED: 6-15-92 1426 / 11. DATE COMPLETED: 6-15-92 1435
12. OVERBURDEN THICKNESS: ~~NA~~ 20'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected HTD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LL1-039-19B @ 19'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			J. Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, light brown, dry, with roots (FILL)					WC < PL Boring advanced with 7¼" OD HSA. Boring logged by cuttings.
	1						
	2	FAT CLAY (CH), hard, dark brown, moist (TOPSOIL)					WC ≤ PL
	3						
	4	LEAN CLAY (CL), firm, light brown, dry, with rootlets and black specks (LOESS)					WC < PL
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LL1-39B

69

HTW DRILLING LOG

HOLE NO. LL-39B

SHEET 2 OF 3 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR J S Nealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	(same as above) LEAN CLAY (CL), firm, light brown dry, (LOESS) with rootholes and black specks					WC<PL
			B2=B6				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL-39B 70

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. LLI-39B

Remedial Investigation, Mead NOP

INSPECTOR S. Mealon

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(same as above) LEAN CLAY (CL), firm, light brown, dry, with roothole and black specks (LOESS)					
	16	POORLY GRADED SAND (SP), dense, light tan, fine grained (ALLUVIUM)	16				
	17						
	18						
	19		Sample HS=ND	19	LLI-039-19B	22	Drove 3" OD split spoon 19'-20'. Recovery 10/12.
						22	
	20		B2=B6	20			Collected soil sample at 1445 hours at 19'.
	21						Bottom of Boring @ 20'.
	22						NOTE: Boring backfilled with cuttings & bentonite from 20' to 2', and with granular bentonite from 2' to surface. Completed @ 1511 hrs. 6-15-92.
	23						

/CORPS/4-1-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-39B

71

HTW DRILLING LOG

HOLE NO. LL-47B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-17'; 3" OD split spoon 6-8', 17-19'	8. HOLE LOCATION: N.565054 - LL1-047 - E.2828741
	9. SURFACE ELEVATION: 1172.9957
	10. DATE STARTED: 6-15-92 0822 / 11. DATE COMPLETED: 6-15-92 0840
12. OVERBURDEN THICKNESS: ~~NA~~ 19'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 19'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LL-047-06B @ 6' LL-047-17B @ 17'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			John Sledon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, light brown, dry to moist ~~damp~~, with roots and pebbles (FILL)					Advanced boring w/ 7¼" HSA. WC<PL Boring logged by cuttings.
	2	2.0 POORLY GRADED SAND (SP), medium dense, brown, fine grained (ALLUVIUM)					
	3	Becomes light tan					
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LL1-47B72

HTW DRILLING LOG

HOLE NO. LLI-47B

Remedial Investigation, Mead NOP | INSPECTOR Jsnealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, fine grained (ALLUVIUM)	Sample HS=ND	6	LLI-047-06B	5	Drove 3" OD split spoon 6-8'.
	7					10	Recovery 22/24.
						12	Collected soil sample at 6.0'
	8		BZ= [redacted] 0.6ppm	8		14	@ 0835
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-47B 73

HTW DRILLING LOG

LLI-47B

SHEET 3 OF 3 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR John Mealor

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(Same as above) POORLY GRADED SAND (SP) medium dense, light tan, fine grained (ALLUVIUM)					
	16	Becomes dense					
	17		Sample HS=ND	17	LLI-047-17B LLI-247-17B LLI-447-17B	11	Drove 3" OD Split spoon 17-19'.
						21	Recovery 24/24.
	18					34	Collected soil samples at 0850 hours @ 17'.
						40	
	19		BZ= 0.6ppm	19			Bottom of Boring @ 19'
	20						NOTE: Boring backfilled with bentonite and cuttings from 19' to 2' and with granular bentonite from 0'-2'. Completed @ 0912 hrs 6-15-92
	21						
	23						
	24						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-47B 74

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. LL1-48B

SHEET 1 OF 3 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA 0-16'; 3" OD split spoon 6-8', 16-18'	8. HOLE LOCATION: N.565194 -LL1-048-E.2828836
	9. SURFACE ELEVATION: 1173.78
	10. DATE STARTED: 6-15-92 0950 / 11. DATE COMPLETED: 6-15-92 1020
12. OVERBURDEN THICKNESS: ~~NA~~ 18'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 18'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LL1-048-06B @6' LL1-048-16B @16'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			John Nelson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), hard, light brown, dry (FILL)	0.5				WC<PL
		FAT CLAY (CH), firm, dark brown, moist (FILL)					WC>PL
	1	with sand lense					Advanced boring with 7¼" HSA. Logged boring by cuttings.
	2	with gravel, wood, rock					
	3	with gravel and creosote	BZ=BG Cuttings = 1.8 ppm				
		LEAN CLAY (CL), soft to firm, medium brown, moist to wet (LOESS)	3.5				WC>PL
	4						
	5	Becomes soft & wet					

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LL1-48B 75

HTW DRILLING LOG

LL1-48B

Remedial Investigation Mead NOP | INSPECTOR: S. Meakin | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), soft, light to medium brown, wet, with creosote or diesel odor					WC>PL
	6		Sample HS=12.0 ppm				Pushed 3" OD split spoon 6-8.
			Cuttings HS=1.4 ppm		LL1-048-06B	P	Recovery 24/24.
	7						Collected soil sample @ 1010 hrs at 6'.
	8		BZ=BG				
	9						
	10						
	11						
	12	POORLY GRADED SAND (SP) med dense, light tan, moist (ALLUVIUM)					
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL1-48B76

/CORPS/4-15-92

HTW DRILLING LOG

LL1-48B

Remedial Investigation Mead NOP | INSPECTOR: S. Nealon | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	med, 15	(Same as above) POORLY GRADED SAND (SP), dense, light tan, fine grained					
	16		Sample HS=ND cuttings = BG		16	17	Collected soil sample @ 1030 at 16'.
						31	Drove 3" ⌀ split spoon 16.0-18.0. Recovery 23/24.
	17				17	33	
						43	
	18		B2=BG	18			Bottom of Boring @ 18'
	19						NOTE: Boring backfilled with cuttings & bentonite from 18' to 2' and with granular bentonite from 2' to surface. Completed @ 1042 hours, 6-15-92.
	20						
	21						
	22						
	23						

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL1-48B77

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HTW DRILLING LOG

HOLE NO. LL1-[redacted]B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0-6'; 3" OD split spoon 6-8'	8. HOLE LOCATION: LL1-55-N.564864-E.2828688
	9. SURFACE ELEVATION: 1177.13 + ~~1174.20~~
	10. DATE STARTED: 1330 6-15-92
	11. DATE COMPLETED: 1385 6/15/92
12. OVERBURDEN THICKNESS: NA 8'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LL1-05~~4~~-06B	X					NA

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			J. Meadon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, very dark brown, dry to ~~damp~~ moist (FILL)	0.5				WC < PL Boring advanced w/ 7¼" HSA. Boring logged by cuttings
	1	POORLY GRADED SAND (SP), loose, light tan, damp, fine grained	1.0		(F, 1)		WC > PL
		~~FAT~~ CLAY (CH), ~~very FAT~~ hard, very dark brown, with roots, moist, (Loess)					
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LL1-5~~4~~B

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HTW DRILLING LOG

54

HOLE NO. LLI-[redacted]B

Remedial Investigation, Mead NOP

INSPECTOR John Nealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) FAT CLAY (CH), very hard, very dark brown, moist, with roots					
	6	([redacted]) (Loess)		Sample 6 HS= ND	LLI-054-[redacted]06B	P	Pushed split spoon 6-8'. Recovery 21/24. Collected soil sample at 6' at 1350 hours.
	7						
	8			B2=B6			Bottom of boring @ 8'.

NOTE: Boring backfilled with cuttings & bentonite from 8' to 2' and with granular bentonite from 2' to surface. Completed 6-15-92 @ 1354 hours.

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 54B LLI-[redacted]

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B07NE003702-04185

HTW DRILLING LOG

HOLE NO. LLI-55B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" OD HSA 0-15'; 3" OD split spoon 15'-17'	8. HOLE LOCATION: LLI-055-N.564956-E.2828831
	9. SURFACE ELEVATION: 1170.16
	10. DATE STARTED: 6-15-92 1125 / 11. DATE COMPLETED: 6-15-92 1134
12. OVERBURDEN THICKNESS: ~~NA~~ 17'	15. DEPTH GROUNDWATER ENCOUNTERED: None ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 17'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LLI-055-15B @ 15	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			J. Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	WELL-GRADED SAND (SW), loose, light brownish gray, fine to coarse grained, with fine gravel (FILL) 1.5					Boring advanced with 7¼" HSA. Boring logged by cuttings.
	2	LEAN CLAY (CL), soft, medium brown, wet (LOESS)					WC > PL
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LLI-55B

HTW DRILLING LOG

44-55B

Remedial Investigation, Mead NOP | INSPECTOR: S. Nealon | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), soft, medium brown, wet (LOESS)					WC>PL
	6						
	7						
	8						
	9						
	10						
	11	POORLY GRADED SAND (SP), med. dense, light tan, fine grained (ALLUVIUM)					
	12						
	13						
	14						

/CORPS 4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL1-55B

HTW DRILLING LOG

HOLE NO. LL1-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealor

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), med. dense, light tan, fine grained (ALLUVIUM)					
	15		Sample HS=ND	15	LL1-055-15B	13	Drove 3" OD split spoon 15'-17'.
						22	Recovery 23/24.
	16					28	Collected soil sample @ 15' at 1140.
						34	
	17		B2=B6	17			Bottom of Boring @ 17'
							NOTE: Boring backfilled with cuttings & bentonite from 17' to 2' and granular bentonite from 2' to surface. Completed @ 1150 hrs 6-15-92.

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LL1-55B

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(CORPS 4-15-82)

HTW DRILLING LOG

HOLE NO. LLI-61B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼ OD HSA 0-6'; 3" OD split spoon 6-8'	8. HOLE LOCATION: LLI-061-N.56141-E2828515
	9. SURFACE ELEVATION: 1178.22
	10. DATE STARTED: 6-16-92 1236
	11. DATE COMPLETED: 6-16-92 1240
12. OVERBURDEN THICKNESS: ~~NA~~ 8'	15. DEPTH GROUNDWATER ENCOUNTERED: None detected ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
LLI-061-06B	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with cuttings & bentonite	X			John Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	FAT CLAY (CH), hard, very dark brown, dry, with roots (Topsoil)					WC<PL Boring advanced with 7¼" HSAs. Boring logged by cuttings
	2	LEAN CLAY (CL), firm to hard, light to medium brown, dry, (LOESS) with rootlets, black specks, and trace to some iron staining					WC<PL
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: LLI-61B #83

HTW DRILLING LOG

HOLE NO. LLI-61B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John S Nealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	(Same as above) LEAN CLAY (CL), firm to hard, light to medium brown, dry, with rootholes, black specks, and trace to some iron staining (LOESS)	Sample HS=ND	6	LLI-061-06B	P	Pushed 3" OD split spoon from 6' to 8'. Recovery 15/24. Collected soil sample @ 6 @ 1250 hours.
	7						
	8		BZ=BG	8			Bottom of Boring @ 8'.
	9					NOTE:	Boring backfilled with cuttings & bentonite from 8' to 2', and with
	10				granular bentonite		from 2' to surface. Completed at 1251 hours, 6-16-92.
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: LLI-61B 84

HTW DRILLING LOG

HOLE NO: LL1-08

1. COMPANY NAME: WOODWARD-CLYDE CONSULTANTS	2. DRILLING SUBCONTRACTOR: Woodward-Clyde
SHEET 1 OF 2 SHEETS	
3. PROJECT: Mead, NUP	4. LOCATION: Mead, Ne
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3-3/4" solid flight Auger; 2" stainless split spoon sampler	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED: 11-19-92
	11. DATE COMPLETED: 11-19-92
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: —	16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: — 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY %
	X				0	

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			Lowell J Davis

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Lean CLAY (CL) firm, brown	0 ppm				logged by cuttings and SS sampler
	5						
		Lean clay (CL) firm, brown					

HTW DRILLING LOG

HOLE NO. LCI-068

PROJECT Mead, NOP

INSPECTOR J. Garcia

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE/ CORE BOX # e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Becoming SANDY					
	15						
		Poorly graded SAND (SP) dense (est), orange, fine grain, moist		100		P	Filled 2-4oz Jars for UCL for LCI-068 @ 1120
		Bottom of Boring at 19 feet					
	20						
	25						

HTW DRILLING LOG

HOLE NO: LL1-69

1. COMPANY NAME: WOODWARD-CLYDE CONSULTANTS	2. DRILLING SUBCONTRACTOR: Woodward-Clyde
SHEET 1 OF 9 SHEETS	
3. PROJECT: Mead NOP	4. LOCATION: Mead, Ne
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 3/4 inch Solid Flight Augers 2" stainless steel split-spoon sampler and 3" SS split sampler	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED: 11-20-92 / 11. DATE COMPLETED: 11-20-92
12. OVERBURDEN THICKNESS: —	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: —	16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 18.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY
	X				0	%

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			Roger J Garcia

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Top soil, brn, moist-wet					Logged by cuttings and Split spoon sampler
		Poorly Graded Silt (ML) dense (est), brown, sandy with trace clay					
	5						

87

B07NE003702-04193

HTW DRILLING LOG

HOLE NO. LL1-69

PROJECT Mead, Nop | INSPECTOR Jorge Garcia | SHEET OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	[illegible] e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		1					3" split spoon
	15	Poorly graded SAND with poorly graded SILT (SP-ML) dense brown and orange silt with sand, trace fibers	0 PPM	67		P	Filled 2-4oz jars for VOCs for LL1-069-15 B and MS/MSD QA/QC samples
		With poor dense sand, tan, fine with silt, dry	0 PPM	71		P	
		Bottom of boring at 18 ft.					2" split spoon
	20						
	25						

HTW DRILLING LOG

HOLE NO: LL1-75

1. COMPANY NAME: WOODWARD-CLYDE CONSULTANTS
2. DRILLING SUBCONTRACTOR: Woodward-Clyde
SHEET 1 OF 2 SHEETS
3. PROJECT: Mead, NOP
4. LOCATION: Mead, Ne
5. NAME OF DRILLER: R. Herber
6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 3/4-inch solid flight Auger; 2" stainless-steel split-spoon
8. HOLE LOCATION
9. SURFACE ELEVATION
10. DATE STARTED: 11-19-92
11. DATE COMPLETED: 11-19-92
12. OVERBURDEN THICKNESS: —
15. DEPTH GROUNDWATER ENCOUNTERED: —
13. DEPTH DRILLED INTO ROCK: —
16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 19 ft.
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
			0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY
	X				0	%

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			Jorge J Garcia

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Brown, top soil, moist-wet 3" thick					Logged by cuttings and soil sampler
		Lean SILT (ML), firm, brown, moist-wet	0ppm				
	5	Lean SILT (ML) firm, brown, dry	0ppm	50		P	filled 2-4 oz. Jars for VOCs id # LL1-075-005B 15:30

89

HTW DRILLING LOG

HOLE NO. LCI-075

PROJECT Mead, Nop

INSPECTOR J. Garcia

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	[illegible] e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Becoming sandy light brown					
	15						
		Poorly graded SAND (SP) dense, tan, fine grain	0 PPM	75		11 13 16 16	Filled 2-4oz jars for VOCs for SD# LCI-075-13 @ 15:45
		Bottom of boring at 14 feet.					
	20						
	25						

HTW DRILLING LOG

HOLE NO: LL1-20

1. COMPANY NAME: WOODWARD-CLYDE CONSULTANTS	2. DRILLING SUBCONTRACTOR: Woodward-Clyde
SHEET 1 OF 2 SHEETS	
3. PROJECT: Mead, NJP	4. LOCATION: Mead, NE
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 3/4" Solid flight Augers. 2" stainless steel split spoon sampler	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED: 11-20-92 / 11. DATE COMPLETED: 11-20-92
12. OVERBURDEN THICKNESS: —	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: —	16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 18	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY %
	X				0	

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			Jorge J Garcia

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		lean clay (CL) with gravel, soft, brown moist	0ppm				Logged by cuttings and soil sampler
	5	becoming sandy, moist, without gravel					

HTW DRILLING LOG

HOLE NO. LL1-80

PROJECT: Mead, NOP

INSPECTOR: J. Garcia

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE/ CORE BOX # e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		be coming poorly graded SAND (SP) dense, tan.					
	15						
		Poorly graded SAND (SP) dense, tan, fine grain, moist.	0 ppm	83		10 14 17 18	Filled 2-4oz jars for VOCs for LL1-080-18B @ 0910
		Bottom of boring at 18 feet.					
	20						
	25						

HTW DRILLING LOG

HOLE NO LL1-83

SHEET 1 OF 2 SHEETS

1. COMPANY NAME WOODWARD-CLYDE CONSULTANTS	2. DRILLING SUBCONTRACTOR Woodward-Clyde
3. PROJECT Mead, NJP	4. LOCATION Mead, NE
5. NAME OF DRILLER R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3 1/4" Solid Flight Augers; 2" stainless steel split-spoon sampler	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED 11-19-92
	11. DATE COMPLETED 11-19-92
12. OVERBURDEN THICKNESS —	15. DEPTH GROUNDWATER ENCOUNTERED N/A
13. DEPTH DRILLED INTO ROCK —	16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 7	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY %
	X				0	

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Lean CLAY (CL), soft Brown, with roots, dry	0 ppm				Logged by cuttings and SS sampler
		Becoming firm					
	5	Lean Clay (CL), Hard Brown	0 ppm	71		P	Filled 2-40c jars for VOCs for LL1-083-0003 at 1215
		Bottom of boring at 7 feet					

HTW DRILLING LOG

HOLE NO: LL1-94

1. COMPANY NAME	WOODWARD-CLYDE CONSULTANTS
2. DRILLING SUBCONTRACTOR	Woodward-Clyde
SHEET 1 OF SHEETS	
3. PROJECT	Mead NOP
4. LOCATION	Mead, Ne
5. NAME OF DRILLER	R. Herber
6. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	3 3/4" solid flight Augers; 2"- stainless-steel split spoon sampler
8. HOLE LOCATION	
9. SURFACE ELEVATION	
10. DATE STARTED	11-19-92
11. DATE COMPLETED	11-19-92
12. OVERBURDEN THICKNESS	—
15. DEPTH GROUNDWATER ENCOUNTERED	N/A
13. DEPTH DRILLED INTO ROCK	—
16. DEPTH TO WATER AND TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	19.0
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
			0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	TOTAL LEAD	TCLP LEAD	OTHER-SPECIFY	21. CORE RECOVERY
	X				0	%

22. DISPOSITION OF HOLE	BACKFILLED	WELL	OTHER-SPECIFY	23. SIGNATURE OF INSPECTOR
	X			Roger J Garcia

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	RECOVERY e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Brown, top soil, moist					Logged by cuttings and SS sampler.
	5	Lean Clay (CL), firm orange-brown, with trace rootlets	0ppm	75		P	Filled 2-4oz. Jars for WCS for LL1-094-060 at 1415

HTW DRILLING LOG

HOLE NO. LL1-94

PROJECT Mead, NOP

INSPECTOR J. Garcia

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE/ CORE BOX # e	ANALYT. SAMPLE # f	BLOW COUNTS g	REMARKS h
		Lean SILT (ML), firm, brown					
		Poorly graded SAND (SP) dense, gry-white					
	15						
		Poorly graded SAND (SP) dense, gry-white, fine - medium gray damp	0ppm	100		17 23 28 28	Filled 2-4oz jars for VOCs for LL1-094-198
		Bottom of Boring at 19 feet					
	20						
	25						

CON 111-172

HTW DRILLING LOG

HOLE NO. G1-14J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: M. Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-33 ft. bgs.: 4" CFA; 33-115 ft. bgs.: Blasthole rig 4" rotary bit; 115-123 ft. Hydropunch	8. HOLE LOCATION: N.578360 – E.2827271
	9. SURFACE ELEVATION: 1196.60
	10. DATE STARTED: 7-12-92/0810
	11. DATE COMPLETED: 7-12-92/1158
12. OVERBURDEN THICKNESS: ~~NA~~ 123.0	15. DEPTH GROUNDWATER ENCOUNTERED: 33' ATD (Estimated)
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 123.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G1-14J~~ 1	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Boring abandoned~~ Backfilled ~~Thermosil/Wellcement~~	X	NA	NA	Robert R Mallised

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay (CL) Firm, dark brown, moist, w/some rootlets (Topsoil)					Boring advanced with 4" continuous flight augers (CFA) Soil/sediment descriptions logged from cuttings.
	2	2.0 ~~Lean~~ clay (CL) stiff, grayish brown, dry (Loess)					
	3						
	4						
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G1-14J 96 B1

HTW DRILLING LOG

HOLE NO. 61-14J

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 2 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	LEAN	(Same as Above) Firm to hard, ~~fat~~ clay (CL) ~~stiff~~, grayish brown, dry (Loess)					
	6	becomes medium gray.					
	7						
	8	becomes firm, moist					
	9		HNU = BG				~~BZ~~ = BKG
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-14J

HTW DRILLING LOG

HOLE NO. 61-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~FAT~~ CLAY (CL) Firm, medium gray, moist (LOESS)					
	15						
	16						
	17						
		17.5'					
	18	Poorly Graded SAND (SP) loose, light brown, dry, Fine grained ~~sand~~ (Alluvium)	HNU = BG				~~BZ~~ = ~~BKG~~
	19						
	20						
	21						
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 4 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above) Poorly Graded Sand (SP), loose, light brown, dry, Fine grained ~~sand~~ (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		NNU = BG				BZ = BKG
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

ICORPM4-15-92

HTW DRILLING LOG

HOLE NO. G1-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), loose, light brown, dry Fine grained sand					Stopped CFA drilling 7-12-92/0835 Switched to rotary/wash boring
	33	becomes wet					~~Began rotary/ wash boring, 4" rotary bit.~~ 7-12-92/0915
	34						Boring continued w/ 4" dia drag bit and bentonite slurry
	35						
	36	becomes fine to medium grained sand.					
	37						
	38						
	39		HNU = BG				~~BZ = BKG~~
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown-multi colored, wet.					
	42	Fine To medium grained ~~sand~~					
	43						
	44	with some coarse grained sand					
	45						
	46	with Trace coarse grained sand.					
	47						
	48						
	49		HNU = BG				~~BG~~ = BKG
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 7 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		loose, multi-colored, wet					
		Fine to medium grained					
	51	~~Sand~~ (Alluvium)					
	52						
	53						
	54						
	55						
	56						
	57						
	58						
			HNU = 0.6				~~B2-BKG~~
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RBM

SHEET 8 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet Fine To medium grained ~~Sand~~ (Alluvium)					
	60						
	61						
	62						
	63						
	64						
			HNU = BG				
	65						
	66	becomes medium grained ~~Sand~~ w/some fine grained sand.					
	67						
	68						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet					
	69	Medium grained ~~sand~~ w/ som fine and coarse grained sand.	HNO = BG				BB = ~~BKG~~
	70						
	71						
		w/ trace of clay					
	72						
	73						
		w/o clay					
	74	becomes fine to medium grained sand.					
	75						
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J 104

HTW DRILLING LOG

HOLE NO. GI-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multicolored, wet Fine to medium grained ~~sand~~ w/Trace coarse grained sand. (Alluvium)					
	78						
			HNU = 86				~~HNU = BKG~~
	79						
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet Fine To medium grained ~~Sand~~ w/ Trace coarse grain. (Alluvium)					
	87						
	88						
	89		HNU = BG				BZ=BKG
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet Fine To medium grained ~~Sand~~. w/Trace coarse Sand. (Alluvium)					
	97						
	98						
	99		HNU = BG				BZ = BKG
	100						
	101						
	102						
	103						
	104						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi.-colored, wet Fine To medium grained ~~sand~~ w/Trace coarse sand.					
	105	- Becoming ~~Poorly Graded SAND (SP) loose, multi-colored, wet~~ medium To coarse grained ~~Sand~~					
	106						
	107						
	108						
	109		NNU= BG				~~BZ=~~ ~~BKG~~
	110	becomes coarse grained Sand To gravel (SP-GP)					
	111						
	112						
	113						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. G1-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet Coarse grained ~~sand to gravel~~ w/ some gravel					
	114		HNU = BG			at	BG-BKG ~~Signal~~ ~~Refusal/washboring~~ ~~To~~ 115.0' 7-12-92/1207 HRS
	115					108	Began hammering w/140 lbs. hammer @ 115.2' on 7-12-92/1259 HRS
	116					98	
	117					57	
	118					59	
	119					84	
	120					111	
	121					89	
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-14J

HTW DRILLING LOG

HOLE NO. GI-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), loose, multi-colored coarse grained w/ some gravel				104	HPII hammering completed to 123.0' 7-12-92/1347 B.O.B 122.0
	123		HNU = ~~HS=~~ BKG =BG				Water sample collected from depth of 123.0' bgs. 7-12-92/1503 hrs.
	124						Note: Boring backfilled with Tremied Volclay grout from 123.0' to surface. @ 7-12-92/1638
	125						
	126						
	127						
	128						
	129						
	130						
	131						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-14J 110

CRH 7/16/92

HTW DRILLING LOG

HOLE NO. G1-15J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.578170- E.2827692
5. NAME OF DRILLER: MaTT Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-32 ft. bgs. : 4" CFA; 32-119 ft. bgs: Washboring 4" rotary bit; 119-129 ft. bgs. Hydromonch II	8. HOLE LOCATION: NW 1/4 SE 1/4 ~~Lot 15~~ SE 1/4 SE 1/4 sec 2. T14 N, R8E
	9. SURFACE ELEVATION: 1195.68
	10. DATE STARTED: 7-14-92 / 0949 — 11. DATE COMPLETED: 7-14-92/1402
12. OVERBURDEN THICKNESS: ~~NA~~ 128.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 32' ATD
13. DEPTH DRILLED INTO ROCK: NA 1.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 129.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~G1-15J @ 129'~~	VOA Screening	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Boring grouted with Trained Volkar grout~~ Backfilled	X	NA	NA	Robert R Mollice

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ clay (CL) Firm, dark brown, moist (Topsoil)					Boring advanced with 4" continuous Flight Augers (CFA) Soil/sediment description logged from cuttings.
	1						
	2						
		2.5'					
	3	LEAN ~~Silty~~ CLAY (CL) Firm medium brown, moist (Loess)	HNU = BG				
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G1-15J B1 111

HTW DRILLING LOG

HOLE NO. G1-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~SILTY~~ CLAY (CL) Firm, medium brown, moist (LOESS)					
	6						
	7						
	8						
	9		NNU = BG				~~DEL~~ BKG
	10						
	11						
	12						
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J 112

ICOMPSW4-18-92

HTW DRILLING LOG

HOLE NO. G1-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 3 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		LEAN ~~SILTY~~ Clay (CL), Firm, medium brown, moist (Loess)					
	15						
	16						
	17	17.0'					
		Poorly Graded SAND (SP), loose, medium brown, moist, fine grained with ~~Some~~ Trace medium grained sand. (Alluvium)					
	18						
	19		HNU = BG				~~BZ = BKG~~
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J

113

(CORPS)4-18-82

HTW DRILLING LOG

G1-15J

Remedial Investigation Mead NOP | INSPECTOR: RRM | SHEET 4 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		~~loose~~ med. dense, medium brown, moist					
	24	Fine grained with Trace medium grained sand.					
		(Alluvium)					
	25						
	26						
	27						
	28						
	29		HNU = BG				BZ = ~~BKG~~
	30						
	31						Stopped drilling with 4" CFA at 32' 7-14-92/1007
	32	becomes wet					▽ Water detected @ 32' ATD

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J 114

ICONPW4-16-92

HTW DRILLING LOG

HOLE NO. G1-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 5 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) ~~loose~~ dense (est.), medium brown, ~~moist~~ wet, Fine grained with trace medium grained sand (Alluvium)					~~Began rotary/ mud boring at 32'~~ 7-14-92/1046 ~~without rotary bit.~~
	33						Boring continued w/4 in dia drag bit and bentonite slurry
	34						
	35						
	36						
	37						
	38						
	39		HNU = BG				~~BG = BKG~~
	40						
	41						

ICONPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J

HTW DRILLING LOG

G1-15J

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), ~~loose~~ dense (est), medium brown, (wet) Fine grained with Trace medium grained sand. (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48						
	49		HNU = 0				~~DZ = BKG~~
	50						

ICONPSV4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J 116

HTW DRILLING LOG

61-15J

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 7 of 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) ~~loose~~ dense(est), medium brown, wet Fine grained with Trace medium grained sand (Alluvium)					
	51						
	52						
	53	53.0'					
		Poorly Graded SAND (SP) ~~loose~~ dense(est), multi-colored, wet medium to coarse grained (Alluvium)					
	54						
	55						
	56						
	57						
	58						
			HNU = B6				BZ = BKG
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-15J

ICOHPS/4-18-92

HTW DRILLING LOG

HOLE NO. GI-15J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est) ~~loose~~, multi-colored (wet) medium to coarse grained (Alluvium)					
	60						
	61						
	62		HNU = BG				
	63						
	64						
	65						
	66						
	67						
	68						

/COHPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-15J

HTW DRILLING LOG

G1-155

Remedial Investigation Mead NOP | INSPECTOR: RRM | SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est) ~~loose~~, multi-colored, wet medium to coarse grained (Alluvium)					
	69		HNU = BG				~~BZ~~ = BKG
	70						
	71						
	72						
	73						
	74						
	75						
	76	With Thin layer of gravel					
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J119

HTW DRILLING LOG

G1-15J

Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded Sand (SP), dense (est.) ~~loose~~, multi-colored, wet medium to coarse grained (Alluvium)					
	78						
	79		HNU = BG				~~BZ~~ = BKG
	80						
	81						
	82						
	83						
	84						
	85						
	86						

ICONPSV4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J 120

HTW DRILLING LOG

HOLE NO. G1-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 18 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense(est) loose, Multi-colored, (wet) medium to coarse grained (Alluvium)					
	87						
	88						
	89		HNU = BG				~~BZ=~~ NQ
	90						
	91						
	92						
	93						
	94						
	95						

ICOHPW4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G-15J 121

HTW DRILLING LOG

G1-15J

Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense(est) multi-colored (wet) medium to coarse grained (Alluvium)					
	96						
	97						
	98						
	99		HNU = BG				
	100						
	101						
	102						
	103	with gravel ~~streak~~ seams					
	104						

ICONPW4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J

122

HTW DRILLING LOG

61-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense (est) ~~loose~~, multi-colored, wet, medium to coarse grained (alluvium)					
	105						
	106						
	107						
	108						
	109		HNU = B6				BZ = BK6
	110						
	111	111.5' ~~becomes coarse grained to fine gravel.~~					
	112	Poorly Graded Gravel (GP) dense (est.) ~~loose~~, multi-colored, wet, coarse sand to fine gravel (Alluvium)					
	113						

ICOMSV4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-15J 123

HTW DRILLING LOG

G1-15J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded Gravel (GP) dense (est) ~~loose~~, multi-colored WET coarse ~~sandy~~ fine gravel, w/some coarse grained sand ALLUVIUM					
	114						
	115						
		becomes coarse gravel					rough drilling
	116						
	117						
	118		HNU = BG				~~BZ=~~ BKG Stopped drilling with rotary wash boring at 119.0' 7-14-92/KJO2
	119						119.0'
						53	Began hammer hydropunch II with 140lbs. hammer at 119.0' 7-14-92/
	120					29	
	121					27	
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-15J 124

ICONPW4-16-82

HTW DRILLING LOG

HOLE NO. 61-14J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
						22	
	123						
						43	
	124						
						68	
	125						
						56	
	126						
						44	
	127						
						56	
	128	128.0					
		Sandstone(?) Hard, reddish brown,				186	HPII hammering completed at 129.0 bgs. 7-14-92/1521 Pulled back 1.0' B.O.P. 129.0'
	129		HS sample = ND				Collected groundwater sample from depth of 129.0 ft. bgs 7-14-92/1542
	130						NOTE: Boring backfilled with Tremied Volclay grout from 129.0' to surface. 7-14-92/1715
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-15J

125

ICDHPSV4-10-92

B07NE003702-04231

HTW DRILLING LOG

HOLE NO. G1-24J

SHEET 1 OF 15 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578433 - E.2826673
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-35.5 ft. bgs, 4" CFA; 35.5-119 ft. bgs rotary/wasboring 4" rotary bit; 119-124 ft. Hydrapunch II	8. HOLE LOCATION: NW 1/4 SE 1/4 SW 1/4 NW 1/4 sec. 2, T14N, R8E
	9. SURFACE ELEVATION: 1201.48
	10. DATE STARTED: 7-1-92/0909 — 11. DATE COMPLETED: 7-7-92/1440
12. OVERBURDEN THICKNESS: ~~N/A~~ 124.0	15. DEPTH GROUNDWATER ENCOUNTERED: 35.5' ATD
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: ~~119~~ 124.0 ~~cft~~	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G1-24~~ 1	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring grouted w/ Tremied Volclay grout	X	NA	NA	Robert A Mallisa

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~SILTY~~ LEAN CLAY (CL) Firm, medium brown, Dry with Trace fine gravel (loess)					Boring advanced w/4" continuous flight augers (CFA) Soil/sediment description from auger cuttings
	1						
	2						
	3						
	4	4.0' Poorly ~~Sorted~~ Graded SAND (SP) loose, light brown ~~dense~~ very fine to fine grained ~~sand~~ (Alluvium)	HNU = BG				~~B2-BKG~~
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 G1-24 126

HTW DRILLING LOG

HOLE NO. G1-24

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mullisee

SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~Sorted~~ Graded SAND (SP) loose, light brown, dry very fine to fine grained ~~Sand~~ (Alluvium)					
	15						
	16		HNU = BG				
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-2127

HTW DRILLING LOG

HOLE NO. G1-24

Remedial Investigation Mead NOP | INSPECTOR R. Mallsee | SHEET 2 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly ~~Sorted~~ Graded SAND (SP)					
		loose, light brown, (dry)					
		dry, very fine to fine					
	6	grained sand.					
		(Alluvium)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 128

HTW DRILLING LOG

HOLE NO. 61-24

Remedial Investigation, Mead NOP

INSPECTOR R. Mullisee

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~sorted~~ graded SAND (SP) loose (soft), light Brown, dry Very fine To fine grained ~~Sand~~ (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29	W/ ~~Som~~ Trace medium grained Sand					
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. G1-24

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 3 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly ~~Sorted~~ Graded Sand (SP) ~~med. dense~~, light, brown (dry) very fine to fine grained sand w/trace medium grained sand. (Alluvium)					
	33						
	34		HNU = BG				WATER ENTERS AIR @ 35.5'. BZ = BKG
	35						Stopped drilling w/ 4" CFA 7-1-92/0940
		becoming wet				⊠	~~Began drilling w/ rotary wash boring~~ 7-1-92/1012 Boring continued w/4" dia drag bit and bentonite slurry
	36						
	37	multicolored becoming fine to medium grained sand.					
	38						
	39						
	40						
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 61-24

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Medium~~ Above grade ~~sorted~~ Poorly SAND (SP) dense (est) ~~loose~~ multicolored, wet					
		U. Fine To medium grained ~~Sand~~ (Alluvium)					
	42						
	43						
	44		HNU = B6				~~B3 = BKG~~
	45						
	46						
	47						
	48	w/ Trace Coarsegrained Sand.					
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 61-24J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 7 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~Sorted~~ Graded SAND (SP) dense (est) ~~loose~~, multicolored, (WET) V. Fine to medium grained, ~~Sand~~ w/ Trace coarse grained sand. (Alluvium)					
	51						
	52						
	53						
	54						
	55	w/o coarse grained sand.					
	56						
	57		HNU = BG				~~BZ = BK6~~
	~~58~~						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 61-24

Remedial Investigation, Mead NOP

INSPECTOR R. Mallrose

SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~sorted~~ graded SAND (SP) ~~loose~~ dense (sat), multicolored, wet, very fine to medium grained ~~sand~~. (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67		MNU = B6 ~~A=BKG~~				~~B2=BKG~~
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation/Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. G1-24

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mullisee

SHEET 8 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly ~~Sorted~~ Graded SAND (SP) ~~loose~~ dense (est), multicolored, wet very fine to ~~medium~~ medium grained ~~sand~~ (Alluvium)					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76	becoming medium to coarse grained sand. w/some fine sand					
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

G1-24

Remedial Investigation, Mead NOP | INSPECTOR: R. Mallisee | SHEET 10 OF 45 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~sorted~~ graded SAND (SP) ~~loose~~ densest, multicolored, wet, medium to coarse grained ~~sand~~ w/Some Fine sand (Alluvium)					
	78		HNU = BG				
	79						
	80						
	81						
	82						
	83						
	84						
	85						
	86						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 135

HTW DRILLING LOG

HOLE NO. G1-24J

Remedial Investigation Mead NOP | INSPECTOR R. Mallisee | SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly graded ~~sorted~~ SAND (SP) ~~dense~~ (est.), multicolored, WET medium to coarse grained ~~sand~~ w/ some fine grained sand. (Alluvium)					
	87						
	88						
	89						
	90						
	91	~~w/ clay from 91' to 94'~~ Poorly graded sand with clay (SP-SC), dense (est), multi-colored, medium to coarse grained, wet					
	92	w/ some fine grained sand					
	93	w/ some clay					
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

Remedial Investigation Mead NOP	INSPECTOR R. Mallisee		HOLE NO. G1-241 SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (Same as Above) c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly ~~Graded~~ SAND (SP) ~~dense~~, multicolored, (wet), medium to coarse grained sand w/some fine sand (Alluvium)					
	96						
	97	~~w/o clay~~					
	98						
	99						
	100						
	101						
	102						
	103						
	104						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. G1-24J

Remedial Investigation Mead NOP | INSPECTOR R. Mullisee | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (Same as Above)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	Poorly Graded SAND (SP) dense (est) ~~loose~~, multicolored (wet) medium to coarse grained ~~sand~~. (Alluvium)					
	106						
	107	w/some fine gravel					
	108	w/o fine gravel					
	109						
	110		HNU = B6				~~B2=BKG~~
	111						
		w/some fine gravel					
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 61-24
SHEET 13 OF 15 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above)					
		Poorly Graded SAND (SP) dense (est) ~~loose~~, multicolored, (wet)					
		medium to coarse grained ~~sand~~ w/some fine					
	114	gravel. (Alluvium)					
	115						
	116	Quantity of gravel decreasing ~~w/some gravel~~					rough drilling from 116' to 117.5'
	117		HNU= BG				
		w/o gravel					
	118						
							stopped rotary/ washborns @ 119ft. 7-1-92/1440
	119						119.0
						190	Began hammering w/ 140lbs. hammer @119ft. 7-2-92/ 1545 HRS
	120						
						212	
	121						
						393	
	122						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: G1-24J

HTW DRILLING LOG

HOLE NO. G1-24

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Robert Mallisee

SHEET 19 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense (est), multicolored, medium to coarse grained, wet	HNU = BG			124	
	123						
						242	Last hammering completed to 124 7-1-92/1622 pulled back 1.0' 124.0'
	124					hydropunch	Water sample collected from depth of 124.0' bgs 7-1-92/1642
				B.O.B 124.0'			Grout from 124 to surface 7-2-92/0930
	125						-Volclay grout weight 10.1 lb/gal
	126						
	127						
	128						
	129						
	130						
	131						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 140

CAH 7/26/92

HTW DRILLING LOG

HOLE NO. G1-27J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 13 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.577300 – E.2827831
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-32ft bgs.: 4" CFA; 32-104ft bgs.: Washboring 4" rotary bit; 104-110' bgs: Hydropunch	8. HOLE LOCATION: SW 1/4 NE 1/4 SE 1/4 NE 1/4 sec. 2 T14N, R8E
	9. SURFACE ELEVATION: 1195.64
	10. DATE STARTED: [redacted]/1005
	11. DATE COMPLETED: 7-24-92/1337
12. OVERBURDEN THICKNESS: 110'	15. DEPTH GROUNDWATER ENCOUNTERED: 32' ATD
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: ~~104'~~ 110'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
G1-27J 1	VOA Screening	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring backfilled with Tremied Volclay grout	X	NA	NA	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ CLAY (CL) Firm, dark brown-black, moist (Topsoil)					Boring advanced ~~Began drilling~~ with 4" CFA; soil/sediment logged from cuttings
	1						
	2	2.0' LEAN ~~Silty~~ Clay (CL), ~~Stiff~~ Soft to Firm, medium brown, moist (Loess					
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: G1-27J

HTW DRILLING LOG

HOLE NO. GI-27J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RBM

SHEET 2 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Topsoil, Gravel, Sandy Loose, light brown~~					
		(same as Above) LEAN ~~Silty~~ Clay (CL), ~~Stiff,~~ medium brown, moist (Loess)					
	6						
	7						
	8						
	9		HNU = BG				BZ = BKG
	10						
	11						
	12						
	13	LEAN ~~Silty~~ CLAY (CL) soft to firm light brown, moist (Loess) — 13.0'					
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-27J 142

HTW DRILLING LOG

GI-27J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 3 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Silty~~ CLAY (CL) Soft to firm, light brown, moist (loess)					
	15	15.0'					
		Poorly Graded SAND (SP) med. dense (est.) Loose, light brown, moist, Fine grained (Alluvium)					
	16						
	17						
	18						
	19		HNU = BG				~~BZ~~ = ~~BKG~~
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-27J 143

HTW DRILLING LOG

HOLE NO. A1-27J

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 4 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP), med. dense (est) ~~loose~~, light brown, moist					
		Fine grained (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		HNU = BG				~~BZ~~ = ~~BKG~~
	30						
	31						Stopped drilling with 4" CFA at 32' ~~[illegible]~~ 7-24-92/1029
	32	becoming wet					WATER ENTERS @ 32' AND ▽

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: A1-27J 144

HTW DRILLING LOG

G1-27J

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 5 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) med dense (est) ~~Loose~~, light brown, wet Fine grained (Alluvium)					~~Begin wash boring with 4" rotary bit~~ at 32' 7-24-92/1050
	33						Boring continued w/ 4" dia drag bit and bentonite slurry
	34						
	35						
	36						
	37						
	38						
	39		HNU = 86				~~BZ~~ = BKG
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-27J145

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G1-27J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly graded SAND (SP) dense (est) ~~loose~~, light brown, (wet), Fine grained (Alluvium)					
	42						
	43	become lrg Fine To medium grained.					
	44						
	45						
	46						
	47						
	48						
	49		HNU = BG				~~BZ~~ = BKG
	50						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-27J

HTW DRILLING LOG

HOLE NO. G1-27J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 7 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP) med. dense (est) ~~loose~~, light brown, wet,					
		Fine To medium grained (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56	56.0'					
		Poorly Graded SAND (SP) dense (est) ~~loose~~, multi-colored, wet					
		Medium To coarse grained (Alluvium)					
	57						
	58						
			HNU = = BG				~~BG~~ BKG
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: G1-27J 147

HTW DRILLING LOG

HOLE NO. G1-27J

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 9 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (sst) ~~loose~~, Multi-colored, wet medium to coarse grained (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS 4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-27J

HTW DRILLING LOG

HOLE NO. GI-27J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 9 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) dense (est) ~~Loose~~ multi-colored (wet) medium to coarse grained (Alluvium)					
	69		HNU = BG				BZ = ~~BKG~~
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-27J149

HTW DRILLING LOG

HOLE NO. GI-27J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 10 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense (est.) ~~loose~~, Multi-colored, WET, medium To coarse grained (Alluvium)					
	78						
	79		HNU = BG				~~BZ = BKG~~
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW0030

HOLE NO.: GI-27J150

B07NE003702-04256

HTW DRILLING LOG

GI-27J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 11 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND(SP), dense (wet) multi-colored, wet, medium to coarse grained (Alluvium)					
	87						
	88						
	89		HNU = BG				~~BZ = BKG~~
	90						
	91						
	92						
	93	93.0 — — — — — Poorly Graded SAND(SP) Loose, multi-colored (wet) coarse grained with some fine gravel. (Alluvium)					
	94						
	95						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-27J 151

HTW DRILLING LOG

61-27J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 12 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND(SP) dense(wet), multi-colored (wet) coarse grained with some fine gravel (Alluvium)					
	96						
	97						
	98	- w/ coarse gravel					rough drilling
	99		HNU = BG				BZ = BKG
	100						
	101						
	102	- w/ coarse gravel					rough drilling
	103						Stopped washboring with 4" rotary bit at 104' 7-24-92 / 1337
	104						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 42KW030

HOLE NO.: 61-27J 152

HTW DRILLING LOG

GI-27J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 11 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense (est.), multicolored, coarse grained, wet w/ some fine gravel				191	Began driving hydropunch II with 140 lbs. hammer at 104 FT. bgs. 7-24-92/1420
	105					146	
	106					143	
	107					48	
	108					129	
	109					278	Completed driving of Hydropunch II at 110' 7-24-92/1445 B.O.B 110.0'
	110		HS sample = ND 1653		GI-27J		collected groundwater sample from depth 110.8' bgs. 7-24-92/1540
	111						NOTE: Boring backfilled with Tremied Volclay grout, from 110' to surface. 7-24-92/1630
	112						
	113						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-27J

CEM 7/14/92

HTW DRILLING LOG

HOLE NO. G1-35J

SHEET 1 OF 1 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.578141 - E.2826387
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-37 ft. bgs. 14" CFA; 37-115 ft. bgs: Washboring 4" Rotary bit; 115.3-122.5 ft. Hydropunch	8. HOLE LOCATION: ~~NW 1/4 SW 1/4 SE 1/4 SE 1/4~~ G(-3) Sec 2 T14N, R8E
	9. SURFACE ELEVATION: 1203.27
	10. DATE STARTED: 7-13-92/0957
	11. DATE COMPLETED: 7-13-92/1441
12. OVERBURDEN THICKNESS: ~~NA~~ 122.5	15. DEPTH GROUNDWATER ENCOUNTERED: 37' ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 122.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G1-35J~~ 1	VOC Screening	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Bentonite grouted well~~ Back filled ~~Permanent monitoring point~~	~~Cement~~ X	NA	~~Hydropunch~~ NA	Robert R Mellace

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ clay (CL) Firm to Stiff medium Gray, moist (Fill)					Boring advanced with 4" continuous Flight Augers (CFA)
	1						Soil/Sediment descriptions logged from cuttings.
	2						Began drilling 7-13-92/0957
	3	LEAN 3.0' ~~Silty~~ clay (CL) Firm, dark brown, moist (Loess)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G1-35 B1

154

HTW DRILLING LOG

HOLE NO. G1-35 J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN ~~Silty~~ clay (CL) Firm, dark brown, moist (Loess)					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
		~~Silty clay (CL)~~ Becoming ~~Firm~~, medium brown, ~~moist~~ ~~(Loess)~~					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35 J

155

HTW DRILLING LOG

HOLE NO. G1-35J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN ~~Silty~~ clay (CL) Firm, medium brown, moist (Loess)					
	15						
	16						
	17	~~Silty clay (CL) Firm, moist,~~ Becoming Tan, moist. ~~(Loess)~~					
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. 61-35J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, tan, moist (LOESS) 23.5'					
	24	Poorly Graded SAND (SP) loose (est) light brown (dry) Fine grained with trace medium grained (Alluvium)					
	25						
	26						
	27						
	28						
	29		HNU = B6				~~B2~~ = ~~BKG~~
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-35J

HTW DRILLING LOG

HOLE NO. G1-35J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) med. dense (SST) ~~loose~~, light brown (dry) Fine grained with Trace Medium grained sand (Alluvium					
	33						
	34						
	35						
	36						Stopped drilling with 4" CFA 7-13-92/1022 37.0' Water detected ATD @ 37.0'
	37	becomes wet					~~Began rotary/ wash boring at~~ ~~0900~~ 7-13-92/1102
	38						Boring continued w/ 4" dia drag bit and bentonite slurry
	39		HNU = B6			~~OZ~~ = BKG	
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. G1-35J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) ~~loose~~ med. dense (est.), light brown, wet, Fine grained with some medium grained sand. (Alluvium)					
	42						
	43						
	44						
	45	dense (est.), becomes (ing) Fine To medium grained. ~~medium grained~~ ~~sand~~ multi.-colored.					
	46						
	47						
	48						
	49		HNU = 0				
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. G1-35J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 7 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est), light brown, wet Fine ~~grained to~~ medium grained, medium grains are multi-colored. (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58	With Trace coarse grained sand.					
	59		HNV = 86				BZ= BKG

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. 61-35J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 8 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense (est) ~~loose~~, light brown, (wet) Fine to medium grained, with trace coarse grained sand, medium grains (are) multi-colored. (Alluvium)					
	60						
	61						
	62						
	63	63.0' — — — — —					
		Poorly Graded SAND (SP), dense (est) ~~loose~~, multi-colored (wet), medium to coarse grained (Alluvium)					
	64						
	65		HNU = BG				
	66						
	67						
	68						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-35J 161

HTW DRILLING LOG

HOLE NO. G1-35J

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		Poorly Graded SAND (SP)					
		dense (est.) loose, Multi-colored, wet					
		medium to course grained	HNU =				D2 = BKG
	69	(Alluvium)	= BG				
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. G1-35J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		dense (est) ~~loose~~, multi-colored, (wet),					
		medium TO coarse grained					
	78	(Alluvium)					
			HNU =				BZ =
	79		BG				BRG
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. 61-35J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 11 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), dense (est.) ~~loose~~, Multi-colored, (wet), Medium To Coarse grained					
	87						
	88						
	89		HNU = BG				~~BZ~~ = ~~BKG~~
	90						
	91						
	92	with Trace fine gravel.					
	93						
	94						
	95						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-35J164

HTW DRILLING LOG

HOLE NO. G1-35J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet, medium to coarse grained with Trace gravel					
	96						
	97						
	98						
	99		HNU = BG				~~BZ = BKG~~
	100						
	101						
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J

HTW DRILLING LOG

HOLE NO. 61-35J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND dense (est.) ~~Coarse~~, multi-colored (wet) Medium To coarse grained. With Trace gravel. (Alluvium)					
	105						
	106						
	107						
	108						
	109		HNU = BG				~~BZ = BKG~~
	110						
	111						
	112	dense					
		112.5' Poorly Graded Gravel (GP) ~~Coarse~~, multi-colored (wet) fine w/coarse sand to gravel (Alluvium)					rough drilling
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-35J

HTW DRILLING LOG

HOLE NO. G1-35J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly GRADED Gravel (GP) ~~Sandy~~ (fst), multi-colored, fine, wet w/ coarse grained sand ~~to gravel~~ (Alluvium)					
	114						Stopped rotary/washboring drilling at 115.5' 7-13-92/1441
		thin seams with ~~streaks~~ of medium to coarse grained sand.					
	115						115.5'
	116					103	Began hammering hydropunch II with 140 lbs. hammer at 115.5' 7-13-92/1521
	117					132	
	118					102	
	119					101 ~~154~~	
	120					154 ~~176~~	
	121					176	
	122					181	

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35J 167

/CORPB/4-15-92

HTW DRILLING LOG

HOLE NO. G1-35J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED ~~SAND~~ GRAVEL (GP), dense (est.), multicolored, fine, wet w/ some coarse grained sand					HPII hammering completed to 122.5' 7-13-92/1552 Pulled Back .5' 122.5 water sample collected from depth of 122.8' bgs. 7-13-92/1634 NOTE: Boring backfilled with Tremied Volclay grout from 122.5 to surface 7-14-92/0750
	123						
	124						
	125						
	126						
	127						
	128						
	129						
	130						
	131						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-35 J168

CEA 7/21/92

HTW DRILLING LOG

HOLE NO. G1-37J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.577497 - E.2826848
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39 ft bgs.: 4" CFA; 39-117 ft. bgs: wash boring 4" rotary bit; 117-123 ft bgs. hydropunch II	8. HOLE LOCATION: SW 1/4 NE 1/4 SW 1/4 NE 1/4 sec 2 T14N, R8E
	9. SURFACE ELEVATION: 1204.18
	10. DATE STARTED: 7-15-92/0919 — 11. DATE COMPLETED: 7-15-92/1354
12. OVERBURDEN THICKNESS: ~~NA~~ 123.0	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ 39' ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 123.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G1-37J-0-33'~~ 1	VOA screening	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring ~~grouted~~ backfilled with Tremied Volclay grout	X	NA	NA	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Stiff~~ clay (CL) ~~Firm~~ Stiff, dark brown, moist (Topsoil)					Boring advanced with 4" continuous Flight Augers (CFA)
	1		HNU = = BG				Soil/Sediment descriptions from logged from cuttings.
	2						
	3						
	4	Becoming ~~Stiff clay (CL)~~ Firm ~~dark brown, moist~~ ( )					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G1-37J B1

HTW DRILLING LOG

HOLE NO. G1-37J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 2 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) ~~Silty~~ LEAN clay (CL) Firm dark brown, moist (Loess)					
	6						
	7	~~Silty clay (CL) Firm~~ Beginning Medium brown, moist ~~(Loess)~~					
	8		MNU= BG				BZ= BRG
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J 170

HTW DRILLING LOG

HOLE NO. G1-37J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~SILTY~~ CLAY (CL) Firm, medium brown, moist (Loess)					
	15						
	16						
		16.5'					
		Poorly Graded SAND (SP) loose, light brown, moist Fine grained (Alluvium)					
	17						
	18						
	19		HNU = BG				~~BG~~ = BKG
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

HTW DRILLING LOG

HOLE NO. G1-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		Poorly Graded SAND (SP)					
		loose, (est) light brown, moist					
		Fine grained					
	24	(Alluvium)					
	25						
	26						
	27						
	28						
	29		HNU = BG				BG = ~~BKG~~
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

HTW DRILLING LOG

HOLE NO. G1-37J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 5 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose (est.) light brown, moist Fine grained. (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38	becoming med. dense (est.), becomes WET	HNU = BG				~~BG = BKG~~ Stopped drilling with 4" CFA at 39' 7-15-92/0917 Water detected ATD 39.0'
	39						~~Began rotary wash boring with mud rotary at~~ at 39' 7-15-92/1026 Boring continued w/ 4-in-dia drag bit and bentonite slurry
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 173

HTW DRILLING LOG

HOLE NO. G1-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) med. dense (est), ~~loose~~, light brown, wet Fine grained (Alluvium)					
	42						
	43						
	44						
	45						
	46	WITH Trace medium grained sand.					
	47						
	48						
	49		HNU = BG				~~BG~~ = ~~BKG~~
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

HTW DRILLING LOG

HOLE NO. G1-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 7 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Poorly Graded SAND (SP) med. dense (est.) ~~loose~~, light brown, (wet) Fine grained with Trace medium grained sand. (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58		HNU = BG				BZ = BKG
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

HTW DRILLING LOG

HOLE NO. 61-375

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) med. dense (est.) ~~loose~~, light brown, wet, Fine grained with Trace medium grained sand (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
		66.5'					
	67	Poorly Graded SAND (SP) dense (est.) ~~loose~~, multi-colored, wet, ~~grained~~ medium to coarse sand (Alluvium)	HNU = BG				
	69						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-375 176

HTW DRILLING LOG

HOLE NO. G1-37J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est.) ~~loose~~, multi-colored (wet) medium to coarse grained (Alluvium)	HNU = BG				BZ = ~~BKG~~
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

HTW DRILLING LOG

G1-37J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		Poorly graded SAND (SP)					
		dense (est.) ~~loose~~, multi-colored (wet)					
		medium to coarse grained					
	78	(Alluvium)					
			HNU				~~BZ~~ =
	79		= BG				~~BKG~~
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J

178

HTW DRILLING LOG

HOLE NO. 61-37J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 11 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND dense(est.) ~~loose~~, multi-colored, wet medium To coarse grained (Alluvium)					
	87						
	88						
	89		HNU = BG				BZ = BKG
	90						
	91						
	92						
	93	93.0' WITH GRAVEL (SP) Poorly Graded SAND (SP) dense(est.) ~~loose~~, multi-colored, wet Coarse grained ~~and To~~ w/ fine Gravel (Alluvium)					
	94						
	95						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-37J

HTW DRILLING LOG

HOLE NO. 61-37

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 2 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND WITH GRAVEL (SP) (~~GP/SP~~) dense (est), ~~loose~~, multi colored (wet) coarse ~~sand to gravel~~ grained					
	96	w/ fine gravel (Alluvium)					
	97						
	98						
	99		HNU = BG				~~BZ = BKG~~
	100						
	101						
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 61-37J

HTW DRILLING LOG

HOLE NO. GI-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) WITH GRAVEL (SP) Poorly Graded Sand ~~(SP)~~ dense(est) ~~loose~~, ~~grained~~ multi-colored, wet coarse ~~Sand To Gravel~~					
	105	w/ fine gravel (ALLUVIUM)					
	106		HNU = BG				
	107						
	108	~~becomes Gravel~~ POORLY GRADED GRAVEL (GP), dense(est), multi-colored, fine, wet w/ little coarse grained sand					
	109						
	110						
	111						
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: GI-37J

HTW DRILLING LOG

HOLE NO. G1-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded Gravel (GP) loose, multi-colored (wet) ~~Gravel~~ fine w/ trace coarse grained sand (Alluvium)					
	114						
	115		HNU = BG				rough drilling ~~BZ~~ BKG.
	116						Stopped rotary/bushboring to 117.0' 7-15-92/1354
	117						117.0' Began hammering of hydropunch II with 140lb. hammer at 1170' 7-15-92/1459
						72	
	118						
						111	
	119						
						157	
	120						
						156	
	121						
						186	
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37 J 182

HTW DRILLING LOG

HOLE NO. G1-37J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED GRAVEL (GP), dense (est) multi-colored, fine, wet	HNU = BG		~~237~~	237	HPII hammering completed at 123.0' pulled back 6" 7-15-92/1535 B.D.B. 123.0
	123						Groundwater sample collected from depth of 123.0' bgs. 7-15-92/1546
	124						Note: Boring backfilled with Tremied Volclay grout from 123.0 to surface. 7-15-92/1705
	125						
	126						
	127						
	128						
	129						
	130						
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-37J183

ICONPS/4-16-92

CW 7/23/92

HTW DRILLING LOG

HOLE NO. G1-47J

SHEET 1 OF 6 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-38 ft. bgs.: 4" CFA; 38-122 ft. bgs.: washboring 4" rotary bit; 121.5'-131.5 ft. bgs.: Hydropunch II	8. HOLE LOCATION: ~~SW~~ 1/4 SE 1/4 NW 1/4 ~~NE~~ 1/4 ~~SW~~ 1/4 ~~G1-47~~ Sec. 2, T14N, R8E
	9. SURFACE ELEVATION: 1203.89
	10. DATE STARTED: 7-21-92/0857
	11. DATE COMPLETED: 7-21-92/1340
12. OVERBURDEN THICKNESS: 131.5	15. DEPTH GROUNDWATER ENCOUNTERED: 38' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 131.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
~~G1-47J~~ @ 131.5'	VOA Screening	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring ~~grouted~~ with backfilled Tremied Volclay grout	X	NA	NA	Robert R Mallison

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ clay (CL) Firm, dark brown, ~~damp~~ dry (Topsoil)					Boring advanced with 4" CFA. Soil/sediment description logged from cuttings.
	1						
		1.5' LEAN ~~Silty~~ clay (CL), Firm, medium brown, moist (Loess)	HNU = BG				
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G1-47J

HTW DRILLING LOG

61-47J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Silty~~ Clay (CL) Firm, medium brown, moist (Loess)					
	6						
	7						
	8						
	9		HNU = = BG				~~BG~~ = ~~BKG~~
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-47J

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead NOP | INSPECTOR: BRM | PAGE 3 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN CLAY (CL), firm, med. brown, moist 14.5'					
	15	Poorly Graded SAND (SP) loose, light brown, ~~moist~~ dry, Fine grained with some ~~medium sand~~ grained (Alluvium)					
	16						
	17						
	18						
	19		HNU = = BG				~~Hnu = 82 = 8.6~~
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92-W-0030

HOLE NO.: G1-47J

186

ICORPS/4-16-92

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead VOP

INSPECTOR: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, light brown, (dry) Fine grained with medium sand (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		HNU = BG				~~BG = BKG~~
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-47J

ICORPS/4-15-92

HTW DRILLING LOG

GI-47J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 5 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP) loose (est), light brown, dry					
	33	Fine grained with some medium grained sand (Alluvium)					
	34						
	35						
	36						
	37						
	38	med. dense (est.), becomes wet					Water detected at 38' ATD Stopped drilling with 4" CFA 7-21-92/0925 at 39'
	39						~~Began washing with 4" rotary bit.~~ 7-22-92/1015 at 39' ~~Began~~
	40		HNU = BG				Boring continued w/4" dia drag bit and bentonite slurry
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92-WC30

HOLE NO.: GI-47J

HTW DRILLING LOG

GI-47J

Remedial Investigation Mead VOP | INSPECTOR RRM | PAGE 6 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), med. dense (est), ~~loose~~, light brown, (wet), Fine grained with some medium grained sand (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48						
	~~49~~						
	49		HNU = BG				DE = BKG
	50						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: GI-47J

HTW DRILLING LOG

GI-47J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 9 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), med. dense (est) ~~Loose~~, light brown, (wet), Fine grained with some medium sand (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56	— — — — 56.0' Poorly Graded SAND (SP) dense (est) ~~Loose~~, multi-colored, (wet) medium to coarse grained, (Alluvium)					
	57						
	58						
	59		HNU = BG				~~BG=BKG~~

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92HW070

HOLE NO.: GI-47J 190

HTW DRILLING LOG

GI-47J

Remedial Investigation Mead VOP

INSPECTOR: RRM

SHEET 8 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above) Poorly Graded SAND (SP) dense (est) ~~loose~~, multi-colored, wet, medium to coarse grained (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65		HNU = = BG				
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 921kw130

HOLE NO.: GI-47J

ICORPS/4-15-82

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead VOP

INSPECTOR: RRM

PAGE 9 OF 16 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND (SP) dense (est.) ~~loose~~, multi-colored (wet) medium to coarse grained (Alluvium)	HNU = BG				B2 = ~~BKG~~
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-47J

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND (SP) dense(est) loose, multi-colored, wet medium to coarse grained (Alluvium)					
	78						
	79		HNU = BG				Be = BKG
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 921[illegible]930

HOLE NO.: G1-47J

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP), ~~loose~~ dense (est), multi-colored, wet, medium to coarse grained, (Alluvium)					
	87						
	88						
	89		HNU = = BG				~~BZ~~ = ~~BKG~~
	90						
	91						
	92						
	93						
	94						
	95						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: G1-47J

HTW DRILLING LOG

HOLE NO. G1-47J

Remedial Investigation Mead VOP | INSPECTOR RRM | SHEET 12 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est), ~~loose~~, multi-colored, (wet) medium to coarse grained (Alluvium)					
	96						
	97						
	98						
	99		HNU = BG				BZ = BKG
	100						
	101						
	102	becomes (1ag) coarse grained					
	103						
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921-W030

HOLE NO.: G1-47J

HTW DRILLING LOG

GI-47J

Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 13 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly graded SAND (SP) dense (est) ~~loose~~, multi-colored WET, coarse grained (Alluvium)					
	105						
	106						
	107						
	108						
	109		HNU = BG				BZ = BKG
	110						
	111						
	112	with some gravel.					
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation Mead NOP 92KW030

HOLE NO.: GI-47J

HTW DRILLING LOG

GI-47J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 14 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense (est) ~~Loose~~, multi-colored (wet) coarse grained with some little gravel. (Alluvium)					
	114						
	115						
	116						
	117	with some fine gravel.					rough drilling
	118						
	119		HNU = BG				~~HNU~~ = BKG
	120						
	121						Stopped drilling with Cotary/washboring 7-21-92/1340 at 122'
	122					45	122.0'

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW0010

HOLE NO.: GI-47J

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 15 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense (est.), multi-colored, coarse grained, wet w/ some fine gravel					Began hammering hydraulic with 140 lbs. hammer at 121.5' bgs. 7-21-92/1442
	123					32	
	124					102	
	125					108	
	126					126	
	127					102	
	128					116	
	129					147	
	130					170	
	131					218	

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G1-47J

HTW DRILLING LOG

G1-47J

Remedial Investigation Mead VOP | INSPECTOR: RBM | SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense(est), multi-colored, coarse grained, wet w/ some fine gravel	HNU = BG				Completed hammering of HRII 7-21-92/1515 at 131.5' pull back 1 ft. DOB 131.5' Collected groundwater sample from depth of 131.5' bgs. 7-22-92/0735 NOTE: Boring backfilled with Tremied Bentonite Gold grout from 131.5' to surface. 7-22-92/0926 HRS.
	132						
	133						
	134						
	135						
	136						
	137						
	138						
	139						
	140						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead VOP 921-W030

HOLE NO.: G1-47J 199

HTW DRILLING LOG

HOLE NO. 62-25

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 of 4 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N. 571590 – E. 2839785
5. NAME OF DRILLER: R. Hedder	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-19'; RWB w/ 4" drag bit on Mobilock rods 19-110'; 2" OD Hydropunch II groundwater sampler 110-117' on NWJ rods	8. HOLE LOCATION: ~~NE/4 SE 1/4 SW1/4 SW1/4~~ see T T14 N ~~[illegible]~~ ~~62-25~~ R9E
	9. SURFACE ELEVATION: ~1190
	10. DATE STARTED: 5-28-92 1623
	11. DATE COMPLETED: 5-29-92 1003
12. OVERBURDEN THICKNESS: ~~NA~~ 117'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by ~~NA~~ drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 117'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~62-25 @ 114'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Backfilled w/ Volclay grout~~	X	NA	NA	John Mealor

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c (LEAN / HARD)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	~~FAT~~ CLAY (CH), ~~very stiff~~, brown, moist, with roots (LOESS)					Advanced boring with 4" CFA. NOTE: Boring logged by cuttings.
	2		HNU = BG				
	3						
	4						
	5						

/CORPS/5-15-82

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~AB~~ 62-25 200

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to hard ~~stiff~~, brown, very moist (LOESS)					~~LL 340~~
	6						
	7						
	8						
	9						
	10	~~Becomes stiff and less moist~~ Becoming stiff. Quantity of moisture decreasing	HNU = BG				
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J 201

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 3 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), stiff, brown, moist (LOESS) 15.0'					~~LL ≈ 40~~
	15	POORLY GRADED SAND (SP), medium dense, light tan, fine grained, dry, (ALLUVIUM)					
	16						
	17						
	18						Boring advanced w/4" dia. drag bit and bentonite slurry
	19						~~Switch to RWB~~ @19 ft. ~~Stopped~~ @19' 5-28-92 1200 Resume 5-29-92 0725
	20	20.0' POORLY GRADED SAND (SP), medium dense (est.) multicolored, wet, fine to medium grained (ALLUVIUM)	HNU= BG				
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J

202

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealor

SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, multi-colored, ~~wet~~, fine to medium grained, (ALLUVIUM)					
	24						
	25						
	26						
		~~26.5'~~ ~~POORLY GRADED SAND (SP), medium dense?, multicolored, wet?,~~ Becoming medium to coarse grained ~~(ALLUVIUM)~~	HNU = BG				
	27						
	28						
	29						
	30						
	31						
	32	Becomes finer 32.0'					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J

203

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealon

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	POORLY GRADED SAND (SP) medium dense to, multi-colored, wet, fine grained with some coarse grained sand (ALLUVIUM)					
	34						
	35						
	36	Becomes coarse grained medium to	HNU= BG				
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John O'Neal

SHEET 6 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, multicolored, wet, coarse grained ~~with trace fine gravel~~ medium to (ALLUVIUM)					
	42						
	43						
	44						
	45		HNU = BG				
	46						
	47						
	48						Mixing new mud
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J205

HTW DRILLING LOG

HOLE NO. G2-25

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, multi-colored, medium to coarse grained (ALLUVIUM) wet					
	51						
	52						
	53		HNU = BG ~~BZ = BG~~ WH = BG				
	54						
	55						
	56						
	57						
	58						Mixing new mud. 0821 hours.
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-25

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J S Mealon

SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, multi-colored, medium to coarse grained (ALLUVIUM) (wet)					
	60						
	61	Becoming mostly medium grained					
	62		HNU = =06				
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J 207

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 9 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(Same as above) POORLY GRADED SAND (SP), medium dense, multicolored, medium grained (ALLUVIUM) wet					
	70	Becomes fine grained with some coarse sand.					
	71						
	72						
	73						Lost 6 gal mud 68.5-73.5
	74	Becomes ~~fine~~ medium to coarse grained.					
	75						
	76						
	77						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J208

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J S Mealon

SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Same as above) POORLY GRADED SAND (SP), medium dense, multicolored, medium to coarse grained (ALLUVIUM) wet					
	79						
	80						
	81						
	82						
	83						
	84						
	85						
	86						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J

HTW DRILLING LOG

HOLE NO. G2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) POORLY GRADED SAND (SP), medium dense, multi-colored, medium to coarse grained (ALLUVIUM) wet					
	88	~~Drill 6" clay chunk 88-88.5~~ 88 SANDY LEAN CLAY (CL), stiff, gray, wet (ALLUVIUM) Flush-					
	89						
	90	~~88~~ POORLY GRADED SAND (SP), ~~medium~~ dense, multicolored, wet coarse grained with trace fine gravel (ALLUVIUM)					
	91						
	92						
	93						
	94						Rough drilling 94-96'
	95						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J

HTW DRILLING LOG

HOLE NO. 62-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(same as above) POORLY GRADED SAND (SP), dense, multicolored, wet, coarse grained, with trace fine gravel (ALLUVIUM)					
	97						
	98						
	99	99.0' POORLY GRADED GRAVEL (GP), dense, multi-colored, fine grained, subrounded to angular with medium to coarse sand, grained (ALLUVIUM) wet.					
	100						
	101						
	102						
	103						
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-2J

HTW DRILLING LOG

HOLE NO. 62-25

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Malon

SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (Same as above)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	POORLY GRADED GRAVEL (GP), dense, multicolored, fine grained, with medium to coarse grained sand (ALLUVIUM) subrounded to angular,					
	106						
	107						
	108						
	109	109.0' POORLY GRADED SAND (SP), dense, multicolored, wet, coarse grained, with trace fine gravel (ALLUVIUM)					Lost 35 gal mud 73.5'-110'
	110					110 83 111	110' @ 1003 hours; Drove HydroPunch II sampler from 110-117 ft. Pulled back 2 ft.
	111					102 112	
	112					70	
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-25

HTW DRILLING LOG

62-2J

Remedial Investigation Mead NOP

INSPECTOR: J. Nelson

PAGE 14 OF 14 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, multicolored, wet, coarse grained, with trace fine gravel				75	NOTE: Hydropunch II groundwater samples collected @ 117' @ 1255 hours.
	114						
						74	
	115						
						120	
	116						
						76	
	117	117.0					
							Bottom of Boring @ 117'
	118						
							NOTE: Boring backfilled w/ Volclay grout @ 10.2 lb/gal. Completed @ 1425 hrs, 5-29-92.
	119						
	120						
	121						
	122						

CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-2J213

HTW DRILLING LOG

HOLE NO. 42-35

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward Clyde Consultants
SHEET 1 OF SHEETS 12	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-14' bgs - 4 inch continuous flight auger; ~~14'~~ 98' bgs - 3 1/4" side discharge paddle bit; 98'-103' 3" - 2" hydropunch w/ NWS tools	8. HOLE LOCATION: 42-35-N.573264-E.2840653
	9. SURFACE ELEVATION: 1763.05
	10. DATE STARTED: 5/16/92 1340 — 11. DATE COMPLETED: 5/17/92 1155
12. OVERBURDEN THICKNESS: ~~98'~~ 103.2'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked ~~NA~~ by drilling fluid
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 51 ft bgs @ 1hr AD
14. TOTAL DEPTH OF HOLE: ~~98'~~ 103.2' NA	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	~~NA~~	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~XXX~~ GZ-3'	X	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Completed~~ backfilled w/ Volclay grout	~~0-103'3"~~ X	NA	NA	Beth Helsley

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS
	0	~~SM~~ Clayey SILT (ML), soft, dk brown, moist with ~~roots and~~ trace of fine-medium sand and root hairs ~~(LOESS)~~ (TOPSOIL)					Boring advanced ~~Begin drilling~~ with 4 inch continuous flight auger (cfa). All descriptions from cuttings
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 42-35

HTW DRILLING LOG

42-35

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above)					
	6	LEAN CLAY (CL), soft, lt reddish brown, moist (loess)					
	7						
	8						
	9						
	10						
	11	POORLY GRADED SAND WITH CLAY ~~(SP)~~ (SP-SC), loose, tan, v fine to fine grained (alluvium)					
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

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HTW DRILLING LOG

HOLE NO. 42-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND WITH CLAY (SP), loose, tan, v. fine to fine grained (alluvium)					~~begin wash boring using a 3 3/4 inch side discharge paddle bit~~ Boring continued w/ 3 1/4-inch-dia drag-bit and bentonite slurry
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

42-35

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedlunkey | SHEET 4 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SP-SC SAND WITH CLAY (SP), loose, tan, v. fine to fine sand (alluvium)					
	24						
	25						
	26						
	27						
	28	-becoming fine - medium					
	29						
	30						
	31						
	32	Becoming v. coarse grained w/trace of fine gravel					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 42-35

217

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP), loose - med. dense, tan, fine to med. grained, w/ trace of coarse grained (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-~~39~~ 218

HTW DRILLING LOG

HOLE NO. 42-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlunkay

SHEET 5 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	~~becoming v. coarse SAND with occasional fine gravel~~ POORLY GRADED SAND (SP), loose to med. dense, tan, fine to medium grained (Alluvium)					
	33						
	34						
	35						
	36	~~becoming fine to med SAND~~ w/ occasional coarse sand					
	37						
	38						
	39	~~becoming fine~~					
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkay

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), loose-med. dense, tan, fine to medium grained					
	42	w/trace of coarse grained (Alluvium)					
	43						
	44	becoming coarse grained SAND					
	45						
	46						
	47	becoming fine to med grained SAND					
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-~~35~~ 220

HTW DRILLING LOG

42-35

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 7 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), loose - med. dense, tan, fine to med. grained, w/ trace of coarse grained (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

221

HTW DRILLING LOG

HOLE NO. 42-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED SAND (SP), loose - med. dense, tan, fine to med. grained, w/ trace of coarse grained sand					
	69						
	70						
	71						
	72						
	73						
	74						
	75	SAND w/ GRAVEL ~~(SP)~~ (SP-GP); POORLY GRADED ~~GRAVEL~~ (GP), dark gray, wet, w/ coarse grained, some fine gravel, dense, rounded to rounded					Note: begin to loose mud ~~at a faster rate~~ returns
	50b						
	76	(alluvium)					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlunkay | SHEET 10 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above)					
		POORLY GRADED SAND WITH GRAVEL (SP-GP),					
	78	dense, dark gray, coarse grained, wet.					
		w/ some fine, subrounded to rounded gravel					
	79	(Alluvium)					
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkar | SHEET 11/12 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(same as above) POORLY GRADED SAND WITH GRAVEL (SP-GP), dense, dark gray, coarse grained, wet					
	87	w/ some fine, subrounded to rounded gravel					
	88						
	89						
	90						
	91						
	92						stop drilling at 93' bgs 5-16-92 @ 1710
	93						resume drilling 5-17-92 @ 0915
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkay | SHEET 12 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same as above) POORLY GRADED SAND WITH GRAVEL (SP-GP), dense, dark gray, coarse grained w/ ~~#~~ some fine, subrounded to rounded gravel					
	96						
	97						
						19	6 inch slough zone
	98						
						103	Hydropunch driven ~~pushed~~ from 98' to 103.2' ~~Boring completed at 1155 on 5/17/92.~~ → water sample collected at 103.0 at 1200 HRS.
	99					79	
	100					43	
	101					41	
	102					58	Bottom of boring 103.2'
	103	~~BOTTOM OF BORING = 103'~~				47	~~Hole refusal at 103' 3" in Hydropunch~~
	104	note: boring was backfilled w/ tremied volclay grout from 103' to surface 5-17-92 at ~~1132~~ 1530.					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-45

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 13	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N-568055-E.2839904
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-29'~~ 4" continuous flight augers; ~~29-102~~ 3/4" paddle bit, with NW-5 rods; ~~102-107~~ 2" Hydropunch II w/ NWS rods	8. HOLE LOCATION: 42-45
	9. SURFACE ELEVATION: 1174.53
	10. DATE STARTED: 5/17/92 1630
	11. DATE COMPLETED: 5/18/92 1413
12. OVERBURDEN THICKNESS: 107 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 107 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~42-45~~ @107' ~~FCE only~~	X	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Completed w/~~ Backfilled w/ Volclay grout	X	N/A	N/A	Bret A Helwig

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft, dk brown, moist with fine-medium grained sand and roots. (topsil)					Boring advanced w/ 4" continuous flight augers
	1						
	2						
	3						
	4	LEAN CLAY (CL), ~~medium to stiff~~, firm to hard, reddish brown, w/ occasional fine sand. (loess)					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 42-45 26

HTW DRILLING LOG

HOLE NO. 42-4J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (Same as above)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	[redacted] LEAN CLAY (CL), ~~medium to stiff~~, firm to hard, lt reddish-brown, w/ occasional fine sand. (loess)					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-4J227

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hellenkamp

SHEET 3 OF SHEETS 13

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above) ~~,~~ LEAN CLAY (CL), ~~medium to stiff~~ firm to hard, lt reddish-brown, w/ occasional fine sand. (loess)					
	15						
	16						
	17						
	18						
	19	POORLY GRADED SAND (SP), medium, light tan, (alluvium)					
	20	fine grained, ~~wet~~ moist, dense					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45 228

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF SHEETS 13

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), light tan, (alluvium) fine grained, moist					
	24	medium dense					
	25						
	26						
	27						
	28						End of cfa @ 29 ft 5-17-92 @ 1700
	29						Resumed drilling w/ drag 3 1/4" bit 5-18-92 @ 0730
	30						and bentonite slurry
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45229

HTW DRILLING LOG

HOLE NO. 42-4J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 5 OF SHEETS 13

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), light tan, (alluvium)					
	33	fine grained, medium dense					
	34						
	35						
	36						
	37	becoming fine- to medium-grained, sub-rounded to well rounded grains. (alluvium)					losing some circulation
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-4J

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 6 OF SHEETS 13

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), light tan, wet, fine- to medium-grained sub rounded to well rounded sand grains. (Alluvium)					
	42						
	43	medium dense					Mix a thicker batch of drilling mud ~~at end of current run~~ @43½' bgs
	44						
	45						
	46						
	47						
	48						
	49	Becoming fine- to medium-grained w/ coarse sand					
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Helderkop

SHEET 7 OF SHEETS 13

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP) light tan, wet, fine- to medium-grained w/ coarse sand, rounded to call rounded. (alluvium)					
	51						
	52	medium dense					
	53						
		becoming fine-to medium-grained					
	54						
	55						
	56	becoming medium-to coarse-grained w/ fine sand					
	57						
		becoming fine-to medium-grained					
	58						
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 8 OF SHEETS 8/13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(same as above) POORLY GRADED SAND (SP), medium dense, light tan, wet, fine-to medium-grained ~~sand~~, ~~co~~ rounded to well rounded. (alluvium)					
	60						
	61	becoming coarse sand w/ fine-to medium-grained sand					
	62	becoming fine-to medium-grained					
	63						
	64						
	65						
	66	becoming medium-to coarse-grained					
	67						
		becoming fine-to medium-grained					
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45 233

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 2 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, wet, fine- to medium- grained, rounded to well rounded. (alluvium)					
	69						
	70						
	71						
	72						
	73	becoming medium- to coarse- grained; rounded grains					
	74						
	75						
	76	becoming fine- to medium- grained					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 10 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP), ~~light~~ tan, wet, fine-to medium-grained, rounded to well rounded. (alluvium)		medium dense			
	78						
	79						
	80						
	81						
	82						
	83						
	84	becoming coarse SAND with medium-grained sand					
	85						
	86	becoming fine- to medium-grained					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45

HTW DRILLING LOG

42-45

Remedial Investigation, Mead NOP | INSPECTOR B. Holinka | SHEET 11 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same as above) POORLY GRADED SAND (SP), light tan, w/ fine-to medium-grained rounded to sub rounded. (alluvium)					
	87						
	88	medium dense					
	89						
	90	becoming coarse SAND with medium-grained sand					
	91						
	92						
	93						
	94	dense, POORLY GRADED GRAVEL (GP), fine grained, w/ medium to coarse-grained sand, sub ~~rounded~~ angular to sub rounded. (alluvium)					
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-436

HTW DRILLING LOG

42-45

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 12 OF 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(same as above) POORLY GRADED GRAVEL (GP), dense, wet, fine grained ~~gravel~~, w/					
	96	medium to coarse grained sand, subangular to sub-rounded grains. (alluvium)					
	97						
	98						
	99						
	100						
	101						Stop drilling 5/18/92 @ 1140
	102					93	Begin ~~hammering~~ driving hydropunch 5/18/92 @ 1335 from 102'-107' bgs w/ 140 lbs hammer
	103					210	
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-45 237

HTW DRILLING LOG

HOLE NO. 42-45

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 13 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	(Same as above) POORLY GRADED (GP), dense, fine grained, with medium to coarse grained sand, subangular to subrounded grains (ALLUVIUM) — wet,				341	
	105	GRAVEL				94	
	106				#1	87	Water sample collected w/ hydro-punch II in hydrocarbon @ 107.0' @ 14:45
							Bottom of Boring = 107'
	107						Note: boring was backfilled w/ tremied volclay grout from 107' to surface, 5/18/92 at 1645.
	108				@9.4 lb/gal		~~NOTE: Water sample collected w/ hydro-punch II in hydrocarbon at 107.0'~~ 5/18/92 @ 1445

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 238

HTW DRILLING LOG

HOLE NO. 42-8J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: K. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0 - 88 ft bgs: 3/4 in drag bit 6.7' w/ NWJ rods~~; ~~0 - 88 ft bgs: 4" cfa~~; ~~88 - ft bgs: 2 in OD Hydropunch II w/ NWJ rods~~	8. HOLE LOCATION: 42-8-N-569997-E.2847316
	9. SURFACE ELEVATION: ~~[illegible]~~ ~~[illegible]~~ about 1160 ft
	10. DATE STARTED: 6-2-92 ~~0815~~ 1630
	11. DATE COMPLETED: 6-3-92 1630
12. OVERBURDEN THICKNESS: 94.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 33.4 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 94.5 feet	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~62-8J @ 94.5'~~	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Back-filled ~~completed~~ w/ volclay grout	X	NA	NA	Bret A Hedrick

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown - black moist, w/ fine grained sand and roots (topsoil)					Boring advanced w/ ~~3 1/4" drag bit and continuous flight augers (cfa)~~ bentonite slurry. Soil/sediment descriptions from auger cuttings. Boring 62-8J (c) moved ~100' W-SW of original boring 62-8J (a)
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 239

42-8

HTW DRILLING LOG

42-8

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown-black, ~~&~~ moist, w/ fine-grained sand (top soil)					
	6						
	7	7.0 LEAN CLAY (CL), ~~medium~~ firm to hard ~~dense~~, lt greenish brown, ~~&~~ moist, w/ ~~[redacted]~~ fine-grained sand (loess)					
	8						~~encounter rock?~~ ~~trifly~~
	9						
	10	~~[redacted]~~ becoming lt reddish-brown					
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8240

HTW DRILLING LOG

HOLE 42-8

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) ~~A~~ LEAN CLAY (CL), ~~medium dense~~ firm to hard, lt reddish-brown, ~~dx~~ moist w/					
	15	fine grained sand (loess)					
	16	16.0 POORLY GRADED SAND (SP), lt tan, loose to medium dense, ~~damp~~ very fine to fine grained					
	17	sand, ~~damp~~ moist. (alluvium)					
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8 241

HTW DRILLING LOG

HOLE NO. 42-8

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), lt tan, loose to medium dense, v. fine to fine grained ~~sand~~, ~~damp~~ moist (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31	becoming lt greyish tan w/ clay and occasional medium grained sand					
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8

242

HTW DRILLING LOG

HOLE NO. 42-B

Remedial Investigation, Mead NOP | INSPECTOR B. Helenkay | SHEET 5 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), lt greyish tan, loose to medium dense, ~~dense~~ moist, v. fine to fine grained ~~sand~~ w/ ~~medium grained~~ clay and occasional medium grained sand (alluvium)					
	33						water detected @ 33' ~~top~~ ATD
	34	becoming lt tan					
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-B

HTW DRILLING LOG

HOLE NO. 42-8

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(same as above) POORLY GRADED SAND, lt tan, wet, v. fine to fine grained sand w/ clay (alluvium)					
	42						
	43						~~Stop cfa drilling to 44 ft bgs on 6-2-92 @ 0905~~
	44						~~Begin RWB 6-2-92 @ 1002. Lose circulation @ 9 ft bgs. Move hole over & begin RWB 6-2-92 @ 1270 lose circulation @ 1225. move hole to the 3rd location begin RWB @ 1652 and drilling @ 1715 on 6-2-92 @ 53 ft bgs~~
	45						
	46	becoming medium to coarse grained sand w/ occasional fine grained subangular to sub rounded gravel.					
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8 244

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. 42-8

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 7 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) Poorly GRADED SAND (SP), lt tan, wet, ~~saturated~~ medium to coarse grained					
	51	~~sand~~ w/ occasional fine grained subangular to sub rounded gravel (alluvium)					
	52						Stop drilling @ 53' bgs 6.2.92 @ 1715
	53						Resume drilling 6.3.92 @ 0745 w/ paddle bit and bentonite slurry
	54						
	55	becoming fine to medium grained sand w/ occassional coarse grained sand					
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8245

HTW DRILLING LOG

HOLE NO. 42-8

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(Same as above) POORLY GRADED SAND (SP), lt tan, wet, v fine to medium grained					
	61	~~Sand~~ w/ occasional coarse grained sand (alluvium)					
	62						
	63	becoming coarse sand w/ fine gravel and medium grained sand					
	64						
	65						
	66	becoming fine to medium gravel sand w/ occasional coarse grained sand					
	67						
	68						
	69						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8246

HTW DRILLING LOG

HOLE NO. C2-8

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 9 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(Same as above) POORLY GRADED SAND (SP), Lt-tan, wet, fine to medium grained w/ occasional coarse grained sand (alluvium)					
	70	becoming coarse grained sand w/ fine grained gravel and medium grained sand					
	71						
	72						
	73						
	74						
	75						
	76						
	77						
	78						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: C2-8

HTW DRILLING LOG

HOLE NO. 42-8

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 10 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Same as above) POORLY GRADED SAND (SP) Heterogeneous coarse grained ~~sand~~ w/ fine grained gravel and medium grained sand (alluvium)					
	79	becoming coarse grained sand w/ fine to medium grained sand and occasional fine grained gravel					
	80						
	81						
	82						
	83						
	84	becoming fine to medium grained sand w/ ocassional coarse grained sand					
	85						
	86						
	87						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8 48

HTW DRILLING LOG

42-8

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 11 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) POORLY GRADED SAND (SP) lt tan, wet, fine to medium grained ~~sand~~ w/ occassional coarse grained sand (alluvium)					
	88						Drilling completed to 88½ ft 6-3-92 @ 0845
	89					560	Begin hammering HPII on 6-3-92 @ 1005 @ 88½
	90					286	
	91					111	
	92					176	
	93					224	Hammering complete to 93½ ft. Fluid sample is drilling mud @ 1055
	94				#1	213	Hammer to 94½ @ 1415. Hydropunch II water sample collected @ 1630 on 6-3-92
	95						Hole backfilled w/ ~~volclay~~ grout w/ tremie pipe from 94½ ft to surface on 6-4-92 at 0830 — Pure Gold

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-8

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G2-95

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consult
SHEET 1 OF SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.566957 – E.2840882
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0–29'~~ 4 in cfa drag; ~~0–108½~~ 3¼ in ~~paddle~~ bit ~~wash rotary~~; 103½–108½ 2 in OD Hydropunch	8. HOLE LOCATION: ~~G2-45~~ G2-95
	9. SURFACE ELEVATION: 1170.93
	10. DATE STARTED: 5-14-92 0740
	11. DATE COMPLETED: 5-14-92 1330
12. OVERBURDEN THICKNESS: ~~NA~~ 108.5	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Masked ~~NA~~ by drilling fluid
14. TOTAL DEPTH OF HOLE: 108.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS ~~G2-95~~ 108.5'	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1	X	NA	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled ~~Completed~~ w/ volclay grout	X	NA	NA	Bud A Hedges

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML) soft, dk brown, moist w/ fine grained sand & roots (top soil)					Boring advanced w/ 4" continuous flight augers (cfa)
	1						
	2						
	3						
	4						
	4.5'	LEAN CLAY (CL), ~~medium~~ firm lt reddish-brown, w/ fine ~~med~~ sand (loess) moist					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 G2-95 250

HTW DRILLING LOG

42-95

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF SHEETS 1

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) LEAN CLAY (CL), ~~medium~~ firm, lt reddish-brown, w/ fine sand, moist. (loess)					
	6						
	7						
	8	~~becoming v. moist~~ Moisture content increasing					
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95

251

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 3 OF SHEETS 3

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above). LEAN CLAY (CL), medium, lt reddish brown, w/ fine sand,					
	15	v. moist, (loess)					
	16	16.0' POORLY ~~SORTED~~ GRADED SAND (SP-SC) w/ ~~trace~~ CLAY ~~(SP)~~, lt tan, v. fine to fine grained, w/ trace of clay in fines (alluvium)					
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ACE OF

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95 252

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY ~~SORTED~~ GRADED SAND WITH TRACE OF CLAY (SP), v. fine to fine grained. (alluvium)					
	24						
	25						
	26						
	27						
	28						Stop CFA at 29' bgs 5-19-92 @ 0805
	29						Resume drilling using 3¼" ~~[illegible]~~ bit and ~~[illegible]~~ bentonite slurry 5-19-92 @ 0840
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95 253

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 5 OF SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED ~~MISSORTED~~ SAND WITH ~~TRACE OF CLAY (SP)~~ CLAY (SP-SC), v. fine to fine					
	33	grained sand ~~(Alluvium)~~ w/trace of clay in fines (Alluvium)					
	34	becoming fine to medium ~~coarse~~ grained w/ occassional coarse sand					
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95254

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenberg

SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	~~(Same as above)~~ POORLY ~~SORTED~~ GRADED SAND (SP) dense fine to medium grained, ~~sand~~ tan w/ occasional coarse sand. (alluvium)					
	42						
	43						
	44						
	45						
	46	becoming fine to medium					
	47						
	48						
	49						
	50	becoming fine to medium w/ occasional coarse grained					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95

HTW DRILLING LOG

HOLE NO. 42-9J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedinkamp

SHEET 7 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(same as above) POORLY ~~ASSORTED~~ GRADED SAND (SP), dense, fine to medium grained, ~~sand~~ tan, w/ occasional coarse grained (alluvium)					
	51						
	52						
	53	becoming med to coarse grained					
	54						
	55						
	56						
	57	becoming fine to medium grained sand					
	58						
	59						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-9J56

HTW DRILLING LOG

42-95

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED ~~SORTED~~ SAND (SP), fine to medium grained ~~sand~~					
	60	(alluvium)					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95 257

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 9 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), fine to medium grained ~~sand~~ (alluvium)					
	69						
	70	becoming med-coarse grained sand					
	71						
	72						
	73						
	74						
	75	becoming fine to medium occasional coarse grained					
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95

HTW DRILLING LOG

42-95

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 10 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(same as above) POORLY GRADED ~~SORTED~~ SAND (SP) dense, fine to medium (alluvium)					
	78						
	79						
	80						
	81	becoming med to coarse grained sand w/ fine gravel					
	82						
	83						
	84						
	85	becoming fine to medium grained w/ occasional coarse grained sand					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95259

HTW DRILLING LOG

HOLE NO. 42-95

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkap | SHEET 11 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same as above) POORLY GRADED ~~SORTED~~ SAND (SP), fine to medium grained w/ occasional coarse grained sand (alluvium)					
	87						
	88						
	89	becoming coarse sand w/ fine gravel					
	90						
	91						
	92						
	93	become medium to coarse sand w/ occasional gravel					
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-95

HTW DRILLING LOG

HOLE NO. 42-95

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 12 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same as above) POORLY GRADED ~~SORTED~~ SAND, medium to coarse grained ~~sand~~ w/ occasional fine gravel Calluvium (SP)					
	96						
	97	97.0' POORLY GRADED ~~SORTED~~ GRAVEL dense angular to subrounded w/ medium to coarse sand (GP) (alluvium)					rig begins loud chatter
	98						
	99						
	100						
	101						
	102						
	103						stop drilling 5/19/92 @ 1130 to 103½ ft bgs
	104					61	Begin hammering hydropunch continued

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: Cotton 42-95261

B07NE003702-04367

HTW DRILLING LOG

HOLE NO. 42-95

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkar

SHEET 13 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	(SAME AS ABOVE) POORLY GRADED GRAVEL (GP), med. dense, fine, angular to subrounded w/ some med. to coarse grained sand (Alluvium)				61	Begin hammering hydropunch 5/19/92 @ 1300 from 103½-108½' bgs
	105					80	~~bottom of boring at 108½ ft bgs~~
	106					91	Note: boring was backfilled w/ tremied volclay grout from 108½' to surface, 5/19/92 at 1450.
	107					104	
	108					78	Note: water sample is collected in hydrocarbon mode at 108½ ft bgs at 1330 HRS.
	109						Bottom of boring 108.5' BGS

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 262

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. 42-12J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 10	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-44 ft bgs 4 in cfa~~ ~~44-87 ft bgs 23/4 in~~ paddle (RWB w/) NWJ3 rods bit on 2-in OD Hydropunch	8. HOLE LOCATION: 42-12 — N. 567368 - E. 2846936
	9. SURFACE ELEVATION: ~~2 1155~~ 1163.63
	10. DATE STARTED: 6·10·92 @ 0815
	11. DATE COMPLETED: 6·10·92 @ 1055
12. OVERBURDEN THICKNESS: 84 ft bgs	15. DEPTH GROUNDWATER ENCOUNTERED: 38 ft ~~bgs~~ ATD
13. DEPTH DRILLED INTO ROCK: — NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 84 ft bgs	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
X ~~G2-12J 84'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Completed~~ Backfilled with tremied volclay grout	X	NA	NA	Bret A. Hedenp

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	CLAYEY SILT (ML), soft, dark brown, moist, with occasional fine grained sand (top soil)					Boring advanced with 4in continuous flight augers (cfa) soil/sediment descriptions from auger cuttings
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 42-12 J63

HTW DRILLING LOG

HOLE NO. 42-12

Remedial Investigation Mead NOP | INSPECTOR Bitkdenkamp | SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft, dark brown, moist, with occasional fine grained sand.					
	6						
	7	becoming dry					
	8						
	9						
	10						
	11						
	12	12.0 LEAN CLAY (CL), soft to firm ~~medium~~, ~~light~~ grayish-brown, moist, with occasional very fine sand (loess)					
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12

HTW DRILLING LOG

HOLE NO. 42-12

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 43 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) LEAN CLAY (CL), soft to ~~medium~~ firm, light tannish-brown with occasional very fine sand. (loess) moist					
	15						
	16						
	17						
	18						
	19						
	20	becoming soft ~~and moist~~					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12

HTW DRILLING LOG

HOLE NO. 42-12

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 1 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) LEAN CLAY (CL) soft, light tannish brown, moist, with occasional very fine sand (loess)					
	24						
	25	25.0' POORLY GRADED SAND (SP) light tan, medium dense, very fine to fine trained, with silt in fines (alluvium)					
	26						
	27						
	28						
	29						
	30						
	31	becoming light greyish-tan and wet					
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12

HTW DRILLING LOG

HOLE NO. 42-12

Remedial Investigation, Mead NOP | INSPECTOR B. Ackenkamp | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP) lt tannish to grey, medium dense, wet, very fine to fine grained, with fines (alluvium)					
	33	→ becoming light tan ~~and damp~~					
	34	Moisture content decreasing					
	35						
	36						
	37	→ becoming moist and very fine to fine grained					
	38	→ becomes wet					water encountered ATD at 38'
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12 267

HTW DRILLING LOG

HOLE NO. 42-12

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET #6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), light tan, very fine to fine grained (alluvium)					
	42						
	43						End cha drilling 6-10-92 @ 0845 to 44 ft bgs
	44						~~begin RWB with 3/4 in paddle bit @ 0935, 6-10-92~~
	45						Boring continued w/ 3 1/4" paddle bit and bentonite slurry 09:35 6-10-92
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12

268

HTW DRILLING LOG

HOLE NO. 42-12

Remedial Investigation, Mead NOP | INSPECTOR: B. Heden kamp | SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP) dark brown, light tan, wet, very fine to fine grained sand, (alluvium)					
	51						
	52						
	53						
	54						
	55	becoming medium grained sand w/ fine grained sand and occasional coarse grained sand					
	56						
	57						
	58	becoming tannish-red					
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12269

HTW DRILLING LOG

HOLE NO. 42-12

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP), reddish-red, wet, medium grained, with fine grained sand and occasional coarse grained sand. (alluvium)					
	60						
	61	becoming coarse grained with fine to medium grained sand and occasional fine grained gravel					begin losing circulation
	62						
	63						
	64						
	65						
	66	66.0 POORLY GRADED GRAVEL (GP), dense, reddish-tan, wet, fine grained with medium to coarse grained sand (alluvium)					
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12

HTW DRILLING LOG

HOLE NO. 42-12

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED GRAVEL (GP), dense, reddish tan, wet fine ~~fraction gravel~~ grained with medium					
	69	to coarse grained sand (alluvium)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12 271

HTW DRILLING LOG

HOLE NO. 42-12

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(same as above) POORLY GRADED ~~SAND~~ GRAVEL (GP) reddish-tan, fine ~~grained~~ gravel with medium to coarse grained sand (alluvium)					
	78						
	79						drilling mud returns becomes dk brownish gray w/ little sand possible gravel (clay seam?)
	80						
	81						
	82						End of RWB drilling 6-10-92 @ 1055 to 83 ft bgs
	83						Begin hammering HP II w/ 140# hammer
						2.56.	6-10-92 @ 1300 Refusal @ 84', HP II pulled back 1 inch
	84	84.0		HydroPunch II			Boring back filled with tremied vol clay grout from 84 ft to the surface. 6-10-92 @ 1500 HRS. Completed
	85					Bottom of Boring 84	NOTE: water sample collected with HP II from 84 ft 6-10-92 @ 1335
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-12 272

HTW DRILLING LOG

HOLE NO. G2-14J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 11 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.564496 - E.2841651
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: ~~CME-55~~ SW 1/4 SW 1/4 SE 1/4 SW 1/4 sec. 17 T14N., R9E
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-44; 4" drag bit on Mobile rods 44-; 2" OD Hydro Punch II on NWJ rods	8. HOLE LOCATION: ~~G2-14~~ CME-55
	9. SURFACE ELEVATION: 1166.42
	10. DATE STARTED: 6-1-92 0950
	11. DATE COMPLETED: 6-2-92 0845
12. OVERBURDEN THICKNESS: ~~NA~~ 95'	15. DEPTH GROUNDWATER ENCOUNTERED: 41.5
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 95'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G2-14J 0-95'~~ 1	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~backfilled with volclay grout~~	X	NA	NA	J S Nealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), ~~very~~ firm to ~~stiff~~ good, very ~~dark~~ brown, moist (TOPSOIL)					Boring advanced with 4" CFA. NOTE: Boring logged by cuttings.
	2	LEAN CLAY (CL), ~~very~~ FIRM TO HARD, ~~stiff~~, brown, moist, medium plastic, (LOESS) ~~or ALLUVIUM~~ with silt					
	3						
	4						
	5						

CORPS/5 15 92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G2-14J 273

HTW DRILLING LOG

HOLE NO. 62-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Nealon

SHEET 2 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS above) LEAN CLAY (CL) ~~very stiff~~, brown, moist, (LOESS ~~OR ALLUVIUM~~) with silt	Firm to hard				
	6	Becoming firm and, ~~very~~ moisture content increasing					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 274 62-14J

HTW DRILLING LOG

HOLE NO. 62-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, brown, very moist (LOESS ~~or alluvium~~)					
	15	(to wet)					
	16						
	17						
	18	POORLY GRADED SAND (SP), medium dense, light tan, fine grained (ALLUVIUM)	18				
	19	moist					
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 2762-14J

HTW DRILLING LOG

HOLE NO. G2-14J

Remedial Investigation, Mead NOP

INSPECTOR [illegible]

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense? light tan, ~~damp~~ moist fine grained (ALLUVIUM)					
	24	moist					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 276 G2-14J

HTW DRILLING LOG

HOLE NO. 62-14J

Remedial Investigation, Mead NOP | INSPECTOR J Mealon | SHEET 5 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(same as above) POORLY GRADED SAND (SP), medium dense ?, light tan, fine grained, moist (ALLUVIUM) ~~damp~~					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-14J

27

HTW DRILLING LOG

HOLE NO. 62-14J

Remedial Investigation, Mead NOP | INSPECTOR J. Mealon | SHEET 6 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(Same as above) POORLY GRADED SAND (SP) medium dense?, light tan, ~~damp~~, fine grained, (ALLUVIUM) moist					Encountered water @ 41.5' Stopped 6-1-92 1200
	43						
	44						~~Switch to PWB~~ @ 44' Resumed 6-2-92 Drilling 0730
	45						Boring continued w/4 in. dia drag bit and bentonite slurry
	46						
	47						
	48	With a little medium grained sand ~~orange~~					
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 27862-14J

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. 62-14J

Remedial Investigation, Mead NOP

INSPECTOR John Mealor

SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense, ~~moist~~ wet, light tan, fine grained with a little orange, medium to coarse grained sand (ALLUVIUM)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59		BZ=ND				

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-14J279

HTW DRILLING LOG

HOLE NO. G2-14J

Remedial Investigation, Mead NOP | INSPECTOR John Mealor | SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP) medium dense & multi-colored, wet, fine to medium grained with a little to some coarse grained sand (ALLUVIUM)					
	60						
	61						
	62						
	63						
	64	POORLY GRADED SAND (SP), medium dense, multicolored, wet, medium to coarse grained with a little subangular to subrounded fine gravel (ALLUVIUM)					
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-14J 280

HTW DRILLING LOG

HOLE NO. G2-14J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John B Nealon

SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense?, multicolored, wet, medium to coarse grained, with a little subangular to subrounded gravel (ALLUVIUM)					
	69						
	70	~~Becoming well graded with some subangular to rounded fine gravel~~					
	71	~~WELL GRADED SAND (SW), dense?, multicolored, wet, medium to coarse grained, with some subangular to rounded fine gravel~~					
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-14J281

HTW DRILLING LOG

G2-14J

Remedial Investigation, Mead NOP | INSPECTOR: John Mealon | SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) ~~WELL~~ POORLY GRADED SAND ~~(SW)~~ (SP), dense, multicolored, medium to coarse grained with some subangular to rounded gravel (ALLUVIUM)					
	78						
	79	~~WELL GRAD~~ Becomes fine to coarse grained sand					
	80						
	81						
	82						
	83						
	84	Becomes fine to medium grained with some coarse grained sand					
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-14J282

HTW DRILLING LOG

G2-14J

Remedial Investigation, Mead NOP | INSPECTOR: [illegible] | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	87	(Same as above) ~~WELL~~ POORLY GRADED SAND (SP), dense, multicolored, fine to medium grained, with some coarse grained sand (ALLUVIUM)	HNU = BG ~~BZ=ND~~				0845 hours. NOTE: HydroPunch II driven from 88 to 95' w/ 140# hammer.
	88				88	42	NOTE: HydroPunch II groundwater sample collected at 95' at 1040.
	89				89	42	
	90				90	52	NOTE: Boring backfilled with tremied 10% clay grout from 95' to surface. Completed 6-2-92 @ 1125 hours.
	91				91	78	
	92				92	357	
	93				93	292	
	94	~~NOTE: Humidity is affecting the HNU. It will not stay zeroed.~~			94		
	95		HNU = BG ~~BZ=ND~~		95	79	Bottom of Boring @ 95

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-14J 283

HTW DRILLING LOG

HOLE NO. 42-18J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 8	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-47 ft bgs: 4 in cfa~~ ~~0-[illegible] ft bgs: 3 1/4 in paddle bit w/ NW-5 rods~~ ~~53-61 ft bgs: 2 in Hydropunch~~	8. HOLE LOCATION: ~~42-18 N. 564850 - E. 2851181~~
	9. SURFACE ELEVATION: ~~@ 1150~~ 1151.10
	10. DATE STARTED: ~~5-30-92 @ 1460~~ 11. DATE COMPLETED: 5-31-92 @ 0825
12. OVERBURDEN THICKNESS: 61 ft w/NWS rods OD II	15. DEPTH GROUNDWATER ENCOUNTERED: 42 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 61 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~42-18J @ 61'~~	~~NA~~ X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled ~~completed~~ with 1:01 clay grout	X	NA	NA	Bret A Hedenkop

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ firm, dark brown, moist ~~with occasional~~ trace fine grained sand & root hairs (top soil)					boring advanced w/ 4 in continuous flight augers (cfa)
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 42-18J 284

HTW DRILLING LOG

42-18J

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF SHEETS 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft to ~~medium~~ firm, dark brown, moist with occasional fine grained sand & root hairs ~~[illegible]~~ (top soil)					
	6						
	7						
	8						
	9						
	10	~~becoming soft to ~~medium~~ firm, dark brown, moist with occasional fine grained sand~~					
	11						
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J285

HTW DRILLING LOG

HOLE NO. 42-18J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF SHEETS 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) CLAYEY SILT (ML), soft to ~~medium~~ firm, dark brown, moist with occasional fine grained sand (topsoil) 15.0					
	15	LEAN CLAY (CL), ~~medium~~ firm to ~~stiff~~ hard, light brownish-red, with occasional very fine grained sand, moist (alluvium)					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J286

HTW DRILLING LOG

HOLE NO. 42-18J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF SHEETS 7/8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above), LEAN CLAY (CL), ~~medium to stiff~~ firm to hard, light brownish-red, with occasional very fine grained sand, moist (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30	30.0 POORLY GRADED SAND (SP) medium dense, ~~light~~ tan, v. fine to fine grained ~~sand~~, ~~moist~~ ~~damp~~ moist (alluvium)					
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J 287

HTW DRILLING LOG

HOLE NO. 42-18J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedinkay | SHEET 5 OF SHEETS 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) Poorly graded sand (SP), medium dense, ~~light~~ tan, very fine to fine grained. ~~sand~~ ~~very damp~~ moist (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39	~~becoming~~ moist					
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J288

HTW DRILLING LOG

HOLE NO. 42-18J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), medium dense, ~~light~~ tan, very fine to fine grained ~~sand~~, moist (alluvium)					
	42						Water detected @ 42 ft ATD
	43						
	44	becoming medium to coarse grained ~~sand~~ with little fine grained sand					
	45						
	46						
	47						
	48	becoming coarse grained ~~sand~~ with some medium grained sand and ~~occasional~~ trace of fine ~~grained~~ gravel					End of cfa drilling 5-30-92 @1515
	49						~~Begin wash bore rotary~~ 5-31-92 @ 0750 Boring continued w/ 8½" drag-bit and bentonite slurry
	50						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18~~J~~ 89

HTW DRILLING LOG

42-18J

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedlunkey | SHEET 7/8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), yellow to tan, wet, coarse grained ~~sand~~, w/ medium grained sand & occasional fine grained gravel (alluvium)					
	51					14	Note: two feet of materials sloughed into the hole
	52					31	stopped WBR on 5-31-92 @ 0825
	53	medium dense				56	Begin hammering w/ 140# hammer 5-31-92 @ 0845
	54					38	~~Note: boring was backfilled w/ tremied bentonite grout from 61 ft bgs to the surface.~~
	55			Hydropunch II		74	
	56					103	
	57					84	
	58					55	
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J

290

HTW DRILLING LOG

42-18J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkay | SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(SAME AS ABOVE) POORLY GRADED SAND (SP), dense, red to tan, wet, coarse grained				71	
	60	w/ little medium grained w/ trace fine gravel (Alluvium)			#1	204	last 4 in of hammering required > 120 blows possible bedrock contact Bottom of Boring @ 61 ft
	61	61					Hammering completed to 61 ft bgs @ 0914 on 5-31-92 HP pulled back
	62						Note: water sample collected using Hydropunch II at 61 ft bgs 5-31-92 @ 093[illegible]
	63						
	64						Note: Boring was backfilled w/ tremied Volclay grout from 61' to surface @ 1100 HRS. 5-31-92
	65						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-18J

HTW DRILLING LOG

HOLE NO. G2-20J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.559882-E.2847234
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-44; RWB w/ 4" drag bit on Mobilock rods 44-77.4; 2" OD Hydrolunch II ground water sampler 77.4-84.4	8. HOLE LOCATION: SW 1/4, SE 1/4, SW 1/4, NE 1/4 sec. 21 ~~G2-20~~ T14N, R9E
	9. SURFACE ELEVATION: 1147.44
	10. DATE STARTED: 5-29-92 1613
	11. DATE COMPLETED: 5-30-92 0904
12. OVERBURDEN THICKNESS: ~~N/A~~ 84.4'	15. DEPTH GROUNDWATER ENCOUNTERED: 41.5
13. DEPTH DRILLED INTO ROCK: N/A 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 84.4'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G2-20J~~ 84.4'	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~backfilled w/ bentonite grout~~	X	NA	NA	John A Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN (CL) hard, ~~FAT CLAY (CH), very stiff,~~ dark brown to black, moist (TOPSOIL)					Advanced boring with 4" CFA. NOTE: Borings logged by cuttings.
	1						
	2						
	3	LEAN hard 3 ~~FAT CLAY (CH), very stiff,~~ brown, moist (LOESS)					
	4						
	5						

/CORPS/6 15 92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G2-20J

292

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | NAME OF DRILLER: John O'Neal | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS above) FAT CLAY (CH), ~~very stiff~~ hard, brown, moist (LOESS)					
	6						
	7	LEAN CLAY (CL), ~~firm to stiff~~ hard, brown, ~~very moist~~ (ALLUVIUM)					
	8						
	9						
	10						
	11	Becoming firm and ~~very moist to~~ wet					
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

293

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP

INSPECTOR: John Nealon

SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), firm, brown, ~~deep~~ moist to wet (ALLUVIUM) 15					
	15	POORLY GRADED SAND (SP), medium dense, light brown, fine grained, moist (ALLUVIUM) with trace orange					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICOFPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

294

HTW DRILLING LOG

62-20J

Remedial Investigation Mead NOP

INSPECTOR John O'Mealon

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	24	(same as above) POORLY GRADED SAND (SP), medium dense, light brown, fine grained, moist (ALLUVIUM) with trace orange					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

295

HTW DRILLING LOG

HOLE NO. G2-205

PROJECT: Remedial Investigation Mead NOP | INSPECTOR: John Mealor | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense, light brown with trace orange, fine grained, moist (ALLUVIUM)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-205

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | INSPECTOR: J S Mealor | SHEET 6 OF 40 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, light brown with trace orange, fine grained (ALLUVIUM) wet					water encountered @ 41.5' ATD
	42						
	43						Stopped 5-29-92 @ 43.5' 1715
							Resume 5-30-92 0740. Caved to 14'. ~~Switch to RWB at 14'.~~ Boring continued w/4" dia drag bit and bentonite slurry
	44						
	45						
	46	46 — — — — — — — — POORLY GRADED SAND (SP), medium dense?, multicolored, medium to coarse grained (ALLUVIUM) wet					
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J 297

FORM 24-18-92

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | INSPECTOR John O'Neal | SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above)					
		POORLY GRADED SAND (SP), medium dense?, multicolored, wet, medium to coarse grained (ALLUVIUM)					
	51						
	52						
	53						Lost 80 gal mud 44.5-53.5
	54						
	55						
	56						
	57						Lost 35 gal mud 58.5-59.5 Mix new mud ~~Lost 80 gallons mud 44.5-58.5~~
	58		HNU = BG ~~B2=B6~~				
	59						

CORPS 4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

298

B07NE003702-04404

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | INSPECTOR: J S Neelon | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(Same as above) POORLY GRADED SAND (SP), medium dense, multicolored, wet, medium to coarse grained (ALLUVIUM)					
	61						
	62						
	63	Becoming coarse grained with trace fine gravel	~~82-86~~				~~Set 35 gal mud 58.5-63.5. Mix new mud~~
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

299

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | INSPECTOR John A Nealon | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense F, multi-colored, wet, coarse grained with trace fine gravel (ALLUVIUM)					Lost 23 gal mud 58.5-68.5
	69						
	70						
	71						
	72						
	73						
		With trace to some fine gravel					
	74						
	75						
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J

300

(CORPS/4-15-92)

HTW DRILLING LOG

G2-20J

Remedial Investigation Mead NOP | John S Nealon | 10 of 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense? multicolored wet coarse grained with trace fine gravel (ALLUVIUM)	HNU = BG BZ = BG to some		77.4'		Lost 6 gal mud 73.5 - [redacted] 0904 hrs. 77.3
	78					30	NOTE: Drove Hydropunch II from 77.4 - 84.4
					78.4		
	79					42	
					79.4		NOTE: Collected Hydropunch II groundwater sample @ 1105 hrs at 84.4 ft.
	80					52	
					80.4		
	81					73	NOTE: Boring backfilled with tremied volclay grout 5-30-92. Completed 84.4' to surface @ 1205 hours.
					81.4		
	82					152	
					82.4		
	83					155	
					83.4		
	84		Water HS = ND		G2-20J	89	
					84.4		Bottom of Boring @ 84.4'
	85						
	86						

CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-20J 301

HTW DRILLING LOG

HOLE NO. 42-21J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 9	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-44' bgs: 4 in cfa~~; ~~0-63½' bgs: 3¼" paddle bit; NWJ rods~~; ~~63½'-69½' bgs: 2 in OD HydroPunch II~~	8. HOLE LOCATION: 42-21[redacted]-N.561206-E.2848995
	9. SURFACE ELEVATION: 1154.94 [redacted]
	10. DATE STARTED: 5-30-92 0755
	11. DATE COMPLETED: 5-30-92 1005
12. OVERBURDEN THICKNESS: 69.5 [redacted] ft bgs	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 52 ft bgs @ 1½ AD
14. TOTAL DEPTH OF HOLE: 69.5 [redacted] ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~[redacted] none~~	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~42-21-5 @ 69.5~~	~~[redacted]~~ x	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled w/ Volclay grout	X	NA	NA	Bret A Hedup

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to firm, dark brown to black, moist, with roots (top soil)					Boring advanced w/ 4 in continuous flight augers (cfa), soil/sediment logged descriptions by [redacted] auger cuttings
	1						
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

42-21J 302

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedinkay | SHEET 2 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	~~(Same as above)~~ CLAYEY SILT (ML), soft to firm, dark brown to black, moist, with roots ~~(top soil)~~ (Loess)					
	6						
	7						
	8						
	9						
	10						
	11						
	12	12.0 LEAN CLAY (CL), soft to firm, light-brown, moist, with occasional fine sand grains (loess)					
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21J

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation Mead NOP | INSPECTOR B. Hedlund | SHEET 3 OF SHEETS 19

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LEAN CLAY (CL), soft to firm light brown, moist with occasional fine sand grains (loess)					
	15						
	16						
	17	17.0 POORLY GRADED SAND (SP), loose, light brown, moist very fine to fine grained with fines (alluvium)					
	18						
	19						
	20						
	21	~~becoming very fine to fine grained with occasional fines~~					
	22						
	23						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21J

HTW DRILLING LOG

42-21J

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenberg | SHEET 4 OF SHEETS 19

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), ~~dry~~ moist light tan, ~~very~~ fine to fine grained, ~~with~~ with occasional fines ~~[illegible]~~ (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

loose

to brown

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 305 42-21J

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedrick | SHEET 5 OF SHEETS 19

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), light tan, ~~damp~~ moist, vf/fine to fine grained, ~~sand~~ w/occasional fines (alluvium) to brown,	medium dense				
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 306 42-21J

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) Poorly					
		GRADED SAND (SP), ~~very fine~~					
	42	to fine grained, ~~with~~ w/ occasional fines. (alluvium)	medium dense, light tan, ~~very dark~~, moist				
	43						CFA complete 5-30-92 @ 0825 to 44 ft bgs
	44						~~Begin wash bore~~ rotary 5-30-92 @ 0941 ~~using 3¼" podell bit~~ ~~NWS rods~~
	45						Boring continued w/ 3¼" drag-bit and bentonite slurry
	46						
	47	becoming fine grained ~~with~~ with occasional medium grained sand					
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21J307

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlunkap | SHEET 7 OF SHEETS 19

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), fine grained, ~~sand~~ with occasional medium grained sand (alluvium) medium dense, light tan,					
	51						
	52	becoming fine sand with medium grained sand and occasional coarse grained sand					
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21 J308

HTW DRILLING LOG

HOLE NO. 42-21

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP), light tan, fine grained, with medium grained sand and occasional coarse grained sand (alluvium) — medium dense					
	60						
	61						
	62	becoming medium grained sand with fine and coarse grained sand.					
	63						Wash rotary completed to 63½' bgs @ 1005 on 5-30-92
	64					83	Begin hammering 5-30-92 @ 1100 w/ 140# hammer. HydroPunch II
	65					80	
	66					58	Possible clay (residual)
	67					47	
	68					76	

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21

/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. 42-21J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkap | SHEET 9 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68					See above	possibly encountered bedrock at 69 ft bgs.
	69				#1	190	bottom 4" required 120 blows
		69.5					bottom of boring at 69½' tammed to 69½ ft bgs.
	70						Note: boring was backfilled with tremied volclay grout from 69½ ft to surface on 5.30.92 @ 1305
	71			HydroPunch II			Note: water sample collected using RD II from 69½ ft bgs on 5.30.92 @ 1130 HydroPunch II

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-21J

310

HTW DRILLING LOG

HOLE NO. 62-22J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: J. Oldham	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-14'; RUB w/4" drag bit on Mobilock rods 14'-70'; 2" OD Hydrpunch II sampler on NWJ rods 70'-77'	8. HOLE LOCATION: 62-22 NE 1/4, SE 1/4, NW 1/4, SE 1/4 sec. 21, T14N, R9E
	9. SURFACE ELEVATION: 1145
	10. DATE STARTED: 5-30-92 1444
	11. DATE COMPLETED: 5-31-92 1015
12. OVERBURDEN THICKNESS: ~~NA~~ 77'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~14'~~ 13' ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 77'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~62-22J 77'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~backfilled with volclay grout~~	X	NA	NA	John Nelson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), ~~stiff~~, firm, very dark brown, ~~damp~~, moist (ALLUVIUM)					Boring advanced with 4" CFA. Boring logged by cuttings.
	2	LEAN CLAY (CL), ~~stiff~~, firm, brown, ~~damp~~ moist, with some very fine sand (ALLUVIUM)					
	3		HNU = BG				
	4		~~BZ=BG~~				
	5						

HTW DRILLING LOG

62-22J

Remedial Investigation Mead NOP | INSPECTOR J J Meadon | SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, brown, moist to wet, very with some very fine sand (ALLUVIUM)					
	6						
	7						
	8						
	9						
	10						
	11	SANDY LEAN CLAY; (CL), soft, dark brown, wet, (ALLUVIUM)					Boring continued w/4-in-dia drag bit and bentonite slurry @ 14ft
	12						
	13		HNU = BG				water encountered @ 13 AT II
	14		~~82-86~~				~~Switch to RWB~~ ~~@ 14'. Started 5-30-92 @ 1457~~

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-22J

COFRS 4-15-92

HTW DRILLING LOG

62-22J

Remedial Investigation Mead NOP

INSPECTOR John Meaden

PAGE 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		~~(Same as above) SANDY LEAN CLAY (CL), soft, dark brown, wet (ALLUVIUM)~~ (14)	~~82-86~~ HNU = 86				Resume 0730 5-31-92
	15	POORLY GRADED SAND (SP), medium dense?, light brown, fine grained with trace medium grained sand, wet, (ALLUVIUM)					
	16						
	17						
	18						
	19						
	20						
	21	21 LEAN CLAY (CL), ~~stiff~~, firm gray, wet (ALLUVIUM)					
	22						
	23						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-22J

HTW DRILLING LOG

62-22J

Remedial Investigation Mead NOP | INSPECTOR: J A Mealor | SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(~~same as above~~) ~~POORLY GRADED SAND (SP), medium dense?, wet, fine grained with trace medium grained sand~~	HNU=BG ~~BZ=BG~~				
	24	LEAN CLAY (CL), ~~stiff~~, firm gray, wet (ALLUVIUM)					
	25						
	26						
	27						
	28	~~POORLY GRADED SAND (SP)~~, medium dense?, light brown, fine grained with wet (ALLUVIUM)					
	29	Some coarse sand grained to medium	HNU= BG ~~BZ=BG~~				Mixed new mud.
	30	~~CLAYEY SAND (SC)~~, POORLY GRADED SAND WITH CLAY (SP-SC), medium dense?, multi-colored sand and gray to black fat clay, wet coarse grained (ALLUVIUM)					
	31						
	32						

CORPS/4 15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-22J

HTW DRILLING LOG

G2-22J

Remedial Investigation Mead NOP | INSPECTOR: J S Mealor | SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME as above) ~~CLAYEY SAND (SC)~~, POORLY GRADED SAND WITH CLAY (SP-SC), medium dense, multicolored sand and gray to black fat clay, coarse grained (ALLUVIUM)					
	33						
	34	34 ~~WELL GRADED~~ POORLY GRADED GRAVEL (GP), dense, multicolored, wet, fine to medium grained, with gray fat sandy clay and coarse grained sand (ALLUVIUM)					
	35						
	36						
	37						
	38						
		38.5 ~~CLAYEY SAND (SC)~~, dense, multicolored, coarse grained sand with gray, ~~very~~ plastic, sandy clay, wet, with trace fine gravel (ALLUVIUM) firm ~~clay~~ to hard ~~stiff~~	BZ=BG WH=BG HNU = BG	highly POORLY GRADED SAND WITH CLAY (SP-SC),			
	39						
	40						
	41						

CORPS 4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-22J

315

HTW DRILLING LOG

G2-22J

Remedial Investigation Mead NOP

INSPECTOR: J. Meal

SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) ~~CLAYEY~~ POORLY GRADED SAND WITH CLAY (SP-SC) ~~SAND (SC)~~, dense, multicolored, coarse grained sand with firm to hard ~~very stiff~~, gray, ~~very~~ highly plastic sandy clay, with trace fine gravel, wet (ALLUVIUM)					
	42						
	43						
	44						
	45						
	46						
	47						
	48		HNU = = BG				
	49		BZ=BG WH=BG				
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-22J316

HTW DRILLING LOG

G2-22J

Remedial Investigation Mead NOP

INSPECTOR

SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) ~~CLAYEY SAND (SC)~~, dense, multicolored, coarse grained sand with ~~very stiff~~ gray highly plastic sandy clay, wet, with trace fine gravel (ALLUVIUM)	POORLY GRADED SAND WITH CLAY (SP-SC), from to hard				
	51						
	52						
	53		HNU= BG				
	54						
	55						
	56						
	57						
	58						
	59		WH=BG BZ=BG				

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-22J

HTW DRILLING LOG

G2-22J

Remedial Investigation Mead NOP | INSPECTOR | SHEET 8 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) ~~CLAYEY SAND (SC)~~, dense, multi-colored, coarse grained Sand with ~~very stiff~~, firm to hard, gray, highly plastic Sandy Clay, wet, with trace fine gravel (ALLUVIUM)	POORLY GRADED SAND WITH CLAY (SP-SC),				
	60						
	61						
	62						
	63						
	64	64 POORLY GRADED SAND (SP), dense, multicolored, wet, medium to coarse grained with trace ~~some~~ Sandy clay and trace fine gravel (ALLUVIUM)	BZ=BG				
	65						
	66						
	67						
	68						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-22J

818

HTW DRILLING LOG

G2-22J

Remedial Investigation Mead NOP | INSPECTOR: J. Mealon | SHEET 9 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(SAME as above) POORLY GRADED SAND (SP), dense, multicolored, wet medium to coarse grained with trace sandy clay and trace fine gravel (ALLUVIUM)					
	70				70		1015 hrs.
						50	NOTE: Drove HydroPunch II groundwater sampler, from 70'-72'
	71				71		
						78	
	72				72		
						87	
	73				73		
						47	
	74				74		
						60	
	75	NOTE: Boring backfilled with tremied Volclay grout from 77' to surface. Completed @ 1444 hours.			75		NOTE: Collected HydroPunch II groundwater sample @ 77' at 1310 hours.
						97	
	76				76		
			Water HS=ND BZ=BG			144	Bottom of Boring @ 77'
	77				77		

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-22J319

CDPH 4-15-82

HTW DRILLING LOG

HOLE NO. 42-25J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 11	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-44 ft:~~ 4in continuous flight augers (cfa); ~~0-93 ft:~~ 3¼ in paddle bit ~~Roll up~~ NW's rods; ~~88-93 ft~~ ; Hydropunch II 2in OD	8. HOLE LOCATION: 42-25-N.556873-E.2849261
	9. SURFACE ELEVATION: 1143.42 ft
	10. DATE STARTED: 6·9·92 @ 0815 / 11. DATE COMPLETED: 6·9·92 @ 13:40
12. OVERBURDEN THICKNESS: 93 ft bgs	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 93 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G2-255 @ 93'~~	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring backfilled w/ Volclay grout	X	NA	NA	Brent A Heckenlaper

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown, moist w/ occasional fine to medium grained sand (top soil)					boring advanced w/ 4in cfa
	1						All soil/sediment descriptions are from auger cuttings
	2						
	3						
	4	becoming dry w/ dessication cracks					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1

320

42-25

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown, dry w/ occasional fine to medium grained sand ~~(top soil)~~ (Loess)					
	6						
	7						
	8						
	9						
	10						
	11	7.0 LEAN CLAY (CL), ~~medium~~ firm to hard ~~to stiff~~, light reddish brown, w/ occasional v. fine sand, moist. (Loess)					
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above) LEAN CLAY (CL), ~~medium to soft~~ firm to hard light reddish brown, w/ occasional					
	15	v. fine sand, moist (loess)					
	16	becoming v. wet and soft ~~to medium~~ firm					
	17						
	18						
	19						
	20	Graded 20.0 POORLY ~~SORTED~~ SAND (SP), lt tan loose to medium dense v. very fine grained, dry (alluvium)					
	21						
	22						
	23						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

322

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH / SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), (lt tan), loose to medium dense, very fine grained,					
	24	dry (alluvium)					
	25						
	26						
	27						
	28						
	29	becoming ~~damp~~ moist					
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), lt tan, loose to medium dense, very fine grained ~~sand~~, clay (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38	~~becom~~ w/ occasional fine to medium grained sand					
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: 42-25 324

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hederkamp | SHEET 6 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(same as above) POORLY ~~GRADED~~ ~~SIKED~~ SAND (SP), lt tan loose to medium dense, very fine grained ~~sand~~ w/ occasional fine to medium grained sand ~~tan~~ moist (alluvium)					
	42						
	43						End cla drilling 6-9-92 @ 0900 to 44 ft bgs
	44						~~begin RWB on~~ 6-9-92 @ 1010 ~~using 3 1/4 in paddle bit & NWJ rods~~
	45						Boring continued w/ 3 1/4 in dia drag-bit and bentonite slurry
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25 325

HTW DRILLING LOG

HOLE NO. 42-25

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), med. dense, wet, ~~lt~~ tan, ~~lt~~ very fine grained ~~sand~~ with occasional					
	51	fine to medium grained sand (colluvium)					
	52	becoming medium w/ fine and occasional coarse grained sand					
	53						
	54						
	55						
	56						
	57	becoming fine grained sand w/ medium grained and occasional v. fine grained sand					
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Heidenkamp | SHEET 8 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(same as above) POORLY GRADED SAND (SP), lt tan, med. dense,					
	wet	fine grained sand w/ medium					
	60	grained and occasional fine grained sand					
		(alluvium)					
	61						
	62						
	63						
	64						
	65	becoming medium grained sand w/ fine grained sand and occasional coarse grained sand to fine grained gravel					
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

HTW DRILLING LOG

HOLE NO. 02-25

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Helenkamp

SHEET 9 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED SAND (SP), med. grained, lt tan, wet, medium grained ~~sand~~ w/ fine grained sand and occasional coarse grained sand to fine grained gravel (alluvium)					
	69						
	70	becoming coarse grained sand w/ medium grained sand and fine grained gravel w/ occasional fine grained sand					
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-228

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Hedankamp | SHEET 10 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(same as above) POORLY GRADED SAND (SP), med dense, tan, wet, coarse grained ~~sand~~ w/ medium grained sand and fine grained gravel w/ occasional fine grained sand (alluvium)					
	78						
	79						
	80	80.0 POORLY GRADED GRAVEL (GP), tannish-red, wet, med. dense, grained sub-rounded to sub angular ~~gravel~~ w/ medium to coarse grained sand and occasional fine grained sand					
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

329

B07NE003702-04435

HTW DRILLING LOG

HOLE NO. 42-25

Remedial Investigation, Mead NOP | INSPECTOR B. Heidenkamp | SHEET 11 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same as above) POORLY GRADED GRAVEL (GP) med. dense, tannish-red, wet, fine grained subangular to sub rounded ~~gravel~~ w/ medium to coarse grained sand and occasional fine grained sand (alluvium)					End of RWB on 6-9-92 @ 1110 to 88 ft bgs
	87						
	88					93	Begin hammering HP II 6-9-92 @ 1320 w/ 140# hammer.
	89					139	
	90					106	
	91					67	
	92			B.O.B. 93.0'		106	Hammering completed to 93 ft bgs @ 1335 on 6-9-92
	93	93.0					Note: boring was back filled w/ Volclay tremied grout from 93 ft to surface @ 1545 6-9-92 @ 1540
	94					Note:	water sample collected with Hydropunch II
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-25

330

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G2-26J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0'-43'; RWB w/4" drag bit on Mobi-lock rods 43'-[redacted] 81'; 2" OD Hydropunch II on NWJ 81'-93'	8. HOLE LOCATION: G2-26J - N.560992 - E.2853992
	9. SURFACE ELEVATION: [redacted] ~1140
	10. DATE STARTED: 6-2-92 1343
	11. DATE COMPLETED: 6-3-92 1150
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 43'
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 93'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
G2-26J @ 93'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with volclay grout	X			J. Nealon

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), stiff, very dark brown, moist (topsoil)					
	2	FAT CLAY (CH), very stiff, brown, moist, with small black inclusions (LOESS OR ALLUVIUM)					
	3						
	4						
	5						

(COHPS E 15-2)

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G2-26J 331

HTW DRILLING LOG

HOLE NO. 62-26J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 2 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	(Same as above) FAT CLAY (CH) very stiff, brown, moist, with small black inclusions (LOESS or ALLUVIUM)					
	7	LEAN CLAY (CL), firm to stiff, brown, moist, medium plasticity (LOESS or ALLUVIUM)					LL ≥ 40
	8						
	9						
	10						
	11						
	12	Becoming soft to firm					
	13						
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-26J

HTW DRILLING LOG

HOLE NO. 62-26J

Remedial Investigation, Mead NOP

INSPECTOR J. Mealor

SHEET 3 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), soft to firm, brown, moist, medium plasticity (LOESS or ALLUVIUM)					
	15	15 POORLY GRADED SAND (SP), medium dense ?, light tan, damp, (ALLUVIUM)					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-26J

333

B07NE003702-04439

HTW DRILLING LOG

HOLE NO. G2-26J

Remedial Investigation, Mead NOP | INSPECTOR John Mealon | SHEET 4 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, light tan, damp (ALLUVIUM)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-26J

HTW DRILLING LOG

HOLE NO. 62-26J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense? light tan, damp (ALLUVIUM)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-26J335

HTW DRILLING LOG

G2-26J

Remedial Investigation, Mead NOP | INSPECTOR John Mealon | SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, light tan, damp (ALLUVIUM)					
	42						
	43		BZ=ND				encountered water at 43' @ 1410 hours.
		43.5					
	44	WELL GRADED SAND (SW), dense, multicolored, wet, with fine gravel (ALLUVIUM) medium to coarse grained,					
	45						
	46						
	47						
	48						
	49		BZ=BG				
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-26J336

HTW DRILLING LOG

HOLE NO. 62-26J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	51	(Same as above) WELL GRADED SAND (SW), dense, multicolored, wet, medium to coarse grained, with fine gravel (ALLUVIUM)					
	52						
	53						
	54	Becoming fine to coarse grained with some fine gravel	BZ=BG				
	55						
	56						
	57						
	58						Lost 35 gal mud 44-59
	59		BZ=BG				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-26J337

HTW DRILLING LOG

HOLE NO. G2-26J

Remedial Investigation, Mead NOP | INSPECTOR J S Nealon | SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(same as above) WELL GRADED SAND (SW), dense, multi-colored, wet, fine to coarse grained, with some fine gravel (ALLUVIUM)					
	61						
	62						
	63						
			B2=BG				
	64	With trace fine to medium grained gravel					
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-26J

HTW DRILLING LOG

HOLE NO. 62-26J

Remedial Investigation, Mead NOP | INSPECTOR J. Mealor | SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	69	(Same as above) WELL GRADED SAND (SW), dense, multi-colored, wet, fine to coarse grained, with trace fine to medium grained gravel (ALLUVIUM)	B2=BG				Stopped 6-2-92 1634 Resumed 6-3-92 0740
	70						
	71	Becomes fine to coarse grained sand					
	72						
	73						
	74		B2=BG WH=BG				
	75	74.5 FAT SANDY CLAY (CH), very stiff, brownish gray, wet, with very fine sand (ALLUVIUM)					
	76	76 WELL GRADED SAND (SW), dense, multicolored, fine to coarse grained, with trace fine gravel (ALLUVIUM)					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-26J

339

HTW DRILLING LOG

HOLE 62-26J

Remedial Investigation Mead NOP | INSPECTOR J. Mealon | SHEET 10 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Same as above) WELL GRADED SAND (SW), dense, multi-colored, fine to coarse grained, with trace fine gravel (ALLUVIUM)	BZ=BG				
	79						
	80						
	81		BZ=0.4ppm			81	with 140# hammer. NOTE: Drove Hydrapunch II 81-88'. Core tip wedged onto tool. Could not open tool. Redrill hole to 88' and drive tool again.
						121	
	82					82	
						143	
	83					83	
						137	
	84					84	
						162	
	85					85	
						294	
	86					86	

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 340 62-26J

HTW DRILLING LOG

HOLE NO. G2-26J

Remedial Investigation, Mead NOP

INSPECTOR: J. Meadon

SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) WELL GRADED SAND (SW), dense, multicolored, fine to coarse grained with trace fine gravel (ALLUVIUM)				380	NOTE: Hole drilled out to 86'. Tool went down to 87! Drive from 87-93 feet. w/ 140# hammer.
	88					213	NOTE: Collected HydroPunch II groundwater sample @ 1305 hours at 93 feet.
	89					115	
	90					177	
	91					216	
	92					219	
	93					250	Bottom of Boring @ 93 feet. NOTE: Boring backfilled with bentonite volclay grout from 93' to surface. Completed 6-3-92 @ 1410 hrs.

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-26J 341

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. G2-27J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 12 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-54'; 4" drag bit on Mo/Black rods 54'-93.5'; 2" OD HydroPunch II on NWJ rods 87'-101'	8. HOLE LOCATION: N.560992 - G2-27 - E.2853992
	9. SURFACE ELEVATION: ~1140 1143.56
	10. DATE STARTED: 6-16-92 1441 / 11. DATE COMPLETED: 6-17-92 0950
12. OVERBURDEN THICKNESS: 99'	15. DEPTH GROUNDWATER ENCOUNTERED: 53' ATD
13. DEPTH DRILLED INTO ROCK: 2'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 101'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
G2-27J @ 101'	X					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with Volclay grout	X			John Medlow

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		FAT CLAY (CH), firm, dark brown, damp (Topsoil)					Advanced boring w/ 4" CFA. Logged boring by cuttings.
	1						
	2	LEAN CLAY (CL), ~~soft to~~ firm, medium brown, ~~damp~~ ~~to~~ moist (LOESS) (2)					WC PL
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G2-27J

342

HTW DRILLING LOG

62-27J

Remedial Investigation Mead NOP | INSPECTOR John Mealor | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), soft to firm, medium brown, damp to moist (LOESS)					WC<PL
	6						
	7						
	8	Becomes soft and wet					WC>PL
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-27J

HTW DRILLING LOG

G2-27J

Remedial Investigation, Mead NOP

INSPECTOR John S Nealon

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL), soft, medium brown, wet (LOESS)					WC>PL
	15						
	16						
	17	(17) POORLY GRADED SAND (SP) med dense, light tan, ~~damp~~ moist, fine grained (ALLUVIUM)					
	18						
	19						
	20						
	21						
	22						
	23						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J

HTW DRILLING LOG

G2-27J

Remedial Investigation, Mead NOP | INSPECTOR John Shealor | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), med dense, light tan, ~~[illegible]~~ rare, fine stained (ALLUVIUM)					
	24						
	25		B2=B6				
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J 345

HTW DRILLING LOG

G2-27J

Remedial Investigation, Mead NOP | INSPECTOR: John Mealon | SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), moist					
	med.	dense, light tan, ~~damp~~,					
	33	fine grained (ALLUVIUM)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J

346

HTW DRILLING LOG

62-27J

Remedial Investigation, Mead NOP | INSPECTOR: John Nealon | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), moist med. dense, light tan, ~~damp~~, fine grained (ALLUVIUM)					
	42	POORLY GRADED SAND (SP), med dense, light tan, ~~damp~~ moist, fine grained, with trace to some medium and coarse grained sand (ALLUVIUM)	42				
	43						
	44						
	45						
	46						
	47						
	48						
	49		BZ=BG				
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J 347

HTW DRILLING LOG

62-27J

Remedial Investigation, Mead NOP | INSPECTOR: J. Mealor | SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(Same as above) POORLY GRADED SAND (SP), med. dense, light tan, ~~damp~~ moist, fine grained, with trace to some medium and coarse grained sand (ALLUVIUM)					
	52						
	53						Water encountered @ 53'. Switch to RWB. Stop 6-16-92 @ 1631 @ 54'
	54						Resume 0730 hours 6-17-92, with 4" drag bit on Mobilock rods
	55						
	56						
	57						
	58						
	59	With some medium and coarse grained sand					

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-27J

HTW DRILLING LOG

62-27J

Remedial Investigation, Mead NOP | INSPECTOR: J O'Malon | SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), med. dense, light tan, ~~with some~~ medium and coarse grained sand (ALLUVIUM)	wet,				
	60		60				
		POORLY GRADED SAND (SP), med. dense, ~~[illegible]~~ multicolored, wet, medium to coarse ~~with coarse sand and fine gravel~~ grained, with fine gravel (ALLUVIUM)					
	61						
	62						
	63						
	64						
	65						Mixing new mud
	66						
	67						
	68						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J

HTW DRILLING LOG

G2-27J

Remedial Investigation, Mead NOP | INSPECTOR: John O'Neal | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(Same as above) POORLY GRADED SAND (SP), med. dense, multicolored, wet, medium to coarse grained, with fine gravel (ALLUVIUM)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J 350

HTW DRILLING LOG

62-27J

Remedial Investigation Mead NOP | INSPECTOR John J Mealon | SHEET 12 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Same as above) POORLY GRADED SAND (SP), med. dense, multicolored, wet, medium to coarse grained, with fine gravel (ALLUVIUM)	BZ=BG				Lost 12 gal mud 63.5-78.5
	79						
	80						
	81						
	82						
	83						Lost 6 gal mud 78.5-83.5
	84						
	85						
	86						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J

351

B07NE003702-04457

HTW DRILLING LOG

G2-27J

Remedial Investigation Mead NOP | INSPECTOR John Nelson | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(same as above) [redacted] GRADED SAND (SP), [redacted], multicolored, wet, medium to coarse grained, with fine gravel (ALLUVIUM)	B2=B6				
						75	Drove Hydro Punch II from 87 to 94 feet. Tool would not open.
	88						[redacted] Drill hole out to 93.5' feet and drove tool to 101'.
						110	
	89						
						86	
	90						
						74	
	91						
						73	
	92						
						82	
	93						
			B2=B6				
			[redacted]		[redacted]	85	
	94						
						42	
	95						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J352

HTW DRILLING LOG

HOLE NO. G2-27J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(same as above) POORLY GRADED SAND (SP), dense, multicolored, wet, medium to coarse grained, with fine gravel (ALLUVIUM)				65	
						119	
	97						
						81	
	98						
						204	Note: HydroPunch II groundwater sample collected @ 101' at 1645 hours, 6-17-92.
	99	SANDSTONE, orange, very fine grained					
						272	
	100						
						325	
	101		water HS=ND		G2-27J		Bottom of Boring at 101'.
	102					NOTE:	Boring backfilled with tremied volclay grout from 101' to surface. Completed at 1914 hours, 6-18-92. at 10.2 hours
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-27J

HTW DRILLING LOG

HOLE NO.	G2-30J
1. COMPANY NAME	Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR	WCC
SHEET 1 OF 1 SHEETS	
3. PROJECT	Remedial Investigation, Mead NOP
4. LOCATION	Mead, Nebraska
5. NAME OF DRILLER	Matt Cooper
6. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	0-47 ft bgs : 4" CFA 47-85.5 ft. bgs washbore 4" rotary bit. 2" O.D. 85.5 - 90.5' Hydropunch
8. HOLE LOCATION	G2-30J - N.
9. SURFACE ELEVATION	1140
10. DATE STARTED	6-29-92/1538
11. DATE COMPLETED	6-30-92/0945
12. OVERBURDEN THICKNESS	~~N/A~~ 90.5'
13. DEPTH DRILLED INTO ROCK	0'
14. TOTAL DEPTH OF HOLE	90.5'
15. DEPTH GROUNDWATER ENCOUNTERED	47' ATD
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	N/A
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
G2-30J	TCE		explosives			N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring grouted w/ Tremied Volclay grout	X			Robert R Mallsee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Silty LEAN CLAY (CL), firm, dark brown, moist (Topsoil)					Boring advanced w/4" continous Flight Augers (CFA) Soil/sediment descriptions from auger cuttings
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 G2-30J 354

HTW DRILLING LOG

HOLE NO. 62-30 J

SHEET 2 OF 4 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR R. Mallison

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) SILTY Clay (CL) ~~Stiff~~ Firm, Dark brown, moist (Topsoil) 6.0'					
	6	~~Becoming light brown~~, ~~Dry~~ ~~Stiff~~ Lean CLAY (CL), Firm, light brown, ~~dark brown~~, ~~moist~~ dry (Loess)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-305

HTW DRILLING LOG

HOLE NO. 62-30 J

Remedial Investigation, Mead NOP

INSPECTOR R. Mullisee

SHEET 3 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN ~~SILTY~~ CLAY (CL) ~~STIFF~~ FIRM, light brown, dry					
		15.0'					
	15	Poorly Graded SAND (SP) loose, light brown, ~~moist~~, very fine to fine grained ~~sand~~					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-30 J

HTW DRILLING LOG

HOLE NO. 62-30J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, ~~dry~~ v. fine to fine grained, dry					
	24						
	25						
	26	Becoming moist w/some coarse grained sand and Trace of clay					
	27						
	28						HNU at BZ = BKG
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-30J

357

HTW DRILLING LOG

HOLE NO. 62-30J

Remedial Investigation, Mead NOP | INSPECTOR R. Mallisee | SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly Graded SAND (SP) loose, light brown ~~moist~~ v.fine to fine grained, moist w/ some coarse grained sand					
	33						
	34	w/o clay					
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-30J

HTW DRILLING LOG

HOLE NO. 62-30J

SHEET 6 OF 11 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly ~~graded~~ SAND (SP)					
		loose, light brown, moist					
	42	w/some coarse grained					
		Sand					
	43						
	44	Becomes wet					
	45						
	46						
	47						
							Stopped 6-29-92 1625
							Started 6-30-92 1080
	48						Began washboring/ rotary drilling
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-30J

HTW DRILLING LOG

HOLE NO. G2-30J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 7 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly GRADED SAND (SP) 50.0' ~~loose~~ loose, multi colored, wet, Fine grained ~~sand~~ w/ medium grained sand &					
	51	some coarse sand					
	52						
	53	becoming fine to medium grained w/ some coarse grained sand					
	54						
	55						
	56						
	57						
	58						
	59						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-30J

360

HTW DRILLING LOG

HOLE NO. 62-50 J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly ~~Graded~~ GRADED SAND (SP) loose, multicolored, wet. Fine To medium grained w/some coarse grained sand.					
	60						
	61	becoming medium grained sand					
	62						
	63						
	64						
	65						
	66						
	67	w/coarse sand To fine gravel					
	68						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 62-30J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly ~~graded~~ graded Sand (SP) loose, multicolored, wet, medium grained w/ coarse To fine gravel.					
	69						
	70						
	71						
	72						
	73						
	74						
	75	becoming medium To coarse grained sand w/fine To coarse gravel.					
	76	becoming coarse grained sand w/fine To coarse gravel					
	77	W/o coarse gravel					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. G2-30J

Remedial Investigation Mead NOP | INSPECTOR R. Mallisee | SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above)					
		Poorly ~~sorted~~ graded SAND (SP)					
		Loose, multi colored, wet					
		coarse grained ~~sand~~					
	78	w/ Fine gravel					
	79						
	80						
		w/ some coarse gravel					
	81						
	82						
	83						rough drilling
	84						wash boring/rotary drilling to 85.5' 6-30-92/0945
	85						85.0' Begun hammering hard/punch w/ Mobile hamer @ 85.5' on 6-30-92/1035
						43	
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

HTW DRILLING LOG

HOLE NO. 62-30J

Remedial Investigation, Mead NOP

INSPECTOR R. Mallise

SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP)?					
	87					48	
	88					51	
	89					145	
	90					172	HPII hammering completed to 90.5' 6-30-92/1053 pulled back 1.5 ft.
						Hydropunch	Water sample collected from depth of 90.5' bgs. 6-30-92 @1212
	91						
	92						Note: boring backfilled w/ Tremied Volclay grout from 90.5' to surface 6-30-92 @1640
	93						
	94						
	95						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. 42-31J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-44 ft bgs: CFA; 0-68 ft bgs: 3/4 in paddle bit w/ NWJ rods; 68-76 ft bgs: Hydropunch	8. HOLE LOCATION: 42-31 - N.557009 - E.2854957
	9. SURFACE ELEVATION: 1122.33
	10. DATE STARTED: 6-16-92 @ 1510
	11. DATE COMPLETED: 6-17-92 @ 0930
12. OVERBURDEN THICKNESS: ~~NA~~ 76'	15. DEPTH GROUNDWATER ENCOUNTERED: 37 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 76 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
42-31J @ 76'	X		EXP ~~explosives~~			NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ tremied bentonite grout	X			Bret A Hedges

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT, ~~medium~~ firm, brown, moist, w/ occasional fine grained sand and roots (top soil)					Boring advanced with 4 in cfa (continuous flight auger)
	1						soil/sediment descriptions by auger cuttings
	2						
	3	becoming dry					
	4	4.0 LEAN CLAY (CL), ~~medium~~ firm, reddish brown, dry, with occasional fine grained sand (loess)					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 42-31J

HTW DRILLING LOG

HOLE NO. 42-31J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkar

SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) LEAN CLAY (CL) firm, lt reddish tan, dry, occasional fine grained sand (loess)					
	6						
	7	7.0 POORLY GRADED SAND (SP), loose to medium, lightbrown, dry, very fine to fine grained (alluvium)					
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J 366

HTW DRILLING LOG

HOLE NO. 42-31J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Bittedenkapp

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) Poorly Graded SAND (SP), lmx to nelium light tan, dry, very fine to fine grained (Alluvium) dense,					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 367 42-31J

HTW DRILLING LOG

42-31J

Remedial Investigation Mead NOP | INSPECTOR: B. Hekenkamp | SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(same as above) POORLY GRADED SAND (SP), loose to medium dense, light tan, dry, very fine to fine grained (alluvium)					
	24						
	25	~~becoming~~ With occasional medium to coarse grained sand					
	26						
	27						
	28	~~becoming with clay~~ ~~medium to stiff~~ Becomes medium dense to dense with clay					
	29						
	30	becoming ~~damp~~ moist with medium to coarse grained sand					
	31						
	32						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J 368

HTW DRILLING LOG

HOLE NO. 42-31J

Remedial Investigation, Mead NOP | INSPECTOR B. Heckenberg | SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) Poorly GRADED SAND (SP), ~~stiff~~ medium dense to dense, ~~stiff, Brown~~ dark brown, ~~damp~~, moist					
	33	medium to coarse ~~grained~~ with Clay (alluvium)					
	34						
	35	becoming medium to coarse grained ~~sand~~ w/ clay and occasional fine grained sand.					
	36						
	37	~~encounter water~~				V	water detected ATD
	38						
	39	becoming medium to coarse grained ~~sand~~ with fine grained gravel					
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J

HTW DRILLING LOG

HOLE NO. 42-31J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedalen | SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	Poorly graded SAND (SP) loose to medium dense, reddish-tan, wet, medium to coarse grained, with fine gravel (alluvium)					
	42						
	43						Cta drilling complete to 44 ft bgs 6.16.92 @ 1545
	44						resume RWB drilling 6.17.92 @ 0800
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J-370

HTW DRILLING LOG

HOLE NO. 42-31J

Remedial Investigation, Mead NOP | INSPECTOR B. Helenkamp | SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), loose to medium dense, reddish tan, wet, medium to coarse grained with subangular to subrounded fine grained gravel (alluvium)					
	51						
	52						
	53						
	54						
	55						begin to lose circulation
	56						
	57						
	58						
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J

HTW DRILLING LOG

HOLE NO. 42-31J

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlund | SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP), loose to medium dense, reddish tan, wet, medium to coarse grained, with subangular to subrounded fine grained gravel (alluvium)					
	60						
	61	61.0 POORLY GRADED GRAVEL (GP) loose to medium dense, reddish tan, wet, subangular to subrounded, fine grained, with medium to coarse grained sand (alluvium)					
	62						
	63						
	64						
	65						
	66						Complete RUNS drilling to 68 ft 6.17.92 @ 0930
	67						
	68						

ICORPS/4-15-9:

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-31J

HTW DRILLING LOG

HOLE NO. G2-31J

Remedial Investigation Mead NOP | INSPECTOR B. Hedlunkap | SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED GRAVEL (GP), loose to medium dense, reddish tan, wet, subangular to subrounded, fine grained, with medium to coarse-grained sand (ALLUVIUM)					Begin hammering HPII hammer 6-17-92 @ 1100 @ 68 ft.
	69					67	
				Hydropunch II		60	
	70					45	
	71					46	
	72					63	
	73					72	
	74					77	HPII hammered to 76 ft @ 1130 6.17.92 Groundwater sample collected @ 76' 6.17.92 @ 1145
	75					72	boring backfilled with bentonite chips grout from 76' to surface 6.17.92 @ 1400
	76			NOTE:			Bottom of Boring @ 76'
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-31J

/CORPS/4-15-92

373

HTW DRILLING LOG

HOLE NO. 42-32

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: ~~[illegible]~~ Woodward-Clyde Cons
SHEET 1 OF SHEETS 7	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: K. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0 -- 44 ft bgs : 4 in cfa; 44-54 ft bgs : 2" OD Hydropunch	8. HOLE LOCATION: 42-32
	9. SURFACE ELEVATION:
	10. DATE STARTED: 6.27.92 @ 0945
	11. DATE COMPLETED: 6.27.92 @ 1055
12. OVERBURDEN THICKNESS: 54 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 13 ft ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 54 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
42-32 @ 54'	TCE		explosives			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring grouted with tremied volclay grout	X			Bret A Hedenkamp

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), ~~medium~~ firm, brown, dry w/ occasional very fine to medium grained sand (top soil)					boring advanced w/ 4 in continuous flight auger (cfa)
	1						soil/sediment descriptions from auger cuttings
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 42-32 B1 374

HTW DRILLING LOG

HOLE NO. 42-32

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), ~~medium~~ firm, brown, dry w/ occasional very fine to medium grained sand (top soil					
	6	6.0 LEAN CLAY (CL) medium, grayish brown, ~~damp~~ moist, w/ ocassional v. fine grained sand (loess)					
	7						
	8						
	9						
	10						
	11						
	12	12.0 POORLY GRADED SAND (SP), loose to medium dense, tan, ~~very damp~~ moist very fine to fine grained ~~sand~~ (alluvium)					
	13					V	water detected ATD
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32

HTW DRILLING LOG

HOLE NO. 42-32

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), loose to medium dense, tan, wet, very fine to fine grained ~~sand~~ (alluvium)					
	15						
	16						
	17						
	18						
	19						
	20	becoming with occasional medium grained sand					
	21						
	22	becoming medium dense					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32

HTW DRILLING LOG

HOLE NO. 42-32

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) Poorly					
		GRADED SAND (SP), medium dense,					
		tan, wet, very fine to fine					
	24	grained ~~sand~~ with occasional					
		medium grained sand					
		(alluvium)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32

377

HTW DRILLING LOG

HOLE NO. 42-32

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), medium dense, tan, wet, very fine to fine grained ~~sand~~ with occasional medium grained sand (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38	becoming with medium grained sand					
	39						
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32 378

HTW DRILLING LOG

HOLE NO. 42-32

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP) medium dense tan, wet, very fine to fine grained ~~sand~~ with medium grained sand (alluvium)					
	42						
	43						Cta drilling complete to 44 feet bgs 6-27-92 @ 1055
	44					pushed	begin hammering w/ 140# hammer @ 45 ft on 6-27-92 @ 1110
	45					63	
	46					75	
	47					57	
	48					46	
	49					72	
	50						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32

HTW DRILLING LOG

HOLE NO. 42-32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP) ?				79	
	51					64	
	52					75	
	53					81	HPII hammering complete to 54 ft @ 6-27-92 @ 1130 back hammered 1 ft
	54					Hydrogeo	Water sample collected from depth of 54 ft bgs 6-27-92 @ 1155
	55						Note: Boring back filled w/ tremied volclay grout from 54 ft to surface 6-27-92 @ 1400 HAS.
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-32

380

GAM 7/23/92

HTW DRILLING LOG

HOLE NO. G2-34J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39ft: 4" CFA; 39-43ft: Hydropunch	8. HOLE LOCATION: SE 1/4, ~~G2-34~~ NW 1/4, NW 1/4, NE 1/4 sec 34 T14N, R9E
	9. SURFACE ELEVATION:
	10. DATE STARTED: 7-22-92/1223
	11. DATE COMPLETED: 7-22-92/1223
12. OVERBURDEN THICKNESS: 43.0	15. DEPTH GROUNDWATER ENCOUNTERED: 6.5' ATD
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 43'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G2-34J @ 43'~~	VOA screening	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Boring grouted with Tremied bentonite grout~~	X	NA	NA	Robert R Mallice

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~Silty~~ Clay (CL), Firm, medium brown, dry, with Trace Fine Sand (topsoil)					Boring advanced with 4" CFA. Soil/sediment descriptions logged from cuttings.
	1						
	2						
	3						
	4	LEAN Sandy Clay (CL) Firm light brown, moist w/ Fine grained sand (Alluvium) — 4.0'					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G2-34J B1

381

B07NE003702-04487

HTW DRILLING LOG

G2-34J

Remedial Investigation Mead VOP | INSPECTOR: RRM | PAGE 4 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		LEAN					
		~~SILTY~~ CLAY (CL) Soft medium gray, wet, with Trace v. Fine Sand (Alluvium)					
	24						
	25	25.0' Poorly Graded SAND (SP), loose, light brown, wet, Fine grained (Alluvium)					
	26						
	27						
	28						
	29	29.0' ~~becomes moist~~ Poorly Graded SAND (SP), loose, multi-colored, wet, medium to coarse grained (Alluvium)	HNU = BG				BZ = BKG
	30						
	31						
	32						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: G234J

382

HTW DRILLING LOG

HOLE NO. G2-34J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN Sandy CLAY (CL) Firm, light brown, moist Fine grained Sand (Alluvium)					
	6						
		becomes wet					WATER ENTERS ATD @ 6.5'.
	7						
	8						
	9		HNU = BG				~~BZ~~ BKG
	10						
	11						
	12	LEAN 12.0' ~~Silty~~ Clay (CL) Firm, medium gray, wet, with Trace v. Fine Sand (Alluvium)					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-34J

HTW DRILLING LOG

HOLE NO. G2-34J

Remedial Investigation, Mead NOP | INSPECTOR RBM | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Silty~~ Clay (CL) Firm, medium gray, wet, with Trace V. Fine sand (Alluvium)					
	15						
	16						
		becomes Soft					
	17						
	18						
	19		HNU = BG				~~BZ = BKG~~
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-34J

384

HTW DRILLING LOG

G2-34J

Remedial Investigation Mead VOP | INSPECTOR RRM | PAGE 5 OF 6 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, Multi-colored (wet) medium to coarse grained (Alluvium)					
	33						
	34						
	35	[redacted]					
		with some gravel.					
	36						
	37						
	38						Stopped drilling with 4" CFA 7-22-92/1252 at 39' bgs 39.0'
	39					18	Began driving hydrapunch II with 140 lbs. hammer at 39' 7-22-92/1358
	40					18	
	41						

PROJECT: Remedial Investigation, Mead NOP 921-W030

HOLE NO.: G2-34J

385

/CORPS/4-18-92

HTW DRILLING LOG

G2-34J

Remedial Investigation Mead VOP | INSPECTOR RRM | SHEET 6 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	HTW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), loose, multi-colored, medium				25	
	42	to coarse grained, wet					Completed driving hydropunch II at 43' 7-22-92/1424 pulled back 6" B.O.B 43.0' Hydropunch II
		w/ some fine gravel				500	
	43					Note:	collected groundwater sample from depth of 43' bgs. 7-22-92/1435
	44						Note: Boring backfilled with Tremied Volclay grout from 43' to surface. 7-22-92/1544
	45						
	46						
	47						
	48						
	49						
	50						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NUP 92KW030

HOLE NO.: G2-34J

HTW DRILLING LOG

HOLE NO. 42-35J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-44 ft bgs 4" cfa; 2" o.d. Hydrapunch II	8. HOLE LOCATION: 42-35
	9. SURFACE ELEVATION: about 1080 ft
	10. DATE STARTED: 6-26-92 @ 1029 / 11. DATE COMPLETED: 6-26-92 @ 1100
12. OVERBURDEN THICKNESS: 46	15. DEPTH GROUNDWATER ENCOUNTERED: 11 ft ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 46'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
42-35j	TCE					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring backfilled with tremied volclay grout	X			Bret A Healy

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), ~~medium~~ fine, medium brown, dry, w/ occasional fine to medium grained sand (top soil)					boring advanced with 4 inch continuous flight augers (cfa)
	1						soil/sediment descriptions from auger cuttings
	2						
	3						
	4						
	5	becoming moist, w/ occasional very fine to fine grained sand					

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 387 ~~B1~~ 42-35

HTW DRILLING LOG

HOLE NO. #1 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkay | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME AS above) CLAYEY SILT (ML) medium dense, medium brown, ~~dry~~ moist, w/ very occasional fine					
	6	to fine grained sand (top soil)					
	7	7.0 LEAN CLAY (CL) ~~medium~~, greyish brown, moist w/ occasional very fine to fine grained sand					
	8	~~(loess)~~ alluvium					
	9						
	10						
	11	~~water detected~~				V	Water detected ATD
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: #1 42-35

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkar | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) LEAN CLAY (CL) firm ~~medium dense~~, greyish-brown, wet, w/ occasional very fine to fine grained sand ~~(Loess)~~ alluvium					
	15						
	16						
	17						
	18						
	19						
	20	20.0 POORLY GRADED SAND (SP), ~~gr~~ medium dense, greyish tan, wet very fine to fine grained ~~sand~~ (alluvium)					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), medium dense, greyish tan, wet, very fine to fine grained ~~Sand~~ (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29	becoming w/occasional medium grained sand					
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation, Mead NOP | INSPECTOR B. Helenkamp | SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP) medium dense, greyish-tan, wet, very fine to fine grained					
	33	~~sand~~ sand w/ occasional medium grained (alluvium)					
	34						
	35						
	36						
	37	becoming medium grained sand w/ very fine to fine grained sand					
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35

HTW DRILLING LOG

HOLE NO. 42-35

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), medium ~~[illegible]~~ dense greyish-tan, wet, medium grained ~~sand~~ w/ occasional very fine to fine grained sand (alluvium)					
	42						
	43						Cfa drilling completed to 44 ft bgs 6-26-92 @ 1100
	44					114	begin hammering w/ 140 # hammer @ 44 ft bgs 6-26-92 @ 1115
	45					324	
					45'9"		Refusal @ 45'9" @ 1140
	46						HP II pulled back ~1½ ft
	47						Water sample collected 6-26-92 @ 1150 @ 45'9" bgs
	48						Note: boring backfilled w/ bentonite grout from 45'9" to surface 6-26-92
	49						@ 1300
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-35 392

HTW DRILLING LOG

HOLE NO. 42-36

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 16	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39 ft bgs: CFA-4in; 39-43 ft bgs: HPT w/ NWS rods	8. HOLE LOCATION: 42-36
	9. SURFACE ELEVATION: about 1085
	10. DATE STARTED: 6-24-92 0930
	11. DATE COMPLETED: 6-24-92
12. OVERBURDEN THICKNESS: 43 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 7 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 43 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
42-36J-43	TCE					NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring backfilled w/ bentonite volclay grout	X			Bret A Hedenup

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), ~~[illegible]~~ dk brown-black, moist w/ occasional fine - medium grained sand (top soil)					boring advanced w/ 4 in continuous flight augers (cfa)
	1						soil/sediment descriptions from auger cuttings
	2						
	3						
	4	~~becoming very~~ moisture content increasing					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 42-36 B1 393

HTW DRILLING LOG

HOLE NO. 42-36

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) CLAYEY SILT (ML), ~~medium~~ firm, dk brown-black, ~~very~~ moist w/ occasional fine to medium grained sand (top soil)					
	6						
	7	becomes ~~saturated~~ moist ~~encounter water~~				V	water detected ATD
	8	7.5 LEAN CLAY (CL) ~~medium~~ firm, dk grey, wet, w/occasional fine grained sand ~~(loess)~~ (alluvium)					
	9						
	10	10.0 POORLY GRADED SAND (SP) loose to medium, ~~very~~ dk greyish tan, wet, very fine to fine grained ~~sand~~ (alluvium)					
	11						
	12						
	13						
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-36

394

B07NE003702-04500

HTW DRILLING LOG

42-36

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), loose to medium dense, dk greyish tan, wet,					
	15	Very fine to fine grained ~~sand~~ (alluvium)					
	16						
	17						
	18						
	19						
	20						
	21						
	22	becoming fine grained sand w/ medium grained sand					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-36

HTW DRILLING LOG

HOLE 42-36

Remedial Investigation, Mead NOP | INSPECTOR B. Helenkay | SHEET 4 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(same as above) POORLY GRADED SAND (SP), loose to medium dense, v dk greyish tan, fine grained ~~sand~~ w/ medium grained sand (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-36

396

HTW DRILLING LOG

HOLE NO. 42-36

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), loose to medium dense, dk greyish tan, wet, fine grained ~~sand~~ w/ medium grained sand (alluvium)					
	33						
	34						
	35	becoming fine to medium grained sand w/ occasional coarse grained sand					
	36						
	37						
	38						drilling complete to 39 ft bgs 6-24-92 @ 0930
	39					HP II pushed	begin hammering with 140# hammer 6-24-92 @ 0950
	40					40	
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-36

ICORPB/4-15-92

397

B07NE003702-04503

HTW DRILLING LOG

HOLE NO. 42-36

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (?)				67	
	42					483	HPT refusal @ 43 ft bgs 1010. Last 3in of hammering required > 300 blows
	43					Hydropunch	Water sample collected @ 43 ft bgs 1030 HRS 6.24.92
	44						Boring backfilled w/ bentonite cold lay grout 6.24.92 @ 1225 HRS
	45						

ICORPB/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-36

398

B07NE003702-04504

UA 71917

42-37

HTW DRILLING LOG

HOLE NO. ~~B1~~

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-39 ft bgs 4 in CFA~~ 2 in OD; ~~39-47½ ft bgs Hydropunch~~ II w/ NWJ rods	8. HOLE LOCATION: 42-37
	9. SURFACE ELEVATION: about 1080
	10. DATE STARTED: 6-28-92 @ 0840
	11. DATE COMPLETED: 6-28-92 @ 1100
12. OVERBURDEN THICKNESS: 47½ ft	15. DEPTH GROUNDWATER ENCOUNTERED: 8 ft ~~bgs~~ ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 47½ ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~42-37 @~~ 1	TCE	NA	explosives	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled with treated bentonite grout	X	NA	NA	Bret A Healey

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML) ~~medium~~ firm brown, dry with roots (top soil)					Boring advanced w/ 4-in-dia CFA
	1						Soil/sediment description based on observed auger cuttings
	2						
	3						
	4	LEAN CLAY (CL) ~~firm~~ ~~medium~~ 4.0 red-gray, dry w/ occasional fine grained sand (loess)					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

42-37 399

HTW DRILLING LOG

HOLE NO. 42-37

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) LEAN CLAY (CL) ~~medium~~ firm, reddish, ~~dry~~ moist w/ occasional fine grained sand (loess)					
	6						
	7						
	8	~~water detected ATD~~					Water detected ATD @ 8'
	9						
	10						
	11	becoming grey					
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-37

400

HTW DRILLING LOG

HOLE NO. 42-37

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) LEAN CLAY (CL) firm ~~medium~~, grey ~~very~~ moist to wet, w/ occasional fine grained sand ~~[illegible]~~ (loose) 15.5					
	15						
		POORLY GRADED SAND (SP) medium dense tannish gray, wet, very fine to fine grained ~~sand~~ (alluvium)					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-37

HTW DRILLING LOG

HOLE NO. 42-37

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), medium, dense, tannish grey, wet, very fine to					
	24	fine grained ~~sand~~ (alluvium)					
	25						
	26						
	27						
	28						
	29						
	30	becoming medium grained ~~sand~~ w/ fine grained sand					
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-37 102

HTW DRILLING LOG

HOLE NO. 92-37

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 5 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), medium dense tannish grey, wet, ~~very fine to fine grained~~ medium grained sand with fine grained sand (alluvium)					
	33						
	34						
	35						
	36	becoming medium grained sand w/ fine and occasional coarse grained sand					
	37						
	38						Cla drilling complete to 39 ft bgs 6-28-92 @ 0840
	39					15	begin driving HPII from 38½ ft bgs @ 0915 on 6-28-92 using 300# hammer
	40					46	
	41					35	

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

B07NE003702-04509

HTW DRILLING LOG

HOLE NO. G2-37

Remedial Investigation Mead NOP | INSPECTOR P. Helenkamp | SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(SAME AS ABOVE) POORLY GRADED SAND (SP), dense, tannish gray, wet, medium grained w/ little fine grained and trace coarse grained sand.				36	
	42					35	
	43					36	
	44					27	
	45					29	
	46					35	HPII refusal @ 47½ ft bgs 6-28-92 @
	47				#1	100	HPII pulled back 1 ft ~~B.O.B. 47.5 ft~~
					47½		Water sample G2-37j collected from 47½ ft 6-28-92 @ 1000
	48						
	49						Note: boring back filled w/ tremied bentonite grout from 47½' bgs to surface 6-28-92 @ 1100
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 404

/CORPS 4-16-92

CCM 7/21/92

HTW DRILLING LOG

HOLE NO. G2-38J

SHEET 1 OF 6 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Driller	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39+ft bgs. : 4" CFA; 39-49.5+ft bgs : hydrofracture	8. HOLE LOCATION: SW1/4, SE1/4, ~~SW1/4~~ G2-38J, SW1/4 sec. 23, T14N, R9E
	9. SURFACE ELEVATION:
	10. DATE STARTED: 7-16-92/0823
	11. DATE COMPLETED: 7-16-92/0845
12. OVERBURDEN THICKNESS: 49.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 9.5' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 49.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G2-38J~~ 1	U&A Screening	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Boring grouted with Tremied Volclay slurry~~ Backfilled	X	NA	NA	Robert R Mallison

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~silty~~ CLAY (CL) firm, dark brown to black, moist (Topsoil)					Boring advanced with 4" continuous flight augers. Soil/sediment logged from cutting.
	1						
	2						
	3						
	4						
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 G2-38J

405

B07NE003702-04511

HTW DRILLING LOG

HOLE NO. 62-38J
SHEET 2 OF 6 SHEETS

Remedial Investigation Mead NOP

NAME OF DRILLER RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~Silty~~ Clay (CL) Firm, dark brown to black, moist (Topsoil)					
	6	LEAN — — — 6.0' Silty clay (CL) Firm, medium gray, moist. (Alluvium)					
	7						
	8						
	9	becomes wet	HNU = BG				~~BZ = BKG~~ ∇ Water detected @ 9.5' ATD
	10						
	11						
	12						
	13						
	14						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 406

HTW DRILLING LOG

HOLE NO. G2-38J

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
	LEAN	~~Silty~~ Clay (CL) Firm, medium gray, wet (Alluvium)					
	15	15.0' Poorly Graded SAND (SP) loose, light brown, wet Fine grained (Alluvium)					
	16						
	17						
		~~Cobble 17.5'~~					
	18						
	19		HNU = BG				~~BZ = BKG~~
	20						
		becomes Fine To medium grained.					
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-38J

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G2-38J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND loose, light brown, wet Fine To medium grained (Alluvium)					
	24						
	25						
	26						
	27						
		multi-colored becomes a Fine To Coarse grained.					
	28						
	29		HNU = BG				~~BZ~~ = ~~BKG~~
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-38J

HTW DRILLING LOG

HOLE NO. G2-38J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet, Fine To Coarse grained (Alluvium)					
	33						
	34						
		With some gravel					
	35						
	36						
	37						
	38						Stopped drilling with 4" CFA at 39' 7-16-92/0845 ~~DB=BKG~~
	39		HNU = BG				Began hammering hydropunch II with 140lbs. hammer @ 40.5 after 1.5ft. push. 7-16-92/0936
	40					P	
						54	
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G2-38J

HTW DRILLING LOG

HOLE NO. 62-38J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), loose, multi-colored, fine to coarse grained, wet w/ some gravel					
	42					36	
	43					27	
	44					29	
	45					38	
	46					39	
	47					53	
	48		HS reading = ND at 1130			58	
	49					212	Finished driving Hydropunch II at 40.5' bgs. 7-16-92/0953 pulled back 6" B.O.B 49.5'
		49.2' Sandstone: hard, reddish brown			collected 7-16-92/ 1008. NOTE! Bor grout	groundwater sample at 49.5'	no backfilled with Tremied Volclay from 49.5' to surface.
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 62-38J 7-16-92

/CORPS/4-15-92

410

HTW DRILLING LOG

HOLE NO. 42-39J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: K. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-44 ft bgs: 4 in CFA; 44-48 ft bgs: 2" HSA	8. HOLE LOCATION: 42-39
	9. SURFACE ELEVATION:
	10. DATE STARTED: 6-26-92 @ 1630 HRS
	11. DATE COMPLETED: 6-26-92 @ 1700 HRS
12. OVERBURDEN THICKNESS: 48 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 18' ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 48	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
42-39 @ 48'	TCE		EXP			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ bentonite volclay grout	X			Bret A Hedenkop

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML) loose to medium dense, brown, dry (fill)					boring advanced w/ 4 in continuous flight auger (CFA)
	1						soil/sediment description from auger cuttings
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

42-39

411

HTW DRILLING LOG

42-39

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML) loose to medium dense brown, dry					
	6	(fill)					
	7						
	8						
	9						
	10	LEAN CLAY (CL) soft to 10.0 medium firm, dk brown-black, moist ~~(loess)~~ (alluvium)					
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-39

412

HTW DRILLING LOG

42-39

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above) LEAN CLAY (CL), soft ~~to medium~~ firm, black, moist					
	15	~~(lean)~~ (alluvium)					
	16						
	17	~~becoming very~~ moisture content increasing					
	18					V	water detected ATD
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-39

413

B07NE003702-04519

HTW DRILLING LOG

HOLE NO. G239

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) LEAN CLAY, ~~medium~~ firm, black, wet. ~~(loess)~~ (alluvium)					
	24						
	25	25.0 POORLY GRADED SAND (SP) medium dense, dk. grey-black, wet very fine to fine grained ~~sand~~ (alluvium)					
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G239

414

HTW DRILLING LOG

42-39

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkop | SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(SAME as above) POORLY GRADED SAND (SP), medium dense, dk grey-black, wet, very fine to fine grained ~~sand~~ (alluvium)					
	33						
	34						
	35						
	36						
	37	becoming medium grained w/ very fine to fine grained sand					
	38						
	39						
	40						
	41	becoming medium to coarse grained sand w/ fine grained sand					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-39

HTW DRILLING LOG

42-39

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), medium dense, dark gray-black, wet, medium to coarse grained ~~sand~~ w/ fine grained sand (alluvium)					
	42						
	43						Cfa drilling complete to 44 ft bgs 6-26-92 @ 1700
	44						begin hammering using 140# hammer @ 46 ft bgs 6-26-92 @ 1720
	45					pushed	
	46					24	
	47					174	HP II refusal @ 48 ft. > 200 blows for 1 in past 48 ft 6-26-92 @ 1730
	48					Hydropunch	Water sample collected @ 48' 6-26-92 @ 1730
	49						boring backfilled w/ tremied volclay grout from 48' to surface 6-27-92 @ 0830
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 42-39

416

HTW DRILLING LOG

HOLE NO. 63-1J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR:
SHEET 1 OF 12 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.567507 - E.2828274
5. NAME OF DRILLER: C. Pfeffer	6. MANUFACTURER'S DESIGNATION OF DRILL: CME 55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA to 33'; RWB to 95' w/AW rods; Hydro Punch II w/ trailer on NWJ rods	8. HOLE LOCATION: ~~NE/4, SW/4, SW/4, SE/4~~ sec. 14 T14N, R8E Outside of Nat'l Guard EQP site
	9. SURFACE ELEVATION: 1177.69
	10. DATE STARTED: 1051, 5-16-92
	11. DATE COMPLETED: 5-17-92, 0958
12. OVERBURDEN THICKNESS: ~~NA~~ 100.5	15. DEPTH GROUNDWATER ENCOUNTERED: 33' ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Caved at 35' after 12 hrs
14. TOTAL DEPTH OF HOLE: ~~98.0'~~ 100.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~NONE~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~63-15' @ 98'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~grouted w/ volclay~~	X	NA	NA	John A Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	~~Stiff, Light to medium gray, lean clay (CL)~~ LEAN CLAY (CL), ~~stiff~~ firm, light to medium gray, ~~damp~~ moist (Fill)					~~FILL~~ Boring advanced with 4" CFA. Drill Rig 2
	1						
	2						
	3	~~Very stiff, Dark Gray to black, fat clay (CH)~~ FAT CLAY (CH), ~~very stiff~~ hard, dark gray to black, moist (Loess)					~~NATIVE SOIL~~
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 63-1J

417

HTW DRILLING LOG

HOLE NO. G3-1J

Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		~~Light gray fat clay, moist, (CH) with minor iron staining~~					
		(SAME FAT CLAY (CH), very firm to hard, ~~stiff~~ (moist), dark gray ~~to~~ black (Loess)					
	6						
		as above)					
	7						
	8	Plasticity decreasing					
	9	~~Becomes lean clay (CL)~~ LEAN CLAY (CL), ~~very stiff~~, hard (moist) light gray (Loess)					
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1J

418

HTW DRILLING LOG

HOLE NO. 63-1J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		~~Soft, light gray, lean clay (CL), wet~~ LEAN CLAY (CL), soft, wet, light gray (Alluvium)					
	15						
	16	~~Buff, fine grained sand (SP), damp~~					
	17	~~Soft, light gray, lean clay (CL), wet~~ POORLY-GRADED SAND (SP), dense, light gray, fine grained (ALLUVIUM) ~~damp~~, moist					
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-1J

HTW DRILLING LOG

HOLE NO. G3-IJ

Remedial Investigation, Mead NOP | INSPECTOR John Mealon | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	SAME as above POORLY-GRADED SAND (SP), dense, light gray, ~~damp~~ moist fine grained (ALLUVIUM)					
	24	moist					
	25						
	26						
	27	~~Poorly-Graded Sand (SP),~~ Dense, light brown, fine- to medium-grained ~~damp~~ moist (ALLUVIUM)					
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-IJ420

HTW DRILLING LOG

G3-1J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown, damp, fine- to medium grained (ALLUVIUM)					
	33						water encountered @ 33' ATD — 33
	34						~~Switch to RWB~~. Boring continued w/ 4-inch-dia drag bit and bentonite slurry
	35						
	36						
	37						
	38		HNu ~~BZ~~ = BG ~~WH = BG~~				6 gals ~~of 5 gals of~~ lost ~~1/2~~ mud 33.5-38.5 ~~HNu BZ = BG~~ ~~but WH = BG~~
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1J

421

HTW DRILLING LOG

HOLE NO. G3-1J

Remedial Investigation, Mead NOP | INSPECTOR John Nealon | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	~~Becomes fine sand.~~					
		POORLY-GRADED SAND (SP), dense, light brown, wet, fine grained, (ALLUVIUM)					
	42						~~no sample in sieve.~~
	43						(12 gals of) lost 1" mud 38.5-43.5
	44						
	45						
	46						
	47						~~use bucket to collect sample. very fine sand.~~
	48						(12 gals of) lost 1" mud 43.5-48.5
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1J

HTW DRILLING LOG

HOLE NO. G3-LJ

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John S Nealon

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown, wet, fine grained, (ALLUVIUM)					
	51						
	52						(~10 ~~20~~ gals) lost ~~1/4~~" mud 48.5-53.5. Mixed new fluid
	53						
	54						
	55						
	56						
	57						(~12 ~~30~~ gals) ~~bucket sample~~ lost ~~1/4~~" mud 53.5-58.5
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1423

HTW DRILLING LOG

HOLE NO. G3-1J

Remedial Investigation Mead NOP | INSPECTOR John S Nealon | SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown, fine grained (ALLUVIUM)					
	60	Becoming coarser, with trace medium-grained sand.	HNu ~~BZ=BG~~ ~~WH=BG~~				~~bucket sample~~ ~~HNu BZ=BG~~ ~~WH=BG~~
	61						
	62						
	63						~12 ~~30~~ gals ~~bucket sample~~. lost 2" mud 58.5-63.5
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1J

HTW DRILLING LOG

HOLE NO. G3-1J

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: John Nealon | SHEET 12 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown, fine grained, with trace medium-grained sand (ALLUVIUM)					40 gals bucket sample lost 1½" mud 63.5-68.5
	69						
	70						
	71						
	72						
		~~Coarseness increasing (Medium grained sand content increasing).~~					
	73	POORLY-GRADED SAND (SP) Dense, light brown, fine- to medium-grained with some coarse sand and some coarse-grained layers. (ALLUVIUM)	HNu B2=BG WH=BG				(12 gals) ~~30 gals~~ lost ½" mud 68.5-73.5 ~~HNU~~
	74						
	75						
	76						
	77						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: G3-1J

HTW DRILLING LOG

G3-1J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		as above Poorly graded sand (SP)					
	78	SAME Dense, light brown, fine to medium grained with some coarse sand and some coarse-grained layers (ALLUVIUM)					
	79						
	80						
	81						
	82						
	83						83 mixing new mud pit
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-1J

426

HTW DRILLING LOG

HOLE NO. 63-IJ

Remedial Investigation, Mead NOP | INSPECTOR John Nealon | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(SAME) Poorly-graded sand (SP) dense, light brown, fine- to medium-grained with some coarse sand and some separate ~~some~~ coarse-grained sand layers (ALLUVIUM)					
	87						
	88						(~12 gals ~~30 gals~~) lost ½" mud 83.5-88.5
	89	well-graded ~~Coarse grained sand (SW), dense, multicolored, with some fine gravel (ALLUVIUM)~~ medium to coarse-grained	HNu B2=BG WH=BG				
	90	~~Poorly-graded sand (SP), dense light brown, fine to medium grained, with some coarse sand (ALLUVIUM)~~					
	91	@ 90' w/ 6 inch thick zone of medium to coarse grained sand					
	92	w/ some fine gravel					(~15 gals ~~35 gals~~) lost ~~1/4~~ mud 88.5-93.5
	93						
	94	POORLY-GRADED SAND (SP), dense, multicolored, medium to coarse grained with some fine-grained gravel (ALLUVIUM)					Difficult drilling (~12 ~~30~~ gals) lost ½ mud 93.5-95.0
	95						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 63-IJ

HTW DRILLING LOG

HOLE NO. 63-1J

Remedial Investigation, Mead NOP | INSPECTOR J B Mealor | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	~~95~~	(SAME as above) POORLY-GRADED SAND (SP), dense, multicolored, medium to coarse grained with some fine-grained gravel (ALLUVIUM)				76 ~~120~~ ~~108~~	HydroPunch II driven 95-98
	96					120	
	97					108	NOTE: HydroPunch II groundwater sample collected at 98' @ 1819 hours
	98		HNu = ~~82~~ BG ~~111~~ BG		63-1J		Stopped 5-16-92 1819 Resume 5-17-92 0828 Hole caved to 35'. Backed off to drill out.
	99						
	100						Drilling very difficult. Stopped at @ 0958. Bottom of Boring @ 100.5
	101						
	102						NOTE: Boring backfilled with tremied Volclay grout from 100.5 to surface, 5-17-92. Completed at 1105.

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-1J

428

HTW DRILLING LOG

HOLE NO. 63-2J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 12 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.567723 - E.2830117
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-39'; 4" Drag Bit on Mobilock rods (RWB) 39-93.5'; 2" OD Hydrolunch II groundwater sampler on NW-J rods 93.5-100.5	8. HOLE LOCATION: NE 1/4, SE 1/4, 63-2J SE 1/4, NE 1/4 sec. 14 T14N, R8E
	9. SURFACE ELEVATION: 1176.25
	10. DATE STARTED: 5-28-92 0732
	11. DATE COMPLETED: 5-28-92 1035
12. OVERBURDEN THICKNESS: ~~NA~~ 100.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 31' ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 100.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~None~~	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~63-2Fe~~ ~~100.5'~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~backfilled with Pure Bold grout~~ Volclay	X	NA	NA	John Madon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), ~~stiff~~ firm, dark gray to black, dry (Topsoil)					Boring advanced continuously w/ 4" ~~CFA~~ flight augers.
	1						note: Boring is logged w/ cuttings.
		LEAN (CL) hard 1.5					
		~~FAT~~ CLAY ~~(CH)~~, ~~very stiff~~, dark grayish brown, moist (Topsoil)					
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~001~~ 42963-2J

HTW DRILLING LOG

HOLE NO. 63-2J

Remedial Investigation, Mead NOP | INSPECTOR J. Medlow | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	hard	(Same as above) ~~FAT~~ CLAY ~~(CH)~~, ~~very stiff~~, dark grayish brown, moist (TOPSOIL)					
	6	~~FAT CLAY (CH), very stiff, medium gray, moist, mottled (ALLUVIUM)~~ Becoming mottled					
	7						
	8	~~LEAN CLAY (CL), firm, light gray, very moist (ALLUVIUM)~~					
	9						
	10						
	11						
	12	LEAN CLAY (CL), firm, light gray, ~~very~~ moist ~~(ALLUVIUM)~~ (LOESS)					
	13						
	14						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 4363-2J

HTW DRILLING LOG

HOLE NO. 63-25

Remedial Investigation, Mead NOP

INSPECTOR J Nealon

SHEET 3 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm, light gray, ~~very~~ moist ~~(ALLUVIUM)~~					
	15	(LOESS)					
	16						
	17						
	18						
		18.5					
	19	POORLY GRADED SAND (SP), medium dense ?, light brown, ~~damp~~, fine grained, (ALLUVIUM) moist					
	20						
	21						
	22						
	23						

ICCRPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-25

HTW DRILLING LOG

HOLE NO. 63-2J

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, light brown, damp, fine grained, moist (ALLUVIUM)					
	24						
	25						
	26						
	27						
	28						
	29	Becoming brown					
	30						
	31						Water encountered @ 31' ATD
	32						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-2J

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Shealon

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense?, brown (wet) fine grained (ALLUVIUM)					
	34	34					
	35	Poorly GRADED SAND (SP), medium dense?, medium brown (wet), medium grained with trace coarse grained sand and some silt (ALLUVIUM)					
	36	fine to					
	37						
	38						Boring continued w/4" dia drag bit and bentonite slurry
	39	~~With trace coarse grained sand~~	HNu BZ= BG				~~Switch to~~ RWB @ 39 0805 hrs.
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G3-2J

Remedial Investigation, Mead NOP | INSPECTOR J. Nealon | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, medium brown, (wet), medium grained, with trace coarse grained sand and some silt (ALLUVIUM)					
	42						
		fine to					
	43						
		With trace to some coarse grained sand					
	44						
	45						
	46						
	47	With trace fine gravel					
	48						Lost 12 gal mud 43.5-48.5
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J 434

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealor

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense, medium brown, wet, fine to medium grained with trace to some coarse grained sand and trace fine gravel (ALLUVIUM)					
	51						
	52						
	53						Losing some circulation
	54						
	55						
	56						
	57						
		With some coarse sand					
	58						Losing some circulation. Mix new mud.
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J S Mealon

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(Same as above) POORLY GRADED SAND (SP), medium dense?, medium brown, wet, fine to medium grained and with some coarse sand and trace fine gravel (ALLUVIUM)					
	61	Becomes fine grained with some medium grained sand					
	62						
	63						
	64						Lost 6 gal mud 58.5-63.5
	65						
	66	POORLY GRADED SAND (SP), dense?, multicolored, wet, coarse grained (ALLUVIUM)					
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Meador

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), dense (?), multicolored, wet, ~~[illegible]~~ coarse grained (ALLUVIUM)					
	69						
	70						
	71						
	72						
	73						Lost 6 gal mud 69.5-73.5
	74						
	75						
	76						
	77						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J 437

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense?, multicolored, wet, coarse grained, (ALLUVIUM)					
	78						
	79						
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J 438

HTW DRILLING LOG

HOLE NO. G3-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealon

SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) POORLY GRADED SAND (SP) dense, multicolored (wet) coarse grained (ALLUVIUM)					
	88	Becomes medium to coarse grained					
	89						
	90						Very rough drilling 90-91. ~~Probably gravel.~~
	91						
	92						
	93		93.5 HNu BZ = BG		93.5		1035 hours
	94				94.5	26	NOTE: Drove HydroPunch II sampler from 93.5-100.5 feet
	95					39	

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J

HTW DRILLING LOG

HOLE NO. G3-2J

Remedial Investigation, Mead NOP | INSPECTOR John Nealon | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), dense, multicolored, wet, coarse-grained (ALLUVIUM)			95.5		
	96					72	
					96.5		
	97					65	
					97.5		
	98					69	
					98.5		
	99					87	NOTE: Collected HydroPunch II groundwater sample at 100.5' @ 1323 hours.
					99.5		
	100		WH = 86 B2 = 86 [redacted] [redacted] Water HS = ND			84	
					100.5		Bottom of Boring @ 100.5'
	101						
	102				10.2 lb/gal	Premixed Portland grout	NOTE: Boring backfilled with grout at from 100.5' to surface. Completed at 1430 hours on 5-28-92.
	103						
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-2J440

HTW DRILLING LOG

HOLE NO. 43-4j

SHEET 1 OF SHEETS 14

1. COMPANY NAME: Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP
4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George
6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-28½ ft 4" cfa; 0-110 ft 3¼" paddle bit & NWS rods; 110-115 ft 2" hydropunch
8. HOLE LOCATION: 43-4j
9. SURFACE ELEVATION: 1172.65
10. DATE STARTED: 5·19·92 1635
11. DATE COMPLETED: 5·20·92 @ 1240
12. OVERBURDEN THICKNESS: 115 ft
13. DEPTH DRILLED INTO ROCK: NA
14. TOTAL DEPTH OF HOLE: 115 ft
15. DEPTH GROUNDWATER ENCOUNTERED: ~~[illegible]~~
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

110-115

18. GEOTECHNICAL SAMPLES: NA — DISTURBED: — UNDISTURBED: — 19. TOTAL NUMBER OF CORE BOXES: NA

20. SAMPLES FOR CHEMICAL ANALYSIS: ~~[illegible]~~ 43-4j @115'

VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
X					NA %

22. DISPOSITION OF HOLE: Completed w/ vol clay grout

BACKFILLED	MONITORING WELL	OTHER (SPECIFY)
X		

23. SIGNATURE OF INSPECTOR: Bret A Helup

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft, ~~[illegible]~~ dark brown, moist w/ fine to medium grained occasional sand (top soil)					Boring advanced w/ 3¼" continuous flight augers (c.fa) all descriptions from cuttings
	1						
	2						
	3						
	3.5	LEAN CLAY (CL) medium to stiff, ~~[illegible]~~ light reddish-brown, with occasional very fine sand. (loess)					
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 441 43-4j

HTW DRILLING LOG

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: B. Hellunk | HOLE NO.: 43-4j | SHEET 2 OF SHEETS 2/14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) LEAN CLAY (CL) medium to stiff, light reddish brown, with occasional very fine sand (loess)					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13	13' POORLY GRADED SAND (SP), medium dense, very fine grained light tan (alluvium)					
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 43-4j442

HTW DRILLING LOG

HOLE NO. 43-4j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlunkar

SHEET 3 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, very fine grained (alluvium)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22	becoming very fine to fine with medium grained sand					
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j 443

372

HTW DRILLING LOG

HOLE NO. 43-4j

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: B. Helenkay

SHEET 4 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) medium dense, POORLY GRADED SAND (SP) light tan very fine					
	24	to fine grained sand with medium grained sand (alluvium)					
	25						
	26	becoming fine to medium grained					
	27						
	28						Stop drilling 5-19-92 @ 1650 using CFA to 29 ft bgs
	29						~~Begin~~ resume drilling 5-20-92 @ 0805 using wash rotary
	30						
	31						
	32						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j 444

HTW DRILLING LOG

HOLE NO. 43-4j

Remedial Investigation Mead NOP | INSPECTOR B. Hedlund | SHEET 5 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), Mediumdense, light tan, fine to medium grained (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40	becoming medium grained with coarse grained sand					
	41						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j

HTW DRILLING LOG

HOLE NO. 43-4j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedunka | SHEET 6 OF 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) Poorly graded ~~sorted~~ SAND (SP), medium dense, light tan, wet, medium grained, with					
	42	coarse sand (alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49	becoming coarse sand w/ fine gravels					begin losing some circulation.
	50						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 446

HTW DRILLING LOG

HOLE NO. 43-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlund

SHEET 7 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY ~~SORTED~~ graded SAND, coarse sand w/ gravel (Alluvium)					
	51	(SP), medium dense, light tan, wet,					
	52						
	53						
	54						
	55	becoming medium to coarse grained ~~sand~~					
	56						
	57						
	58	becoming fine to medium grained w/ occasional coarse grained sand					
	59						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4 447

HTW DRILLING LOG

HOLE NO. 43-4j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlund | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), medium dense, light tan, wet, fine to medium grained (alluvium)					
	60	w/ occasional coarse sand					
	61						
	62	becoming medium to coarse grained sand					
	63						
	64						
	65						
	66	becoming fine to medium grained sand					
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 448

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. 43-4j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 9 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), fine to medium grained (alluvium)					
	69	medium dense, light tan, wet,					
	70	~~becoming fine to medium~~					
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j

449

HTW DRILLING LOG

HOLE NO. 43-4j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlunkay | SHEET 10 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP), fine to medium grained (alluvium)					
	78		medium dense, light tan, wet,				
	79						
	80						
	81	becoming med-coarse grained sand w/ fine gravel					
	82						
	83	becoming fine to medium grained w/ coarse sand					
	84						
	85						
	86						

ICORPS/4-18-87

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j

450

HTW DRILLING LOG

HOLE NO. 43-4

Remedial Investigation Mead NOP | INSPECTOR B. Hedlunkay | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same as above) POORLY GRADED SAND (SP), fine to medium grained, w/ coarse sand (alluvium)	medium dense, light tan, wet,				
	87						
	88						
	89						
	90	becoming coarse sand w/ fine gravel, subangular to subrounded					begin losing some circulation
	91						
	92						
	93						
	94						
	95						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4

HTW DRILLING LOG

HOLE NO. 43-4j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Helen Kamp

SHEET 12 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same as above) (alluvium) POORLY GRADED SAND (SP), coarse grained, with fine, subangular to subrounded gravel (medium dense, wet)					
	96	POORLY ~~SORTED~~ GRADED GRAVEL (GP), fine grained, subangular, ~~gravel~~ with medium to coarse grained sand. (alluvium)					drill rig begins to shake
	97						
	98	dense, wet,					
	99						
	100						
	101						
	102	becoming very angular, fine to medium grained gravel					
	103						
	104						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j 452

HTW DRILLING LOG

HOLE NO. 43-4j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 13 OF SHEETS 14

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO	BLOW COUNTS	REMARKS
	104	(Same as above) POORLY GRADED GRAVEL (GP), dense, wet					
	105	fine to medium grained, angular to subrounded, with medium to coarse sand grained (alluvium)					
	106						
	107						
	108						
	109	~~CLAY~~					Note: drilling becomes very easy at 109' Possible clay layer
							stop drilling 5-20-92 @ 1120
	110					51	Begin driving hydropunch 5-20-92 @ 1220
	111					67	~~removed~~ from 110' – 115' bgs
	112					134	
	113						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. 43-4j 453

HTW DRILLING LOG

HOLE 43-4j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlunkaya | SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	(Same as above)					
						188	
	114						
						135	bottom of boring @ 115' bgs
	115						Note: boring was backfilled w/tremied grout from 115 ft to surface on 5/20/92 @ 1530
	116						
	117						Note: Hydropunch II water sample collected from 115 ft bgs on 5/20/92 @ 1345
	118						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-4j

454

HTW DRILLING LOG

HOLE NO. G3-5J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: N/A
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.564435 - E.2829587
5. NAME OF DRILLER: C. Pfeffer	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-38; RWB w/ AW drill rods ~~38-95~~; NWJ rods for sampling; Hydrolynch II, hydrocarbon mode, 95-100	8. HOLE LOCATION: SE 1/4, SE 1/4, SE 1/4, SW 1/4 sec. 14 - ~~G3-5~~ T14N, R8E
	9. SURFACE ELEVATION: 1174.55
	10. DATE STARTED: 5-17-92 1450
	11. DATE COMPLETED: 5-18-92, 1210
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: 38'
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 100'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
3 ~~G3-5J-51~~ ~~G3-5J-60~~ ~~G3-5J-100~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~grouted at Valley~~	X	NA	NA	John O'Neal

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0–3.5	LEAN CLAY (CL), ~~stiff~~, gray and brown, moist, with some organics (FILL)					~~FILL~~ Boring advanced with 4" CFA. ~~Drill Rig 2~~.
	3.5–5	FAT CLAY (CH), ~~very stiff~~, hard, dark gray, moist ~~(topsoil)~~ (LOESS)					~~NATURAL SOIL~~

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: G3-5J

455

HTW DRILLING LOG

HOLE NO. 63-5J

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: J Mealon

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		as above SAME FAT CLAY (CH), ~~very~~ hard, ~~stiff~~, dark gray, moist (~~topsoil~~) (LOESS)					
	6						
	7						
	8						
	9	LEAN CLAY (CL) ~~stiff to~~ firm to hard, ~~very stiff~~, brown, moist (LOESS)					
	10						
	11						
	12						
	13	LEAN CLAY (CL), firm, gray, moist (ALLUVIUM) ~~dry~~					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-5J

456

HTW DRILLING LOG

G3-5J

Remedial Investigation, Mead NOP

INSPECTOR: J Mealor

SHEET 3 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	14	(SAME as above) LEAN CLAY (CL), firm, gray, ~~very~~ moist (Alluvium)					
	15						
	16						
	17						
	18	POORLY-GRADED SAND (SP), medium dense, light brown, fine grained, ~~dry to damp~~ moist					
	19	(alluvium)					
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J

HTW DRILLING LOG

HOLE NO. 63-5J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Meallon

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown, fine grained, ~~damp~~ moist,					
	24	medium					
		(alluvium)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J

HTW DRILLING LOG

HOLE NO. 63-5J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Nealon

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED SAND (SP), dense, light brown fine-grained, ~~damp~~ moist (alluvium) medium					
	33						
	34						
	35						
	36						
	37						
	38	becomes ~~saturated~~ wet					detected water at 38' ATD
	39		HNU BZ=BG WH=BG				
	40						
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-5J

HTW DRILLING LOG

G3-5J

Remedial Investigation, Mead NOP | INSPECTOR: J Nealon | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above) SAME POORLY-GRADED SAND (SP), dense, light brown, fine-grained, wet (alluvium) medium					
	42						
	43						
	44						NOTE: Ran Hydro Punch II after drilling 44'. ~~Hole caved to 43'~~ HPII pushed hydraulically to 45, then driven to 49'. No sample recovered.
	45					15	
						~~23~~	
	46					~~59~~	
						~~56~~	
						23	
	47					59	
	48					56	
					G3-5J-49		
	49					105	
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J

460

HTW DRILLING LOG

HOLE NO. G3-5J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 7 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above) SAME POORLY-GRADED SAND (SP), medium dense, light brown, fine grained, wet, (alluvium)				~~105~~ 125	BORING (SAMPLING) w/4 inch dia drag bit and bentonite slurry @ 51' ~~Switch to Rotb~~ Stopped 5-17-92 @1650
	51	With some medium to coarse-grained sand, multicolored; becomes dense	pH=6.8 HNU ~~B2=B6~~ ~~WH=B6~~		63-5J-51		Resumed 5-18-92 @0706 Caved to 38'. Lost 1" mud 43.5-48.5
	52						
	53						
	54						
	55					87	Drove Hydrapunch 55-60' on NWJ rods
	56					~~87~~ ~~113~~ ~~150~~	
	57					~~147~~ 150	
	58					147	
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J

HTW DRILLING LOG

HOLE NO. G3-5J

Remedial Investigation, Mead NOP | INSPECTOR J. Mealon | SHEET 8 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	as above (SAME A POORLY-GRADED SAND (SP), dense, light brown fine grained, wet with some multicolored, medium to coarse-grained sand (alluvium)	water HS = 2 ppm		G3-5J-60	150 groundwater	NOTE: Collected HydroPunch II sample at 60 @ 0938
	61						
	62						
	63						6 gals ~~lost~~ mud 58.5-63.5
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J 462

HTW DRILLING LOG

HOLE NO. 63-5J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above) SAME A POORLY-GRADED SAND (SP), dense, light brown, fine grained, with some multicolored, medium to coarse-grained sand (alluvium)					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J463

HTW DRILLING LOG

HOLE NO. G3-5J

Remedial Investigation, Mead NOP | INSPECTOR J.S. Neallon | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(as above) SAME POORLY-GRADED SAND (SP), dense, light brown, fine-grained, with some multicolored, medium to coarse-grained sand (alluvium)	HNu BZ= BG				6 gals lost mud 73.5-78.5. mixing new mud fast.
	79						
	80						
	81						
	82						
	83	POORLY-GRADED SAND (SP) dense, not multicolored, medium to coarse grained (alluvium)					12 gals lost mud 78.5-83.5
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: G3-5J

HTW DRILLING LOG

HOLE NO. G3-5J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: S. Nealon

SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS above): POORLY-GRADED SAND (SP), dense, multicolored, wet, medium to coarse-grained (alluvium)					
	87						
	88						
	89						
	90						
	91						
	92						
	93						
	94						
	95		HNu B2=B6				

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-5J

460

HTW DRILLING LOG

HOLE NO. G3-5J

Remedial Investigation, Mead NOP | INSPECTOR J. Mealon | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		as above SAME POORLY-GRADED SAND (SP), dense, multicolored, wet medium to coarse grained (alluvium)					Drove Hydro Punch II 95-100'
	96					70	
						40	
	97					23	
						34	
	98					77	
						34	
	99						
						77	
	100		HNu BZ= BG		G3-5J-100		
							Bottom of Boring @ 100'
	101						
					groundwater sample		NOTE: Collected Hydro Punch II at 1403 hrs at 100'.
	102						
	103						NOTE: Boring backfilled w/ Volclay grout from 100' to surface 5-18-92 completed at 1541. tremied
	104						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: G3-5J

HTW DRILLING LOG

HOLE NO. 63-7J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.564319 - E.2832829
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME 55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA 0-; 4" drag bit on Mobilock rods; 2" OD HydroPunch II sampler on NW-J rods	8. HOLE LOCATION: SW 1/4, SE 1/4, ~~63-7~~ T6E 1/4, SE 1/4, sec. 13, T14N, R8E
	9. SURFACE ELEVATION: 1175.28
	10. DATE STARTED: 5-27-92 0820
	11. DATE COMPLETED: 5-27-92 1130
12. OVERBURDEN THICKNESS: ~~NA~~ 102'	15. DEPTH GROUNDWATER ENCOUNTERED: 42.5
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 102'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~None~~			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~63-7J~~	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~backfilled w/ Volclay Pure Gold grout~~	X	NA	NA	J. Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), ~~stiff~~ firm, very dark brown to black, moist, with roots (Topsoil) to wet, 1.5'					Boring advanced w/4-inch-dia CFA
	2	LEAN CLAY (CL), ~~very~~ firm to hard, ~~stiff~~, brown, moist (LOESS)					
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 63-7J 467

HTW DRILLING LOG

63-7J

Remedial Investigation, Mead NOP | INSPECTOR: J. Mealon | SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) LEAN CLAY (CL), ~~very stiff~~, brown, moist (LOESS) firm to hard					
	6						
	7						
	8						
	9	Plasticity increasing					
	10						
	11	~~LEAN CLAY (CL), firm to stiff, brown, moist (ALLUVIUM)~~ 11.0					
	12	Consistency decreasing					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

HTW DRILLING LOG

HOLE NO. G3-7J

Remedial Investigation, Mead NOP | INSPECTOR J. Nealon | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME AS ABOVE) LEAN CLAY (CL), firm to ~~stiff~~, brown, ~~very~~ moist (ALLUVIUM)					
	15						
		16.0'					
	16	POORLY-GRADED SAND (SP), medium dense, light tan, fine grained, ~~damp~~ moist, with trace medium grained sand (ALLUVIUM)					
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

HTW DRILLING LOG

HOLE NO. G3-7J

Remedial Investigation, Mead NOP

INSPECTOR J S Nealon

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	(Same as above) POORLY GRADED SAND (SP), medium dense?, light tan, fine grained, moist ~~damp~~, with trace medium grained sand (ALLUVIUM)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

470

HTW DRILLING LOG

HOLE NO. G3-7J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J S Healon

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense ?, light tan, fine grained, moist ~~damp~~ with trace medium grained sand (ALLUVIUM)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J, 471

HTW DRILLING LOG

HOLE NO. G3-7J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(illegible)~~ POORLY GRADED SAND (SP), medium dense ?, light tan, fine grained, moist ~~damp, with trace medium grained sand~~					
	42	(ALLUVIUM) to medium					
							water encountered 42.5' ATD
	43						Boring continued w/ 4" dia drag bit and bentonite slurry
	44						~~switch to RVB~~ @ 44'
	45	Becoming coarser grained					
	46						
	47						
	48						
	49						
	50	With trace ~~to some medium~~ of ~~to~~ coarse sand	HNu B2=BG				

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J 472

HTW DRILLING LOG

HOLE NO. 63-7J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Meaton

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(Same as above) POORLY GRADED SAND (SP), medium dense ?, light tan, wet, fine to medium grained, ~~sand~~ with trace coarse sand (ALLUVIUM)					
	52						
	53						
	54						
	55	55.0'					
	56	POORLY-GRADED SAND (SP), medium dense ?, multi-colored, medium to coarse-grained, wet, (ALLUVIUM)					
	57						
	58						
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-7J

HTW DRILLING LOG

HOLE NO. G3-7J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(same as above) POORLY GRADED SAND (SP), medium dense ?, multi-colored, medium to coarse grained (ALLUVIUM) wet,					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

HTW DRILLING LOG

HOLE NO. G3-8J

Remedial Investigation, Mead NOP

INSPECTOR J S Neglon

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRAINED SAND (SP), medium dense?, multicolored, medium to coarse grained, wet (ALLUVIUM)					
	69						
	70						Mixing new mud.
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

HTW DRILLING LOG

63-7J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(SAME as above) POORLY GRAINED SAND (SP), medium dense?, multicolored, wet, medium to coarse grained, (ALLUVIUM)					
	79	Becoming coarser with trace fine gravel					
	80						
	81						
	82						
	83						Lost 12 gal mud 70-83.5
	84						
	85						
	86						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-7J

476

HTW DRILLING LOG

HOLE NO. 63-7J

Remedial Investigation Mead NOP | INSPECTOR S. Nealon | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(same as above) POORLY GRADED SAND (SP), medium dense?, multi-colored, (wet) medium to coarse grained with trace fine gravel (ALLUVIUM)					
	88						Lost 6 gal mud 83.5-88.5
	89						
	90						
	91						
	92						
	93						Lost 6 gal mud 88.5-93.5
	94						
	95		HNo HS=0.6ppm				1130 hours

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-7J

477

HTW DRILLING LOG

63-7J

Remedial Investigation, Mead NOP

INSPECTOR: John Shealon

SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), 95.5' ~~medium~~ dense, multicolored ~~wet~~, medium to coarse grained, wet ~~sand~~ with trace fine gravel (ALLUVIUM)				52	Drove Hydropunch II sampler from 95-102'.
	96					45	NOTE: Collected HydroPunch II groundwater sample at 99' @ 1406 hours.
	97	~~POORLY~~ GRADED SAND (SW), ~~WELL~~ Becoming ~~dense~~, light gray, ~~wet~~, fine to medium grained, with some silt (~~ALLUVIUM~~)				31	NOTE: Drove 3" OD split-spoon from 95.5'-97.5' to obtain sample of low blow count material.
	98					71	
	99		Water HS = ND				
						88	
	100					150	
	101					62	
	102						Bottom of Boring @ 102 feet
	103						NOTE: Boring backfilled with tremied Pure Gold grout @ 10.0 lb/gal from 102' to surface. Completed @ 1630 5-27-92
	104						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-7J 478

HTW DRILLING LOG

HOLE NO. 63-8J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC (OMAHA)
SHEET 1 OF 15 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.561082 - E.2827418
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME 55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: RWB 0-130'. AW rods for drilling, NWT rods and HydroPunch II for sampling. Used hydrocarbon sampling mode.	8. HOLE LOCATION: SW 1/4, NE 1/4, NE 1/4, SW 1/4 Sec. 23 ~~63-8~~ T14N, R8E
	9. SURFACE ELEVATION: 1167.20
	10. DATE STARTED: 5-19-92 0857 / 11. DATE COMPLETED: 5-20-92 1019
12. OVERBURDEN THICKNESS: ~~N/A~~ 130'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked ~~ND~~ by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~none~~ NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 130'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA ~~none~~	NA	NA	NA NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
[redacted]	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
[redacted]	X	NA	NA	J. Nealon

ELEV. a	DEPTH b	[redacted] DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CL					
		~~FAT~~ CLAY (~~CH~~), ~~very stiff~~ firm to hard, brown with iron staining, moist, ~~[illegible]~~ (LOESS)					~~Advancing boring w/ RWB~~ Boring advanced w/4-inch-dia drag bit and bentonite slurry
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 63-8J

479

HTW DRILLING LOG

63-8J

Remedial Investigation, Mead NOP | INSPECTOR: J Nealon | SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (above) c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME as ~~FAT~~ CLAY ~~(CH)~~, ~~very stiff~~, brown with iron staining, moist (LOESS)	firm to hard,				
	6						
	7	---------- firm -- LEAN CLAY (CL), ~~stiff~~, light gray ~~and brown~~, moist, (ALLUVIUM) with trace iron staining and black specks					
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-8J 480

HTW DRILLING LOG

HOLE NO. 63-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Nealon

SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) LEAN CLAY (CL), firm, ~~stiff~~, light gray, moist, with trace iron staining and black specks (ALLUVIUM)					
	15						
	16						
	17						
	18						
	19						
	20						
	21	WELL-GRADED SAND (SW), dense, light brown, dry, with multicolored coarse grains, fine to coarse grained (Alluvium)					
	22						
	23						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-8J 481

HTW DRILLING LOG

HOLE NO. 63-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) WELL-GRADED SAND (SW), dense, multicolored, fine to coarse-grained, dry, (ALLUVIUM)					
	24						
	25						
	26						
	27	~~Become~~ POORLY-GRADED SAND (SP), dense, light brown, with trace to some medium-grained sand					
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J 482

HTW DRILLING LOG

HOLE NO. 63-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME above WELL-GRADED SAND (SW), dense, multicolored, fine to coarse-grained (ALLUVIUM) dry					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-8J

HTW DRILLING LOG

HOLE NO. G3-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(SAME above) WELL-GRADED SAND (SW), dense, multicolored, fine to coarse grained, wet (ALLUVIUM)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J

HTW DRILLING LOG

HOLE NO. G3-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 7 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) WELL-GRADED SAND (SW) dense, multicolored, fine to coarse grained, wet (ALLUVIUM)					
	51						
	52						
	53						Mixing new mud pit.
	54	with trace fine gravel					
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J

HTW DRILLING LOG

HOLE NO. G3-8J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(SAME as above) WELL-GRADED SAND (SW), dense, multicolored, fine to coarse grained, with trace fine gravel (ALLUVIUM) wet					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J 486

HTW DRILLING LOG

HOLE NO. G3-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 19 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(SAME above) WELL-GRADED SAND (SW), dense, multicolored, fine to coarse grained, with trace fine gravel, wet (ALLUVIUM)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J 487

HTW DRILLING LOG

HOLE NO. 63-8J

Remedial Investigation, Mead NOP | INSPECTOR: J Nealon | SHEET 10 OF 15 SHEETS

ELEV a	DEPTH 77	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	WELL-GRADED SAND (SW) dense, ~~multicolored~~ reddish-brown, medium to coarse grained with fine gravel (ALLUVIUM) wet	HNu BZ=BG				Harder drilling
	78						
	79						
	80						
	81						
	82						
	83						
	84						
	85						
	86						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 48 63-8J

HTW DRILLING LOG

HOLE NO. G3-8J

SHEET 1 OF 15 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR J. Mealor

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(SAME above) WELL-GRADED SAND (SW), dense, wet, reddish-brown, medium to coarse grained with fine gravel (ALLUVIUM)					
	88						
	89						
	90						
	91						
	92	POORLY-GRADED GRAVEL (GP), dense, wet, multi-colored, fine grained, with coarse sand (ALLUVIUM)	HNu BZ=BG				Difficult drilling
	93						
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. G3-8J

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. G3-8J

Remedial Investigation, Mead NOP | INSPECTOR B Mealor | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED GRAVEL (GP), dense, wet, multicolored, fine grained with some coarse sand (ALLUVIUM)					
	96						
	97						
	98						
	99						
	100						Mixing new mud pit.
	101						
	102						
	103						
	104						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. G3-8J

HTW DRILLING LOG

HOLE: G3-8J

Remedial Investigation, Mead NOP | INSPECTOR: John S Nealon | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as above) POORLY-GRADED GRAVEL (GP), dense, wet, multicolored, fine grained, with coarse sand (ALLUVIUM)	HNu ~~Bz~~ BG				
	105						
	106						
	107						
	108						
	109						
	110						
	111						
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J

HTW DRILLING LOG

HOLE NO. 63-8J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above) SAME POORLY-GRADED GRAVEL (GP), dense, wet, multicolored, fine grained, with some coarse sand (ALLUVIUM)					
	114						
	115		HNo BZ= BG				Stop drilling 5-19-92 1700
							Resume drilling 5-20-92 0735 Backed off to 85 to drill out 30' of caved material.
	116						
	117						
	118						Lost 24 gals mud 85-118.5
	119						
	120						
	121						
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-8J

HTW DRILLING LOG

HOLE NO. G3-8J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealon

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above) SAME POORLY-GRADED GRAVEL (GP), dense, wet, multi-colored, fine grained, & with coarse sand (ALLUVIUM)					
	123						Lost 12 gals mud 118-123.5
	124						
	125						Drove Hydropunch II from 125-130 @ 1019
	126					49	NOTE: Hydropunch II water sample and water HS sample collected at 130' at 1019 hours.
						33	
	127					26	
						26 35	
	128					41	NOTE: Boring backfilled w/ tremied Volclay grout from 130 ft to surface. Completed @ 1230 5-20-92
						35	
	129					at 9416/gal	
			Water HS = ND			41	
	130				G3-8J		Bottom of Boring @ 130'

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-8J 493

HTW DRILLING LOG

HOLE NO. G3-12J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 12 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME 55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: RVB with 4" CFA 0-44'; 4" Drag Bit 44'-; Mobil 8x drill rods; NWJ rods for sampling w/ 2" OD HydroPunch II Sampler (93.5-100.5)	8. HOLE LOCATION: G3-12-N.561704 - E.2834276
	9. SURFACE ELEVATION: 1165.83 SE 1/4 NW 1/4, NE 1/4 NE 1/4 sec. 24, T14N, R8E
	10. DATE STARTED: 5-22-92 0720
	11. DATE COMPLETED: 5-22-92 0950
12. OVERBURDEN THICKNESS: ~~NA~~ 100.5	15. DEPTH GROUNDWATER ENCOUNTERED: 43 ft ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 100.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 G3-12-a (100.5')	X	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~grouted with Volclay~~	X	NA	NA	John S Nedon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), ~~stiff~~, firm, dark gray to black, damp to moist (Topsoil)					Boring advanced w/4-inch-dia CFA
	1						
	2	LEAN CLAY (CL), ~~stiff~~, firm, reddish brown, moist, (LOESS)					LL>40
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~B1~~ G3-12J494

HTW DRILLING LOG

HOLE NO. 63-12 J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL) ~~stiff~~, reddish brown, moist (LOESS)	firm,				LL >40
	6						
	7						
	8	LEAN CLAY (CL), firm, brown, moist to wet (LOESS OR ALLUVIUM)					
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-12J

HTW DRILLING LOG

G12J

Remedial Investigation, Mead NOP | INSPECTOR John S Neeley | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY-GRADED SAND (SP), medium dense, light tan, ~~damp~~, fine grained, moist (ALLUVIUM)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J 496

HTW DRILLING LOG

HOLE NO. 63-12J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, ~~damp~~ fine grained, (ALLUVIUM) moist					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-12J 497

HTW DRILLING LOG

HOLE NO. 63-12J

Remedial Investigation, Mead NOP

INSPECTOR J Mealon

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense, light tan, damp, fine grained, moist (ALLUVIUM)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 498 63-12J

HTW DRILLING LOG

HOLE NO. G3-12J

Remedial Investigation, Mead NOP | INSPECTOR J. Mealon | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(Same as above) POORLY GRADED SAND (SP), medium dense, light tan, damp, fine grained (ALLUVIUM)					
	43						Boring continued w/ 4" dia drag bit and bentonite slurry
	44					@	~~Switch to PVC~~ 44' @ 0821
	45						
	46						
	47		HNU B2:B6				water encountered @ 47' AT D
	48						
	49	POORLY GRADED SAND (SP), dense, multicolored, fine to medium grained wet, (ALLUVIUM)					
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J 499

HTW DRILLING LOG

HOLE NO. 63-12J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan to multicolored, fine to medium grained, (ALLUVIUM)					
	51	wet,					
	52						
	53						
	54						
							6 gal mud lost 50-55
	55	with trace coarse sand					
	56	Becoming fine grained with some medium grained sand, light tan					
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-12J 500

HTW DRILLING LOG

HOLE NO. G3-12J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Neeley

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan, wet, ~~[illegible]~~ fine grained with some medium grained sand (ALLUVIUM)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J

HTW DRILLING LOG

HOLE NO. G3-12J

Remedial Investigation Mead NOP | INSPECTOR J Mealon | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Same as above) POORLY GRADED SAND (SP), dense, multicolored, wet, medium grained, with trace to some coarse-grained sand (ALLUVIUM)					
	79						
	80		HNu B2=B6				lost 17 gal mud 75-80 mixing new mud.
	81						
	82	POORLY GRADED GRAVEL (GP), dense, multicolored, wet, fine grained, with medium and coarse sand (ALLUVIUM)					
	83						lost 11.5 gal mud 80-83.5
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J 502

HTW DRILLING LOG

HOLE NO. 63-12J

Remedial Investigation Mead NOP | INSPECTOR J. McAlon | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED GRAVEL (GP), dense, multicolored, fine grained, with medium to coarse sand (ALLUVIUM) wet					
	87						Pounded drilling.
	88						lost 29 gal mud 83.5-88.5
	89						
	90						
	91						
	92						
	93						Lost 6 gal mud 88.5-93.5 0950 hours.
	94					243	Drove Hydropunch II from 93.5-100.5.
	95					242	

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-12J

HTW DRILLING LOG

HOLE NO. G3-12J

Remedial Investigation, Mead NOP | INSPECTOR John Nealon | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), dense, light tan, wet, fine grained with some medium grained sand (ALLUVIUM)					
	69	with occasional coarse grained sand					
	70						
	71	POORLY GRADED SAND (SP), dense, multicolored, wet, medium grained with trace to some coarse grained sand (ALLUVIUM)					
	72						
	73						
	74						
	75						16 gal mud lost 70-75
	76						
	77						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J

HTW DRILLING LOG

HOLE NO. G3-12J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Spealor

SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(Same as above) POORLY GRADED GRAVEL (GP) dense, multicolored, wet, fine grained with medium to coarse sand				105	NOTE: Blow counts indicate possible clay or silt layer 96-98.3 feet.
	97					60	
	98					93	
	99					165	NOTE: HydroPunch II groundwater sample collected at 100.5 ft at 1132 hours.
	100		Water HS = ND		G3-12J	161	
	101						Bottom of Boring @ 100.5' NOTE: Boring back-filled with premied Volclay grout from 100.5' to surface. Completed 5-22-92 @ 1312
	102						
	103					at 9.5 lb/gal	
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-12J

505

B07NE003702-04611

HTW DRILLING LOG

HOLE NO. 63-13J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.556844-E.2828055
5. NAME OF DRILLER: R. Herber	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4" CFA – 0-37'; RWB w/ 4" drag bit 37'-95'; ~~[illegible]~~ Mobi lock drill rods; 2" OD HydroPunch II sampler 90'-95' on NW-J rods	8. HOLE LOCATION: NW 1/4, SE 1/4, ~~SE 1/4~~, ~~SE 1/4~~ sec. 26 ~~63-13~~ T14N, R8E
	9. SURFACE ELEVATION: 1157.17
	10. DATE STARTED: 5-20-92 1340
	11. DATE COMPLETED: 5-21-92 1427
12. OVERBURDEN THICKNESS: ~~NA~~ 95'	15. DEPTH GROUNDWATER ENCOUNTERED: 37' ATD
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 95'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~63-13S @ 95'~~	X	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~grouted with~~ Volclay	X	NA	NA	John Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~FAT~~ CLAY (CH), ~~very stiff~~ firm to hard, dark gray, moist (Topsoil)					(Advanced) Bound with 4" CFA
	1						
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~62~~ 606 63-13J

HTW DRILLING LOG

HOLE NO. G3-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Meadow

SHEET 2 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: FAT CLAY (CH), ~~very stiff~~ firm to hard, dark gray, ~~damp~~ moist (Topsoil)					
	6	LEAN CLAY (CL), ~~very stiff~~ firm to hard, brown, ~~damp~~ moist (LOESS)					LL ~45
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-13J 507

HTW DRILLING LOG

HOLE NO. 63-13J

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 3 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: LEAN CLAY (CL), ~~very stiff~~ firm to hard, brown, ~~damp~~ moist (LOESS)					
	15						
	16						
	17						
	18						
	19	LEAN CLAY (CL), ~~stiff~~ firm, ~~dry~~ brown, moist, with some fine black sand (LOESS)					
	20	POORLY-GRADED SAND (SP), med. dense, light brown, fine grained, (ALLUVIUM) dry					
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-13J

/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. G3-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: POORLY-GRADED SAND (SP), dense, light brown, fine grained (Alluvium)					
	24	moist					
	25						
	26						
	27						
	28						
	29						~~water encountered @ 29'~~
	30						
	31						
	32						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-13J 509

HTW DRILLING LOG

HOLE NO. G3-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John O'Neal

SHEET 5 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: POORLY-GRADED SAND (SP), dense, light brown, fine grained, (Alluvium)					
	33	(moist)					
	34						
	35						
	36						
	37	Becoming wet					water encountered @ 37' — ATD
	38						Boring continued w/ 4⅝" drag bit and bentonite slurry
	39		HNu BZ= BG				~~Switch to RWB~~ @ 39'. Stopped 5-20-92 @1520
							Resumed 5-21-92 @1015
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-13J

HTW DRILLING LOG

HOLE NO. 63-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealon

SHEET 6 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: POORLY-GRADED SAND (SP), med dense, light brown (wet), fine grained (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-13J

HTW DRILLING LOG

HOLE NO. 63-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above), POORLY-GRADED SAND (SP) med dense, light brown, fine grained, wet, (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						Mix new mud pit

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-13J

519

HTW DRILLING LOG

HOLE NO. 63-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY-GRADED SAND (SP), med. dense, light brown, wet, fine grained, (Alluvium)					
	60	POORLY-GRADED SAND (SP), med. dense, multicolored, wet, medium to coarse grained (Alluvium)	gradational contact				
	61						
	62						
	63						
	64						
	65						Lost 11.5 gal mud 60-65
	66						
	67						
	68						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. 63-13J513

HTW DRILLING LOG

HOLE NO. 63-13J

Remedial Investigation, Mead NOP | INSPECTOR J Nealon | SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY-GRADED SAND (SP), dense, multicolored, wet, medium to coarse grained (Alluvium)					
	med. 69						
							Lost 11.5 gal mud 65-70
	70						
	71						
	72						
	73						
	74						
							Lost 8.5 gal mud 70-75
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 63-13J

HTW DRILLING LOG

HOLE NO. 63-13J

Remedial Investigation, Mead NOP | INSPECTOR John S Nealon | SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), very dense, multi-colored, wet, medium to coarse grained, (Alluvium)					
	78						
	79						
	80						Lost 11.5 gal mud 75-80
	81						
	82	POORLY GRADED GRAVEL (GP), very dense, multicolored, wet, fine grained, with coarse sand (Alluvium)					
	83						
	84						
	85						Lost 33 gal 80-85 Mix new mud pit.
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. 63-13J515

HTW DRILLING LOG

HOLE NO. G3-13J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) POORLY GRADED GRAVEL (GP), med. dense, multicolored, wet, fine grained, with coarse sand (Alluvium)					
	88						Lost 23 gal mud 85-88.5
	89						
	90		HNu B2-B6				1305 hours - drilling complete. Deave Hydro Punch II 90-95 ft
						72	NOTE: Drove sampler 57 blows thru 18" of slough from 88.5-90.
	91					55	
	92					56	NOTE: Hydro Punch II groundwater sample collected @ 95' at 1427 hours.
						169	NOTE: Boring backfilled with tremied Volclay grout from 95' to surface. Completed at 1600
	93					169	
	94					169	Volclay @ 9.4 lb/gal
	95		Water HS=ND		G3-13J		BOTTOM OF BORING @ 95'

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-13J

(4)

HTW DRILLING LOG

HOLE NO. 43-15j

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 16	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.557195-E.2832834
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-19' bgs~~: 4 in cfa; ~~0-121' bgs~~: 3 1/4 in paddle bit w/ NWJ rod; 121-126' bgs: 2 in OD Hydropunch II w/ NWS rods	8. HOLE LOCATION: 43-15j (B) - second attempt hole location
	9. SURFACE ELEVATION: 1165.45 ft
	10. DATE STARTED: 5-29-92 @ 0850
	11. DATE COMPLETED: 5-29-92 @ 1341
12. OVERBURDEN THICKNESS: 126 ft	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 126 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~43-15 @ 126'~~	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Completed~~ Backfilled w/ Volclay Pure Gold grout	X	NA	NA	Bret A Hedenkap

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), ~~soft~~ soft to firm ~~to medium~~, dk brown to black moist, w/ root hairs (top soil)					boring advanced w/ 4 in continuous flight augers (cfa) descriptions from auger cuttings
	1						
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 517

43-15j

HTW DRILLING LOG

HOLE NO. 43-15j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 2 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	~~(same as above) LEAN CLAY~~ (ML), soft to ~~medium~~ firm, dk brown to black, moist w/ root hairs (topsoil)	CLAYEY SILT				
	6						
	7						
	8						
	9						
	10						
	11	11.0 LEAN CLAY (CL), firm, brown, moist, w/occasional fine sand (loess)					
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j 518

HTW DRILLING LOG

HOLE NO. 43-15j

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 3 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(SAME as above) LEAN CLAY (CL) firm, brown, moist, w/ occasional fine grained sand (loess)					
	15						
	16						
	17	17.0 POORLY GRADED SAND (SP), loose-medium dense, light tan, moist, v. fine grained, with trace of fine grained sand and clay (alluvium)					
	18						Stopped cfa drilling 5-29-92 @ 0910 5-29-92
	19						~~begin wash bore~~ Boring continued ~~rotary drilling~~ w/ 3¼" ~~pudd~~ drag bit and ~~start~~ bentonite slurry ~~pudd~~ 5-29-92 @ 0920 HRS.
	20						
	21						
	22	becoming v. fine to fine grained sand					
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

519

HTW DRILLING LOG

HOLE NO. 43-15

Remedial Investigation Mead NOP | INSPECTOR R. Hedinger | SHEET 4 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), light tan, v fine to fine grained ~~sand~~ w/ trace of clay (alluvium)					
	24						
	25	becoming fine grained w/ occasional medium grained sand					
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15 520

HTW DRILLING LOG

HOLE NO. 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenke | SHEET 5 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY ~~SO~~ GRADED SAND (SP), light tan, fine grained ~~sand~~ w/ occasional medium grained sand (alluvium)					
	33						
	34						
	35	becoming v. fine to fine grained sand					
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

HTW DRILLING LOG

HOLE NO. 43-15j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR B. Hedenkamp

SHEET 6 OF 6 sheets 116

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), med. dense, tan, v. fine to fine grained ~~sand~~ (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j22

HTW DRILLING LOG

HOLE 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Heffernan | SHEET 7 OF SHEETS 7/16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP), tan U. fine to fine grained ~~sand~~ (alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48	becoming mostly fine grained w/ little of U. fine grained sand and ~~occasional~~ trace of medium grained sand					
	49						
	50						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

HTW DRILLING LOG

HOLE NO. 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Helenkamp | SHEET 8 OF SHEETS 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP) tan fine grained ~~sand~~ w/ little of U. fine sand and ~~occasional~~ trace of medium grained sand (alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j 521

HTW DRILLING LOG

HOLE: G3-15j

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkay | SHEET 9 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP), tan fine grained ~~sand~~, w/ v. fine sand and occasional medium grained sand (alluvium					
	60						
	61						
	62						
	63						
	64						
	65						
	66	becoming fine grained sand w/ medium grained sand and occasional coarse grained sand					
	67						
	68						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-15j

525

HTW DRILLING LOG

HOLE NO. 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedinkamp | SHEET 10 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY ~~SOT~~ GRADED SAND (SP), tan, fine grained ~~sand~~, w/ medium grained sand and occasional coarse grained sand (alluvium)					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

HTW DRILLING LOG

HOLE NO. 43-15j

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: B. Hedlunkamp

SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH / SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP), tan fine grained w/ medium grained ~~sand~~ and occasional coarse grained sand (alluvium)					
	78						
	79						
		80.0					
	80	POORLY ~~SORTED~~ GRADED SAND (SP), tanish-red, coarse grained ~~sand~~ w/ trace of fine grained gravel and medium grained sand. (alluvium)					
	81						
	82						
	83						
	84						
	85	becoming med to coarse grained sand w/ occasional fine grained gravel					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

HTW DRILLING LOG

HOLE NO. 43-15

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 12 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as above) POORLY GRADED SAND (SP), reddish tan, medium to coarse ~~sand~~ w/ occasional fine grained gravel (alluvium)					
	88						
	89						
	90	90.0 POORLY ~~SORTED~~ GRADED GRAVEL (GP), fine ~~grained~~, subangular to subrounded ~~gravel~~ w/ little medium to coarse grained sand ~~and occasional medium grained sand~~ (alluvium)					
	91						
	92						
	93						
	94						
	95						
	96						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15

HTW DRILLING LOG

HOLE NO. 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 13 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH / SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(Same as above) POORLY GRADED GRAVEL (GP), fine grained, w/ medium to coarse sand (alluvium) 97.0					
	97	POORLY ~~SD~~ GRADED SAND (SP), med to coarse grained ~~sand~~ w/ little fine gravel					
	98						
	99						
	100						
	101						
	102						
	103						
	104						
	105						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

529

HTW DRILLING LOG

HOLE NO. 43-15j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 14 OF SHEETS 116

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	(Same as above) POORLY GRADED SAND (SP), med to coarse grained ~~sand~~ w/ little fine ~~grained~~ gravel (alluvium)					
	106						
	107						
	108						
	109	109.0 POORLY GRADED GRAVEL (GP) fine ~~graded~~ ~~gravel~~ ~~gravel~~ w/ some med to coarse grained sand (alluvium)					
	110						
	111						
	112						
	113						
	114						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j 53C

HTW DRILLING LOG

HOLE NO. 43-15j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkar

SHEET 15 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	114	(Same as above) POORLY GRADED GRAVEL (GP), fine ~~grained~~, angular to sub rounded ~~gravel~~ w/ ~~med~~ coarse to coarse grained sand					
	115						
	116						
	117						
	118						
	119						
	120						Stopped wash bore rotary drilling 5-29-92 @ 1342 ~~down~~ @ 121 ft bgs
	121					80	begin hammering Hydropunch w/ 140 lbs hammer
	122					140	
	123						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j

HTW DRILLING LOG

43-15j

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkay | SHEET 16 OF SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	123	~~AO samples collected~~ ~~No cuttings to log.~~ (SAME AS ABOVE) POORLY GRADED GRAVEL (GP), med. dense, fine, subangular to subrounded w/ some med. to coarse grained sand				112	
	124					121	Note: Hydropunch water sample collected @ 126' @ 1545 HRS.
	125				#1	138	
							BOB = 126.0'
	126						Hammering completed @ 1525 on 5-29-92 to 126' bgs
	127						NOTE: Boring backfilled w/ Volclay grout @ 10.2 lbs/gal from 126' to 0' @ 1650 HRS on 5-29-92.
	128						
	129						
	130						
	131						
	132						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-15j 532

HTW DRILLING LOG

HOLE NO. 43-16J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 14	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Georg	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-44': 4in cfa~~; ~~0-113': 3 1/4 in paddle bit: NWS rods~~; ~~113-118': 2in OD Hydropunch~~ w/ NWS rods	8. HOLE LOCATION: 43-16J - N.557231 - E.2834864
	9. SURFACE ELEVATION: ≅ 1165
	10. DATE STARTED: 5.31.92 @ 1310
	11. DATE COMPLETED: 6.1.92 @ 0950
12. OVERBURDEN THICKNESS: 118 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 40 ft (estimated)
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 118 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~G3-16JC 118'~~ 1	TCE	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Back-filled ~~Completed~~ w/ Vol Clay grout	X	NA	NA	B. Hedenkop

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL), ~~soft~~ firm dk brown to black, moist w/ trace fine sand, roots present (top soil)					boring advanced w/ 4 inch continuous flight augers (cfa) soil/sediment descriptions made by auger cuttings
	1						
	1.5	FAT CLAY (CH), ~~stiff~~ firm dk brown, moist w/ trace of fine sands and roots (topsoil) ~~[illegible]~~					
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 43-16

533

B07NE003702-04639

HTW DRILLING LOG

HOLE NO. 43-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlunkaya

SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) FAT CLAY (CH) ~~stiff~~ firm, dk brown, moist w/ trace of fine grained sand &					
	6	and roots (topsoil)					
	7	7.0 LEAN CLAY (CL) ~~medium~~ firm, lt tannish brown, moist w/ trace v. fine grained sand (loess)					
	8						
	9						
	10						
	11	becoming soft					
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16

534

B07NE003702-04640

HTW DRILLING LOG

HOLE NO. G3-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedberg

SHEET 3 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) LEAN CLAY (CL) ~~medium dense~~ firm, lt tannish-brown, moist w/ v. fine grain sand (loess)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22	22.0 POORLY GRADED SAND (SP), medium dense, v. fine to fine grained ~~sand~~, light tan dry (alluvium)					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-16

535

B07NE003702-04641

HTW DRILLING LOG

HOLE NO. 43-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), medium dense, very fine to fine grained					
	24	~~sand~~, light tan, dry (alluvium)					
	25						
	26						
	27						
	28	becoming lt grey					
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16536

HTW DRILLING LOG

HOLE NO. 43-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 5 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), medium dense, very fine to fine grained ~~sand~~, (lt grey, dry alluvium)					
	33						
	34						
	35						
		becoming lt tan w/ some dk grains ~~fines, damp~~ moist					
	36						
	37						
	38						
	39						
	40	becoming lt. tan and ~~v. damp~~ moist to wet					sand caved in to 40 ft bgs after removing cfa, probable water table
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16

537

HTW DRILLING LOG

43-16

Remedial Investigation, Mead NOP | INSPECTOR: B. Helm Kay | SHEET 6 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH/ SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP) med dense, (very fine to fine grained) ~~sand~~, lt tan, v. moist, (alluvium)					
	42						
	43						Cfa completed 5.31.92 @ 1355 to 44 ft bgs
	44						~~begin rotary wash~~ Begin continued ~~bore using~~ 3 1/4" drag ~~potable~~ bit and 5.31.92 @ 1530
	45						bentonite slurry
	46	becoming mostly fine grained w/ little medium grained sand					
	47						
	48						
	49	becoming medium grained w/ little fine and coarse grained sand					
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16538

HTW DRILLING LOG

43-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkop

SHEET 7 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), lt tan, wet, medium grained sand with little fine and coarse grained sand (alluvium)					
	51						
	52						
	53						
	54						
	55						
	56	becoming v. fine to fine w/ ~~occasional~~ trace of medium grained sand					
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16

HTW DRILLING LOG

HOLE NO. 43-16

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	59	(Same as above) POORLY GRADED SAND (SP) lt tan, wet, v fine to fine grained ~~sand~~ w/ occasional medium grained sand (alluvium)					
	60	becoming medium to coarse grained sand w/ fine grained sand and fine gravel					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 540

43-16

HTW DRILLING LOG

HOLE NO. 43-16

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 9 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(same as above) POORLY GRADED SAND (SP), lt tan, wet, medium to coarse grained ~~sand~~ w/ fine grained sand and fine gravel (alluvium)					
	69						
		becoming fine to medium grained sand w/ occasional coarse grained sand					
	70						
	71						
	72						
	73						
	74						
	75						
	76	becoming coarse grained sand w/ medium grained sand & occasional ~~coarse~~ fine gravel					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 541 43-16

HTW DRILLING LOG

43-16

Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 10 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP) lt tan, coarse grained ~~sand~~ w/ medium grained sand and occasional fine gravel (alluvium)					
	78	becoming coarse grained sand w/ medium grained sand					
	79						
	80						
	81						
	82						
	83	~~becoming coarse grained sand w/ medium grained sand and~~ w/ little fine gravel					
	84						
	85						
	86						

542

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16

HTW DRILLING LOG

43-16

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 11 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	86	(same as above) POORLY GRADED SAND (SP), lt tan, wet, coarse grained sand, w/ medium grained sand and fine gravel Calluvium					
	87	becoming fine to medium grained sand w/ coarse grained sand and occasional fine gravel					End of drilling to 88 ft bgs on 5 4.92 @ 1715
	88						
	89						
	90						
	91						
	92	becoming coarse grained sand w/ medium grained sand and occasional fine grained gravel					
	93						
	94	wet 94.5 POORLY GRADED GRAVEL (GP) reddish tan, subangular to subrounded fine gravel w/ coarse gravel sand (Calluvium)					
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 543

43-16

HTW DRILLING LOG

G3-16

Remedial Investigation Mead NOP | INSPECTOR: B. Hedrickson | SHEET 12 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same as above) POORLY GRADED GRAVEL (GP), reddish-tan, subangular to subrounded fine ~~gravel~~ w/ coarse grained sand (alluvium)					
	96						
	97						
	98						
	99						
	100						
	101	101.0 WELL GRADED GRAVEL (GW) tan ~~[illegible]~~ ~~[illegible]~~ fine to coarse grained ~~gravel~~					begin rig chatter @ 101 ft bgs
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: G3-16

544

HTW DRILLING LOG

43-16

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | 13/14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	(Same as above) ~~Poorly~~ WELL GRADED GRAVEL (GW) lt tan to red fine to coarse sub angular to subrounded gravel (alluvium)					
	105						
	106						
	107						
	108						
	109						
	110						
	111						
	112						RWB complete to 113 ft bgs @ 0950 on 6.1.92
	113						

CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-16545

HTW DRILLING LOG

HOLE 43-16

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	(SAME AS ABOVE) WELL GRADED GRAVEL (GW), lt tan to red, fine to coarse, subangular to subrounded (Alluvium)				167	~~Bottom of boring @113 ft bgs~~ @0950 on 6-1-92 Begin HP II Driving w/ 140# from 113' to 118'.
	114					161	
	115					171	
	116					165	Note: water sample collected with Hydropunch II on 6-1-92 @ 1230 @ 118ft bgs B.O.B 118'
	117				#11	220	
	118	1180				140#	Hammering is complete to 118 ft bgs @ 1125 on 6-1-92
	119						Note: boring was back filled w/ tremied wet clay grout from 118 ft bgs to the surface on 6-1-92 @ 1430
	120						
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ~~546~~ 43-~~546~~

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. 43-19j

SHEET 1 OF SHEETS 12

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-27 ft 6 in~~ 4 in CFA; ~~0-90'~~ 3 1/4 in paddle bit w/ NWS rods; ~~98'-100'~~ 2 in OD hydropunch	8. HOLE LOCATION: 43-19j N.553736-E.2830890
	9. SURFACE ELEVATION: 1159.53 ft
	10. DATE STARTED: 5/20/92 @ 1710
	11. DATE COMPLETED: 5/21/92 @ 1600
12. OVERBURDEN THICKNESS: 100.8	15. DEPTH GROUNDWATER ENCOUNTERED: ~~N/A~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~NA~~ ~~2'~~ 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: ~~101'~~ 100.8	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~43-19j @ 101'~~	TCE	NA	NA	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Back-filled ~~completed~~ w/ volclay grout	X	NA	NA	Bret A Hedenlye

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft, dk brown, moist with fine grained sand and roots (top soil) ~~occasional~~ trace of					Boring advanced w/ 4" continuous flight augers
	1						Note: hole logged w/ cuttings
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 43-19j

HTW DRILLING LOG

43-19

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkap | SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft, dk brown, moist w/ ~~fine~~ occasional fine grained sand and roots (top soil)					
	6						
	7						
	8						
	9						
	10	10.0 LEAN CLAY (CL), ~~med.~~ soft to firm ~~to stiff~~, lt reddish brown, moist, w/ occasional fine sand (loess)					
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19

548

HTW DRILLING LOG

HOLE NO. 43-19j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above), LEAN CLAY (CL), ~~med to stiff~~ soft to firm lt reddish brown, w/ occasional fine sand (loess)					
	15						
	16						
	17						
	18						
	19						
		19.5' POORLY ~~SORTED~~ GRADED SAND WITH CLAY (SP-SC), loose to medium ~~dense~~ tan, moist, v. fine grained sand w/ lean clay (alluvium)					
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19j

HTW DRILLING LOG

43-19j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedinkay

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY ~~SORTED~~ GRADED WITH CLAY (SP-SC), loose to medium dense, tan, v. fine, grained ~~sand~~ in fines w/ traces ~~tan~~ clay (alluvium)					
	24						
	25						
	26	26.0' POORLY ~~SORTED~~ GRADED SAND (SP), loose to medium, dense tan, moist, v. fine grained ~~sand~~ (alluvium)					
	27						
	28						stopped continuous flight auger (cta) drilling 5-20-92 @ 1735
	29						~~Begin wash bore~~ Boring continued w/ ~~drilling using a~~ 3 1/4" paddle bit & bentonite slurry & NWJ rods 5-20-92 @0850
	30						
	31	becoming fine w/ medium grained sand					
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19j 550

HTW DRILLING LOG

HOLE NO. 43-19

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenlay

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(same as above) POORLY GRADED ~~SORTED~~ SAND (SP), tan, fine grained ~~sand~~ w/ medium grained sand (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19 551

HTW DRILLING LOG

43-19j

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) Poorly ~~SORTED~~ GRADED SAND (SP), tan, fine grained ~~sand~~ with little medium grained ~~sand~~ sand (alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48	becoming fine to medium grained sand					
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19j 552

HTW DRILLING LOG

HOLE NO. 43-19j

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlunkaup

SHEET 7 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), tan, fine to medium grained sand (alluvium)					
	51						
	52	becoming medium to coarse grained w/ little fine gravel sand and fine subrounded gravel					
	53						
	54						
	55						
	56						
		becoming fine to medium w/ occasional coarse sand					
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 553 43-19j

HTW DRILLING LOG

43-19

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(same as above) POORLY ~~SORTED~~ GRADED SAND, tan, fine to medium w/ occasional coarse sand.					
	60	becoming fine to medium grained					
	61						
	62						
	63						
	64						
	65						
	66						
	67	becoming medium to coarse grained w/ fine sand & occasional fine gravel					
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 554

43-19

HTW DRILLING LOG

43-19j

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 9 OF 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED ~~SOFT TO~~ SAND (SP), tan medium to coarse ~~and~~ w/ fine					
	69	grained sand. (alluvial) and occasional fine gravel.					
	70						
	71						
		becoming medium to					
	72	coarse grained sand with occasional fine gravel					
	73						
	74						
	75						
	76	becoming med to coarse grained ~~sand~~					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19j555

HTW DRILLING LOG

HOLE NO. 43-19

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedlund

SHEET 10 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED ~~SOR (TED~~ SAND (SP), tan, medium to coarse ~~sand~~ (alluvium)					
	78						
	79						
	80						
	81						
	82						
	83						
	84	~~becoming med to coarse sand~~ w/ trace of fine ~~occasional~~ gravel					
	85						
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 43-19

556

HTW DRILLING LOG

43-19

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedlunkap | SHEET 11 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same as above) POORLY ~~SORTED~~ GRADED SAND (SP), tan, med. to coarse ~~sand~~ w/ occasional gravel (alluvium)					
	87						
	88						
	89						
	90						
	91	POORLY ~~SORTED~~ GRADED GRAVEL (GP), fine subangular to subrounded ~~gravel~~ w/ little med to coarse sand (alluvium)					
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 55

43-19

HTW DRILLING LOG

HOLE NO. 43-19j

Remedial Investigation, Mead NOP | INSPECTOR B. Hedinkop | SHEET 12 OF SHEETS 12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same as above) POORLY ~~SORTED~~ GRADED GRAVEL (GP) fine subangular to subrounded ~~gravel~~ w/ little of ~~sand~~ gravel w/ medium to coarse callowin					
	96						
	97						stopped drilling to 98ft bgs on 5.21.92 @ 1115
	98				98	27	Begin hammering HP at 98ft bgs 5.21.92 @ 1455 using 240# hammer
	99				99	341	Hammered to 100'8½" @ 5.21.92 @ 1600. Hammered back to 100'8"
	100				100 #1	1450	Note: water sample collected w/ hydrocarbon made at 100'8" @ 1630 on 5-21-92
							BOP ~~100'8½"~~ 100.8"
	101				101		Note: boring was back filled w/ ~~bentonite~~ Portland Gold tremied grout from 100'8½" to surface on 5.22.92 at 1000
	102				102		
	103				103		

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 558

43-19j

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. H-1

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 11	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-~~49~~ ft bgs: 4 in cfa; 0-83 ft bgs: 3¼ in RWB; 83-88 ft bgs: 2 in hydro-punch II	8. HOLE LOCATION: H-1 - N.549052 - E.2852028
	9. SURFACE ELEVATION: ~~[illegible] ft~~ 1137.91
	10. DATE STARTED: 6·24·92 @ 1455
	11. DATE COMPLETED: 6·25·92 @ 1115
12. OVERBURDEN THICKNESS: 88 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~~[illegible]~~ bgs NA Masked by drilling fluid.
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~[illegible]~~ 68 ft bgs 2 hrs AD
14. TOTAL DEPTH OF HOLE: 88 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
H-1i ; H-1j	TCE		explosives			NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring backfilled with tremied volclay grout	X			Bert A Helup

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown, moist w/ occasional fine to medium grained sand (top soil)					boring advanced with 4 inch continuous flight augers (cfa)
	1						soil/sediment descriptions from auger cuttings
	2						
	3	becoming dry					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H-1

559

B07NE003702-04665

HTW DRILLING LOG

HOLE NO. H-1

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 2 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft to ~~medium~~ firm, dark brown, moist with occasional fine					
	6	to medium grained sand ~~(top soil)~~ (Loess)					
	7	becoming moist					
	8						
	9						
	10	10.0 LEAN CLAY (CL) ~~medium~~ firm, lt. reddish brown, moist w/ occasional					
	11	very fine grained sand (loess)					
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

560

HTW DRILLING LOG

HOLE NO. H-1

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 3 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above) LEAN CLAY (CL) ~~medium~~ firm, lt reddish-brown, moist, with occasional very fine grained sand (loess)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22	~~[illegible]~~ moisture content increasing					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

HTW DRILLING LOG

HOLE NO. H-1

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(same as above) LEAN CLAY (CL), ~~medium~~ firm, lt reddish-brown, ~~very~~ moist, with occasional very fine grained sand (loess)					
	24						
	25						
	26	26.0 POORLY GRADED SAND (SP) loose to medium, tan, ~~damp~~ moist very fine to fine grained sand (alluvium)					
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

562

HTW DRILLING LOG

HOLE NO. H-1

Remedial Investigation, Mead NOP

INSPECTOR B. Helenka

SHEET 5 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) Poorly					
		graded sand (SP) loose to					
		medium dense, tan ~~damp~~ moist, very fine					
	33	to fine grained sand					
		(alluvium)					
	34						
	35						
	36	becoming medium dense					
	37						
	38						
	39						
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

563

HTW DRILLING LOG

HOLE NO. H-1

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 6 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(same as above) POORLY GRADED SAND (SP) medium dense, tan, ~~damp~~ moist very fine to					
	42	fine grained sand (alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						CFA drilling complete to 49 feet bgs 6-24-92 @ 1545
	49						Begin RWB drilling 6-25-92 @ 0735 w/ 3 1/4 inch drag bit and bentonite slurry
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1 564

HTW DRILLING LOG

HOLE NO. H-1

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) Poorly					
		GRADED SAND (SP) medium dense,					
		tan, ~~[illegible]~~ very fine to fine grained					
	51	sand (Alluvium)					
	52						
	53						
	54						
	55						
	56						
	57	becoming with occasional medium					
		grained sand					
	58						
	59						

bedrock elev ~ 1044 @ H-1

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

565

B07NE003702-04671

HTW DRILLING LOG

HOLE NO. H-1

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(same as above) POORLY GRADED SAND (SP) medium dense, tan, wet very fine to fine grained sand with occasional medium grained sand (alluvium)					
	60						
	61						
	62						stop RWB drilling 6-25-92 @ 0825 to a depth of 63'
	63					pushed	begin hammering HP II using a 140# hammer 6-25-92 @ 0920
	64					28	
	65	becoming medium grained sand w/ fine grained sand				35	
	66					40	
	67					38	Hydropunch II hammered to 68 ft 0930 6-25-92
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

566

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. H-1

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenlar

SHEET 9 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) POORLY GRADED SAND (SP), medium, dense, tan, wet, medium grained sand w/ fine grained sand (alluvium)					resume RWB drilling @ 68.1 6-25-92 @ 1040
	69						
	70						
	71						
	72	~~[illegible]~~					
	73						
	74						
	75	becoming coarse grained sand w/ medium grained sand and fine grained gravel and occasional fine grained sand					
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1

HTW DRILLING LOG

HOLE NO. H-1

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 10 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP) medium dense to dense, tan/rich-red, wet, coarse grained ~~sand~~ w/ medium grained sand and fine grained gravel w/ occasional fine grained sand (alluvium)					
	78						
	79						
	80						
	81						
	82						Complete RWB drilling to 83ft 6-25-92 @ 1115
	83					pushed	begin hammering w/ 140# hammer 6-25-92 @ 1335, @ depth of 84'
	84					254	
	85					185	
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-1 568

HTW DRILLING LOG

HOLE NO. H-1

Remedial Investigation, Mead NOP | INSPECTOR B. Heidenkamp | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	[redacted]				151	hammering complete to 88 ft bgs 6-25-92 @ 1435 HPII pulled back 1 ft [redacted]
	87	POORLY GRADED SAND(?)				121	B.O.B 88.0'
	88						Water sample collected @ 88 feet bgs 6-25-92 @ 1500
	89						boring backfilled with tremied volclay grout from 88ft to surface 6-26-92 @ 0835
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 569

HTW DRILLING LOG

HOLE NO. ~~H-02~~ H-2

SHEET 1 OF SHEETS 1/6

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-39 ft bgs~~: 4 inch cfa (continuous flight auger); ~~0-22 ft bgs: 3 1/4 in paddle bit w/ NWJ rods~~; ~~upper water sample~~; ~~22-40 ft bgs HPT 2 in OD~~; ~~lower water sample~~; ~~40-48 ft bgs~~ HPT w/ NWJ rods	8. HOLE LOCATION: H-02 N. 554687 - E. 2860728
	9. SURFACE ELEVATION: 1080.77
	10. DATE STARTED: 6-11-92 @ 0840
	11. DATE COMPLETED: 6-12-92
12. OVERBURDEN THICKNESS: 48 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 7 ft ~~bgs~~ ATD
13. DEPTH DRILLED INTO ROCK: 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 48 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~H-02i/H-02j~~ 2	TCE	NA	E+P	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ bentonite volclay grout	X	NA	NA	Bret A Hedenys

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft, dk brown, moist, w/ occasional fine to medium grained sand (top soil)					boring advanced w/ 4 in cfa; soil/sediment descriptions from auger cuttings
	1						
	2						
	3	becoming brownish grey and ~~very moist~~ w/ occasional fine grained sand					Moisture content increasing
	4						
	5						

/CC RPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 570 ~~H-02~~ H-2

HTW DRILLING LOG

HOLE NO. H-02

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) CLAYEY SILT (ML), soft, brownish grey w/ occasional fine grained ~~sand~~ sand, ~~w~~ moist					
	6	6.5					
	7	LEAN CLAY (CL), soft to ~~medium~~ firm, dk grey, (w/ occasional fine sand, saturated (alluvium) → wet				✓	water detected 7' bgs ATD
	8						
	9						
	10						
	11						
	12						
	13	13.0 (wet) POORLY GRADED SAND (SP) loose to medium dense, greyish tan, medium grained ~~sand~~ w/ fine grained sand and occasional coarse grained sand (alluvium)					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-02

HTW DRILLING LOG

HOLE NO. H-02

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 3 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP) loose to medium dense, greyish-tan, (wet), medium grained ~~sand~~ w/					
	15	fine grained sand and occasional coarse grained sand (alluvium)					Hydropunch pushed from 15 – 22 ft 6-11-92 @ 1000.
	16						Hydropunch pulled back 1 ft.
	17						
	18						~~Complete grd to 19 ft bgs 6-11-92 @ 0915~~
	19						~~Begin RWB 6-11-92 @ H35~~
	20	becoming medium grained w/ coarse grained sand					
	21					#1	
	22						Water samples collected @ 1025 from 22' bgs Boring continued w/ 3 1/2" drag bit and bentonite slurry @ 6-11-92 11:25
	23	becoming medium to coarse grained sand w/ gravel					

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO. H-02

ICORPS/4-15-92

572-H

HTW DRILLING LOG

HOLE NO. H-02

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Heldenkop

SHEET 4 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), lt grey tan (wet), medium to coarse grained ~~sand~~ w/ fine grave (alluvium)	loose to medium	dense			
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-02573

HTW DRILLING LOG

H-02

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), lt reddish tan, medium to coarse grained ~~sand~~ w/ fine grained sand (alluvium)	loose to medium wet	dense			
	33						
	34						
	35						
	36						
	37						
	38	wet 38.0 POORLY GRADED GRAVEL (GP), tannish red, fine grained gravel w/ medium to coarse grained sand	medium dense				
	39						~~Hole moved over ~18 west. Cfa drilled to 39ft. Hydropunch pushed to 40'9". Begin hammering 6-12-92 @0815~~
	40				40'9"		
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-02574

/CORPS/4-15-92

HTW DRILLING LOG

HOLE # H-02

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED GRAVEL (GP), lt greyish tan, wet, fine grained ~~gravel~~ w/ medium to coarse grained sand (alluvium)	medium dense			57	Begin hammering Hydropunch II w/ 300# hammer @ 40.7' 6-12-92
	42				41'9"	46	
					42'9"		
	43					41	
					43'9"		
	44					47	
					44'9"		
	45					45	
					45'9"		
	46					43	dk grey returns less coarse returns (shale)?
					46'9"		
	47					56	End of RWB drilling 6-11-92 @ 1350 @ 48' bgs
					47'9"		
	48				48'	50	refusal; lifted back to 47'.
	49						Note: water sample collected w/ HP II @ 48' bgs 6-12-92 @ 0850. Hole backfilled w/ tremied volclay grout from 48 ft to surface
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. @1010 on 6-12-92 H-0575

HTW DRILLING LOG

HOLE NO. H-3

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 1/6	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-39 ft hyd~~: 4 in continuous flight augers; ~~19-24 ft~~ 2 in OD Hydropunch w/ NQJ rods; ~~39-45 ft: Hydropunch~~	8. HOLE LOCATION: H-3 N.557193 - E.2859720
	9. SURFACE ELEVATION: 1002.12
	10. DATE STARTED: 6-12-92 @ 1247
	11. DATE COMPLETED: 6-12-92
12. OVERBURDEN THICKNESS: ~~40 ft~~ 45 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 9 ft ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: ~~40 ft~~ 45 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~H-02i / H-03i~~ 2	TCE	NA	Explosives	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ bentonite volclay grout	X	NA	NA	Brit A Helay

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ FIRM, dk brown, occasional fine grained sand (moist) (top soil)					boring advanced w/ 4 in cha soil/sediments descriptions by auger cuttings
	1						
	2						
	3						
	4	becoming soft					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H-3 576

HTW DRILLING LOG

H-3

Remedial Investigation, Mead NOP | INSPECTOR B. Heidenkamp | SHEET 2 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) CLAYEY SILT (ML), soft, dk brown w/occasional fine grained sand (moist) (top soil)					
	6						
	7	7.0 LEAN CLAY (CL) dk greyish-black, soft, moist (loess)					
	8						
	9	becomes wet					water detected @ 9ft ATD
	10						
	11						
	12						
	13	13.0 POORLY GRADED SAND (SP) tannish grey, medium to fine grained sand (alluvium)	wet, very dense				
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-3

HTW DRILLING LOG

HOLE NO. H-3

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Helenkay

SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), tannish grey, medium, wet, very fine to fine grained ~~sand~~ dense (alluvium)					
	15						
	16						
	17						
	18						Cta to 19 ft @ 1320 on 6-12-92 for water sampl H-3c
	19						Hydropunched pushed from 19-24 ft bgs on 6-12-92 @ 1315
	20	~~becoming~~ w/ medium grained sand					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-3

578

HTW DRILLING LOG

HOLE NO. H-3

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenberg | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), tannish grey, medium ~~dense~~, very fine to fine grained ~~sand~~ w/ little medium grained sand (alluvium)	(wet)		#1		
	24						Water sample H-4i collected @1325 6-12-92
	25						
	26						
	27						
	28						
	29	becoming medium grained sand w/ coarse grained sand					
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-3

HTW DRILLING LOG

HOLE NO. H-3

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 5 OF SHEETS 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), tanish grey, medium, medium grained (wet)					
	33	sand w/ coarse grained sand (alluvium)					
	34						
	35						
	36						
	37						
	38						Ch complete to 39 ft @ 1525 on 6.12.92 for water sample H-3
					38'6"		
	39					25	Hydropunch pushed from 38ft - 45'3" bgs on 6.12.92 @ 1605
					39'6"		
	40					30	
					40'6"		
						33	
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-3 580

HTW DRILLING LOG

HOLE NO. H-6

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(SAME AS ABOVE) POORLY GRADED SAND (SP), tannish gray, medium dense, wet, medium grained w/ little to some of coarse grained sand			41'6"	33 (Cont)	
	42				42'6"	31	
	43				43'6"	42	
	44				#2 44'6"	52	
	45				45'3"	30	
	46						Refusal at 45'3" @1615 6-12-92 Water sample H-3, collected @1030 6-12-92 Note: hole grouted w/ tremied Pure Gold ~~bentonite~~ grout @ 1700 on 6-12-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-3

/CORPS/4-15-92

581

HTW DRILLING LOG

HOLE NO. H-4

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 11	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: K. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0'-44' bgs~~: 4 in cfa; ~~0'-95'~~ bgs: 3 1/4 in paddle bit w/ NWJ rods; 2" OD Hydropunch II w/ NWJ rods	8. HOLE LOCATION: H-4 N.543802 - E.2853362
	9. SURFACE ELEVATION: ~~[illegible]~~ 1142.91
	10. DATE STARTED: 6-14-92 @ 0745
	11. DATE COMPLETED: 6-14-92 @ 1530
12. OVERBURDEN THICKNESS: 95 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 69 ft ~~bgs~~
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 95 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~X~~ 2	TCE	NA	explosives	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ tremied valley grout	X	NA	NA	Brett A. Helmy

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to firm, lt brown, moist, w/ occasional medium to coarse grained sand (top soil)					boring advanced w/ 4 inch continuous flight augers
	1						soil/sediment descriptions from auger cuttings
	2						
	3	3.0 LEAN CLAY (CL), ~~[illegible]~~, lt reddish brown, ~~damp~~ moist, w/ occasional fine grained sand (loess) — firm					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1

H-4582

HTW DRILLING LOG

HOLE NO. H-4

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) LEAN CLAY (CL), ~~soft~~ firm, lt reddish brown, ~~damp~~ moist, with occasional fine grained sand (loess)					
	6						
	7	7.0					
		POORLY GRADED SAND (SP), lt tan, medium dense, ~~damp~~ moist, very fine to fine grained ~~sand~~ (alluvium)					
	8						
	9						
	10						
	11						
	12	becoming dry					
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkay

SHEET 3 OF SHEETS 3/11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), lt tan, medium dense, dry, very fine to fine grained ~~sand~~ (alluvium)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4

584

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), light tan, medium dense, dry, very fine to fine grained ~~sand~~ (alluvium)					
	24						
	25						
	26						
	27						
	28						
	29	becoming ~~damp~~ moist					
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4

585

HTW DRILLING LOG

HOLE NO. H-4

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), lt tan, medium dense, moist ~~damp~~, very fine to fine grained					
	33	~~Sand~~ (alluvium)					
	34						
	35						
	36						
	37	~~Becoming~~ very damp Moisture content increasing					
	38						
	39	~~Becoming~~ w / occasional medium grained sand					
	40						
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4586

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenbap

SHEET 6 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(~~same~~ as above) POORLY GRADED SAND (SP), medium dense lt tan, ~~v. damp~~ moist, very fine					
	42	to fine grained ~~sand~~ w/occasional medium grained sand (alluvium)					
	43						complete cha to 44 ft on 6-14-92 @ 0830
	44					136	begin hammering w/140# hammer HP II 6-14-92, @ 0910 @ 44'
	45					198	
	46					236	
	47					312	
	48					284	
	49				No water in sampler	625	Hammering of HP II completed to 50 ft bgs @ 1040 6-14-92
	50						

AH

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4587

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Heidenkamp

SHEET 7 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same as above) POORLY GRADED SAND (SP), medium dense, lt tan, ~~very dense~~ moist, very fine to fine grained ~~sand~~ w/ occasional medium grained sand (alluvium)					Resumed drilling (no water encountered) 6-14-92 @ 1100
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4588

HTW DRILLING LOG

HOLE NO. H-4

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 8 OF 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59.9	(same as above) POORLY GRADED SAND (SP), medium dense, lt tan, ~~very damp~~ moist, very fine to fine grained sand w/occasional medium grained sand (Alluvium)					
	60						
	61						
	62						
	63						
	64						drilling complete to 64 ft bgs w/ Cfa 6-14-92 @ 1140
						45	Begin hammering w/140# HPII 6-14-92 @ 1150 @64'
	65					41	Boring continued w/ 3 1/4" drag bit and bentonite slurry @ 64 ft bgs on 6-14-92
	66					69	
	67					106	
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4589

HTW DRILLING LOG

HOLE NO. H-4

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 9 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same as above) Poorly GRADED SAND (SP), lt tan, medium dense wet, v. fine to fine grained ~~sand~~ w/ occasional medium grained sand (alluvium) → becomes saturated			#1	186	Hammering complete to 69 ft bgs 6-14-92 @ 1205. Hammer broke
	69		water detected 69 ft ATD			V	Water sample H-4i collected @1250 6-14-92 @69 ft bgs.
	70	~~becoming~~ w/ medium sand					~~Resume RWB drilling from 69 ft 6-14-92 @ 1455~~
	71						
	72						
	73	~~becoming~~ w/ medium sand and occasional coarse grained sand					
	74						
	75	becoming med to coarse grained sand w/ fine gravel and occasional fine grained sand					
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4 596

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same as above) POORLY GRADED SAND (SP) lt tan, medium, dense, medium to coarse grained ~~sand~~					
	78	w/ fine grained gravel and occasional fine grained sand (alluvium)					
	79						
	80	80.0 POORLY GRADED GRAVEL (GP) reddish tan, medium dense, w/ fine grained sub rounded to sub angular ~~gravel~~					
	81	w/ medium to coarse grained sand					
	82						RWB complete to 83ft 6.14.92 @ 1830
	83	Quantity of sand increasing				116	Begin hammering HPII @ 83' by 6.14.92 @ 1615 w/ 140# hammer
	84					47	
	85					18	
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4

HTW DRILLING LOG

HOLE NO. H-4

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkap

SHEET 11 OF SHEETS 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(SAME AS ABOVE) POORLY GRADED GRAVEL (GP), med. dense, light tan, wet, ~~medium to coarse~~ fine, subrounded to subangular w/ little to some of medium and coarse grained sand				27	
	87					47	
	88					81	
	89					48	
	90					48	
	91					53	
	92					57	HPII hammered to 95ft bgs 6-14-92 @ 1705 water sample 4j collected @ 95ft @ 1725 6-14-92
	93					51	Note: boring backfilled w/ tremied water Pure Gold grout 6-15-92 @ 0900 from 95' to surface.
	94				#2	50	
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-4592

HTW DRILLING LOG

HOLE NO. H-5

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS 6	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-30 ft bgs: 4 inch~~ Cont. flight augers ~~25-29 ft: 2 in HPT~~ ~~sample H-5i~~ ~~30-50 ft: 2 in HPT~~ ~~sample H-5j~~	8. HOLE LOCATION: H-5 N.551500 - E.2860458
	9. SURFACE ELEVATION: ~~about 1080~~ 1079.18
	10. DATE STARTED: 6-15-92 @ 1055 / 11. DATE COMPLETED: 6-15-92 @ 1525
12. OVERBURDEN THICKNESS: 50 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 9 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 50 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
2 ~~H-5i, H-5j~~	TCE	NA	explosives	NA	NA	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ bentonite/cement grout	X	NA	NA	B. Hedenkamp

Pure Gold

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML) soft, grey brown, moist w/ occasional fine grained sand and roots (top soil)					boring advanced w/ 4 in cha soil/sediment descriptions by auger cuttings
	1						
	2						
	3						
	4	4.0 LEAN CLAY (CL), dk gray soft, moist w/ v fine grained sand occasional ~~(loess) allowing~~ (Loess)					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: 593 ~~H-5~~ H-5

HTW DRILLING LOG

HOLE: H-5

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same as above) LEAN CLAY, (CL), dk grey, soft, very moist, w/ occasional v. fine grained sand					
	6	(~~loess~~) (Loess) ~~alluvium~~					
	7						
	8						
	9	becomes wet ~~encounter water~~				▽	water detected ATD
	10						
	11	~~becoming~~ w/ v. fine grained sand					
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-5

HTW DRILLING LOG

HOLE NO. H-5

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(same as above) LEAN CLAY (CL), dk grey, soft, wet, w/ very fine grained sand					
	15	~~(loess)~~ ~~alluvium~~ (Loess)					
	16						
	17						
	18						
	19	19.0 POORLY GRADED SAND (SP) dk greyish-tan, loose to medium dense, wet, v fine to fine grained ~~sand~~ (alluvium)					
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-5

HTW DRILLING LOG

HOLE NO. H-5

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(same as above) POORLY GRADED SAND (SP), dk grayish tan, loose to medium, wet, very fine to fine grained sand (alluvium)					
	24					pushed	Pushed Hydropunch II from 24 to 25 ft
	25					5/0	Begin hammering Hydropunch II w/ 140# hammer 6-15-92 @ 1125 @ 25ft
	26					4/6	HPII pulled back 2ft water sample H-4i collected @ 29ft 6-15-92 @ 1135
	27					37	
	28					45	
	29	becoming med to coarse sand w/ trace of fine grained sand					Resume cfa drilling 6-15-92 @ 29ft
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-5

HTW DRILLING LOG

HOLE NO. H-5

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 6

DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
32	(same as above) POORLY GRADED SAND (SP) tan with red (medium ~~dense~~), wet, medium to coarse grained ~~sand~~ with fine grained sand (alluvium)					
33						
34						
35						
36						
37						
38						CFA drilling complete @ 34' @ 1526 hrs 6-15-92
39					26	Begin hammering HP II w/ 140# hammer 6-15-92 @ 1545 @ 38 ft bgs
40					37	
41					72	

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: H-5

HTW DRILLING LOG

HOLE NO. H5

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	~~(No Soil Sampling)~~ (SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense, tannish red, wet, medium to coarse grained w/trace of fine grained sand				64	
	42					55	
	43					59	
	44					50	
	45					61	
	46					41	Complete hammering to 50 ft bgs @ 6-15-92 @ 1420.
	47					40	Water sample H-5j collected @ 50ft @ 1440 6-15-92
	48					44	Hole backfilled w/ tremied volclay grout from 50ft bgs to the surface 6-15-92 @ 1540
	49					110	~~Refusal at 50'~~ B.O.B. last 3" required 80 blows
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-5598

HTW DRILLING LOG

HOLE NO. H-6

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-48'3" ft bgs: 4in cfa; 19'-24': HPT (Sample H-6i); 41'-48'3": HPT (Sample H-6j)	8. HOLE LOCATION: H-6 - N. 554545 - E. 2862408
	9. SURFACE ELEVATION: about 1000 ft 1081.24
	10. DATE STARTED: 6·16·92 @ 0800
	11. DATE COMPLETED: 6·16·92 @ 0915
12. OVERBURDEN THICKNESS: 48 ft 3 in	15. DEPTH GROUNDWATER ENCOUNTERED: 9 ft ATD
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 5 ft bgs 10 min AD
14. TOTAL DEPTH OF HOLE: 48 ft 3 in	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
H-6i @ 24'/H-6j @ 48.5'	TCE		Explosives			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
boring back filled w/ brewed cole by pond	X			Bret A. Kelly

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft to ~~medium~~ firm, dk brown, moist w/ occasional fine grained sand & roots (top soil)					boring advanced w/ 4in cfa (continuous flight auger) Soil/sediment descriptions from auger cuttings
	1						
	2						
	3						
	4	4.0 CLEAN CLAY (CL), soft to ~~medium~~ firm, dk grey, ~~wet~~ moist, w/ occasional fine grained sand (loess) (alluvium)					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H-6599

HTW DRILLING LOG

HOLE NO. H-6

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	~~Silt~~ as above) LEAN CLAY (CL), soft to ~~medium~~ firm, dk grey, ~~very~~ moist w/ occasional fine grained sand ~~(fines)~~ alluvium					
	6						
	7	→ becomes ~~saturated~~ ~~encounter water~~ wet				V	water detected @ 7' bgs ATD
	8						
	9						
	10						
	11						
	12						
	13	13.0 POORLY GRADED SAND (SP), loose to medium dense greyish tan, wet, very fine to fine grained sand w/ fines (alluvium)					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-6

HTW DRILLING LOG

HOLE NO. H-6

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Heldenkamp

SHEET 3 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) POORLY GRADED SAND (SP), loose to medium (dense) greyish-tan, wet very fine to fine grained sand w/ fines (alluvium)					
	15						
	16						
	17	becoming w/ medium grained sand					
	18						Complete cha drilling to 19 ft bgs 6-16-92 @ 0815
	19					pushed	Hydropunch pushed 2 ft begin hammering from 21 ft bgs w/ 140# hammer 6-16-92 @ 0820 Water sample H-6i collected
	20						
	21					69	@ 24 ft @ 0840 6-16-92
	22					98	Hydropunch pulled back 2 ft to 22 ft bgs prior to sampling
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-6

601

B07NE003702-04707

HTW DRILLING LOG

HOLE NO. H-6

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B Hedenkamp

SHEET 4 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), ~~loose~~ (wet) to medium dense grey/ob tan, v. fine grained to fine grained (alluvium)				86	
	24						Resume c-ta drilling @ 24 ft 6.16.92 @ 0830
	25						
	26						
	27						
	28						
	29						
	30	becoming w/ occasional medium grained sand					
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-6 602

HTW DRILLING LOG

HOLE H-6

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	BOTTOM ELEVATION OF CASING e	MECHANICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), loose to medium dense greyish-tan very fine to fine grained ~~sand~~ w/ occasional medium grained sand (Colluvium)	wet				
	33						
	34						
	35	becoming w/ medium grained sand					
	36						
	37						
	38	becoming medium to coarse grained sand w/ fine grained sand and occasional v. fine grained sand					
	39						
	40						
	41	~~becoming~~ w/ occasional fine grained gravel					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. H-6603

HTW DRILLING LOG

HOLE NO. H-6

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same as above) POORLY GRADED SAND (SP) loose to medium dense greyish tan, wet, medium to coarse grained ~~sand~~ w/ fine grained ~~sand~~ and fine grained gravel (colluvium)				22	
	42					24	
	43					45	Cta complete to 44 ft bgs 6·16·92 @ 0915
	44					35	Begin hammering HPT II @ 41ft bgs 6·16·92 @ 0925 w/ 140# hammer.
	45					47	Hammering complete to 46' 3" 6·16·92 @ 1005. HPT II pulled back 2' to 46' 3".
	46					54	Water sample H-6j collected @ 46' 3", 6·16·92 @ 1015
	47					81	
	48				48'3"	100	Boring backfilled w/ tremied grout from 48' 5" to the surface 6·16·92 @ 1400 — voids
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-6 604

ICONS-15-92

HTW DRILLING LOG

HOLE NO. H-7

SHEET 1 OF SHEETS 7

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. George	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-75
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ~~0-39': CFA~~ 44; 39-53½ ft: Hydropunch	8. HOLE LOCATION: ~~H-3~~ M-7-N.555991-E2862396
	9. SURFACE ELEVATION: ~~1080~~ 1082.53
	10. DATE STARTED: 6-13-92 @ 0745 / 11. DATE COMPLETED: 6-13-92 @ 0945
12. OVERBURDEN THICKNESS: 53½ ft	15. DEPTH GROUNDWATER ENCOUNTERED: 7 ft bgs ATD
13. DEPTH DRILLED INTO ROCK: 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 53½ ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~H-07: @ 39'~~ ~~H-07: @ 53'~~ 2	TCE	NA	explosives	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ tremied volclay grout	Y	NA	NA	Bret A Hedenberg

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	CLAYEY SILT (ML), soft, dk brown-black, moist w/ occasional fine to medium grained sand (top soil)					boring advanced w/ 4in continuous flight augers
	1						soil/sediment description from auger cuttings
	2						
	3						
	4	Moisture content increasing ~~becoming very moist~~					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H-605

HTW DRILLING LOG

HOLE NO. H-7

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlund | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same as above) CLAYEY SILT (ML), soft, dk brown ~~very~~ moist, w/ occasional fine to mid grained sand (top soil) 6.0					
	6	LEAN CLAY (CL), soft, grey, ~~very~~ moist (loess) w/ occasional fine sand					
	7	~~encountered water~~				~~dry~~	water detected ATD ≈ 4'
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-7

606

HTW DRILLING LOG

HOLE NO. H-7

Remedial Investigation, Mead NOP | INSPECTOR B. Hedlunkaup | SHEET 3 OF SHEETS 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same as above) LEAN CLAY (CL), soft, grey, ~~saturated~~ wet w/ occasional fine sand (loess) 15.0					
	15	POORLY GRADED SAND (SP) soft-medium, tannish-grey, ~~saturated~~ wet, v. fine to fine grained sand (alluvium)					
	16						
	17						
	18						
	19						
	20						
	21	~~becoming~~ w/ occasional medium grained sand					
	22						
	23						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-7

HTW DRILLING LOG

HOLE NO. H-7

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkap

SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same as above) POORLY GRADED SAND (SP), ~~soft~~ loose to medium dense, tannish grey, ~~saturated~~ wet, U. fine to fine grained ~~sand~~ w/ occasional medium grained sand (alluvium)					Cfa drilling complete to 24 ft bgs @ 0825 6·13·92 Hydropunch/pushed to 25 ft bgs
	24					pushed	
	25					32	Begin hammering HP II @ 0845 6·13·92 w/ 300# hammer
	26	becoming medium grained ~~sand~~ w/ coarse grained sand and occasional fine grained gravel				38	
	27					36	
	28				#1	39	HP II hammered to 29 ft bgs & pulled back 1 ft @ 0850
	29						Water sample H-07 collected @ 0850 Cfa resumed @ 0910 @ 29 ft 6·13·92
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-7

608

HTW DRILLING LOG

HOLE NO. H-7

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 5 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same as above) POORLY GRADED SAND (SP), medium dense tan-reddish grey, ~~saturated~~ wet,					
	33	medium grained ~~sand~~ w/ coarse grained sand and occasional fine grained gravel (alluvium					
	34						
	35						
	36						
	37						
	38						Cfa complete to 39 ft for water sample H-7 @ 0945 6-13-92
	39					pushed	Hydropunch pushed to 40 ft begin hammering @ 1005 6-13-92
	40					62	
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H-7 609

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. H-7

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkop | SHEET 6 OF SHEETS 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(SAME AS ABOVE) POORLY GRADED SAND (SP), med. dense, tan - reddish gray, wet, med. grained w/ little coarse grained sand. w/ trace of fine gravel				90	
	42					184	
	43					143	
	44					87	
	45					108	
	46					107	
	47					104	
	48					110	
	49					111	
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 81 72

HOLE NO.: H-7 610

HTW DRILLING LOG

HOLE NO. H-7

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: B. Hedenkamp

SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME AS ABOVE) POORLY GRADED SAND (SP), med. dense, tan to reddish gray wet, med. grained w/ little coarse grained sand w/ trace of fine gravel ~~gravel sand~~				81	
	51					72	
	52				#2	89	
	53					135	
					53½		Bottom of boring ~~Refusal @~~ 53½ ft bgs. Pulled back 1½ ft @ 1050 6-13-92 Water sample collected @ 1110 6-13-92 Note: hole backfilled w/ ~~Volclay~~ Premier Pure Gold grout from 53.5' to 0' @ 1335 HB 6-13-92
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 611

CCW 8/11/92

H2-1I

HTW DRILLING LOG

HOLE NO. ~~H2-1~~

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker ADII
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-49' bgs: 4" CFA; 49-55' bgs: Hydropunch II	8. HOLE LOCATION: H2-1
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-9-92/1435
	11. DATE COMPLETED: 8-9-92/1509
12. OVERBURDEN THICKNESS: ~~NA~~ 55'	15. DEPTH GROUNDWATER ENCOUNTERED: 34' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 55'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
IH2-001-082 ~~IM2~~-001-082	X	Total & Dissolved X	Semi-VOC Pest/PCBs Exp	Cyanide TSS, TDS, Alk, BOD	Hardness NO_3/NO_2	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring grouted with Tremied Volclay grout	X	NA	Hydropunch II	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Silty~~ LEAN CLAY (CL) firm, dark brown, moist, with organics. (Topsoil)					Boring advanced with 4" CFA. Soil/sediment descriptions logged from cuttings.
	1	1.0 ~~Silty~~ LEAN CLAY (CL), Firm, medium brown, moist. (LOESS)					
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-~~1~~ 1I

B1 612

HTW DRILLING LOG

HOLE NO. H2-1I

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		~~SHTY~~ LEAN CLAY (CL) Firm, medium brown, moist, (Loess)					
	6						
	7						
	8						
	9	becomes ~~Stiff~~ Hard	HNU = BG				~~BZ~~ = BKG
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1I

613

HTW DRILLING LOG

HOLE NO. H2-1I

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		14.0' Poorly Graded SAND (SP) Loose, light brown, dry, Fine grained with some medium grained sand. (Alluvium)					
	15						
	16						
	17						
	18						
	19		HNU BZ = BG				BZ = BKG
	20						
	21						
	22						
	23						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1I

614

HTW DRILLING LOG

HOLE NO. H2-1I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR ARM

SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		Loose, light brown, dry,					
	24	fine grained, with some					
		medium grained sand.					
		(Alluvium)					
	25						
	26						
	27						
	28						
			HNU				
			BZ =				
	29		= BG				~~BZ = BKG~~
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1I

615

HTW DRILLING LOG

HOLE NO. H2-1I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RKM

SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, dry Fine grained with some medium grained sand (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38		HNO: BZ = BG				
	39						BZ = BKG
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1I

616

HTW DRILLING LOG

HOLE NO. H2-1I

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) loose, light brown, wet, fine grained with some medium grained sand. (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47	becoming fine to medium grained with some coarse					
	48		BZ = = BG				Stopped drilling with 4" CFA 8-9-92/1500 ~~BZ = BKG~~
	49					26	Began hammering of hydropunch II with 140 lb. hammer at 49' 8-9-92/1604
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: ~~H2-1~~ H2-1I

617

B07NE003702-04723

HTW DRILLING LOG

HOLE NO. H2-~~604~~-I

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						74	
	51					88	
	52					129	
	53					126	
	54				IH2-001-082; IH2-601-082	137	Completed driving hydropunch II 8-9-92/1622 HRS
	55						Collected groundwater sample from depth of 55.0' 8-10-92/0900 NOTE: Boring backfilled with Tremied Volclay grout from 55.0 to 0' 8-10-92/1130 HRS
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-601

618

CBH 8/11/92

HTW DRILLING LOG

HOLE NO. H2-2I

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Poyton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker ADII
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-49 FT: 4" CFA; 49-59 FT.: Hydropunch II	8. HOLE LOCATION: H2-2
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-10-92/1113
	11. DATE COMPLETED: 8-10-92/1133
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 37'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 59.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	NA		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
IH2-001-082, JH2-001-082	X	Total & Dissolved	EXP Semi-VOC Pesticides	Cyanide, TOC, TDS, Alk, BOD	Hardness, NO2/NO3	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring grouted with Tremied Volclay grout	X		Hydropunch II	Robert R Mallice

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~SANDY~~ CLAY (CL) STIFF, dark brown, moist with organics. (Topsoil)					Boring advanced with 4" continuous flight augers (CFA) Soil/Sediment descriptions logged from cuttings
	1						
	2	2.0' LEAN ~~SANDY~~ CLAY (CL) Firm, dark brown, moist (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-2I

B1 619

HTW DRILLING LOG

HOLE NO. H2-2I

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 2 OF N SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN ~~SANDY~~ CLAY (CL) Firm dark brown, moist (Loess)					
	6						
	7	7.0 LEAN ~~SANDY~~ clay (CL) Firm, medium brown, moist (Loess)					
	8						
	9						BZ = BKG
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2I

620

HTW DRILLING LOG

HOLE NO. H2-2I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		LEAN CLAY (CL) Firm, medium brown, moist (Loess)					
	15						
	16	16.0					
		Poorly Graded SAND (SP) loose, light brown, moist Fine grained (Alluvium)					
	17						
	18						
	19						BZ = BKG
	20						
	21						
	22						
	23						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW1030

HOLE NO.: H2-2I

HTW DRILLING LOG

HOLE NO. H2-2I

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) loose, light brown, moist, Fine grained. (Alluvium)					
	24						
	25						
	26						
	27						
	28	[redacted]					
	29	[redacted]					Bz = BKG
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2 I 622

HTW DRILLING LOG

HOLE NO. H2-2I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND(SP) Loose, light brown, moist Fine grained. (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39	becomes wet					▽ ATD
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2I

HTW DRILLING LOG

HOLE NO. HZ-2I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, light brown, wet, Fine grained (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47						
	48						Stopped drilling 4" CFA at 49' 8-10-92/1133
	49						BZ=BKG 49.0'
						14	Began hammering of hydro punch II with 140lbs. hammer at 49' 8-10-92/1212
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: HZ-2I 624

HTW DRILLING LOG

HOLE NO. H2-2I

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						42	
	51					92	
	52					174	
	53					142	
	54					161	
	55					210	
	56					262	Completed hammering HPII 8-10-92/1258 at 59.0'
	57					207	Collected groundwater sample from depth of 59.0 8-10-92/1630
	58					186	NOTE: Boring back filled with Tremied Volclay grout from 59.0 to surface 8-11-92/0930 bgs 59.0
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2I

625

CCA 8/19/92

HTW DRILLING LOG

HOLE NO. H2-3I A/redrill

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-56ft bgs: 4" CFA; 56-62ft bgs: Hydropunch II	8. HOLE LOCATION: H2-3 (redrill 10' West of H2-03:)
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-12-92/1551
	11. DATE COMPLETED: 8-12-92/1617
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 33'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 62'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
IH2-003-002 filtered; IH2-003-002 unfiltered	X	Total & dissolved	Semi-VOC Pest/PCBs EXP	Chloride TSS, TDS, Alk BOD	Hardness NO3/NO2	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring backfilled with Tremied Volclay grout	X		Hydropunch II	Robert R Mallison

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) firm, dark brown, moist. (Topsoil)					Soil/sediment descriptions logged from cuttings. Boring advanced with 4" CFA.
	2	2.0 LEAN CLAY (CL) soft to firm, medium brown, moist. (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H2-3I/redrill

HTW DRILLING LOG

H2-3I/redrill.

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 2 of

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN CLAY (CL) soft to firm, medium brown, moist (Loess)					
	6						
	7						
	8						
	9						Bz = BKG
	10						
	11						
	12						
	13	13.0' LEAN CLAY (CL) soft to firm, light brown, moist (Loess)					
	14						

PROJECT: Remedial Investigation, Mead NOP 92[illegible]30

HOLE NO.: H2-3I/redrill

(CORPS/4-16-82)

HTW DRILLING LOG

H2-3I/redrill

Remedial Investigation, Mead NOP | NSMR: RRM | Page 3 of 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	HNU UNITS g	REMARKS h
		(same as Above) BEAN CLAY (CL) soft to firm, light brown, moist. (Loess)					
	15	15.0					
		POORLY GRADED SAND (SP) Loose, light brown, moist, Fine grained. (Alluvium)					
	16						
	17						
	18						
	19						BZ = BKG
	20						
	21						
	22						
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92-[illegible]

HOLE NO.: H2-3I/redrill

628

HTW DRILLING LOG

H2-3I/redrill

Remedial Investigation, Mead VOP | NAME: RRM | SHEET 4 OF 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		POORLY GRADED SAND (SP),					
		Loose, light brown, moist,					
	24	Fine grained.					
		(Alluvium)					
	25						
	26						
	27						
	28						
	29						BZ = BKG
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead VOP 92K WO 10

HOLE NO.: H2-3I/redrill

629

HTW DRILLING LOG

H2-3I/redrill

Remedial Investigation, Mead NOP | INSPECTOR: RRM | PAGE 5 of 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	OW NO g	REMARKS h
		(same as Above)					
		POORLY GRADED SAND (SP)					
		Loose, light brown, wet,					
		Fine grained.					
	33	(Alluvium)					∇ water enters at 33'
		becomes wet					
	34						
	35						
	36						
	37						
	38						
	39						BZ = BKG
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 42[illegible]

HOLE NO.: H2-3I/redrill 630

ICORPS/4-16-92

HTW DRILLING LOG

H2-3I /redrill

Remedial Investigation Mead NOP | RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above) POORLY GRADED SAND (SP) Loose, light brown, wet Fine grained. (Alluvium)					
	42						
	43	become fine To medium grained.					
	44						
	45						
	46						
	47						
	48						
	49						BZ = BKG
	50						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 42KW030

HOLE NO.: H2-3I /redrill

HTW DRILLING LOG

H2-3I/redrill

Remedial Investigation Mead VOP | NSPECTOR RRM | 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	HTW UNITS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) loose, light brown, wet, Fine to medium grained. (Alluvium)					
	51						
	52						
	53						
	54						
	55						Stopped drilling with 4" CFA 8-12-92/1617 hrs
	56					67	56' Began driving HP II with 140 lbs. hammer at 56' 8-12-92/1439
	57					140	
	58					247	
	59						

PROJECT: Remedial Investigation, Mead VOP 42-[illegible]

HOLE NO.: H2-3I/redrill

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. H2-3I/redrill

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						296	
	60						
						326	
	61						Completed driving HPII at 62' 8-12-92/1519 HRS
						384	
	62						62' Collected groundwater sample from depth 62. 8-13-92/1000 HRS
	63						NOTE: Boring backfilled with Tremied Volclay grout, from 62' to surface 8-13-92/1230 HRS
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3I/redrill

CGH 8/20/92

HTW DRILLING LOG

HOLE NO. H2-04I

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC - OMAHA
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: ACKER AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0' to 39' 4" CFAS; 39' to ' Hydropunch II	8. HOLE LOCATION: H2-04 (Admin Area)
	9. SURFACE ELEVATION: ≅ 1202
	10. DATE STARTED: 8-19-92 / 1405 HRS; 11. DATE COMPLETED: 8-19-92 / 1445 HRS
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: 38' bgs ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 60'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
IH2-004-002, IH2-604-002	x	Total & Dissolved	Semi-VOCs, Pest/PCBs, Explosives	Cyanide, TDS, TSS, Alk, BOD	Hardness, NO3/NO2	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Bucket-filled w/ bentonite "pure gold" grout	X			Terry Q. Thom

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		GRASS SOD					Boring advanced w/ 4" continuous flight augers. All soil descriptions are from cuttings.
	1	LEAN CLAY (CL), firm, dark brown, damp, w/ trace organics. [Topsoil]					
	2						
	3						
	4	gradational contact 4.0' LEAN CLAY (CL), firm, light brown, damp. [LOESS]					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 H2-0604

HTW DRILLING LOG

HOLE NO. H2-04I

Remedial Investigation, Mead NOP | INSPECTOR T. L. THONEN | SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: LEAN CLAY (CL), firm, light brown, damp [LOESS]					
	6						
	7						
	8						
	9						B2 = BG
	10						
	11						
	12	POORLY GRADED SAND (SP), med. dense (est.), light brown to tan, damp, v. fine-grained w/ trace fine to medium grains (w/ bimodal texture) [Eolian] 12.0					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-04I

HTW DRILLING LOG

HOLE NO. H2-04I

Remedial Investigation Mead NOP

INSPECTOR T. L. THOMEN

SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same. POORLY GRADED SAND (SP), med dense (cont.), light ~~gray~~ brown to tan, damp, v. fine grained w/ trace fine to medium grains (w/ bimodal texture) [Eolian]					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2 ~~03C~~

HTW DRILLING LOG

HOLE NO. H2-041

Remedial Investigation, Mead NOP

INSPECTOR T. L. THONEN

SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	Same: POORLY GRADED SAND (SP), med. dense (SSL), light brown to tan, damp, v. fine grained w/ trace fine to medium grains (w/bimodal texture) [Eolian]					
	25						
	26						
	27						
	28						
	29						B2 = B6 ~~[illegible]~~
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-63

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. H2-04I

Remedial Investigation, Mead NOP | INSPECTOR T. L. THONEN | SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	Same POORLY GRADED SAND (SP), ~~damp~~ med. dense (est.), light brown to tan, damp, v. fine grained w/ trace fine to medium grains (bimodal texture) [Eolian Dune Deposit]					
	34						
	35	estimated contact 35.0'					
	36	POORLY GRADED SAND (SP), med. dense (est.), light brown, moist, fine grained w/ some medium grains and trace organic matter. [Alluvium]					
	37						
	38	becoming wet					
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2 68I

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. H2-04I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THONEN

SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (est.), light brown, moist, fine grained w/ some medium grains ~~[illegible]~~ and trace organics					
	42	[Alluvium]					
	43						
	44						
	45						
	46						
	47						
	48						
	49						BZ = B6 ~~HS~~
	50						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-63I

HTW DRILLING LOG

HOLE NO. H2-04I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THOMEN

SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same. POORLY GRADED SAND (SP), med. dense (est.), light brown, wet fine grained w/ some medium grains and trace organics.					
	51	[Alluvium]					
	52						
	53						
	54						
	55						
							completed CFA drilling at 56', 8-19-92 @ 1445 hrs
	56					39	Begin driving Hydropunch II w/ 140 lb. hammer 8-19-92 @ 1500 hrs
	57					170	
	58	58.0' POORLY GRADED SAND (SP), med dense (est.), multi-colored, wet, coarse-grained w/ some medium grains. [Alluvium]				199	
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-04I

HTW DRILLING LOG

HOLE NO. H2-04I

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THOMEN

SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (ext.), light brown, wet, fine-grained w/ some medium grains and trace organics. (Alluvium)				210	Completed driving Hydropunch to 60' 8-19-92 @ 1520 hours
	60						Collected hydropunch water sample at 60' on @ 1330 hrs. on 8-20-92
	61						
	62						Note: Boring was backfilled w/ "pure gold" grout from 60' to 0' on 8-20-92 @ 1700 hrs.
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-04I

641

8/11/92

HTW DRILLING LOG

HOLE NO. H2-1J

SHEET 1 OF 1 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker ADII
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-34' bgs: 4" CFA; 34'-109' bgs: rotary/wash boring - 4" drag bit; 109'-115' Hydropunch II	8. HOLE LOCATION: H2-1
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-8-92/1600
	11. DATE COMPLETED: 8-9-92/1002
12. OVERBURDEN THICKNESS: 115.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 34' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 115.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
JH2-001-082 JH2-001-082 (2)	X	Total & Dissolved	Semi-VOC Pest/PCBs EXP	Cyanide TSS, TDS, Alk, BOD	Hardness NO3/NO2	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring grouted with Tremied Volclay grout	X	NA	hydropunch II	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN Silty CLAY (CL) firm, dark brown, moist, with organics. (Topsoil)					Boring advanced with 4" CFA. Soil/sediment description logged from cuttings.
	1	1.0 LEAN Silty CLAY (CL), Firm, medium brown, moist. (Loess)					
	2						
	3						
	4						
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-1J

B1 64

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN ~~SILTY~~ CLAY (CL) firm, medium brown, moist. (Loess)					
	6						
	7						
	8						
	9						~~BZ = BKG~~
		becomes ~~stiff~~ firm to hard	BZ = = BG				
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c 14.0	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) loose, light brown, dry, Fine grained with some medium sand. (Alluvium)					
	25						
	16						
	17						
	18						
	19		BZ = = BG				BZ = BKG
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J 644

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, dry, fine grained with some medium grained sand. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		BZ = = BG				~~BZ~~ = BKG
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-1J

SHEET 5 OF 14 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, dry Fine grained with some medium grained sand. (Alluvium)					
	33						Stopped drilling with 4" CFA at 34' 8-8-92/1618
	34	becomes wet.					Boring continued ~~Began Rotary/ Cobble boring~~ with 4" drag bit at 34' 8-9-92/0802
	35						and water
	36						
	37						
	38						
	39		BZ = = 86				BZ = BKG
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1 J

64E

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 6 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light brown, wet, Fine grained with some medium grained sand. (Alluvium)					
	42						
	43						
	44						
	45						
	46						
	47	becoming fine to medium grained with some course grained sand					
	48						
	49		BZ = BG				~~BZ = BK~~
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-1J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		Poorly Graded SAND (SP) loose, light brown, wet, Fine to medium grained					
	51	with some coarse grained sand. (Alluvium)					
	52						
	53						
	54	54.0					
		Poorly Graded SAND (SP) loose, multi-colored, wet, medium to coarse grained (Alluvium					
	55						
	56						
	57						
	58		BZ =				
			=BG				~~BZ=BK~~
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J 648

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, multi-colored, wet medium to coarse grained (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-15

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 9 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet, medium to coarse grained (Alluvium)	BZ = = BG				BZ = ~~BKG~~
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-15

650

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR BRM | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) Loose, multi-colored, wet, medium To course grained (Alluvium)					
	78						
			BZ =				BZ =
	79		= BG				BKG
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

651

HTW DRILLING LOG

HOLE NO. H2-1J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet, medium to coarsegrained (Alluvium)					
	87						
	88						
	89		BZ = = BG				BZ = BRG
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-1J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, multi-colored, wet, medium to coarse grained (Alluvium)					
	96						
	97						
	98						
	99						
	100		BZ = = BG				~~BZ~~ = BKG
	101						
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

HTW DRILLING LOG

HOLE NO. H2-1J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Same as Above~~ 104.5' Poorly Graded SAND (SP) Loose, multi-colored, wet, coarse grained with some fine gravel and some medium grained sand. (ALLUVIUM)					
	105						
	106						
	107						
	108						Stopped RWB at 109' 8-9-92/1002
							BZ = BKG
	109					123	Began hammering of hydropunch II with 140lbs. hammer at 109.0' 8-9-92/1105
	110					131	
	111					126	
	112					139	
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-1J

654

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. H2-15

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						149	
	114				JH2-001-082 JH2-601-082	181	completed hammering HPII 8-9-92/1132
	115						collected groundwater sample from depth of 115.0' 8-9-92/1420
	116						NOTE: Boring backfilled with Tremied Volclay grout from 115.0'
	117						8-10-92/1030
	118						
	119						
	120						
	121						
	122						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-15

HTW DRILLING LOG

HOLE NO.	H2-2J
1. COMPANY NAME	Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR	WCC
SHEET 1 OF 4 SHEETS	
3. PROJECT	Remedial Investigation, Mead NOP
4. LOCATION	Mead, Nebraska
5. NAME OF DRILLER	Tom Payton
6. MANUFACTURER'S DESIGNATION OF DRILL	Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	0-39' bgs.: 4" CFA 39-109': bgs.: Washboring -4" rotary bit. 109-115': Hydropunch II
8. HOLE LOCATION	H2-2
9. SURFACE ELEVATION	
10. DATE STARTED	8-10-92/1338
11. DATE COMPLETED	8-10-92/1622
12. OVERBURDEN THICKNESS	NA 104'
15. DEPTH GROUNDWATER ENCOUNTERED	39' ATD
13. DEPTH DRILLED INTO ROCK	0
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	104'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
JH2-001-082 + 801-002	X	Total Dissolved	Exp. Semi-voc Pest/PCBs	Cyanide TSS, TDS, Alk Bod	Hardness Na/Na2	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring grouted with Tremied Volclay grout	X	NA	Hydropunch II	Robert R Mallised

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Coarse sand and gravel (pavement) 0.5					Boring advanced with 4" continuous Hight Augers (CFA)
	1	LEAN CLAY (CL) ~~Stiff~~ Firm, dark brown, moist with organics. (Topsoil)					Soil/Sediment descriptions ~~from~~ logged from cuttings.
		2.0'					
	2	LEAN ~~Silty~~ CLAY (CL) Firm, dark brown, moist (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-2J B1

65C

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) Firm, dark brown, moist (Loess)					
	6						
	7	LEAN CLAY (CL) Firm, Becoming medium brown, ~~moist~~ ~~(Loess)~~ — 7.0'					
	8						
	9		BZ = = BG				~~BZ~~ = BKG
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

HTW DRILLING LOG

HOLE NO. H2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		LEAN ~~SANDY~~ CLAY (CL) Firm, medium brown, moist (Loess)					
	15						
	16	16.0					
		Poorly Graded SAND (SP) Loose, light brown, moist fine grained. (Alluvium)					
	17						
	18						
	19		BZ = BG				~~BZ = BKG~~
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J 658

HTW DRILLING LOG

HOLE NO. H2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, lgLT brown, MOIST, fine grained. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		BZ = = BG				BZ = ~~BKG~~
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KJ030

HOLE NO.: H2-2J

HTW DRILLING LOG

H2-2J

Remedial Investigation Mead VOP | NSR: RRM | Sheet 5 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	HYDROLOGIC DATA g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP), loose to med. ~~loose~~ dense, light brown, moist fine grained. (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39	becomes wet					Stopped CFA drilling 8-10-92 @ 39' @ 1403
							ATD Began rotb drilling 8-10-92 @ 1450
							~~BGS~~ BKC Water enter
	40						Boring continued w/4-inch-dia drag-bit and bentonite slurry
	41						

PROJECT: Remedial Investigation, Mead VOP

HOLE NO. H2-2J

660

ICORPS/4-15-82

HTW DRILLING LOG

H2-2J

Remedial Investigation Mead VOP | INSPECTOR: RRM | PAGE 6 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, light brown, wet, fine grained. (Alluvium)					
	42						
	43						
	44						
	45						
	~~46~~						
	46						
	~~46~~						
	47	with Trace medium grained sand.					
	~~47~~						
	48						
	~~48~~						
	49		BZ = = BG				~~BZ = BKG~~
	50						

/COAPS/4-18-82

PROJECT: Remedial Investigation, Mead VOP 421-W-10

HOLE NO.: H2-2J

HTW DRILLING LOG

H2-2J

Remedial Investigation Mead VOP | RRM | 7 / 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) Loose, light brown, wet fine grained with Trace medium grained sand. (Alluvium)					
	51						
	52						
	53						
	54						
	55						
		with Trace of coarse gravel.					
	56						
	57						
	58						
			B2 = = B6				
	59						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead [illegible] 42[illegible]

HOLE NO.: H2-2J

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly Graded SAND (SP) Loose, light brown, wet, fine grained with trace medium to coarse grained sand. (Alluvium)					
	60						
	61						
	62						
	63						
	64						
	65	65.0' Poorly Graded SAND (SP) Loose, multi-colored, wet medium to coarse grained (Alluvium)					
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 9 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		Loose, multi-colored, wet,					
		medium to coarse grained	BZ =				
	69	(Alluvium)	= BG				BZ = BKG
	70						
	71	become fine to coarse grained					
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

664

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, multi-colored, wet fine to coarse grained, (Alluvium)					
	78						
	79		BZ = = BG				BZ = ~~BKG~~
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, multi-colored, wet, Fine To coarse grained, (Alluvium)					
	87						
	88						
	89		BZ = = BG				~~BZ = BKG~~
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

666

HTW DRILLING LOG

HOLE NO. HZ-2J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), loose, multi-colored, fine to coarse grained, wet					
	96	96' Poorly Graded SAND (SP) loose, multi-colored, wet coarse grained with some medium sand and fine gravel. (Alluvium)					
	97						
	98						
	99		BZ = = BG				~~BZ~~ = ~~BKG~~
	100						
	101						
	102						
	103						
	104						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: HZ-2J

HTW DRILLING LOG

HOLE NO. H2-2J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above) Poorly Graded SAND (SP) loose, multi-colored, wet, coarse grained, with some medium sand and fine gravel, (Alluvium)					
	105						
	106						
	107						
	108						Stopped rotary/ washboring at 109.0' 8-10-92/1622
	109		BZ = = BG			118	~~BZ = BKG~~ Began hammering of HPII with 140lbs. hammer at 109.0' 8-10-92/1713
	110					106	
	111					169	
	112					318	
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

HTW DRILLING LOG

HOLE NO. H2-2J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND(?)				404	
	114				JH2-001-082; JH2-601-082	469	Completed hammering HPT 8-10-92/1754 at 115.'
	115						Collected groundwater sample from depth of 115.0' 8-11-92/0830 HG
	116						Note: Boring backfilled with Tremied Portland grout from 115.0 to surface. 8-11-92/1000 HG
	117						
	118						
	119						
	120						
	121						
	122						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-2J

9/18/92

HTW DRILLING LOG

HOLE NO. H2-3I

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: LUM Taylor	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39ft bgs: 4" CFA; 39ft bgs-55' Hydropunch II	8. HOLE LOCATION: H2-3
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-12-92/0838
	11. DATE COMPLETED: 8-12-92/0946
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 33' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 58'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS (filtered/unfiltered)	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	X	Total & Dissolved	Semi-VOC Pest/PCBs			NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring Backfilled with Tremied Volclay grout	X		Hydropunch II	Robert R Mullins

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) Firm, Dark brown, moist. (Topsoil)					Soil/sediment descriptions logged from cuttings. Boring advanced with 4" CFA.
	1						
	2	2.0' LEAN CLAY (CL) soft to firm, med. brown, moist (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-3I

B1 670

HTW DRILLING LOG

H2-3I

Remedial Investigation Mem. NOP | INSPECTOR RRM | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) soft to firm, medium brown, moist. (Loess)					
	6						
	7						
	8						
	9						BZ = BKG
	10						
	11						
	12						
	13	~~LEAN CLAY (CL) soft to firm~~, Becoming light brown, ~~moist.~~ ~~(Loess)~~ 13.0					
	14						

PROJECT: Remedial Investigation, Mem NOP 92RW030

HOLE NO.: H2-3I

ICORPS/4-16-82

HTW DRILLING LOG

H2-3I

Remedial Investigation Meas NOP | NSPE: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN CLAY (CL) soft to firm, light brown, moist (Loess) 15.0'					
	15	POORLY GRADED SAND (SP) Loose, light brown, moist, fine grained. (Alluvium)					
	16						
	17						
	18						
	19						BZ = BKG
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Meas NOP 921-W-030

HOLE NO.: H2-3I 672

ICORPS/4-18-82

HTW DRILLING LOG

H2-3I

Remedial Investigation, Mead NOP | INSPECTOR: RRM | 4 of 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly GRADED SAND (SP) Loose, light brown, moist, Fine grained. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						BZ = BKG
	30						
	31						
	32						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92RW030

HOLE NO.: H2-3I

HTW DRILLING LOG

H2-3I

Remedial Investigation, Mead NOP | INSPECTOR: RRM | PAGE 5 OF 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above) Poorly GRADED SAND (SP) Loose, light brown, wet, Fine grained. (Alluvium)					
	33	becomes wet					∇ water enter at 33'
	34						
	35						
	36						
	37						
	38						
	39						BZ = BKG
	40						
	41						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: H2-3I

674

HTW DRILLING LOG

H2-3I

Remedial Investigation Mead NOP | INSPECTOR RRM | PAGE 6 OF 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above) Poorly GRADED SAND (SP) Loose, light brown, wet, Fine grained (Alluvium)					
	42						
	43	becomes Fine To medium grained.					
	44						
	45						
	46						
	47						
	48						Stopped drilling WITH 4" CFA. 8-11-92/1046 AT 49'
	49					26	Began driving hydropunch II WITH 140 lbs hammer AT 49' 8-11-92/1138
	50						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3I

675

HTW DRILLING LOG

H2-3I

Remedial Investigation Mead VOP | NSR: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOWS g	REMARKS h
		POORLY GRADED SAND(?)					
						65	
	51						
						147	
	52						
						194	
	53						
						292	
	54						
						246	Completed driving HPII at 55' 8-11-92/1211 Note: unable to collect groundwater sample due to insufficient water flow.
	55						
						304	Began re-driving hydropunch II w/ 140 lbs. hammer at 55 ft 8-12-92/1006
	56						
						422	
	57						
						556	Completed driving HPII at 58' 8-12-92/1131
	58						
							Note: unable to collect ground water sample due to insufficient water flow. Boring backfilled with tremied volclay grout from 58' to surface 8-13-92/1230
	59						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NPL 92-W-0010

HOLE NO.: H2-3I

676

8/18/19

HTW DRILLING LOG

HOLE NO. H2-3J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 14 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker MD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-34' bgs: 4" CFA; 34'-109 bgs: -rotary/washboring -4" drag bit; 109-115': Hydropunch II	8. HOLE LOCATION: H2-3
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-11-92/1257
	11. DATE COMPLETED: 8-11-92/1520
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 34'
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 115.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC
IH2-003 - 082 IH2-603 - 082	X	Total & Dissolved	Semi-VOC Pest/PCBs			NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Boring grouted with Tremied Volclay grout	X		Hydropunch II	Robert R Mallace

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) Firm, dark brown, dry (Topsoil)					Boring advanced with 4" continuous Flight Augers (CFA) Soil/sediment descriptions logged from cuttings.
	2	2.0' LEAN CLAY (CL) soft to firm, medium brown moist (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: H2-3J B1 67

HTW DRILLING LOG

HOLE NO. H2-3J

PROJECT Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN CLAY (CL) soft to firm, medium brown, moist. (Loess)					
	6						
	7						
	8						
	9						BZ= BKG
	10						
	11						
	12						
	13	13.0 LEAN CLAY (CL) soft to firm, light brown, moist. (Loess)					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

678

HTW DRILLING LOG

HOLE NO. H2-3J

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) soft to firm, light brown, moist. (Loess) 15.0					
	15	POORLY GRADED SAND (SP) Loose, light brown, moist Fine grained. (Alluvium)					
	16						
	17						
	18						
	19						BZ-BKG
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

679

HTW DRILLING LOG

HOLE NO. H2-3J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) POORLY GRADED SAND (SP) Loose, light brown, moist, Fine grained. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						BZ = BKG
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

680

HTW DRILLING LOG

HOLE NO. H2-3J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RAM

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND(SP) Loose, light brown, moist Fine grained. (Alluvium) becomes wet					
	33						∇ water ~~water~~ at 33' bgs.
	34						
	35						
	36						
	37						
	38						Stopped drilling with 4" CFA at 39' 8-11-92/1315
	39						Began rotary washboring at 33'. ~~bgs~~ 8-11-92/1347
	~~39~~						
	40						-boring collapsed to 33'
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

HTW DRILLING LOG

HOLE NO. H2-3J

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 6 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) Loose, light brown, wet, Fine grained. (Alluvium)					
	42						
	43	Becomes Fine To medium grained.					
	44						
	45						
	46						
	47						
	48						
	49						BZ = BKG
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J 682

HTW DRILLING LOG

H2-3J

Remedial Investigation Meas NOP | INSPECTOR: RRM | PAGE 7 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded Sand (SP) Loose, light brown, wet, Fine to medium grained. (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56	56.0 — Poorly Graded SAND (SP) Loose, multi-colored, wet, medium to coarse grained (Alluvium)					
	57						
	58						
	59						BZ = BKG

ICORPS/4-16-92

PROJECT: Remedial Investigation, Meas NOP 92KW030

HOLE NO.: H2-3J 683

HTW DRILLING LOG

H2-3J

Remedial Investigation Mead NOP | INSPECTOR RRM | PAGE 8 OF 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND(SP) LOOSE, MULTI-COLORED, WET, MEDIUM TO COARSE GRAINED. (ALLUVIUM)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92-W-030

HOLE NO.: H2-3J

HTW DRILLING LOG

H2-35

Remedial Investigation Mead NOP | NSPECTOR: RRM | PAGE 9 OF 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above)					
		Poorly GRADED SAND (SP)					
		Loose, multi-colored,					
		wet, medium To coarse					
	69	grained. (Alluvium					BZ = BKG
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

685

HTW DRILLING LOG

H2-3J

Remedial Investigation Mead NOP | INSPECTOR RRM | PAGE 10 OF 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) Loose, multi-colored, wet, medium to coarse grained (Alluvium)					
	78						
	79						BZ = BKG
	80						
	81						
	82						
	83						
	84						
	85						
	86						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92RW030

HOLE NO.: H2-3J 68E

HTW DRILLING LOG

HZ-3J

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND(SP) Loose, multi-colored, wet, medium to coarse grained. (Alluvium)					
	87						
	88						
	89						BZ = BKG.
	90						
	91						
	92						
	93	93.0 Poorly GRADED SAND Loose, multi-colored, wet, coarse grained with some gravel. (Alluvium)					
	94						
	95						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92RW330

HOLE NO.: HZ-3J

687

HTW DRILLING LOG

H2-3J

Remedial Investigation Mead NOP | NSR: RAM | Sheet 2 of 4

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above) POORLY GRADED SAND(SP) Loose, multi-colored, wet coarse grained, with some gravel. (Alluvium)					
	96						
	97						
	98	with gravel					
	99						BZ = BKG
	100						
	101	with gravel.					
	102						
	103						
	104						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 921-W-10

HOLE NO.: H2-3J

HTW DRILLING LOG

H2-3J

Remedial Investigation, Mead VOP | NAME OF DRILLER: RRM | SHEET 13 OF 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as Above) POORLY GRADED SAND (SP) Loose, multi-colored, wet, coarse grained with ~~fine~~ gravel. (Alluvium)					
	105						
	106						
	107						
	108						Stopped rotary/ washboring with 4" rotary bit. 8-11-92/1520 HOS
	109						BZ = BKG 109' Began driving hydropunch II with 140 lbs. hammer at 109' 8-11-92/1606
						141	
	110						
						225	
	111						
						237	
	112						
						235	
	113						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-3J

689

HTW DRILLING LOG

H2-3J

Remedial Investigation Mead VOP | INSPECTOR RRM | SHEET 14 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	FLOW COUNTS g	REMARKS h
						305	
	114					412	Completed driving HPII at 115' 8-11-92/1714 115'
	115						Collected groundwater sample from depth 115.0' bgs. 8-12-92/0800
	116						
	117						Note: Boring backfilled with Tremied Volclay grout from 115 to surface 8-12-92/1230
	118						
	119						
	120						
	121						
	122						

ICORPW4-16-92

PROJECT: Remedial Investigation, Mead VOP 92-10-10

HOLE NO.: H2-3J

690

CWM 8/20/14

HTW DRILLING LOG

HOLE NO. HZ-04J

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC - OMAHA
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP PHASE II	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: ACKER AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-39' bgs = 4" CFAs; 39'-109' = 4" tricone bit rotary wash bore; 109'-115' Hydropunch II	8. HOLE LOCATION: HZ-04 (Admin. Area)
	9. SURFACE ELEVATION: Not Available (≅ 1202)
	10. DATE STARTED: 8-18-92 / 0915
	11. DATE COMPLETED: 8-19-12 / 0855
12. OVERBURDEN THICKNESS: ~~N/A~~ 115	15. DEPTH GROUNDWATER ENCOUNTERED: 38' ATD
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 115'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
JHZ-004-082 (water) (multiple) JHZ-604-082 (filtered)	x	x total & dissolved	Semi-VOCs Pest/PCBs Explosives	Cyanide, TDS, TSS, Alk, BOD	Hardness NO3/NO2	~~N/A~~ %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
backfilled w/ tremied "pure gold" grout	X			TERRANCE THOMEN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~GRASS~~ TOPSOIL					Boring advanced w/ 4" CFAs. All descriptions are from cuttings.
	1	LEAN CLAY (CL), firm, dark brown, ~~damp~~ moist, w/ trace organics ~~[Topsoil]~~ [Modified Loess]					
	2						
	3						
	4	gradational contact 4.0'					
		LEAN CLAY (CL), firm, light brown, ~~damp~~ moist [LOESS]					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: HZ-04J B1

691

B07NE003702-04797

HTW DRILLING LOG

HOLE NO. H2-04J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. THOREN

SHEET 2 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Silty LEAN CLAY (CL), firm, light brown, ~~damp~~ moist [LOESS]					
	6						
	7						
	8						
	9						B2 = NO/BG
	10						
	11						
	12	POORLY GRADED SAND (SP), med. dense, light brown to tan, ~~damp~~ damp, v. fine grained to fine grained w/ trace fine to med. grains. (bimodal texture) (Eolian Dune deposit) — estimated gradational contact 12.0'					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-04J

692

HTW DRILLING LOG

HZ-045

Remedial Investigation Mead NOP | INSPECTOR T.L THOREN | 3 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		SAND: POORLY GRADED SAND (SP), med. dense, light brown to tan, ~~damp~~, moist v. fine-grained to fine grained w/ trace fine to med grains (bimodal texture) (Eolian Dune Deposit)					
	15						
	16						
	17						
	18						
	19						B2=ND/B6
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: HZ-045 693

HTW DRILLING LOG

HOLE NO. H2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THOMEN

SHEET 4 OF 28 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	SAME: POORLY GRADED SAND (SP), med. dense (wet), light brown to tan, ~~dark~~ moist, v. fine grained to fine-grained w/ trace fine to med. grain S (bimodal texture) (Eolian Dune Deposit)					
	25						
	26						
	27						
	28						
	29						B2 = B6
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-045 694

HTW DRILLING LOG

HOLE NO. HZ-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T.L. THOMEN

SHEET 5 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (est.), light brown to tan, damp, fine-grained to fine-grained w/ trace medium grains (bimodal texture) [Eolian]					
	33						
	34						
		~~gradational~~ estimated contact 35.0'					
	35	POORLY GRADED SAND (SP), med. dense (est.), light brown, moist, fine-grained w/ some medium grains and trace organic matter (ALLUVIUM)					
	36						
	37						
	38	- becomes wet					▽ WATER ENTERS ATD @ 38'
							Stopped CFA drilling @ 39' 8-18-92 @ 0944 HRS
	39						B2 = B6 Begin 4" rwb ~~[illegible]~~ @ 39' 8-18-92 1030 HRS
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: HZ-045 695

HTW DRILLING LOG

HOLE NO. H2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. L. THONEN

SHEET b OF 24 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	42	Same of POORLY GRADED SAND (SP), med. dense (est.), light brown, wet, fine-grained w/ some medium grains and trace organic matter (ALLUVIUM)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						B2 = B6
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-045

696

HTW DRILLING LOG

HOLE NO. H2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. L. THOMEN

SHEET 7 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (est.), light brown, wet, fine-grained w/ some medium grains and trace organics [Alluvium]					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58	58.0 — POORLY GRADED SAND (SP), med. dense (est.), multi-colored, wet, coarse-grained w/ some medium grains [Alluvium]	gradational contact				B2 = B6
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-045

697

HTW DRILLING LOG

HOLE NO. H2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THONEN

SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (est.), multi-colored, wet, coarse-grained w/ some medium grains. [Alluvium]					
	60						
	61						
	62						
	63	? ? ? estimated contact POORLY GRADED SAND (SP), med. dense (est.), light ~~brown~~ tan, wet, fine-grained w/ trace silt. [Alluvium]					
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-045

HTW DRILLING LOG

HOLE NO. H2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THONEN

SHEET 9 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (ent.), light ~~brown~~ gray, wet, v. fine-grained w/ trace silt (Alluvium)					B2-B6
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-045

HTW DRILLING LOG

HOLE NO. H2-04J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THONEN

SHEET 10 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: POORLY GRADED SAND (SP), med. dense (est.), light gray, wet, v. fine-grained w/ trace silt (Alluvium)					
	78						
	79						B2=B6
	80						
	81						
	82						
	83						
	84						
	85	– becomes fine-grained w/ no silt					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-~~04J~~

HTW DRILLING LOG

HOLE NO. H2-04J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L THONEN

SHEET 11 OF 24 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same. POORLY GRADED SAND (SP) med. dense (est.), light gray, wet, fine grained (Alluvium)					
	87	gradational contact 87'					
		POORLY GRADED SAND (SP), med. dense (est), multi-colored, wet, medium to coarse-grained (Alluvium)					
	88						
	89						B2 = B6
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-701

HTW DRILLING LOG

HOLE NO. HZ-04J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THONEN

SHEET 12 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME: POORLY GRADED SAND (SP), med. dense (cont.), multi-colored, wet, medium-to coarse-grained (Alluvium)					
	96						
	97						
	98						B2 = B6
	99						Stopped drilling @ 99' 8-18-92 @ 1140 hrs. Resumed rub drilling on 8-19-92 @ 0845 hrs
	100						
	101						
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: HZ-04J

HTW DRILLING LOG

HOLE NO. H2-04J

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THOMEN

SHEET 13 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same: POORLY GRADED SAND (SP), med. dense (est.), multi-colored, wet, medium to coarse grained [Alluvium]					
	105	— with trace fine gravel					
	106						
	107						
	108						Completed ~~Stopped~~ rub drilling on 8-19-92 @ 0855 HRS
	109	~~No description available after 109'.~~				33	Begin ~~hammering~~ driving Hydropunch II w/ 140 lb. hammer @ 1021 8-19-92 @ 1235 HRS
	110					101	
	111					47	30 ft
	112					38	
	117						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: H2-04J

HTW DRILLING LOG

HOLE NO. A2-045

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. L. THOMEN

SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~No description available~~ POORLY GRADED SAND (SP)?				44	Note: Hydropunch driven to 115' and pulled back 6" @ 1255 HRS
	114					99	Note: Groundwater sample collected w/ Hydropunch @ 115' @ 8-20-92 @ 800 HRS. HS = ND
	115						
	116						
	117						Note: Boring backfilled with tremied "pure gold" grout from 115' to 0' on 8-20-92 @ 1645 HRS.
	118						
	119						
	120						
	121						
	122						

/CORPS/4-15-9:

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: A2-04804

DRAFT REPORT

REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA

DACA 41-92-C-0023

Prepared for
Department of the Army
U.S. Army Engineers District
Kansas City District
Corps of Engineers
Kansas City, Missouri

February 1993

Woodward-Clyde

Woodward-Clyde Consultants
5055 Antioch Road
P.O. Box 3777
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Volume III of IV

APPENDIX A (CONTINUED)
BORING LOGS

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CWA 8/4/92

HTW DRILLING LOG

HOLE NO. MW-21B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0-6'; 5 7/8" tricone roller bit, 6'-79'	8. HOLE LOCATION: MW-21; N.558978-E2829473
	9. SURFACE ELEVATION: 1163.26'
	10. DATE STARTED: 7-26-92 1350 / 11. DATE COMPLETED: 7-27-92 1305
12. OVERBURDEN THICKNESS: ~~79'~~ ~~N/A~~ 79.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~Mask of Drill Fluid NA~~ 33' (Estimated)
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 79'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	N/A	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ N/A	N/A	N/A	N/A	N/A	N/A	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed ~~upon completion of boring~~	NA	MW-21B	N/A	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, brown, moist, with roots (FILL)					Boring advanced with 6" CFA. Soil descriptions obtained from cuttings and from detailed log of Boring MW-21D.
	1						
	2						
	3						
	4	Becoming soft					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-21B

HTW DRILLING LOG

MW-21B

Remedial Investigation Mead VOP | INSPECTOR: J. Nealon | SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, dark gray, moist, with rootholes (LOESS or TOPSOIL)					
	6	Becomes hard			Boring continued		Stop drilling w/ CFAs. 7-26-92 1615 hrs. ~~Resume drilling~~ with 5 7/8" tricone roller bit @ 0750 7-27-92. ~~Drilling with 100 gal~~ and water. (100 gals)
	7						
	8						
	9	Becomes firm, light brown, with ~~and~~ light gray mottling and iron staining (LOESS)	B2=BG				
	10						
	11						
	12						
	13						
	14		B2=BG				No water loss to 14.

PROJECT: Remedial Investigation, Mead VOP 92-W030

HOLE NO.: MW-21B 706

ICORPS/4-15-92

HTW DRILLING LOG

MW-21B

Remedial Investigation, Mead VOP | INSPECTOR: J. Mealon | PAGE 3 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN CLAY (CL), firm, light brown, with light gray mottling and iron staining (LOESS)	moist,				
	15						
	16						
	17						
	18						
	19		B2 = BG				No water loss to 19'.
	20	POORLY GRADED SAND (SP), medium dense (est), light gray, very fine to fine grained, with trace medium grained sand (ALLUVIUM) — dry	20				
	21						
	22	without medium grained sand					
	23						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NSP 921-W010

HOLE NO.: MW-21B 707

HTW DRILLING LOG

MW-21B

Remedial Investigation Mead NOP | INSPECTOR: J. Nealon | PAGE 4 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	24	(SAME as ABOVE) POORLY GRADED SAND (SP), medium dense (est), light gray, very fine to fine grained (ALLUVIUM) dry	B2=BG				added 30 gal. water. No water loss to 24'.
	25						
	26						
	27						
	28						
	29						10 gallons water lost 24'-29'.
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921-W-010

HOLE NO.: MW-21B 708

HTW DRILLING LOG

MW-21B

Remedial Investigation Mead VOP | INSPECTOR: J. Nealon | SHEET 5 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		WELL GRADED SAND (SW), medium dense (est), light gray, fine to					
	33	coarse grained becomes wet (ALLUVIUM)	to multicolored, dry				▽ WATER ENTERS @ 33' ATD.
	34	POORLY GRADED SAND (SP), medium dense (est), light gray, fine grained (ALLUVIUM)	34				
	35	wet,					
	36						
	37						
	38						
	39		BZ=BG				No water loss 29'-39'.
	40						
	41						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NPL 92[illegible]10

HOLE NO.: MW-21B709

HTW DRILLING LOG

MW-21B

Remedial Investigation Mead NOP | NSPE: [illegible] | Sheet 6 of 10 sheets

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	42	(Same as above) POORLY GRADED SAND (SP), medium dense (est), light gray, ~~[illegible]~~ fine grained (ALLUVIUM) wet					
	43						
	44						Added 60 gal water. Lost 20 gal water 39-44.
	45						
	46						
	47						
	48						
	49	With trace medium grained sand	BZ=BG				Lost 40 gal water 44-49. Added 40 gal water and 1-50# bag Aquagel Bentonite
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21B 710

ICORPS/4-18-82

HTW DRILLING LOG

MW-21B

Remedial Investigation, Mead VOP | INSPECTOR | SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP) medium dense (est), light gray, wet, fine grained, with trace medium grained sand (ALLUVIUM)					
	51						
	52						
	53						
	54						Lost 15 gal fluid 49-54.
	55						
	56						
	57						
	58						
	59		BZ=BG				Lost 15 gal fluid 54-59.

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NSP 92KW010

HOLE NO.: MW-21B

711

B07NE003702-04820

HTW DRILLING LOG

MW-21B

Remedial Investigation Mead NOP | NSPECTOR John S Nealon | PAGE 8 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense (est), light gray, wet, fine grained, with trace medium grained sand (ALLUVIUM)					added 50 gal water.
	60						
	61						
	62						
	63						
	64	without medium grained sand					Lost 10 gal fluid mud 59-64.
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21B 712

ICORPS/4-15-82

HTW DRILLING LOG

MW-2B

Remedial Investigation Mead NOP | INSPECTOR: J. O'Neal | PAGE 9 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense (est), light gray, wet, fine grained (ALLUVIUM)					
	69		BZ=BG				Lost 15 gal mud 64'-69'
	70						
	71						
	72						
	73						
	74						No mud loss 69'-74'
	75						
	76						
	77						Lost 30 gal mud 74-77.5 Added 50 gal water.

PROJECT: Remedial Investigation, Mead NOP 921-W-010

HOLE NO.: MW-2B 71

ICORPS/4-15-82

HTW DRILLING LOG

MW-21B

Remedial Investigation, Mead NOP | INSPECTOR: J Mealor | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(same as above) POORLY GRADED SAND (SP) medium dense (est), light gray, wet, fine grained (ALLUVIUM)					Lost 10 gal mud while circulating hole.
	79						Bottom of Boring @ 79', 1305 hrs, 7-27-92.
	80						Monitoring well MW-21B installed upon completion of hole.
	81						Grouting at 10.1 lb/gal completed at 1434 hrs, 7-27-92.
	82						Drilling fluid losses:
	83						105 gal, 0-64' 55 gal, 64'-79' (screened interval)
	84						35 gal, flushing 20 gal placing filter pack.
	85						
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21B 714

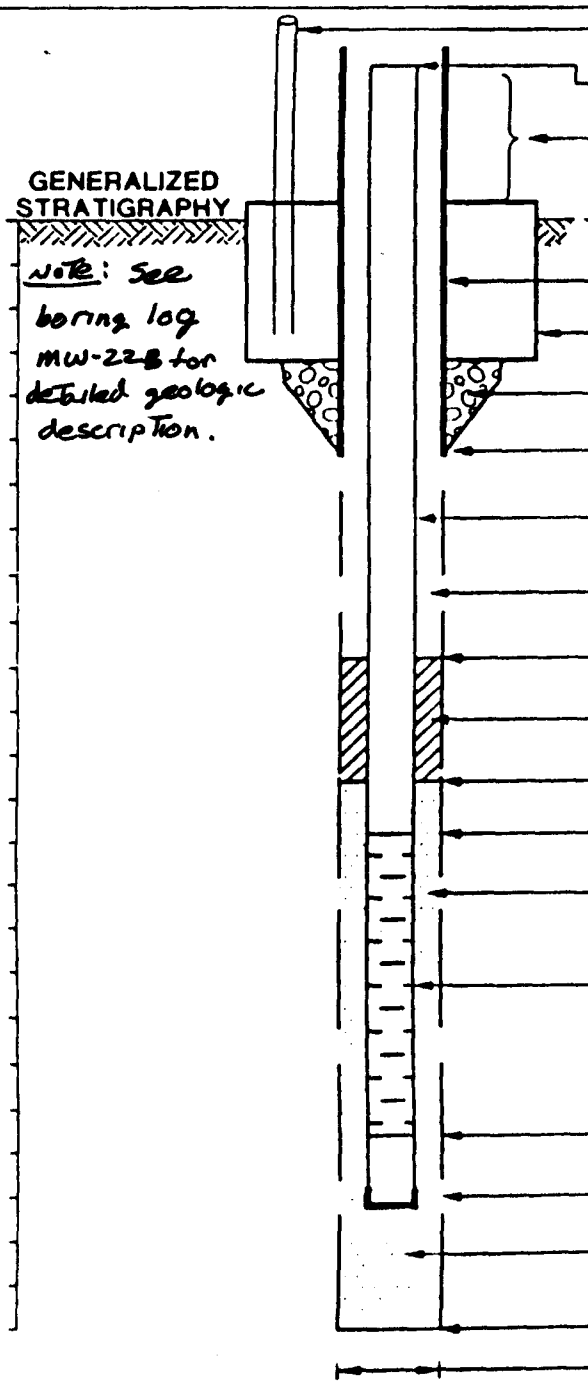
FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mullisse

Monitor Well No.: MW-22B
Project No.: 92KW030
Date: 6-27-92
Time: 1543

Method of Installation: Rotary/wash boring, filter pack sand & Volclay grout placed
Remarks: with 1" Tremie pipe. Used 75 gal. of water for washboring and used 250 gal of water for filter pack installation



Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1176.24'
Height of riser above ground: 1.86'
Ground Elevation: 1174.38'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" v-mix Concrete
Type of surface seal: Granular Bentonite/v-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of backfill: Cement/Bentonite Grout 7/1/92
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 55.0'
Depth of top of screen: 58.0'
Type of filter pack: 20-40 Silica Sand
I.D./Type of screen: 2" I.D. Schedule 40 PVC factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 68.0'
Depth of bottom of plugged bank section: 69.0'
Type of backfill below monitoring well: 20-40 Silica Sand
Depth of bottom of boring: 70.0'
Diameter of boring: 6"

Woodward-Clyde Consultants

HTW DRILLING LOG

HOLE NO.	MW-22B
1. COMPANY NAME	Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR	WCC
SHEET 1 OF 9 SHEETS	
3. PROJECT	Remedial Investigation, Mead NOP
4. LOCATION	Mead, Nebraska
5. NAME OF DRILLER	MATT. COOPER
6. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	6" Roller bit; 3" MWJ Rods
8. HOLE LOCATION	MW-22B-N.565862-E.2829009
9. SURFACE ELEVATION	1174.38'
10. DATE STARTED	6-27-92/1025
11. DATE COMPLETED	6-27-92/1350
12. OVERBURDEN THICKNESS	N/A
15. DEPTH GROUNDWATER ENCOUNTERED	22'-Masked by drilling Fluid
13. DEPTH DRILLED INTO ROCK	0'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	N/A
14. TOTAL DEPTH OF HOLE	70'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
None	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installated monitoring well	N/A	N/A	N/A	Robert R Mallese

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean CLAY (CL) firm, dark brown to gray, dry w/ root holes (topsoil/Loess)					Boring advanced w/ 7 3/4" HSAS
	1						
	2	becoming moist					
	3						
	4	becoming light brown (Loess) w/iron staining + iron nodules					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-22B B1

716

HTW DRILLING LOG

HOLE NO. MW-22B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Lean Clay (CL) Very firm,					
		light brown, dry					
		with iron staining and					
	6	iron					
		(Loess)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B 717

HTW DRILLING LOG

HOLE NO. MW-22P

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) Lean clay (CL) very firm, light gray, dry					
	15	15.1' Poorly Graded SAND (SP) loose, light gray, dry V.fine to fine grained sand w/some iron staining (Alluvium?)					
	16						
	17						
	18						
	19						
	20						
	21						
	22	becoming light brown to yellow					
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22P 18

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-22B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND (SP) loose, light brown to yellow, very fine to fine grained sand.					
	24						
	25	w/ limonite staining					
	26						
	27						
	28	w/ multi colored grains w/ Trace of medium grained sand					
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B 719

HTW DRILLING LOG

HOLE NO. MW-22B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS Above)					
		Poorly Graded SAND (SP)					
		loose, light gray To yellow,					
	33	very fine To fine grained					
		Sand					
	34						
	35						
	36						
	37						
	38						
	39						
		w/ limonite staining					
	41						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B

HTW DRILLING LOG

HOLE NO. MW-22B

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: R. Mallizze

SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly Graded SAND (SP) loose, light gray To Tan, Very fine To fine grained Sand					
	42	w/ Trace of medium grained Sand.					
	43						
		w/ limonite STAINING					
	44						
	45						
	46						
		w/ iron STAINING					
	47						
	48	w/ Trace of course sand					
	49						
	50						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B

HTW DRILLING LOG

HOLE NO. MW-22B

Remedial Investigation, Mead NOP | INSPECTOR R. Mallisee | SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		loose, Tan to brown, w/					
	51	~~multi~~ multi colored,					
		fine to medium grained					
		sand w/ Trace of					
		coarse sand					
	52	w/ less coarse sand					
	53						
		w/ Trace coarse sand					
	54						
	55						
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B 722

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-22B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(Same as above) Poorly Graded SAND (SP) loose, Tan To gray, very fine To fine grained Sand w/Trace of coarse Sand.					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B 723

HTW DRILLING LOG

HOLE NO. MW-22B

Remedial Investigation, Mead NOP | INSPECTOR R. Mallisee | SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose Tan To light gray, very fine To fine grained sand. w/ Trace of medium grained sand.					
	69	69.0'					
		Poorly Graded SAND (SP) loose, multi colored, medium grained sand w/ some fine grained sand & Trace of very fine grained sand.					
	70						B.O.B 70.0' 6-27-92 1350 Boring completed as monitoring well. Total lost of water = 100gal.
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22B

724

CRH 7/13/92

HTW DRILLING LOG

HOLE NO. MW-23B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.564843 - E.2828791
5. NAME OF DRILLER: Tom Peyton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Rotary wash hole with 5 7/8" tricone bit	8. HOLE LOCATION: MW-23 NE SE SW SE Sec 14 T14N, R8E at Load Line 1
	9. SURFACE ELEVATION: 1171.62'
	10. DATE STARTED: 7-12-92 at 1540 / 11. DATE COMPLETED: 7-13-92 at 1050
12. OVERBURDEN THICKNESS: 79.0	15. DEPTH GROUNDWATER ENCOUNTERED: ~33 ft (estimated - Masked by drilling fluids
13. DEPTH DRILLED INTO ROCK: 0.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 79.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
completed as monitoring well	N/A	MW-23B	N/A	J. Ritterling

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to hard, dark brown, dry, with some roots (Topsoil)	BZ=BG				Boring advanced with 5 7/8" tricone bit and rotary wash.
	1.0'	LEAN CLAY (CL), firm to hard, light brown, dry (Loess)					Boring logged from observation of washed cuttings and log of MW-23A.
	1						First mixture: 50 gal water, ½ 50# AquaGel
	2						Remarks on consistency and density are estimated.
	3						
	4	becoming moist					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-23B B1

725

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm to hard, light brown, moist, (Loess)					
	6	becoming firm					
	7						
	8						
			HNU = BG				
	9		~~B2 = BH = BG~~				
	10						
	11						
	12						
	13						
	14	14.0'					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B 726

HTW DRILLING LOG

HOLE NO. MW-23B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), medium dense, light brown, fine grained, moist ?, with trace of silt (Alluvium)					Add to hole: 50 gal water ~~1/2 50#~~ Aqua Gel 25#
	15						
	16	becoming light gray ?, dry ?, silt is grading out					
	17						
	18		HNU = BG				
	19		~~B2-BH-BG~~				
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

727

CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, ~~light~~ gray, fine, ~~grained~~					
	24	dry (Alluvium)					drilling Stop 7-12-92 1735
							Resume 7-13-92 0805 drilling
	25						
	26						
	27						
	28						
			HNU = BG				
	29		~~B2=BH=BG~~				
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

728

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP)					
		medium dense, gray, fine grained, dry					
		(Alluvium)					
	33	becoming wet					
	34						
	35						
	36						
	37						
	38						
			MNU = BG				
	39		~~B2 = BH = BG~~				Add to mix: 80 gal water, 50 # AquaGel
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B 729

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP)					
		medium dense, gray, fine, graded wet					
	42	(Alluvium)					
		with trace of medium sand					
	43						
	44						
	45						
	46						
	47						
	48		HNU = BG				
	49		~~B2-B11=BG~~				
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

730

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAMP) POORLY GRADED SAND (SP) medium dense, gray, fine grained with trace of medium sand (Alluvium) wet					
	51						
	52						
	53						
	54						Add to mix: 70 gal water 50# Aqua Gel
	55						
	56						
	57						
	58	medium sand grading out					
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND(SP),					
		medium dense, gray, fine, wet					
	60	(Alluvium) grained					
	61						
	62						
	63						
			HNU = BG				
	64		~~B2 = BK = BL~~				
	65						
	66						
	67	~~becomes fine~~ with some medium sand grained					
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) medium dense gray, fine grained with some medium grained sand, wet (Alluvium)					Add to mix: 70 gal water, 50# Aqua Gel
	69						
	70						
	71						
	72						
	73						
	74	becoming fine grained with some medium grained sand and trace of coarse grained sand	B2=BM=BG				
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

HTW DRILLING LOG

HOLE NO. MW-23B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) medium dense, gray, fine grained sand with some medium grained sand and trace of coarse grained sand, wet (Alluvium)					
	78						
	79						Stop 7-13-92 1050
							Bottom of borehole at 79'. Completed boring as monitoring well MW-23B. ~~Approx.~~ 320 gal of drilling fluid ~~(Aqua Gel bentonite) mixed.~~ Lost in screen interval 220 gal used to flush fluid.
	80						
	81						
	82						
	83						
	84						
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-23B

/CORPS/4-15-92

CLA 8/14/92

HTW DRILLING LOG

HOLE NO. MW-24B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.557354 - E.2830830
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0-6'; 5 7/8" tricone roller bit 6'-67.5'	8. HOLE LOCATION: MW24 (Avenue A south of 4th st.)
	9. SURFACE ELEVATION: 1160.86'
	10. DATE STARTED: 7-29-92 0750 — 11. DATE COMPLETED: 7-29-52 1140
12. OVERBURDEN THICKNESS: ~~67.5'~~ 67.5	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 67.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ N/A	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed ~~upon completion of hole~~	NA	MW-24B	NA	John S Nelson

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		FAT CLAY (CH), hard, dark brown, moist to wet (TOPSOIL)					Advanced boring with 6" CFA. Soil descriptions obtained from cuttings and from detailed geologic log of MW-24A.
	1						
	2						
	3	LEAN CLAY (CL), firm, brown and light gray, with some iron staining and carbon, medium plasticity (LOESS) moist	(3)				LL>40
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-24B

735

HTW DRILLING LOG

MW-24B

Remedial Investigation, Mead NOP | NSPE: John Nealon | Page 2 of 8

ELEV	DEPTH	DESCRIPTION OF MATERIALS	PID/OVA SCREENING RESULTS	GROTON SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
		(SAME AS ABOVE) LEAN CLAY (CL), firm, brown and light gray moist, with some iron staining and carbon, medium plasticity (LOESS) (est)					8:40
	6		BZ=BG			Boring continued	Switch to RUB @ 6'. ~~Begin drilling with~~ 5 7/8" tricone roller bit ~~at 0840. Using~~
	7					and	130 gal water, ~~no gel.~~
	8						
	9						Added 20 gal. water.
	10						
	11						
	12						
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 921...10

HOLE NO.: MW-24B 736

ICORPS/4-18-82

B07NE003702-04845

HTW DRILLING LOG

MW-24B

Remedial Investigation Mead NOP | NAME: J. Neale | PAGE 3

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	OBSERVED SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO	BLOW COUNTS	REMARKS
		(SAME as ABOVE) LEAN CLAY, (CL), firm (est), brown and light gray, moist, with some iron(?) staining and carbon(?) medium plasticity (LOESS)					
	15						
	16	POORLY GRADED SAND (SP), medium dense (est), light brown, very fine to fine grained (ALLUVIUM) ~~damp~~ moist					
	17						
	18						
	19	with trace medium grained sand					
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92LW010

HOLE NO.: MW-24B 737

ICORPS/6-18-82

HTW DRILLING LOG

MW-24B

Remedial Investigation Mead VOP | INSPECTOR: J. Nealon | SHEET 4 OF 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	FLOW UNITS g	REMARKS h
	24	(SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense, light brown, ~~damp~~, very fine to fine grained, with trace medium grained sand (ALLUVIUM) moist	BZ=BG				
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORFS/4-16-92

PROJECT: Remedial Investigation, Mead VOP 92-10-30

HOLE NO.: MW-24B 738

HTW DRILLING LOG

MW-24B

Remedial Investigation Meadow NOP | NAME OF DRILLER: John Nealon | PAGE 5 OF 8 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	OTHER SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense, (est) light brown, moist, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Meadow NOP 92RI0010

HOLE NO.: MW-24B

739

HTW DRILLING LOG

MW-24B

Remedial Investigation Mead NOP | NSPECTOR: John Nealon | PAGE 6 OF 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SPLIT SPOON SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	HOW MANY g	REMARKS h
	42	(same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, wet, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	43						
	44	~~With trace to some medium grained sand~~	B2=BG				
	45						
	46						
	47						
	48						
	49						
	50						

Added 140 gal water from rig tank in interval 16'-44'. Added ~~[illegible]~~ 50# ~~[illegible]~~ aquagel at 44'.

(CORPS)4-16-82

PROJECT: Remedial Investigation, Mead NOP 92-[illegible]-10

HOLE NO.: MW-24B. 740

HTW DRILLING LOG

MW-24B

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	VOC/SVOC SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO	ACSW COUNTS	REMARKS
	51	(same as above) POORLY GRADED SAND (SP), medium dense, light brown, wet, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	52						
	53						
	54		B2=BG				150 gal drilling fluid lost 0'-54'. Add 75 gal. water @ 54'
	55						
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead

HOLE NO.: MW-24B 741

ICORPS/4-16-92

HTW DRILLING LOG

MW-24B

Remedial Investigation Mead VOP | John Mealor | 3

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD BORING RESULTS	DEPTH BARREL OR CORE BOXES	ANALYTICAL SAMPLE NO	HTW UNITS	REMARKS
	60	(Same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, wet, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	61						
	62						
	63						NOTE: Monitoring well MW-24B installed upon completion of boring. Grouting @ 10.4 lb/gal completed at 1408 hours, 7-29-92.
	64						
	65						Drilling fluid losses: 150 gal, 0'-54' 40 gal, 54'-67.5' (Screened interval); 30 gal, flushing; 20 gal, filter pack placement
	66						
	67						
	68						Bottom of Boring @ 67.5' 1140 hrs 7-29-92

PROJECT: Remedial Investigation, Mead VOP 92 MW 30

HOLE NO.: MW-24B 742

ICORPS/4-18-82

Clk 7/16/92

MW-25B

HTW DRILLING LOG

HOLE NO. ~~5~~ MW-25B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.560332-E.2830679
5. NAME OF DRILLER: Tom Peyton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" tricone bit rotary wash boring.	8. HOLE LOCATION: NE SW SW, sec. 24 T14N, R8E MW-25 SE of Load Line 1
	9. SURFACE ELEVATION: 1172.51'
	10. DATE STARTED: 7-13-92 at 1600
	11. DATE COMPLETED: 7-14-92 1120
12. OVERBURDEN THICKNESS: 85'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked ~~N/A~~ by drilling fluid
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~not recorded~~ N/A
14. TOTAL DEPTH OF HOLE: 85'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
completed as monitoring well	N/A	MW-25B	N/A	Jon M. Gittelsby

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, dark brown, moist, with roots (Topsoil)					Boring advanced use rotary wash bore with 5 7/8" tricone bit. Boring logged from observation of cuttings and log of MW-25D
		1.5'					
	2	LEAN CLAY (CL), firm, light brown, moist (Loess)					Remarks on consistency and density + moisture content are estimated
	3						Drilling fluid: 80 gal water. ~~3/4 50#~~ Aqua Gel 35#
	4		HNU = = BG ~~B2-B4-B6~~				
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-25B B1 743

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, light brown, moist (Loess)					
	6						
	7						
	8						
			HNU = BG ~~B2-BH=BG~~				Stop 7-13-92 1710
	9						Resume 7-14-92 0735
	10						
	11						
	12						
	13	13.0' POORLY GRADED SILTY SAND ~~WITH SILT~~ (SM), loose to med. dense, light brown, fine grained ~~moist~~ (Alluvium)	HNU = BG ~~B2-BH=BG~~				
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B

744

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAND)					
		POORLY GRADED SILTY SAND (SM), loose to medium dense, light brown, fine grained, moist (Alluvium)	HNU = = BG				
	15						
	16						
	17						
	18						
	19						
	20	20.0'					
		POORLY GRADED SAND (SP), loose to medium dense, tan, fine grained with a trace of medium grained sand, dry (Alluvium)					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, tan, fine with a trace of medium gravel sand, dry (Alluvium)	~~B2-B4-B6~~ BG HNU = BG				
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B 746

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAMB) POORLY GRADED SAND (SP), loose to modm. dense, tan fine grained with trace of medium grained sand, dry (Alluvium)					
	33		HNU = B6 ~~B2 = B11 - B6~~				
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B 747

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), ~~loose~~ medium dense, tan, fine grained ~~fine~~ with trace of medium grained					
	42	Sand (Alluvium) moist?					
	43						
			HNU=BG				
	44		~~B2=BK=BG~~				Add ~~and min~~ 75 gal water.
	45						
	46						
	47	becoming wet.					
	48						
			HNU = BG				
	49		~~B2=BK=BG~~				
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		(loose to medium dense, fine grained with trace of medium grained sand, wet (Alluvium)					
	51						
	52						
	53						
	54						Added ~~50 mix~~ 50 gal water
	55						
	56						
	57						
	58						
	59		HNV = BG BZ=AH=Ab				

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SA MF) POORLY GRADED SAND (SP), ~~loose to~~ medium dense, tan, fine grained with trace of medium grained sand, wet (Alluvium)					Add ~~ad~~ ~~water~~ 75 gal water
	60						
	61						
	62						
	63						
	64						Add ~~ad~~ ~~water~~ 25 gal water. ~~3/4 50#~~ Aquagel ~~2 1/4 110#~~
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25B

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, tan fine grained with trace of medium grained sand, wet (Alluvium)	HNU = BG ~~R2-BH-BG~~				
	69						
	70						
	71						
	72						
	73						
	74						Estimated drilling fluid loss from 0'-74' = 145 gal.
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 751

HTW DRILLING LOG

HOLE NO. MW-25B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, fine grained with trace of medium grained sand (Alluvium)					
	78						
	79						
	80						
	81						
	82						NOTE: Completed boring as monitoring well MW-25B. 160 gal drilling fluid lost in screen interval. (~~10 gal~~ 150 gals used to flush fluid)
	83						
	84						
	85						Sep 7-14-92 1120 drilling. Bottom of borehole at 85.0'.
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 752

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-26B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0-6'; 5 7/8" tricone roller bit 6'-77.5	8. HOLE LOCATION: MW-26; N.564263 - E.2832245
	9. SURFACE ELEVATION: 1172.00'
	10. DATE STARTED: 7-28-92 0743 / 11. DATE COMPLETED: 7-28-92 1147
12. OVERBURDEN THICKNESS: ~~77.5~~ 77.5	15. DEPTH GROUNDWATER ENCOUNTERED: 38' (in MW-26A)
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 77.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	NA	NA	NA	NA	NA	N/A%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon well installed ~~upon completion of hole~~	NA	MW-26B	NA	J. O'Mealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), firm, very dark brown, moist to wet (TOPSOIL)					Advanced boring with 6" CFA. Soil descriptions from cuttings and from detailed boring log of MW-26A.
	2	FAT CLAY (CH), hard, brown, moist to wet (B-HORIZON)					
	3	SILTY CLAY (CL), firm, light brown and gray, moist, with iron staining and some carbon (LOESS)	B2=BG				
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-26B

753

HTW DRILLING LOG

MW-26B

Remedial Investigation, Mead NOP

INSPECTOR: J S Nealon

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) SILTY CLAY (CL) firm, light brown and gray with iron staining and some carbon (LOESS)					
	6	moist					Switch to RWE 0820 hrs 7-28-92
							~~Added 120 gal water, no gel~~
	7						Boring continued w/ 5 7/8" dia tri-cone roller bit and water (120 gals)
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26B 754

HTW DRILLING LOG

MW-26B

Remedial Investigation, Mead NOP | INSPECTOR: J. Nealon | SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) SILTY CLAY (CL), firm, light brown and gray, with iron(?) staining and some carbon(?) (LOESS)					
	15	moist,					
	16	POORLY GRADED SAND (SP), medium dense (est), light brown, fine to fine grained with trace silt (ALLUVIUM)	14				
	17	Becoming fine to very fine grained with trace medium sand					
	18	moist ~~damp~~					
	19						
	20		BZ=BG				
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26B 755

HTW DRILLING LOG

MW-26B

Remedial Investigation, Mead NOP | INSPECTOR: J. Nealon | PAGE 4 of 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	24	(same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, very fine to fine grained, with trace medium sand (ALLUVIUM)					
	25	~~damp~~ moist					
	26						
	27						
	28						added 50 gal water.
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 921.W030

HOLE NO.: MW-26B 756

ICORPS/4-15-82

HTW DRILLING LOG

MW-26B

Remedial Investigation Mead NOP

INSPECTOR: JS Nealon

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, v. fine to fine grained, with trace medium grained sand (ALLUVIUM) moist ~~damp~~					
	34						
	35						
	36						
	37						
	38						
	39		BZ=BG				Added 50 gal water
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW0030

HOLE NO.: MW-26B

757

ICORPS/4-15-82

HTW DRILLING LOG

MW-26B

Remedial Investigation Mead NOP | INSPECTOR: J. O'Neal | Sheet 6 of 10 sheets

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED (SP) medium dense (est), light brown, wet, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	42						
	43	With zones of medium grained sand					
	44						Added 30 gal water and ~~B~~ 50# ~~bag~~ Aquagel.
	45						
	46						
	47						
	48						
	49	Becomes very fine to fine grained with trace medium grained sand	BZ=BG				Added 30 gal water.
	50						

PROJECT: Remedial Investigation, Mead NOP 92LW030

HOLE NO.: MW-26B

758

ICORPS/4-18-92

HTW DRILLING LOG

MW-26B

Remedial Investigation, Mead NOP

INSPECTOR: John S Nealon

SHEET 7 OF 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	51						
	52	wet,					
	53						
	54						Added 30 gal. water and 50# Aquagel.
	55						
	56						
	57						
	58						
	59						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92.1.0010

HOLE NO.: MW-26B

759

HTW DRILLING LOG

MW-26B

Remedial Investigation Mead NOP | INSPECTOR: John Nelson | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense (est), light brown, wet, fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	60						
	61	With ~~[illegible]~~ some medium to coarse grained sand					
	62						
	63						
	64						Drilling fluid ~~[illegible]~~ loss from 0'-64' was 170 gallons.
	65						
	66	With trace medium sand					
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-26B

760

/CORPS/4-15-92

HTW DRILLING LOG

MW-26B

Remedial Investigation Mead NOP | INSPECTOR: John J Nealon | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME as ABOVE) POORLY GRADED SAND (SP), medium dense (est), light brown, very fine to fine grained, with trace medium grained sand (ALLUVIUM)					
	69						Added 20 gal water.
	70	wet,					
	71						
	72						
	73						
	74	With some medium grained sand	B2=BG				Added ~~4~~ 50# ~~bag~~ Aquagel and 40 gal water.
	75						
	76	Becoming medium grained with some coarse grained sand and multicolored					
	77						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921.W.010

HOLE NO.: MW-26B

761

HTW DRILLING LOG

MW-26B

Remedial Investigation, Mead NOP | NSPE: 724 | John S. Realon | Sheet 10 of 10 Sheets

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense (est), multicolored, wet, medium grained, with some coarse grained sand (ALLUVIUM)	B2=BG				
	78						Bottom of Boring @ 77.5' 1147 hrs 7-28-92
							Monitoring well MW-26B installed upon completion of boring. Grouting at 10.2 lb/gal completed at 1429 hrs, 7-28-92.
	79						
					Drilling fluid losses:		170 gal, 0-64'
							35 gal, 64-77.5'
							40 gal, flushing
							20 gal, filter pack placement

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92[illegible]10

HOLE NO.: MW-26B

762

HTW DRILLING LOG

HOLE NO. MW-27B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾ O.D. HSA; 4" catcher	8. HOLE LOCATION: MW-27; N 563539 - E 2833818
	9. SURFACE ELEVATION: 1173.70'
	10. DATE STARTED: 6-23-92/1627 — 11. DATE COMPLETED: 6-24-92/1149
12. OVERBURDEN THICKNESS: 73.0 - cell	15. DEPTH GROUNDWATER ENCOUNTERED: 36.5'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 73.0 - cell	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
None	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed shallow monitoring well	N/A	MW-27B	N/A	Robert R Mellisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean clay (CL) firm, Light brown, Dry, with occasional rootlets and iron nodules (Loess)					logged by cuttings
	1						
	2						
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-27B 763

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation, Mead NOP | INSPECTOR Robert R Mallsee | SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME) Lean Clay (CL) firm, light brown, moist, with occasional iron nodules (Loess)					
	6						
	7	Becoming moist					
	8						
		9.0'					
	9	Poorly Graded Sand (SP) loose, Tan, Dry, fine to fine grained sand (Alluvium)					
	10						
	11						
	12						
	13						
	14	Moist to Becoming Saturated					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B

764

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallisee

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(SAME) Poorly Graded SAND (SP) loose, Tan, moist To saturated, v.fine To fine grained sand (Alluvium)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B765

HTW DRILLING LOG

HOLE NO. MW-27B
SHEET 4 OF 9 SHEETS

Remedial Investigation, Mead NOP

INSPECTOR Robert R. Mollisee

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(SAME) Poorly Graded SAND (SP) loose, Tan, ~~v.fine~~ moist to saturated, v. fine to fine grained sand. (Alluvium)					
	24						
	25						
	26						
	27						
	28	Becoming fine grained					
		Becoming v. fine to fine grained					Stopped drilling @ 1700 HRS 6-23-92
	29						Resumed drilling @ 0700 HRS 6-24-92
	30	Becoming fine to medium grained					
		Becoming v. fine to fine grained					
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B

766

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mollisee

SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(SAME) Poorly Graded SAND (SP) Loose, Tan, moist To saturated V. fine To fine grained Sand. (Alluvium)					
	33						
	34	W/Trace of medium To coarse grained Sand					~~Started 6-24-92 Stopped 7-6-92 Started 6-24-92 Stopped 7-6-92~~
	35						
	36	becomes wet					
	37						
	38						
	39						
	40	with few medium To coarse grained Sand					
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B767

B07NE003702-04876

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation, Mead NOP | INSPECTOR Robert R Mallisee | SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same) Poorly Graded SAND (SP) loose, wet tan and orange, wet, fine grained sand (Alluvium)					
	42						
	43	With Trace medium grained sand					
	44						
	45	Becoming fine grained sand.					
	46						
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B 768

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation Mead NOP

INSPECTOR Robert R Mallisee

SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME) Poorly Graded SAND (SP) Loose, Tan, wet, fine grained sand, with little medium grained sand (Alluvium)					
	51						
	52						
	53						
	54	Becoming v.fine to fine grained					
	55						
	56	With Trace coarse grained					
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B 769

HTW DRILLING LOG

HOLE NO. MW-27B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallisee

SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(SAME) Poorly Graded SAND (SP) Loose, Tan To gray, WET, V. fine To fine grained Sand (Alluvium)					
	60						
	61						
	62						
	63	WITH Trace medium sand					
	64	WITH little Coarse Sand					
	65						
	66						
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B 770

HTW DRILLING LOG

HOLE NO. MW-27B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Robert R Mallisee

SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(SAME) Poorly ~~Sorted~~ SAND (SP) loose, Tan To grey, wet, fine grained sand (Alluvium)					
	69						
	70	with Trace coarse ↓ grained sand					
	71						
	72						Finished drilling @ 1150 HRS. 6-24-92
	73	BM B					720 ~~B.O.B. 6-24-92 1449~~ B.O.B. 73.0' Boring completed as Monitoring well. 6-24-92 LDST at 300 gal of water used during drilling 100 gal of water used during well installation.
	74						
	75						
	76						
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27B 771

HTW DRILLING LOG

HOLE NO. MW-28B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward - Clyde Consultants
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.557660 - E.2835291
5. NAME OF DRILLER: Tom Peyton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" tricone roller bit - rotary wash bore.	8. HOLE LOCATION: NE NW SE NE sec 25 T14N R8E; MW-28 S of Load Line 2
	9. SURFACE ELEVATION: ~~Masked by drilling fluid~~ 1170.02
	10. DATE STARTED: 7-14-92 at 1600
	11. DATE COMPLETED: 7-15-92 at 1120
12. OVERBURDEN THICKNESS: 79.0'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling Fluids
13. DEPTH DRILLED INTO ROCK: 0.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~not recorded~~ N/A
14. TOTAL DEPTH OF HOLE: 79.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): ~~none~~ N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
completed as monitoring well	N/A	MW-28B	N/A	Jim M. Gittelsby

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), ~~[illegible]~~, Firm, dark brown, dry (Topsoil) with roots					Boring advanced with 5 7/8" tricone roller bit and rotary wash bore.
	1	1.0' LEAN CLAY (CL), Firm, light brown, dry (Loess) with sme roots					Boring logged from observation of wash cuttings and log of MW-28A.
	2						Remarks on consistency, density, & moisture content are estimated.
	3						7-15-92: Mix drilling fluid: 90 gal water & 50# AquaGel bentonite
	4						
	5						Stop 7-14-92 1605

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW 28 B B1 772

HTW DRILLING LOG

HOLE NO. MW 28 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Ritterling / J JOHNSON

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					Resume 1 15 92 OK
		LEAN CLAY (CL), firm,					
		light brown, dry (Loess)					
	6						
	7						
	8						
			HNU=BG				
	9		~~B2=BH-BG~~				
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B 773

HTW DRILLING LOG

HOLE NO. MW-28 B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, light brown, dry (Loess)					
	15						
	16						
	17						
		17.5'					
		POORLY GRADED SAND (SP), grained loose to medium dense, fang fine, dry (Alluvium)					
	18						
			HNU = 0.6				
			~~B2 = BH = B6~~				
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B 774

HTW DRILLING LOG

HOLE NO. MW 28B

PROJECT Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, tan, fine grained, dry (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29		HNU = BG ~~BZ = BH-BG~~				
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B 775

HTW DRILLING LOG

HOLE NO. MW-28B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, tan, fine grained (All moist) ~~with trace of medium sand~~					
	33						
	34						
	35						
	36						
	37	37.0' POORLY GRADED SAND WITH CLAY (SP-SC), medium dense, tan to light brown, fine grained (All moist)					
	38						
	39		B2=BH=B6				Add gel to mix: 60 gal water
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

776

HTW DRILLING LOG

HOLE NO. MW-28B

PROJECT Remedial Investigation, Mead NOP

INSPECTOR J. Rittenling

SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), loose to medium dense, tan, fine grained, ~~dry~~ moist (Alluvium)					
	42						
	43						
	44						
	45						
	46	with some medium grained sand					
	47						
	48						
	49		B2=BH=B6				Add 40 gal water to mix.
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

B07NE003702-04886

HTW DRILLING LOG

HOLE NO. MW-28B

PROJECT Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		loose to ~~medium~~ dense, tan,					
	51	fine ~~with trace of medium sand~~ grained, wet (Alluvium)					
	52						
	53						
	54						
	55	with 1.0'-1.5' layer of dense, ~~medium~~ grained sand					
	56						
	57						
	58						
	59		B2=B11=B6				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

778

HTW DRILLING LOG

HOLE NO. MW-28B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), ~~loose to~~ loose to medium dense, tan, fine grained, wet (Alluvium)					
	60						
	61						
	62						
	63	with some seams of sandy clay					
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

HTW DRILLING LOG

HOLE NO. MW-28B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, tan, fine grained (Alluvium)	HNU=BG ~~A2=BH=BG~~				Approximately 120 gal drilling fluid lost from 0'-69'.
	69						
	70						
	71						
	72						
	73						
	74						Approximately 30 gal loss 69'-74'. of drilling fluid
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

780

HTW DRILLING LOG

HOLE NO: MW-28B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 10 OF 10 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND WITH CLAY (SP-SC), medium dense, tan to light brown, fine (All fine) grained					
	78	with seams of clay					of drilling fluid
							Approx 28 gal lost 74'-79'.
		with trace of medium and coarse grained sand					
	79						Stop 7-15-92 1120
							Bottom of borehole at 79'
							At 79': Add ~~40 min~~: 40 gal water 30# ~~2½ sk~~ Aqua Gel
	80						10 gal loss
							Estimated drilling fluid loss in screen interval = 60 gal, of water
	81						Used 140 gal to flush fluid.
							Completed boring as monitoring well MW-28B.
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28B

781

B07NE003702-04890

HTW DRILLING LOG

HOLE NO. MW-29B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N. 553790-E2836793
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾ HSA, 4½" Basket	8. HOLE LOCATION: MW-29B
	9. SURFACE ELEVATION: 1158.35'
	10. DATE STARTED: 6-25-92/1040 — 11. DATE COMPLETED: 6-25-92/1345
12. OVERBURDEN THICKNESS: —	15. DEPTH GROUNDWATER ENCOUNTERED: 48.5'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: ~~75'~~ 76.0' CBR	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
none	N/A	N/A	N/A	N/A	N/A	N/A%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed Shallow monitoring well	N/A	MW-29B	N/A	Robert R Mullins

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean Clay (CL) very hard, Dark Brown, Dry, w/ rootlets (Loess)				Boring	logged from cuttings
	1						
	2	Becoming light Brown					
	3						
	4	Becoming Hard, light Brown ~~and~~ light gray mottled, moist, w/ rootlets and Iron oxide staing (Peoria Loess)					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-29B 782

HTW DRILLING LOG

HOLE NO. MW-29 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mollisee

SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above)					
		LEAN CLAY (CL), Hard,					
		Light Brown and Light Gray					
		mottled, moist, w/rootholes					
	6	and Iron oxide staining					
		~~Latto~~					
		(Peorian Loess)					
	7						
	8	Becoming Firm, moist					
	9						
	10	Becoming Soft	HNu = BKG				
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B

783

HTW DRILLING LOG

HOLE NO. MW-29B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		14.5'					
	15	Poorly Graded SAND (SP) medium dense, light Gray, Dry fine grained sand w/ Trace of medium grained sand (Alluvium)					
	16						
	17						
	18	Becoming Dry					
	19						
	20		HNu = BKG				
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B784

HTW DRILLING LOG

HOLE NO. MW-29B

Remedial Investigation Mead NOP

INSPECTOR R. Mallisee

SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS Above) Poorly Graded SAND (SP) medium dense, light Gray, Dry, fine grained sand, w/ Trace of medium sand. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B

785

HTW DRILLING LOG

HOLE NO. MW-29B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above) Poorly Graded SAND (SP) medium dense, light Gray, dry, fine grained sand, w/ Trace of medium grained sand. (Alluvium)					
	33						
	34						
	35		HNU = BKG				
	36						
	37						
	38						
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B

786

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-29B

Remedial Investigation Mead NOP | INSPECTOR R. Mallisee | SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP), medium dense, light Gray. Dry, fine grained sand, w/Trace of medium grained Sand. (Alluvium)					
	42						
	43						
	44						
	45		HNU = BKG				
		Becoming moist w/o medium grained sand.					
	46						
	47						
	48						
		Becoming wet					
	49						
			HNU = BKG				
	50						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B 787

HTW DRILLING LOG

HOLE NO. MW-29B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mellisec

SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly Graded SAND (SP), medium Dense, light Gray, wet, fine grained sand. (Alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B

HTW DRILLING LOG

HOLE NO. MW-29B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly Graded SAND, (SP), medium dense, light Gray, wet. (Alluvium)	Hxm=Blk				
	60						
	61	with Trace of medium To coarse grained sand					
	62						
	63	with thin layer of fine To coarse grained sand w/ Trace of fine gravel.					
	64						
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B 789

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-29B

Remedial Investigation Mead NOP | INSPECTOR R. Mallise | SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), Medium Dense, Light Gray, Wet, w/Trace of medium To Coarse Grained sand.					
	69						
	70	W/o medium To Coarse Grained Sand.	HNU = BKG				
	71						
	72						
	73						Note: finished drilling @ 1345 HRS. 6-25-92.
	74						76.0' B.O.B. ~~73.0'~~ Boring Completed as Monitoring well MW-29B. 6-24-92
	75	W/ some medium grained ~~Sand and s~~ and ~~To~~ coarse grained sand					Lost of ~~300~~ 150 gal. of water used during drilling 100 gal. of water used during installation of filter pack sand
	76	W/ Trace coarse sand, medium grained sand ~~grading out~~.					
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-29B790

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-30B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾" O.D. HSA; 4¼" Basket for HSA	8. HOLE LOCATION: MW30B; N. 562464 - E. 2838668
	9. SURFACE ELEVATION: 1166.03'
	10. DATE STARTED: 6-26-92/1132 — 11. DATE COMPLETED: 6-26-92/1350
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: 40'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 71.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
None	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed monitoring well	N/A	MW-30 B	N/A	Robert L Millier

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), Firm, Dark Reddish Gray, moist with occasional rootlets. (Loess)					Boring Logged from cuttings
	1						Boring advanced w/ 7¾" HSAS
	2						
	3						
	4	Becoming Hard					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-30 B | B1 791

HTW DRILLING LOG

HOLE NO. MW-30B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL), Hard Dark Reddish Gray, ~~Hard~~ Dry with occasional rootlets (Loess)					
	6						
		Becoming lighter in color					
	7						
	8	Becoming Firm, Grayish Brown mottled with light Gray, moist with rootholes					
	9						
	10						
	11						
	12						
	13						
			HNU = BKG				
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

792

HTW DRILLING LOG

HOLE NO. MW-30B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallise

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS Above) LEAN CLAY (CL) Firm, Grayish Brown, mottled with light Gray, moist w/ iron oxide Staining (Loess)					
	15						
	16	W/ Iron oxide concretions					
	17						
	18						
	19						
		19.8'					
	20	POORLY GRADED SAND (SP) Loose, light Gray, Dry, Fine To Very fine grained Sand w/ Iron Oxide Staining in upper 6" of The layer (Alluvium)					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

HTW DRILLING LOG

HOLE NO.: MW-30B

Remedial Investigation Mead NOP

INSPECTOR: R. Mallisee

SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, light Gray, Dry Very Fine To Fine grained Sand. (Alluvium)					
	24		HNU = BKG				
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

HTW DRILLING LOG

HOLE NO. MW-30B

Remedial Investigation, Mead NOP | INSPECTOR R. Mallisee | SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Loose, light Gray, Dry, Vf fine To fine grained sand. (Alluvium)					
	33						
	34		HNU = BKG				
	35						
	36						
	37						
	38						
	39		HNU = BKG				
	40	Becoming wet					WATER ENTERED @ 40' AND
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

795

B07NE003702-04904

HTW DRILLING LOG

HOLE NO. MW-30B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP) Loose, light Gray, wet, V. Fine To Fine grained Sand. (Alluvium)					
	42						
	43						
		Becoming fine grained W/Trace of medium grained Sand					
	44						
	45						
	46	W/ a Thin layer of medium To fine grained Sand					
		Becoming fine grained Sand					
	47						
	48						
	49						
	50						

ICORPS/4-15-93

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

HTW DRILLING LOG

HOLE NO. MW-30B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND, (SP) Loose, light Gray, wet, fine grained sand.					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58	w/thin layers of medium to coarse grained sand					
	59						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

797

B07NE003702-04906

HTW DRILLING LOG

HOLE NO. MW-30B

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: R. Mullisee

SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		loose, light Gray, wet,					
		fine grained sand					
	60	w/ thin layers of medium to coarse grained sand to 59.5'					
	61						
	62	w/ trace of medium grained sand.					
	63						
	~~64~~						
	64						
	65						
	66						
		w/ thin layer of medium to coarse grained sand					
	67						
		becoming fine grained sand.					
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30B

798

HTW DRILLING LOG

HOLE NO. MW-30B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP) Loose, light Gray, wet					
	69	becoming medium grained Sand					
	70	w/few fine gravel					
		71.0'	HNU = BKG				71.0'
	71						B.O.B. 71.0' Boring completed as monitoring well MW-30B 6-26-92 Cost 120 gals. during drilling & 100 gal. during filter pack installation. -220 gal. Total lost.
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-30B

799

B07NE003702-04908

HTW DRILLING LOG

HOLE NO.	MW-31B
1. COMPANY NAME	Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR	WCC
SHEET 1 OF 9 SHEETS	
3. PROJECT	Remedial Investigation, Mead NOP
4. LOCATION	Mead, Nebraska
5. NAME OF DRILLER	Matt Cooper
6. MANUFACTURER'S DESIGNATION OF DRILL	CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	7¾" O.D. HSA
8. HOLE LOCATION	MW-31B; N.558626-E.2840298
9. SURFACE ELEVATION	? 1164.65'
10. DATE STARTED	6-23-92/0913
11. DATE COMPLETED	6-23-92/1032
12. OVERBURDEN THICKNESS	
15. DEPTH GROUNDWATER ENCOUNTERED	47'
13. DEPTH DRILLED INTO ROCK	0'
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	N/A
14 TOTAL DEPTH OF HOLE	62'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None	N/A	N/A	N/A	N/A	N/A	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
completed as monitoring well	N/A	MW-31B	N/A	Robert R Mallies

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean Clay (CL), firm, medium brown, damp, (Topsoil)					Logged from cuttings.
	1						
	2						
	3						
	4						LOST 250 gal. of water during drilling.
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-31B B1

800

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP | INSPECTOR Robert R Mallisee | SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same) LEAN Clay (CL), firm, medium brown, damp, (Topsoil)					
	6						
	7						
	8	8.0' Poorly Graded Sand (SP), medium dense, light Gray, Fine Grained, moist, with Limonitic staining (alluvium)					
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32B 801

HTW DRILLING LOG

HOLE NO. MW-31B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Robert R Mullisee

SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(SAME) Poorly Graded sand (SP) Medium Dense, light Gray, Fine grained, moist, with Limonitic staining					
	15	(alluvium)					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

802

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallisee

SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(SAME) Poorly Graded sand (SP) medium Dense, light Gray, Fine grained, moist, with Limonitic Staining					
	24	(alluvium)					
	25	~~becoming Dry~~					
	26						
	27	becoming Dry					
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mellisee

SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(SAME) Poorly Graded sand (SP) medium dense, light Gray, Fine grained, ~~moist~~ dry, ~~with~~ (alluvium)					
	33						
	34						
	35						
	36						
	37	becoming damp ~~moist~~					
	38						
	39						
	40						
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

804

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallison

SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(SMMB) Poorly Graded SAND (SP) medium dense, light Gray Fine grained, dry To moist with some medium grained sand.					
	42	(alluvium)					
		becoming dry					
	43						
		becoming fine grained					
	44						
	45						
	46						
	47	becomes Saturated					← water Enters ATD
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallisee

SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME) Poorly graded SAND (SP), medium dense, light gray, fine grained sand, wet, with Trace fine gravel					
	51	(alluvium)					
	52						
	53	with Trace fine gravel					
	54						
	55						
	56						
	57						
	58	~~with layer of poorly graded gravel lens~~					
	59						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

806

HTW DRILLING LOG

HOLE NO. MW-31B

Remedial Investigation, Mead NOP

INSPECTOR Robert R Mallisee

SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(SAME) Poorly graded SAND (SP) medium dense, light gray, fine grained sand, wet (alluvium)					
	60	with poorly graded gravel lens from 60 to 60.2 ~~(alluvium)~~					
	61	60.0 Poorly Graded Gravel (GP), dense, light Gray, Fine grained sand, wet, with some coarse gravel and medium & fine sand (Alluvium) 62.0					Finished ~~stopped~~ drilling @ 1082 on 6-23-92 at 62'
	62	BOTTOM of Boring 62'					note: Boring completed as monitoring well MW-31B.
	63						note: 250 gals. of water were lost during drilling of the boring.
	64						
	65						
	66						
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31B

HTW DRILLING LOG

HOLE NO. MW-32 B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward Clyde Consultants
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 3/8 OD 4 1/4 ID HSAs	8. HOLE LOCATION: MW-32; N.554445 E.2842034
	9. SURFACE ELEVATION: 1151.91'
	10. DATE STARTED: 6/27/92 @ 1445 — 11. DATE COMPLETED: 6/28/92 @ 0920
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: 44'
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Not Recorded
14. TOTAL DEPTH OF HOLE: 82.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): None

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	N/A	N/A	None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
None	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed monitoring well	N/A	MW-32 B	N/A	Jonathan C Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean Clay (CL) Firm, Dark Brown, moist (TOPSOIL)					Boring logged from cuttings. Boring advanced w/ 7 3/4" OD HSA's.
	1						
	2						
	3						
	3.5'	Lean Clay (CL) Firm, Light Brown to grey, moist, (LOESS)	BZ=BN=BKg				
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-32B | B1 808

HTW DRILLING LOG

HOLE NO. MW-32B

Remedial Investigation, Mead NOP

INSPECTOR J Johnson

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)					
		LEAN CLAY (CL) Firm, Light Brown, moist (Loess)					
	6						
	7						
	8						
	9						
	10						
		Becoming soft to firm					
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32B

809

HTW DRILLING LOG

HOLE NO. MW 32B

Remedial Investigation, Mead NOP

INSPECTOR J Johnson

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN CLAY (CL), Soft to firm, Light Brown, moist (LOESS)					
	15						
	16						
	17	17.0' Poorly Graded Sand (SP) Medium dense Light Brown to tan, dry, fine grained (Alluvium)					
	18						
	19						
	20						
	21						
	22	Becoming mostly Tan					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32B

816

HTW DRILLING LOG

HOLE NO. MW32B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J C JOHNSON

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)					
		Poorly Graded Sand (SP)					
		Medium Dense, Tan, ~~Brn~~, Dry, fine grained	0 ppm				
		(Alluvium)					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW32B

811

HTW DRILLING LOG

HOLE NO. MW-32B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Johnson

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded Sand (SP), medium dense, tan, fine grained, dry (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40	Becoming Moist					
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32B

81

HTW DRILLING LOG

HOLE NO. MW 32 B

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded Sand (SP) medium dense, TAN, fine graded, moist					
	42						
	43						
	44	Becoming wet					STOP 1550 6/27/92 RESUME 6/28/92 0724 WATER ENTERS @ 44' ATD
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32 B

HTW DRILLING LOG

HOLE NO. MW-32B

Remedial Investigation, Mead NOP | INSPECTOR J Johnson | SHEET 7 OF ~~10~~ SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as ABOVE) poorly graded Sand (SP) med dense, light gray, fine grained, wet)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32B

814

HTW DRILLING LOG

HOLE NO. MW 32B

Remedial Investigation, Mead NOP | INSPECTOR J JOHNSON | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded Sand (SP), medium Dense, Light gray, wet fine grained					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32B

HTW DRILLING LOG

HOLE NO. MW 32B

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as ABOVE)					
		Poorly graded Sand (SP) med					
		Dense, light gray, fine grained,					
		wet					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32 B

816

HTW DRILLING LOG

HOLE NO. MW-32B

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as ABOVE) Poorly graded Sand, med dense, Light gray, fine grained, wet					
	78						
	79		HNu BZ=AS=BK				
	80						
	81						Note: 45 gallons of water lost total during drilling. 30 gallons lost in the screened interval
	82						Bottom of Boring 82'. Finished drilling at 0820 6/28/92
	83						Note: Boring Completed with monitoring well MW-32B.
	84						
	85						
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32B

CMA 7/9/92

HTW DRILLING LOG

HOLE NO. MW-33B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward - Clyde Consultants
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N. 558215 E. 2844763
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" O.D. and 4 1/4" I.D. HSA	8. HOLE LOCATION: SE NW NE, 29, T14N, R9E MW-33 south of road line
	9. SURFACE ELEVATION: 1158.13'
	10. DATE STARTED: 7-8-92 at 0700 / 11. DATE COMPLETED: 7-8-92 at 0900
12. OVERBURDEN THICKNESS: ~~116.5 ft ?~~ 84 1/2 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~51 ft 7-8-92 (estimated)
13. DEPTH DRILLED INTO ROCK: 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 84 1/2 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed mon. tong well MW-33B	N/A	MW-33B	N/A	J. M. Gittelsby

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to hard, dark brown, dry (Loess - topsoil)					Boring logged from cuttings. All consistency & density noted is estimated.
	1						
							End log from MW-33D
	2						
							Boring advanced w/ 4 1/4" ID HSA
	3						
	4	becoming light brown					
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-33B | B1

818

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH. SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm to hard, light brown, dry					
	6	[Loess]					
	7						
		WITH CLAY 7.5' POORLY GRADED SAND (SP-SC) medium dense, light brown to tan, dry, with clay (Alluvium)					
	8						
	9						
	10						
	11						
	12	12.0' POORLY GRADED SAND (SP) medium dense, tan, fine grained, dry (Alluvium)					
	13		HNO = BG				
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, tan, fine grained dry					
		(Alluvium)					
	15						
	16						
	17						
	18						
	19						
	20						
	21	becoming mostly grayish tan					
	22	medium to coarse grained sand seam					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-33B

820

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, grayish tan, fine grained, dry, with a trace of medium grained sand (Alluvium)	MNU = BG				
	24		~~BZ=BK=BG~~				
	25						
	26						
	27						
	28						
	29						
	30	Becoming moist ~~moisture content increasing~~					
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(SAME) POORLY GRADED SAND (SP), medium dense, grayish tan, fine grained moist, with a trace of medium sand (Alluvium)					
			HNU=BG				
	34		~~BZ=BH=BG~~				
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterhay

SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan,					
	42	fine grained, moist, with a trace of					
		medium grained sand (Alluvium)					
	43						
			HNU = BG				
	44		~~12=BKGD~~				
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterhouse

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(SAME) POORLY GRADED SAND (SP), medium dense, grayish tan, ~~fine~~ grained, moist, with a trace of medium grained sand (Alluvium) becoming wet					~~80 gal of~~ Aquagel Mixed bentonite drilling fluid: 80 gal H_2O 75 ~~1.5 cu ft bags~~ Aquagel
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59		B2=B11=BG				

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B 824

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterlang

SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(SAME)~~					
		POORLY GRADED SAND (SP), ~~medium~~ dense, grayish tan, fine grained, wet, with some medium grained sand (Alluvium)	HNU = BG				
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), ~~medium~~ dense, grayish tan, fine, wet, with some medium sand	HNU = BG ~~BZ = BK = BG~~				
	69						← Mixed bentonite drilling fluid: 50 gal H_2O ~~75 lb x 50 lb bags~~ Aquagel
	70	becoming fine to medium grained sand with trace of coarse grained sand					
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B

HTW DRILLING LOG

HOLE NO. MW-33B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND/SP) ~~mod~~ dense, grayish tan, fine to medium grained, wet, with trace of coarse grained sand (Alluvium)					
	78						
			HNU=BG ~~B2=B4=B6~~				
	79						
	80						
	81						
	82						
	83						
	84						
		84.5					Stop 7-8-92 0900
	85						Bottom of borehole at 84.5'. (completed boring as monitoring well MW-33B. 510 gal drilling water loss (~160 gal drilling fluid below WT).
	86						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33B 8 of 7

HTW DRILLING LOG

HOLE NO. MW-34B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 9 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" O.D. and 4 1/4" I.D. HSA ~~(0-76 ft)~~	8. HOLE LOCATION: MW-34 - N.554161 E.2846780
	9. SURFACE ELEVATION: 1154.61
	10. DATE STARTED: 6-30-92 0840 hrs; 11. DATE COMPLETED: 6-30-92 1100 hrs
12. OVERBURDEN THICKNESS: ~113 ft (encountered at MW-34A + 34D)	15. DEPTH GROUNDWATER ENCOUNTERED: ~55 ft
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 76 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
none						N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed monitoring well MW-34B		MW-34B		Jon M. Kittelsen

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), hard, dark brown, dry (Loess - topsoil)					Boring logged from cuttings. Boring advanced with 7 7/8" O.D. and 4 1/4" I.D. hollow stem augers (HSA). ~~Material is silty.~~
	1						
	2						
	3						
	4	becoming firm, light brown, moist					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-34B B1

828

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 2 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, light brown, moist (Loess)					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14		B2=BH=Bkg				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

829

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 3 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, light brown, moist (Loess)					
	15						
	16						
	17						
	18						
	19						
	20	20.0 POORLY GRADED SAND (SP), medium dense to dense, grayish tan, dry (alluvium) fine					
	21						
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B 83C

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense to dense, grayish tan, dry (alluvium)					
	24	Fine	B2=BH=Bkg				
	25						
	26						
	27						
	28	becoming medium dense					
	29						
	30						
	31						
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B 831

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan,					
	33	Fine, dry (alluvium)					
	34		B2=B1=Bkg				
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

832

HTW DRILLING LOG

HOLE NO. MW-34B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 6 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan,					
	42	fine, dry (alluvium)					
	43						
	44		B2=BK=BKg				
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 7 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), medium dense, grayish tan, fine, moist (alluvium)					
	51						
	52						
	53						
	54		BZ=BH=BKg				
	55						
	56	becoming wet with trace medium sand					
	57						
	58						
	59		BZ=BH=BKg				

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 8 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), medium dense, grayish tan, fine, wet with trace medium sand (Alluvium)					
	60						
	61						
	62						
	63						
	64		S2=BH=Bkg				
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

HTW DRILLING LOG

HOLE NO. MW-34B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan,					
	69	fine, wet, with trace					
		medium sand (alluvium)					
	70						
	71						
	72						
	73						
	74		~~B2~~ B1 = ~~B4~~ g				
	75						
	76					Note 8	Finished drilling @ 1100 HRS ~~Stop~~ 6-30-92 ~~1100~~ Bottom of boring at 76'. Completed boring as monitoring well MW-34B. Used 310 gal of water during drilling.
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34B

83

HTW DRILLING LOG

HOLE NO. MW-35B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Peyton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 1/8" O.D. HSA	8. HOLE LOCATION: MW-35-N.551644-E.2851919
	9. SURFACE ELEVATION: 1137.38
	10. DATE STARTED: 6-25-92 0922 hrs
	11. DATE COMPLETED: 6-25-92 ~~1225 hrs~~ 1050 HRS
12. OVERBURDEN THICKNESS: ~~~93 ft (MW-35D)~~	15. DEPTH GROUNDWATER ENCOUNTERED: ~50 ft
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 68 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none	—	—	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
none	—	—	—	—	—	%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	—	MW-35B	—	Jon M. Kittelsy

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to ~~stiff~~, dark brown to black, dry, w/silt & ~~%~~ (Topsoil)					Boring logged from cuttings.
	1						
	2						
	3						
	35'	LEAN CLAY (CL), firm, light brown, moist (Loess)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

HTW DRILLING LOG

HOLE NO. MW-35B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL), firm, light brown, moist (Loess)					
	6						
	7						
	8						
	9		B2=BK1=BKg				
	10						
	11						
	12						
	13						
	14		B2=BK1=BKg				

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 838

HTW DRILLING LOG

HOLE NO. MW-35B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL), fm,					
		light brown, moist (loess)					
	15						
	16						
	17						
		17.5'					
		Poorly graded SAND (SP), loose,					
	18	tan, fine (Eolian sand)					
	19		B2=BK=BKg				
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 83

HTW DRILLING LOG

HOLE NO. MW-35B

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP),					
	24	loose, tan, fine (Eolian sand)					
	25						
	26						
	27						
	28						
	29			B2=BH=Bkg			
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 84(

HTW DRILLING LOG

HOLE NO. MW-35B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), loose, tan, fine (Eolian sand)					
	33	moist					
	34						
	35						
	36						
	37						
	38						
	39		B2=BH1=Bkg				
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded sand (SP), loose, tan, fine, moist (Bolon sand)					
	42						
	43						
	44						
	45						
	46						
	47						
	48						
	49		B2=BH=BKg				
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 84

HTW DRILLING LOG

HOLE NO. MW-35B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	51	Poorly graded SAND (SP), loose, tan, fine, moist (Eolian sand)					
	52						
	53						
	54	becoming fine with occasional medium sand, wet					
	55						
	56						
	57						
	58						
	59		B2=BH=BKg				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 84

HTW DRILLING LOG

HOLE NO. MW-35B

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), loose, tan, fine, wet, with trace of medium sand (Eolian sand)					
	60						
	61						
	62						
	63						
	64						Note: used 150 gallons of water during drilling. ~~note~~
	65						~~Complete boring as monitoring well: Screen at 57'-67' Filter pack 1155-1315. Grouted to 10' bgs at 1725.~~
	66						Note: completed boring as monitoring well MW-35B.
	67						Finished HSA drilling @ 1050 HRS. 6-25-92
	68						Bottom of borehole 68'

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 84

HTW DRILLING LOG

HOLE NO. MW-36B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 4 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-6': 6" CFA; 6'-28.5': 5 7/8" Tricone roller bit; - rotary/wash boring	8. HOLE LOCATION: MW-36 - N. 551975 - E. 2857132
	9. SURFACE ELEVATION: ~~1077 ±~~ 1076.42
	10. DATE STARTED: 8-8-92/0904 HRS; 11. DATE COMPLETED: 8-8-92/1025 HRS
12. OVERBURDEN THICKNESS: ~~NA~~ 28.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 0.5' (surface water)
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 28.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed ~~Shallow~~ Monitoring well		MW-36B		Robert R Mallison

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN ~~SILTY~~ CLAY (CL) firm, dark brown, moist, with organics. (Topsoil)					Boring logged from cuttings and log of MW-36D. ▽ ATD Water detected advanced Boring ~~drilled~~ with 6" CFA.
		- becomes wet					
	1						
	2						
		~~2.5'~~					
	3	SILT (ML) firm, dark brown to black, wet, with trace fine sand. (Alluvium)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-36B B1

84

B07NE003702-04954

HTW DRILLING LOG

HOLE NO. MW-36B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		SILT (ML) firm, dark brown to black, wet, with trace fine sand. (Alluvium)					Stopped drilling with 6" CFA at 6' 8-8-92/0910
	6						Began rotary/wash boring with 5 7/8" Tricone roller bit and water 8-8-92/0937
		with some gray mottling					
	7						
	8						
	9						BZ = BKG
	10	becomes firm to stiff, gray.					
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36B

HTW DRILLING LOG

HOLE NO. MW-23B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) SILT (ML) firm To stiff, gray, wet, with Trace very fine grained sand. (Alluvium)					
	15	15.0' Poorly Graded SAND (SP) dense, light brown, wet, fine grained, with Trace medium To coarse grained sand. (Alluvium)					
	16						
	17						
	18	become fine To medium grained sand.					
	19						BZ= BKG
	20						
	21	with Trace fine gravel.					
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36B

HTW DRILLING LOG

HOLE NO. MW-36B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND (SP) dense, light brown, wet, fine to medium grained with trace coarse sand to fine gravel. (Alluvium)					
	24						
	25						
	26						
	27						NOTE: Est. drilling fluid loss in screen interval: 10 gal. 30 gal. loss flushing drilling fluid, 20 loss in placement of filter pack. Total water loss = 60 gal.
		becomes medium dense.					BZ = BKG
	28						
	29						Bottom of Boring 28.5' 8-8-92/1025 hrs. Completed boring as shallow monitoring well MW-36B
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36B

848

HTW DRILLING LOG

HOLE NO. MW37B

SHEET 1 OF 4 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANY
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER - DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8 TRICONE	8. HOLE LOCATION: ~NE SEC 3 T13N R9E
	9. SURFACE ELEVATION:
	10. DATE STARTED: 6-17-92 / 0900 — 11. DATE COMPLETED: 6-17-92 / 1245
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUID
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE:	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW-37B		LISA TRAUAGLIN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) SOFT, DARK-BROWN, MOIST, W/ TRACE FINE, AND W/ ROOTLETS					BORING ADVANCED W/ 7 7/8 TRICONE BORING LOG FROM CUTTINGS ~~D-1~~ ~~D-2~~
	1						1
	2						LAT 2
		POORLY GRADED SAND (SP) FINE BROWN W/ IRON STAINING, FINE, DRY					
	3						3
	4						LAT 4
	5						5

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 84B1

B07NE003702-04958

HTW DRILLING LOG

HOLE NO. MW-37B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6						
	7						
	8						
	9						
	10						
	11	POORLY GRADED SAND, DENSE, GRAY, FINE, MOIST					
	12						
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 850

HTW DRILLING LOG

HOLE NO. MW-37B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15						
	16	W/SOME SILT					
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 851

HTW DRILLING LOG

HOLE NO. MW-37B

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	LEAN CLAY (CL) FIRM, LT. BROWN, W/OCCASSIONAL IRON STAINING MOIST. W/TRACE FINE SAND					
	25	POORLY GRADED SAND (SP) LOOSE, BROWN, FINE TO MED. WET					
	26						
	27						
	28	BECOMING MED W/COARSE					
	29	— — — — —					
	30	~~POORLY GRADED SAND (SP) LOOSE, BROWN, COARSE WET, W/TRACE OF FINE GRAVEL.~~					B.O.H 29.5' COMPLETE BORING AS MONITORING WELL 6-17-92 TOTAL DRILLING WATER LOSS = 40 GAL
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 85%

HTW DRILLING LOG

HOLE NO. MW-40B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: T. Paxton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0-6'; 5 7/8" tricone roller bit 6'-65.5	8. HOLE LOCATION: MW-40-N.567321-E.2895425
	9. SURFACE ELEVATION: 1169.96
	10. DATE STARTED: 7-30-92 0829 / 11. DATE COMPLETED: 7-30-92 1012
12. OVERBURDEN THICKNESS: ~~NA~~ 65.5	15. DEPTH GROUNDWATER ENCOUNTERED: 31.5 (in MW-40A)
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 65.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA ~~NA~~

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed ~~upon completion of hole~~	NA	MW-40B	NA	John S Mealor

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, very dark brown, moist, with rootlets (TOPSOIL)					(Advanced) Boring with 6" CFA.
	1	LEAN CLAY (CL), hard, brown, moist ~~(B HORIZON)~~					Soil descriptions obtained from cuttings and from detailed log of MW-40A.
	2	LEAN CLAY (CL), firm to hard, light brown, dry (LOESS)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-40B

HTW DRILLING LOG

MW-40B

Remedial Investigation Mead NOP | INSPECTOR: S. Healan | SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY (CL), firm to hard, light brown, dry (LOESS)					
	6	Becomes mottled with light gray, with iron staining and carbon	B2-B6				Switch to RNB @ 0841. ~~the 140 gallons water, no damage.~~ ~~Advancing boring~~ with 5 5/8" tricone roller bit and water (140 gals)
	7				Boring continued		
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-40B

854

HTW DRILLING LOG

MW-40B

Remedial Investigation Mead NOP | INSPECTOR: J. Nealon | PAGE 3 OF 8 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	15	(Same as above) LEAN CLAY (CL), firm to hard, light brown and light gray dry, with iron staining (?) and carbon (?) (Loess)					
	16	POORLY GRADED SAND (SP), medium dense (est), light gray, dry, fine grained (ALLUVIUM)	No				
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92-L-0030

HOLE NO.: MW-40B

85!

HTW DRILLING LOG

MW-40B

Remedial Investigation, Mead NOP | INSPECTOR: J S Nealon | PAGE 4 of 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense (est), light gray, dry, fine grained (ALLUVIUM)					
	24		BZ=BG				
	25						
	26						
	27	With trace medium grained sand					
	28						
	29						
	30						
	31						
		Becomes wet					Water at 31.5' in MW-40A
	32						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 921KW010

HOLE NO.: MW-40B

85C

HTW DRILLING LOG

MW-40B

Remedial Investigation Mead NOP | INSPECTOR: J Nealon | SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense (est), light gray, fine grained, wet with trace of medium grained sand (alluvium)					
	34						
	35						
	36						
	37						
	38						
	39						Added 50 gallons water.
	40						
	41						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW0010

HOLE NO.: MW-40B

85

HTW DRILLING LOG

MW-40B

Remedial Investigation, Mead NOP | INSPECTOR: J O'Neelon | SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	42	(Same as above) POORLY GRADED SAND (SP), medium dense (est), light gray, wet, fine grained, with trace medium to coarse grained sand (ALLUVIUM) to some					
	43						
	44						Added 1/2-50# Aquagel and 100 gallons water.
	45						
	46						
	47	without medium and coarse sand					
	48						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-40B 858

HTW DRILLING LOG

MW-40B

Remedial Investigation Mead NOP

INSPECTOR: J Mealon

SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	51	(SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense (est), light gray, wet, fine grained (ALLUVIUM)					
	52						
	53						
	54						Added ~~1/2-50#~~ 25 ~~bag~~ Aquagel and 50 gallons water.
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92LW0[illegible]

HOLE NO.: MW-40B 85[illegible]

HTW DRILLING LOG

MW-40B

Remedial Investigation, Mead NOP | INSPECTOR: John Nealon | SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	60	(SAME AS ABOVE) POORLY GRADED SAND (SP), medium dense (est), light gray, wet, fine grained (ALLUVIUM)					
		With some medium to coarsegrained sand					
	61						
	62						
							Drilling fluid losses: 0-54', 140 gal; 54'-65.5', 70 gal (screened interval); flushing, 20 gal; filter pack placement, 20 gal
	63						
	64						
	65						
			BZ=BG				Added 25 gallons water.
	66						Bottom of Boring @ 65.5 feet at 1012 hours, 7-30-92.
	67						Monitoring well MW-40B installed upon completion of hole. Grouting @ 10.1 lb/gal completed at 1405, 7-30-92.
	68						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921NW010

HOLE NO.: MW-40B 861

MEW 8-9 8/11/92

HTW DRILLING LOG

HOLE NO. MW-41 B

1. COMPANY NAME Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR WINNEK COMPANIES
SHEET 1 OF 6 SHEETS	
3. PROJECT Remedial Investigation, Mead NOP	4. LOCATION Mead, Nebraska N.567351 - E.2846781
5. NAME OF DRILLER Robert Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL Gardner-Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8-inch-dia tri-cone roller-bit	8. HOLE LOCATION NE ~~NW~~ SW Sec 16 T14N R9E
	9. SURFACE ELEVATION 1165.85
	10. DATE STARTED 8-8-92 16:00 / 11. DATE COMPLETED 8-9-92 9:50
12. OVERBURDEN THICKNESS 47.0 '	15. DEPTH GROUNDWATER ENCOUNTERED Masked with drilling fluids
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE 47.0 '	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) 8-9-92 Adjacent MW-41A ~30 ft BGS

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
—	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	N/A	X	N/A	Gene Papenmaker

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), black, soft, wet w/ roots [Topsoil]	N/A	N/A	N/A	N/A	Boring advanced w/ 5 7/8-inch-dia tri-cone roller bit and drilling water
	1						
							WC > PL
	2						Boring logged from cuttings, boring log MW-41A, and drilling characteristics
	3						
	4	Becoming brown, moist [Loess]					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-41 B B1 861

HTW DRILLING LOG

HOLE NO. MW-41B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), firm, brown, moist [LOESS]	N/A	N/A	N/A	N/A	
	6	Becoming hard, light brown, dry w/ orange mottling					
	7						
	8						
	9						
	10						
	11						
	12	Becoming soft					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41B

86

HTW DRILLING LOG

HOLE NO. MW-41B

Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LEAN CLAY (CL), soft, light brown, wet	N/A	N/A	N/A	N/A	
	15						
	16						
	17						
	18						End of shift 8-8-92 17:00
	19	POORLY GRADED SAND (SP), dense, light brown, fine grained					Drilling resumed 8-9-92 7:30
	20	w/ trace of coarse grained sand (disseminated)					50 lbs of Aquagel bentonite added to drilling fluid
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41B

HTW DRILLING LOG

HOLE NO. MW-41B

Remedial Investigation, Mead NOP | INSPECTOR Gene Pagnako | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense, lt grayish yellow, fine grained w/ trace of medium grained sand					
	24						
	25						
	26						
	27						
	28						
	29						
	30						Approximately 50 gals of water (mud) lost
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41B

HTW DRILLING LOG

HOLE NO. MW-41 B

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, fine grained					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41 B

865

HTW DRILLING LOG

HOLE NO. MW-41B

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	42						
	43						
	44						
	45						
	46						
							B.O.B. 47.0 ft
	47						50 lbs of bentonite added to drilling fluid for stabilization of borehole
	48	Becoming loose, fine to medium grained w/ trace of fine gravel					Monitoring well installed upon completion
	49						Estimated water loss ~ 100 gals
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41B

ICORPS/4-15-92

861

CDA 8/7/92

HTW DRILLING LOG

HOLE NO. MW-42B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-16': 6" CFA; 16'-64.5': 5 3/8" Tricone rollerbit - rotary/washboring	8. HOLE LOCATION: MW-42 - N.556909 - E.2851741
	9. SURFACE ELEVATION: 1144.12
	10. DATE STARTED: 8-6-92/1031
	11. DATE COMPLETED: 8-6-92 / 1517
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 50'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 64.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed shallow monitoring well		MW-42B		Robert R Mallise

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SILTY CLAY (CL) stiff, dark brown, moist, with organics. (Topsoil)					Boring logged from observation of cuttings and log of MW-42D. Boring advanced with 6" CFA
	1						
	2	2.0' LEAN CLAY (CL) stiff, light brown, moist. (Loess					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-42B

B1 86

HTW DRILLING LOG

HOLE NO. MW-42B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) STIFF, light brown, MOIST. (LOESS)					
	6						
	7						
	8						
	9						BZ = BKG
	10						
	11						
	12						
	13						Stopped drilling WITH 6" CPAAT 14' 8-6-92/1040
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42B 868

HTW DRILLING LOG

HOLE NO. MW-42B

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (LL) STIH, light brown, moist (LOESS)					Began rotary/wash boring with 5 7/8" Tricone roller bit at 14' 8-6-92/1109
	15	with SILT					
	16	16.0 Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained (Alluvium)					
	17						
	18						
	19						BZ = BKG
	20	with some medium grained sand.					
	21						
	22						
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42B

HTW DRILLING LOG

MW-42B

Remedial Investigation Mead VOP | INSPECTOR RRM | SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Medium dense, light brown, MOIST, Fine grained with trace medium sand. (Alluvium)					
	24						
	25						
	26						
	27						
	28						
	24						BZ = BKG
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921-W030

HOLE NO.: MW-42B

870

HTW DRILLING LOG

MW-42B

Remedial Investigation Mead VOP | INSPECTOR: RRM | PAGE 5 OF 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained with some medium grained sand. (Alluvium)					
	33						
	34	34.0 — Poorly Graded SAND (SP) medium dense, multi-colored, moist, fine to medium grained with trace coarse sand to fine gravel. (Alluvium)					
	35						
	36						
	37						
	38						
	39						BZ = BKG
	40						
	41						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42B

871

HTW DRILLING LOG

MW-42B

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium Dense, multicolored, moist, fine to medium grained with trace coarse sand to fine gravel. (Alluvium) 42.0					
	42						
		Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained (Alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						Ba = BKG
	50	becomes wet					WATER ENTERS AT DEPTH 50'

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42B

87%

HTW DRILLING LOG

MW-42B

Remedial Investigation Mead NOP | INSPECTOR: RRM | SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, wet, fine grained. (Alluvium)					
	51						
	52	becomes dense					
	53						
	54						
	55						
	56						
	57						
	58	WITH Trace medium To coarse sand and fine gravel.					BE = BKG
	59						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-42B

87

HTW DRILLING LOG

MW-42B

Remedial Investigation Mead NOP

INSPECTOR: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) dense, multi-colored, wet, fine grained with Trace Medium to coarse sand & fine gravel. (Alluvium)					
	60						
	61						
	62						
	63						Note: Est. water loss in screen interval: 20 gal. drilling fluid 50 gal. water to thin drilling fluid & 20 gal. used to place filter pack Total loss = 90 gal 42.5'
	64	becomes medium to coarse grained with Trace fine gravel.					Bottom of Boring 64.5'
	65						Boring completed as shallow monitoring well MW-42B
	66						Finished drilling @ 8-6-92 @ 1517
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42B

87

ICORPS/4-18-92

CORA 8/5/92

HTW DRILLING LOG

HOLE NO. MW-43B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" Tricone roller bit - rotary/wash boring	8. HOLE LOCATION: MW-43 - N.559646 - E.2851617
	9. SURFACE ELEVATION: 1140.51
	10. DATE STARTED: 8-4-92/1531 — 11. DATE COMPLETED: 8-5-92/0904
12. OVERBURDEN THICKNESS: —	15. DEPTH GROUNDWATER ENCOUNTERED: 43.5'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 52.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed shallow monitoring well	X	MW-43		Robert R Mallice

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SILTY CLAY (CL) firm, dark brown, moist, with organics (Topsoil)					Boring advanced with 5 7/8" Tricone roller bit - rotary/wash boring. (Surface casing set to 5' with 6" CFA)
	1	1.0' LEAN CLAY (CL) firm, light grayish brown, moist (Loess)					Boring logged from cuttings and log of MW-43D.
	2						
		Becomes light brown					
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-43B | B1 87

HTW DRILLING LOG

HOLE NO. MW-43B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) firm, light brown, moist (LOESS)					
	6						
	7						
	8						
	9						BZ = BKG
	10						
	11	11.0' SILT (ML) Soft, light gray, moist with some light brown, clay (Alluvium)					
	12						
	13						
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B

87

HTW DRILLING LOG

HOLE NO. MW-43B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) SILT (ML) soft, light gray, moist with some light brown clay. (Alluvium)					
	15						
	16						
	17	17.0' Poorly Graded SAND (SP) medium dense, light gray, very fine to fine grained. (Alluvium)					
	18						
	19	becomes fine grained					BZ = BKG
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B

87

HTW DRILLING LOG

HOLE NO. MW-43B

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light gray, moist, fine grained (Alluvium)					
	24						
	25						
	26	With Trace of medium grained sand.					
	27						
	28						Stopped RWB at 29.0' 8-4-92/1638
							BZ = BKG
	29						Started RWB at 29.0 8-5-92/0824
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-43B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained					
	33	with Trace medium grained sand. (Alluvium)					
	34						
	35						
	36						
	37						
	38	with Trace coarse sand ~~[illegible]~~.					
	39	becomes fine grained					BZ=BKG
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B 87

HTW DRILLING LOG

HOLE NO. MW-43B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BRM

SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light gray, moist, fine grained (Alluvium)					
	42						
		with some multi-colored medium to coarse grained.					
	43						
		becomes wet.					
	44						
	45	with Trace of fine gravel.					
	46						
	47						
	48						
	49						
	50						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B

880

HTW DRILLING LOG

HOLE NO. MW-43B

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) POORLY Graded SAND (SP) medium dense, light gray-multi-colored, wet, fine grained with coarse sand and fine gravel. (Alluvium)					NOTE: Est. drilling fluid loss in screen-interval 20gal. drilling fluid 40gal. To flush drilling fluid + 10gal To place filter pack. Total water loss = 70gal.
	51						
							Stopped rotary/wash boring at 52' 8-5-93/0904 52'
	52						Bottom of Boring 52.0'
	53						Boring completed as shallow monitoring well MW-43B
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43B

881

HTW DRILLING LOG

HOLE NO. MW-44B

SHEET 1 OF 1 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drag bit rotary/washboring; 6" CFA	8. HOLE LOCATION: N.555721 - E.2855304
	9. SURFACE ELEVATION: 1090.24
	10. DATE STARTED: 7-30-92/0730
	11. DATE COMPLETED: 7-30-92/1020
12. OVERBURDEN THICKNESS: 30.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 15.0
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 30.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ N/A	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
~~none~~ NA	NA	NA	NA	NA		

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed ~~shallow~~ monitoring well	NA	MW-44B		Robert R Mallsee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Silty CLAY (CL) Firm, black, moist, sandy, with abundant organics (OL) (Topsoil)					Boring logged from cuttings
	1						Boring advanced with 6" ~~drag bit/rotary wash boring and bentonite slurry~~ CFA
		1.5					
	2	Silt with Sand (ML) firm, dark brownish gray, moist with iron oxides staining with root and roothairs (colluvium & Alluvium)					
	3	Becoming dark grayish brown					
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

HTW DRILLING LOG

HOLE NO. MW-44B

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		5.5					
	6	LEAN CLAY WITH SAND (CL) firm, blush gray with yellow mottling with trace of silt, fine sand & roothairs. (Alluvium)					
	7						
	8	with clayey sand (SC) and iron-manganese(?) staining					
	9						BZ = BKG
		Becoming soft, olive and blushing gray with iron(?) oxides staining & roothairs.					
	10						
		Becoming olive gray with trace of course grained sand					
	11						
	12						
	13						
		Becoming dark gray. wet					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44B

HTW DRILLING LOG

HOLE NO. MW-44B
SHEET 3 OF 4 SHEETS
Remedial Investigation Mead NOP
INSPECTOR RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as 3 Above) SANDY LEAN CLAY (CL) Soft, dark olive gray, wet with some fine grained sand & Trace of coarse Sand (Alluvium) 15.6'					Stopped drilling with 6" CFA 7-30-92/0740 @ 15.0 15.0'
	15					Boring continued	~~Began rotary/ rock boring~~ with 6" drag bit @ 15' 7-30-92/0810 and bentonite slurry
		Poorly Graded SAND with clay (SP-SC) very loose, gray, wet, very fine To fine grained with Trace of clay. (Alluvium)					
	16						
	17						
	18						
	19						BZ = BKG
	20						
		becomes loose					
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44B

884

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-44B
SHEET 4 OF 11 SHEETS

Remedial Investigation, Mead NOP
INSPECTOR RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND with CLAY (SP-SC) loose, dark gray, wet, very fine to fine grained with trace of clay (Alluvium)					
	24						
	25						
	26	~~26.0~~					
		26.5 Lean CLAY with SAND (CL) firm, medium dive gray, wet with organic matter and trace of fine sand. (Alluvium)					
	27						
	28						Stopped rotary washboring with 6" drag bit @ 30' 7-30-92/0841
	29	29.0' Poorly Graded SAND (SP) medium dense light yellowish gray, wet, fine grained with trace course sand and fine gravel					BZ = BKG Boring caved to 29.0'
	30						30.0' NOTE: Est. drilling fluid loss in screen interval 20 gal. 60 gal. Total wash drilling fluid
	31						Boring completed as Shallow Monitoring well ~~MW-44B~~
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44B

88

ICORPS/4-15-92

CGH 7/24/92

HTW DRILLING LOG

HOLE NO. MW-45B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNEK COMPANIES
SHEET 1 OF SHEETS 4	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.554523 - E.2857397
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" TRICONE BIT	8. HOLE LOCATION: SW SW SW SECTION 26 T14N R9E
	9. SURFACE ELEVATION: 1079.16
	10. DATE STARTED: 07.23.92 @ 11:15 / 11. DATE COMPLETED: 07.23.92 @ 14:18
12. OVERBURDEN THICKNESS: ≈ 28.5'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: ≈ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 28.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well ~~installed well~~ installed	NA	MW-45B		R.G. PACHECO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), soft, black moist w/roots (Topsoil)					Boring Advanced with a 5 7/8" tricone bit. and water (no bentonite)
	1						
	2	Becoming grayish-black					
	3	~~LEAN CLAY (CL), soft, grayish-black~~					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1 MW-45B

HTW DRILLING LOG

MW-45B

Remedial Investigation, Mead NOP

R.G. PACHECO

SHEET 2 OF 4

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	5	(SAME)					
	6	LEAN CLAY (CL) soft, grayish black					
	7						
	8						
	9						
	10						
	11						
	12	Poorly Graded Sand (SP), Medium dense to dense, dark grey, very fine to fine, moist grained					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45B 88'

HTW DRILLING LOG

HOLE NO. MW-45B

Remedial Investigation Mead NOP

INSPECTOR R. G. PACHECO

SHEET 3 OF SHEETS 4

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	Poorly graded sand (SP), very loose, medium grey, very fine to fine grained, wet					
	15						
	16						
	17						
	18	Poorly graded sand WITH GRAVEL (SP), medium dense, orange-tan, very fine to fine grained, wet w/some fine gravel					
	19						
	20						
	21						
	22	Becoming ~~Poorly graded sand (SP), medium dense orange-tan~~, fine to medium grained, w/some fine gravel					
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45B

HTW DRILLING LOG

HOLE NO. MW-45B

Remedial Investigation, Mead NOP

NSPE: R.G. PACHECO.

SHEET 4 OF SHEETS 4

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	~~FIELD SCREENING RESULTS d~~	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23						
	24	Poorly graded sand (SP) dense, orange-tan, fine to medium grained w/trace					
	25	of fine gravel					
	26	Becoming ~~Poorly graded sand (SP)~~ medium dense ~~orange-tan, fine to medium w/~~					
	27	~~trace of gravel~~					
	28	~~Poorly graded sand (SP) medium dense, orange-tan~~ medium to coarse w/few fine gravel					~~Tricone 5 7/8" down to 28.5'~~
							BOB @ 28.5' 7-23-92 Boring completed as monitoring well
							Total drilling water lost 125 gal (est.) Drilling water lost in screen interval 83 gal (est.)

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45B

88

CAH 7/24/92

HTW DRILLING LOG

HOLE NO. MW-46B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 1 SHEETS.	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: T. Paxton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-~~5~~ 6" CFA; 5-34' 5 7/8" tricone roller bit	8. HOLE LOCATION: MW-46 - N.554664-E.2859808
	9. SURFACE ELEVATION: ~~1079.2~~ 1080.39
	10. DATE STARTED: 7-24-92 0814 / 11. DATE COMPLETED: 7-24-92 1030
12. OVERBURDEN THICKNESS: 34'	15. DEPTH GROUNDWATER ENCOUNTERED: 2' 0825, 7-24-92
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 34'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA ~~None~~	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
non, ~~well installed upon completion of boring~~	NA	MW-46B	NA	J. Mealor

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, ~~grey~~ dark brown to black, moist, with roots (TOPSOIL)					Boring advanced with 6" CFA. Boring logged by cuttings.
	1	SANDY SILT (ML), soft, grayish brown, ~~moist~~ wet (ALLUVIUM)	1				Water at 2' (surface water)
	2						Soil description determined from cuttings and from detailed log of Boring MW-46D
	3						
	4	LEAN CLAY (CL), firm, black, wet (ALLUVIUM)	4				~~[illegible]~~
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-46B

890

HTW DRILLING LOG

MW-46B

Remedial Investigation Mead VOP | INSPECTOR John Mealon | SHEET 2/5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h Stopped CFA drilling @ 0700 hrs
		(Same as above) ~~SANDY SILT (ML), soft, grayish brown, wet (ALLUVIUM)~~					Switch to RWB @ 0906 hrs.
	6	LEAN CLAY (CL), firm, black, wet (ALLUVIUM)					~~Added 1/50# bag~~ Aquagel to 140 gal water
	7						Boring continued w/ 5 7/8" dia. tri-cone roller bit and bentonite slurry
	8						
	9						
	10						
	11						
	12	POORLY GRADED SAND (SP), medium dense?, dark gray, very fine-fine grained (ALLUVIUM) wet	12				
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead VOP 92 [illegible] 10

HOLE NO.: MW-46B

89.

HTW DRILLING LOG

MW-46B

Remedial Investigation Mead VOP | INSPECTOR: J S Nealon | SHEET 3 OF 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, dark gray, wet, very fine to fine grained (ALLUVIUM)					
	15						
	16	With clay or silt zones					
	17						
	18						
	19						
	20						
	21						
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-46B

89

HTW DRILLING LOG

MW-46B

Remedial Investigation Mead VOP | INSPECTOR John S Nealon | PAGE 4/5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as above) POORLY GRADED SAND (SP), medium dense?, dark gray, wet, very fine to fine grained, with clay or silt zones (ALLUVIUM)					
	24						
	25						
	26						
	27	POORLY GRADED SAND (SP), medium dense, multicolored, wet, medium grained, with very fine to fine grained sand (ALLUVIUM)	27				
	28						
	29						Added 50# ~~bag of Aquagel~~. bentonite
	30						
	31						
	32						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92-0030

HOLE NO.: MW-46B

89:

B07NE003702-05002

HTW DRILLING LOG

MW-46B

Remedial Investigation Mead NOP | INSPECTOR: J. Nealon | SHEET 5 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(same as above) POORLY GRADED SAND (SP), medium dense?, multi-colored, medium grained, with fine to very fine grained sand (ALLUVIUM)					
	34						Bottom of Boring @ 34 @ 1030 hrs.
	35						Monitoring well installed upon completion of hole. Complete at 1130 hrs 07-24-92.
	36						Estimated water losses: 9 gal 0-19' 25 gal 19-34' 50 gal flushing 25 gal placing filter pack
	37						Grout at 10.4 lb/gal.
	38						
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW010

HOLE NO.: MW-46B 89

ICORPS/4-15-92

MEW 8-10 CEH 8/11/92

HTW DRILLING LOG

HOLE NO. MW-47B

SHEET 1 OF 1 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants

2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES

3. PROJECT: Remedial Investigation, Mead NOP

4. LOCATION: Mead, Nebraska → N.579958.21 - E.2826310

5. NAME OF DRILLER: Bill Vick

6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CFD 1250

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 5/8 TRICONE ROLLER BIT

8. HOLE LOCATION: SW SE SW Sec 35 T15N R8E N' Admin Area

9. SURFACE ELEVATION: ~~NA~~ 1199 ± 1199.31

10. DATE STARTED: 8/10/92 @ 9:30

11. DATE COMPLETED: 8/10/92 @ 15:00

12. OVERBURDEN THICKNESS: 86.6' ~~126.0~~ CEH 8/11/92

13. DEPTH DRILLED INTO ROCK: NA

14. TOTAL DEPTH OF HOLE: 86.6'

15. DEPTH GROUNDWATER ENCOUNTERED: NA

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed monitoring well	NA	MW-47B	NA	J. Heckt

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN, Highly organic CLAY (OL) firm dk. brown w/ occ. Root hairs (top soil)					BEGAN 8/10/92 9:30 Boring advanced with 5 5/8 Tricone roller bit ~~no sampling~~ Logged by cuttings
	1						Drilling Fluids - 50 lbs bentonite + 200 gallons H_2O
		Lean CLAY (CL) firm light brown (loess)					
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-47B

HTW DRILLING LOG

HOLE NO. MW-47B

Remedial Investigation, Mead NOP

INSPECTOR J. Heck

SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					logged by cuttings
		Lean CLAY, (CL) soft, lt. brown & gray					
	6	(loess)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47B

89

HTW DRILLING LOG

HOLE NO. mw-47B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) Lean CLAY (CL) soft, lt brown & orey (loam)					~~logged by auger~~
	15						
	16	Clayey SAND (SC) med dense lt. brown, fine to v. fine grained (Alluvium)					
	17						
	18						
	19						
	20	Poorly graded SAND (SP) med dense, Tan, fine grained trace of med sand (alluvium)					
	21						
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-47B

89

B07NE003702-05006

HTW DRILLING LOG

HOLE NO. MW-47B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 4 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					logged by cuttings
		Poorly graded SAND (SP)					
		med dense, tan, fine grained					
	24	w/ trace med sand					
		(alluvium)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47B

898

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-47B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					~~Triggered by cutting~~
		poorly graded SAND (SP)					
		med dense, Tan, fine grained					
	33	w/trace med sand					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47B

HTW DRILLING LOG

MW-47B

Remedial Investigation, Meau NOP

INSPECTOR: J. Hecht

PAGE 6 OF 9 PAGES

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					~~logged by cuttings~~
		Poorly graded SAND (SP)					
		med dense, lt brown					
	42	fine grained w/ trace med sand					
		(alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Meau NOP 921KW030

HOLE NO.: MW-47B

90(

B07NE003702-05009

HTW DRILLING LOG

MW - 4713

Remedial Investigation, Meadow NOP | INSPECTOR: J. Hecht | PAGE 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same)					logged by cuttings
		Poorly graded SAND (SP)					
		med dense lt brown					
	51	fine to v. fine grained w/ trace					
		med sand					
		(alluvium)					
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Meadow NOP 92KW030

HOLE NO.: MW-47B

901

B07NE003702-05010

HTW DRILLING LOG

MW-47B

Remedial Investigation Mead NOP | T. Hecht | 7 of 18

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) Dense, blue-grey, v. fine grained (alluvium)					logged by cuttings
	60						
	61						
	62						
	63	Becoming fine to v. fine grained with w/ little med to coarse sand					
	64						
	65						
	66	becoming v. fine grained					
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47B

ICORPS/4-15-92

HTW DRILLING LOG

mw-47A

Feeds Investigation Mem: NOP | INSPECTOR: T. Hecht | Pg 8

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					logged by cuttings
		Poorly graded SAND (SP)					
		dense, grey, v. fine grained					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

PROJECT: [illegible]

mw-47A

90

B07NE003702-05012

HTW DRILLING LOG

MW-47B

Remedial Investigation Mcas NOP | NSPECTOR: J. Hecht | SHEET 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					m ~~Logged by Cutting~~
		Poorly graded SAND (SP)					100#
		dense, grey, V. fine					added ~~2 bags~~
	78	grained (alluvium)					bentonite +
							200 gallons H_2O
	79						
	80						
	81						
	82						
	83						
	84						
	85	w/ Trace med to coarse grained Sand					
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mcas NOP 92KW030

HOLE NO.: MW-47B

HTW DRILLING LOG

MW-47A

Remedial Investigation Mea NOP

INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) dense, grey, v-fine (alluvium)					Logged by cutting
	87						BOH = 86.6 monitoring well installed upon completion 8/10/92
	88						water lost in screened interval ≈ 200 gal
	89						
	90						
	91						
	92						
	93						
	94						
	95						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mea NOP 92KW030

HOLE NO.: 90

MEW 8-11 8/11/92

HTW DRILLING LOG

HOLE NO. MW-48 B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N. 574823 - E. 2829903
5. NAME OF DRILLER: Robert Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner - Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8-inch-dia tri-cone roller-bit	8. HOLE LOCATION: NW 1/4 sec 12 T14N R8E
	9. SURFACE ELEVATION: 1190.90
	10. DATE STARTED: 8-11-92 8:20 / 11. DATE COMPLETED: 8-11-92 10:50
12. OVERBURDEN THICKNESS: 83.5	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 83.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
—	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	N/A	X	N/A	Gene Paganoko

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), hard, black, wet w/ abundant roots (Topsoil)					Boring advanced w/ 5 7/8-inch-dia tri-cone roller bit and water
	2	Becoming lt brown w/ iron oxides nodules (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-48B1

HTW DRILLING LOG

HOLE NO. MW-48 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), hard, light-brown, wet					
	6						
	7						
	8	Becoming soft					
	9						
	10	w/brown mottling					
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48 B

HTW DRILLING LOG

HOLE NO. MW-48 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	~~13~~ 14	LEAN CLAY (CL), soft, light brown, wet w/ root hairs					
	~~14~~ 15						
	~~17~~ 16						
	~~16~~ 17	SILT (ML), soft, light brown w/ trace of clay in fines w/ trace of fine grained sand					
	18	POORLY GRADED SAND (SP), loose, light brown, very fine grained					Approximately ~50 gals of water lost. 100 lbs of Aquagel bentonite added to drilling fluid
	~~19~~ 20						
	20	Becoming medium dense (est.)					
	21 ~~22~~						
	22 ~~23~~	Becoming dense (est.), fine grained					
	23 ~~24~~						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48 B

908

B07NE003702-05017

HTW DRILLING LOG

HOLE NO. MW-48B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense (est.) light brown, fine grained					
	24 ~~25~~	w/ trace of med. grained sand					
	25 ~~26~~						
	26 ~~27~~						
	27 ~~28~~						
	28 ~~29~~						
	29 ~~30~~						
	30	Becoming med. dense (est.)					~ Approximately 25 gals of water lost
	31 ~~32~~						
	~~32~~ ~~33~~						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48B

HTW DRILLING LOG

HOLE NO. MW-48B

PROJECT Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), dense (est.), light brown, fine grained					
	33						
	34	Becoming med. dense (est.)					
	35	w/trace of med. grained sand (disseminated)					
	36						
	37						
	38	POORLY GRADED SAND WITH SILT (SP-SM), dense (est.), light brown, fine grained w/ thin silt layers.					
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-48B

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	~~42~~ 41	POORLY GRADED SAND (SP), dense (est.), light brown, fine grained					
	42 ~~43~~						
	43 ~~44~~						
	44 ~~45~~						
	45 ~~46~~						
	46 ~~47~~	w/ trace of med. grained sand.					
	47 ~~48~~						
	48 ~~49~~						
	49						
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48B

HTW DRILLING LOG

HOLE NO. MW-48B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinaka

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), dense (est), light brown, fine grained w/trace of med. grained sand					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						Approximately 25 gals of mud lost.
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48B

/CORPS/4-15-92

912

HTW DRILLING LOG

HOLE NO. MW-48 B

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: Gene Papinako.

SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP), dense (est.), light brown, fine grained w/ trace of medium grained sand					
	60						
	61	Becoming very dense (est.)					
	62						
	63						
	64						
	65	w/ trace of coarse grained sand (disseminated)					
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48 B

HTW DRILLING LOG

HOLE NO. MW-48 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papcinako

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), dense (est.), light brown, fine grained w/ trace of med. grained sand					
	69						
	70						
	71						
	72						
	73						
	74						Approximately ~100 gals of mud lost
	75	w/ trace of silt (SM)					~~Estimated water loss is ~ 200 gals Approx. ~50 gals from this quantity were lost in the screened interval~~
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48 B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-48B

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND (SP), dense (est.), light brown, fine grained w/ trace of med. grained sand					
	78						
	79						
	80						
	81	Becoming very dense (est.)					
	82	w/ iron oxides (?) staining w/ trace of lean clay (SC)					
	83						B.O.B. 83.5 ft
	84						Monitoring well installed upon completion. Estimated water loss ~200 gals. Approx ~ 50 gals from this quantity were lost in the screened interval.
	85						
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48B

91

B07NE003702-05024

HTW DRILLING LOG

HOLE NO. MW-52B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¼" HSA	8. HOLE LOCATION: N.564112 – E.2849404
	9. SURFACE ELEVATION: 1153.50
	10. DATE STARTED: 6-28-92/0830
	11. DATE COMPLETED: 6-28-92/1000
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: 42'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 54.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	—	—	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
completed as monitoring well	—	MW-52B	—	Robert R Mallise

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) Firm, dark Brown, moist w/grass + rootlets (Loess)					Logged from cuttings
	2	Becoming light Brown					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-52B

B1

91(

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		LEAN CLAY (CL), Firm, light brown, moist w/o rootlets.					
	6	(Loess)					
		mottled w/ iron staining					
	7						
	8						
		Becoming soft, mottled, w/ Dark Brown					
	9		Hnu = BKG				
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Lean CLAY (CL) Firm, light brown, mottled, w/ Dark Brown, moist w/ Iron staining					
	15	(Loess)					
	16						
	17						
	18						
	19	19.0' Poorly graded Sand (SP) Loose, lt. Brown, moist very fine To Fine grained sand (Aeolian? Alluvium)	HNU = BKG				
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) Loose, light Gray, moist, very fined to fine grained Sand.					
	24						
	25						
	26						
	27						
	28	w/ Trace medium grained Sand					
	29		HWU= BKG				
	30						
	31						
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation, Mead NOP

INSPECTOR R. Mallisee

SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light Brown, Moist, Fine grained sand w/Trace of medium grained sand.					
	33						
	34						
	35	Becoming light Gray					
	36						
	37						
	38						
	39		HNU = BKG				
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

920

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation, Mead NOP | INSPECTOR R. Mollisee | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP) Loose, light gray brown, moist					
	42	W/ Thin layer of silty clay					
	43	Becoming light brown, very fine To fine grained Sand.					
	44						
	45	Becoming Brown					
	46						
	47						
	48	Becoming light Brown W/Trace of medium grained Sand.					
	49						
	50						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

921

B07NE003702-05030

HTW DRILLING LOG

HOLE NO. MW-52B

Remedial Investigation Mead NOP | INSPECTOR R. Mallise | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) loose, light Brown, wet					
	51	with Thin layer of clay, Soft, Dark Gray, moist					
		51.7'					
	52	Poorly Graded SAND (SP) Loose, orange, wet, Fine grained Sand 52.2'					
		CLAY (CL) Soft, light gray, moist					
	53	53.0' POORLY Graded SAND (SP) Loose, multicolored (orange, Brown, Gray, Red) wet ~~with~~ Fine To medium grained sand w/Trace Fine gravel and some coarse sand.					
							54.0'
	54						B.O.B. 54.0' 6-28-92/1000 completed Boring as Shallow monitoring well
	55						Total water lost/used, during drilling and filter Pack installation, To formation = 160 gallons
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-52B

92

ICORPS/4-16-82

7/21/92

HTW DRILLING LOG

HOLE NO. MW-53B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.563499 - E.2850281
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" tricone roller bit - rotary wash bore.	8. HOLE LOCATION: SE NW NE Sec. 21 T14N, R.9E ~~MW-53 south of~~ (landfill)
	9. SURFACE ELEVATION:
	10. DATE STARTED: 7-16-92 at 0840
	11. DATE COMPLETED: 7-16-92 1345
12. OVERBURDEN THICKNESS: 39.0'	15. DEPTH GROUNDWATER ENCOUNTERED: X ~ 28 ft (estimated)
13. DEPTH DRILLED INTO ROCK: 0.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 39.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	N/A	NA	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed monitoring well	N/A	MW-53B	N/A	Jon M. Gittelsby

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), Firm, dark brown to black, moist, organic with roots (Topsoil)					Boring advanced with 5 7/8" tricone rolle. bit and ~~rotary wash bore~~ bentonite slurry. Boring logged from observation of wash cuttings and log of MW-53A. Remarks on consistency, density, and moisture content are estimated.
	2	2.5'					
	3	LEAN CLAY (CL), Firm, brown to ~~dark brown~~, dry (Loess) with some roots, with silt					Mix drilling fluid: 100 gal water ~~50# Aqua Gel~~ ~~bentonite~~
	4		HNU = =BG ~~BG=BKGD~~				
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-53B B1

92:

HTW DRILLING LOG

HOLE NO. MW-53B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 2 OF 5 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm, brown, dry, with silt (Loess)					
	6						
	7						
	8						
			HNU = BG ~~B2 BK=BG~~				
	9						
	10						
		11.0'					
	11	POORLY GRADED SAND (SP), loose to medium dense, light brown, or brown, fine grained dry (Alluvium)					
	12	becoming medium dense to dense					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53B

92

HTW DRILLING LOG

HOLE NO. MW-53B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 3 OF 5 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) ~~[illegible]~~ POORLY GRADED SAND (SP), medium dense to dense, light brown?, fine grained, dry (Alluvium)					
	15						
	16						
	17						
	18	becoming medium dense					
			HNU = BG ~~R2-BH-BG~~				
	19						Add 30 # Aqua-bel bentonite.
	20						
	21	with some medium grained sand					
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53B

92

HTW DRILLING LOG

HOLE NO. MW-53B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 4 OF 5 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, light brown, fine, moist (Alluvium)					Estimated drilling loss 0'-24' = 20 gal. Add to mix: ~~1/2 50#~~ Aqua Gel 25
	24						
	25						
	26						
	27						
	28	becoming fine with trace of medium sand, wet					
			HNU = BG ~~PID=BG~~				Add to mix: 30 gal water
	29						
	30	becomes loose to medium dense					
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53B

92(

HTW DRILLING LOG

HOLE NO. MW-53B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 5 OF 5 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose to medium dense, light brown, Fine grained with trace of medium sand, wet (Alluvium)					
	33						
	34						
	35						
	36						
	37						NOTE: Estimated drilling fluid loss in screen interval = 20 gal. Used 130 gal water to flush out fluid.
	38	~~with trace of~~ with trace of ~~fine~~ coarse grained sand and fine gravel	HNU = BG ~~B2-BR-BG~~				
	39						Stop 7-16-92 1345. Bottom of borehole = 39'. At 39' added 10 min: ~~Add~~ 10 gal water ~~&~~ 50# Aquagel. Completed boring as monitoring well MW-53B.
	40						
	41						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53B

92

HTW DRILLING LOG

HOLE NO. MW-54B

SHEET 1 OF 4 SHEETS

1. COMPANY NAME Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR WCC
3. PROJECT Remedial Investigation, Mead NOP	4. LOCATION Mead, Nebraska
5. NAME OF DRILLER Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7¾ O.D. HSA.	8. HOLE LOCATION N.564183 - E.2850284
	9. SURFACE ELEVATION ~~1125~~ ± 1119.31
	10. DATE STARTED 6-29-92/0815
	11. DATE COMPLETED 6-29-92/0900
12. OVERBURDEN THICKNESS 31'	15. DEPTH GROUNDWATER ENCOUNTERED 9.5'
13. DEPTH DRILLED INTO ROCK 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 9.5' ATD
14. TOTAL DEPTH OF HOLE 31'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~completed and abandoned~~ Monitoring well	NA	MW-54B	NA	Robert R Mullise

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) FIRM, Dark Brown, moist, w/ Rootlets					Logged from cuttings. Boring advanced w/ 7 7/8" ~~dia~~ OD HSA
	1						
	2						
	3						
	4						
	5						

(CORP)5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-54B

B1 92E

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation Mead NOP | INSPECTOR R. Mallisee | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN CLAY (CL) FIRM, DARK Brown, MOIST w/ Rootlets					
	6						
	7	Becoming Sandy w/Trace medium grained Sand.					
	8						
	9		HNU = BKG				~~BZ = BKG~~
		9.5' POORLY GRADED SAND WITH CLAY (SP-SC), ~~Becoming~~ Brown, Fine grained ~~sand~~, Poorly Sorted, WET					← Water detected ATD
	10	Soft w/clay					
	11						
		11.5' SANDY CLAY (SC), soft ~~Becoming gray clay~~, w/fine grained sand, WET, ~~soft~~					
	12						
		Becoming Dark Brown, ~~Sandy clay w/fine grained sand~~, Mottled w/iron staining, ~~wet~~, Soft.					
	13						
			HNU = BKG				~~BZ = BKG~~
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-54B

HTW DRILLING LOG

HOLE NO. MW-54B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R. Mallisee

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) SANDY (CL) CLAY, Soft, Dark Brown, wet, w/ Fine grained sand					
	15		HNU = BKG				BZ = ND
	16						
	17						
	18						
		Becoming Firm, ~~Dark Brown, wet,~~ w/ Trace of Fine grained sand					
	19						
	20		HNU = BKG				BZ = ND
	21						
	22						
	23	Becoming gray w more Sandy					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54B

930

HTW DRILLING LOG

HOLE NO. MW-54B
SHEET 4 OF 4 SHEETS

PROJECT: Remedial Investigation, Mead NOP
INSPECTOR: R. Mallisee

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		23.0' Poorly GRADED SAND (SP) loose, Gray, wet ~~w/ Trace~~ Br Fine To medium grained ~~Sand~~ w/ Trace gravel.					
	24						
	25	Becoming Brown, Fine grained Sand w/ Trace medium grained sand. w/clay	HNU= BKG				~~B2 → 2D~~
	26	Becoming ~~Poorly graded SAND (SP)~~ ~~Loose~~, multi colored, ~~wet~~, fine To coarse sand w/Trace gravel					
	27	Becoming poorly graded SAND w/clay (SP-SC) Gray, mottled w/ Iron staining Fine grained.					
	28	Becoming Poorly Graded SAND (SP) loose multi colored, wet, fine TO coarse grained sand w/Trace gravel. Becoming fine To medium w/ Trace coarse sand and gravel.					
	29	29.0' LEAN ~~SILTY~~ CLAY (CL) w/ Iron staining Firm, Brown, wet. 29.5' GRADED POORLY ~~Sorted~~ SAND, (SP) loose, Brown, wet, Very fine To fine w/clay, w/Trace medium grained sand.					B.O.B. 31.0 6-29-92/0900 Boring completed as shallow monitoring well Total lost of water To the formation. = 175 gallons
	30	Becoming ~~Poorly Graded Sand (SP), loose~~ multi colored, ~~wet~~, Fine grained sand w/Trace gravel.	HNU= BKG				
	31	Becoming fine w/Trace med. 31.0' grey.					31.0'
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54B

CW 7/23/92

HTW DRILLING LOG

HOLE NO. MW-55B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.563700 - E.2850523
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" CFA 0-6; tricone bit on NWJ rods 6-68'; 5 3/8"	8. HOLE LOCATION: MW-55 (Landfill)
	9. SURFACE ELEVATION: 1128 ±
	10. DATE STARTED: 7-21-92 0857
	11. DATE COMPLETED: 7-21-92 1435
12. OVERBURDEN THICKNESS: ~~N/A~~ 68.0'	15. DEPTH GROUNDWATER ENCOUNTERED: 17' (estimated)
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 68.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	NA	NA	NA	NA	NA	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~monitoring well installed upon completion of hole~~	NA	MW-55 B	NA	John Shealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, dark brown, dry, with roots (TOPSOIL)					Advanced boring with 8" CFA. Boring logged by cuttings.
	1						
	2						
	3	~~[illegible]~~ POORLY GRADED SAND (SP), loose, brown, dry, with silt (ALLUVIUM)					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~11~~ MW-55B

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 2 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), loose, light brown, dry, fine grained (ALLUVIUM)					
	6		BZ=BG				Switch to RWB @ 6'. ~~Use 5 7/8" tricone bit~~ @ 0905 hrs Bentonite drilling fluid: 100 gal water & 50# Aquagel
	7						Boring continued w/ 5 7/8" dia tri-cone roller bit and bentonite slurry
	8						
	9						
	10	Becoming dense					
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 3 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE): POORLY GRADED SAND, dense, light brown, fine grained (ALLUVIUM)					
	15						
	16						
	17						added 20 gal water @ 17'.
	18						
	19		B2=BG				
	20	Becoming fine grained with ~~little medium~~ some medium to coarse grained sand					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B

934

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Shealor

SHEET 4 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(~~SAME AS ABOVE~~) POORLY-GRADED SAND (SP), dense, ~~light~~ multicolored, ~~brown~~, wet, ~~fine grained~~, ~~with some~~ medium grained sand (ALLUVIUM) with some fine grained sand to coarse and trace fine gravel					
	24					25	Added 50 gal water and ~~1/2 50 lb~~ bags Aquagel (Bentonite)
	25						
	26	With gravel lens 26-26.5					
	27						
	28						
	29		BZ=BG				
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Mealor

SHEET 5 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE): POORLY-GRADED SAND (SP), dense multicolored, wet, medium to coarse-grained with some fine grained sand and ~~some~~ fine gravel (ALLUVIUM)					
	33						
		Becomes fine to coarse grained (SW)					
	34						
		~~35~~					Added 40 gal water
	35	LEAN CLAY (CL), firm, brown, wet (ALLUVIUM)					
	36						
	37						
		light brown					
	38	~~38~~ POORLY-GRADED SAND (SP), dense, wet, fine-grained (ALLUVIUM)					
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B 93t

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Nealon

SHEET 6 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE): POORLY-GRADED SAND (SP), dense, light brown, wet, fine-grained (ALLUVIUM)					
	42						
	43						
	44		BZ=BG				
	45						
	46						
	47						
	48						
	49						Added 30 gal water from rig tank
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Shealon

SHEET 7 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), dense, light brown, fine grained (ALLUVIUM)					
	51						
	52	~~[illegible] medium grained~~					
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B938

HTW DRILLING LOG

HOLE NO. MW-55B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 8 OF 8 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE): POORLY-GRADED SAND (SP), dense, light brown, fine grained (ALLUVIUM)					
	60						
	61						
	62	Becomes fine to medium grained					
	63						
	64		BZ=BG				Monitoring well MW-55B installed upon completion.
	65						Total water loss during drilling ~118 gallons. Total loss during flushing and filter pack placement ~125 gallons. Total includes 10 gal loss in screened interval from 56.5'-66.5'.
	66						
	67						Bottom of Boring @ 68'. Completed @ 1435.
	68		BZ=BG				Lost 10 gal 54'-68'.

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55B93

HTW DRILLING LOG

HOLE NO. MW-56B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: ~~Mead, Nebraska~~ → N.563593-E.2850592
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0-4'; 5 7/8" tricone roller bit 4'-32'	8. HOLE LOCATION: MW-56 (Landfill)
	9. SURFACE ELEVATION: 1138 ±
	10. DATE STARTED: 7-22-92 0819
	11. DATE COMPLETED: 7-22-92 1043
12. OVERBURDEN THICKNESS: ~~NA~~ 32.7'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 32.7	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~None~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed ~~upon completion of hole~~	NA	X	NA	John S Mealor

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL), firm, very dark brown, moist, with roots, trace fine sand (TOPSOIL)					Boring advanced with 6" CFA. ~~[illegible]~~ Soil description determined from drill cuttings and boring log from MW-56A
	1						
	2						
	3		3.5				Boring continued w/5 7/8" dia tri-cone roller bit and bentonite slurry (50 lbs ~~aquagel~~ + 70 gals water)
	4	POORLY GRADED SAND (SP), loose, tan, very fine to fine grained, with little fines, (ALLUVIUM) ~~roots~~					Switch to RWB @ 0826 hrs ~~Mix 1/2-50# bag Aquagel with 70 gal water~~
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~MW~~ MW-56B

HTW DRILLING LOG

MW-56B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J Mealon

SHEET 2 OF SHEETS 4

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), loose, tan, very fine to fine grained, with a little fines (ALLUVIUM)					
	6	roots					
	7	With trace medium-grained sand and no fines					
	8						
	9						
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56B

941

B07NE003702-05050

HTW DRILLING LOG

HOLE NO. MW-56B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: John Nealon

SHEET 3 OF 4 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY-GRADED SAND (SP), dense?, tan, very fine to fine grained, ~~with~~ with					
	15	~~a little fines~~ (ALLUVIUM) ~~and~~ trace medium grained sand					
	16	With trace to some medium grained sand					
	17						
	18						
	19		B2=B6				Added 70 gal water and ~~[illegible]~~ 50# ~~bag~~ Aquagel Bentonite
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56B

HTW DRILLING LOG

HOLE NO. MW-56B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealor

SHEET 4 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), dense?, tan, very fine to fine grained, with trace to some medium grained sand (ALLUVIUM)					
	24						Added ~~½~~ - 25# ~~bag~~ Aquagel @ 24'
	25	Becomes very fine to fine grained with medium grained sand					
	26						
	27						
	28						Added ½ - 50# bag Aquagel @ 32'
	29		B2=B6				Monitoring well MW-56B installed upon completion. Grouting completed @ 1710 hrs, 7-22-92. Total water loss = 130 gallons. Loss over screened interval = 13 gallons. Loss during flushing = 60 gallons. Loss during filter placement = 50 gallons
	30	POORLY GRADED SAND WITH CLAY (SP), dense?, tan to multicolored, fine grained, with medium grained sand (ALLUVIUM)	30				
	31						
	32						Bottom of Boring @ 32.1' @ 1043 hrs. 7-22-92

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56B

94

HTW DRILLING LOG

HOLE NO. MW-57B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES
SHEET 1 OF SHEETS 9	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571817 – E.2830063
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" & 3" SPLIT SPOON BARRELS; 4 3/4" DRAG BIT; 140# & 300# HAMMERS; 5 7/8" TRICONE BIT	8. HOLE LOCATION: Parking lot of Mead Cattle Company
	9. SURFACE ELEVATION: ~~1196 ±~~ 1193.88
	10. DATE STARTED: 07.28/92 12:55 — 11. DATE COMPLETED: 07.30.92 11:59
12. OVERBURDEN THICKNESS: 74	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: Ø	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 74'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	~~NA~~ NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
NA	NA	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed		MW-57B		R. G. PACHECO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay (CL) soft, dark brown, wet/no roots	HNu= BG			P	Boring advanced w/2" and 3" split barrel samplers followed by a 4 3/4" drag bit. Sample taken w/3" spoon D#1 D=2.0' R=0.67
	2						
	3		HNu= BG			P	w/2" spoon ~~and 140# hammer~~ D#2 D=2' R=0.42'
	4	Becoming light-Brown					w/3" spoon D#3, D=2' R=1.75'
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-57B

HTW DRILLING LOG

HOLE NO. MW-57B

Remedial Investigation, Mead NOP | INSPECTOR R.G. PACHECO | SHEET 2 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME) Lean CLAY (CL), soft, light brown, wet w/roots	HNu= BG			P	
	6		HNu= BG			P	w/2" spoon D#4 D= 2' R= 1.92'
	7						
	8		HNu= BG			P	w/3" spoon D#5 D= 2' R= 2'
	9						
	10		HNu= BG			P	w/2" spoon D#6 D= 2' R=1.83'
	11	Silt (ML) soft to firm, light brown ~~w/some clay~~					
	12		HNu= BG			P	w/3" spoon D#7 D= 2' R= Ø
	13	Poorly graded sand (SP), medium dense, light-brown gray, very fine, wet. stained	HNu= BG			P	w/2" spoon D#8 D= 1' R= 0.67'
	14						STOPPED 07.28.92

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-5/B

PROJECT: Remedial Investigation, Mead NOP

DRILLER: R. G. PACHECO

SHEET 3 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h STARTS 07.29.92
	14	(Same) Poorly graded sand (SP), ~~medium~~ dense, light-brown gray, fine (grained), wet				27 43	w/3" spoon D#9, D=2', D=1.5'
	15		HNu= BG			46 62	
	16					13 18	w/2" spoon D#10 D=2' R=1.08'
	17		HNu= BG			24 29	
	18					18 36	w/3" spoon D#11 D=2' R=1.17'
	19		HNu= BG			43 69	
	20	Becoming very dense				21 29	w/2" spoon D#12 D=2' R=0.83'
	21		HNu= BG			52 39	
	22					22 46	w/3" spoon D#13, D=2' R=0.83'
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-5/B

HTW DRILLING LOG

HOLE NO. MW-57B

Remedial Investigation, Mead NOP | INSPECTOR R.G. PACHECO | SHEET 4 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	~~Becoming dry~~ Poorly graded SAND (SP) v. dense, light brown-gray, fine grained, dry	HNu= BG			66 64	
	24		HNu= BG			21 28 32 41	w/2" spoon D#14 D=2' R=1.33'
	25						
	26		HNu= BG			24 34 46 51	w/3" spoon D#15 D=2' R=1.0'
	27						
	28	w/trace of medium sand	HNu= BG			13 27 37 45	w/2" spoon D#16 D=2' R=0.83'
	29						
	30		HNu= BG			40 85 110 160	w/3" spoon D#17 D=2' R=1.25'
	31						
	32	Poorly graded Sand (SP), dense, light brown, fine to medium grained					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-57B

HTW DRILLING LOG

HOLE NO. MW-5/B

Remedial Investigation, Mead NOP | INSPECTOR R. G. PACHECO | SHEET 5 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	HNU SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	Poorly graded SAND (SP), ~~Becoming~~ very dense, light brown, fine to medium grained, wet	HNu= BG			34 60 83 88	w/2" spoon D#18 D=2' R=1.17'
	33						
	34		HNu= BG			26 49 65 80	w/2" spoon D#19 D=2' R=1.17'
	35	fine w/trace of medium sand grained					
	36		HNu= BG			42 66 66 62	w/2" spoon D#20 D=2' R=1.0
	37						
	38	~~Becoming dense~~	HNu= BG			20 33 40 60	w/2" spoon qua 140# hammer D#21 D=2' R=0.83'
	39						
	40					17 32	w/2" spoon D#22 D=2' R=0.75'
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-5/B

/CORPS/4-15-92

HTW DRILLING LOG

MW-57B

Remedial Investigation, Mead NOP | NSPE: R.G. PACHECO | SHEET 6 OF SHEETS 9

ELEV a	DEPTH	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	Poorly graded sand (SP), reddish light brown, fine grained	HNu= BG			47 50	
	42		HNu= BG			22 31	w/2" spoon D#23 D=2' R=0.67'
	43					54 66	
	44	w/trace of medium grained sand	HNu= BG			21 44	w/2" spoon D#24 D=2' R=0.83'
	45					59 62	
	46	Fine to medium grained with a trace of fine gravel	HNu= BG			17 42	w/2" spoon D#25 D=2' R=1.08'
	47					72 69	
	48		HNu= BG			11 25	w/2" spoon D#26 D=2' R=0.83'
	49					45 54	
	50	Fine to medium grained w/trace of fine gravel					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-57B

HTW DRILLING LOG

HOLE NO. MW-57B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R.G. PACHECO

SHEET 1 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME) Poorly graded SAND (SP) v. dense, light brown (grained) fine to medium w/trace fine gravel	HNu= BG			24 47 56 91	w/2" spoon D#27 D=2' R=0.75'
	51						
	52		HNu= BG			28 50 70 51	w/2" spoon D#28 D=2' R=0.83'
	53						
	54		HNu= BG			21 40 51 64	w/3" spoon D#29 D=2' R=0.75' Driven by 300# hammer
	55						
	56		HNu= BG			21 37 47 62	w/2" spoon D#30 D=2' R=0.89'
	57						
	58		HNu= BG			23 37	w/3" spoon D#31 D=2' R=1.25'
	59	Poorly graded sand (SP) v. dense light brown tan, fine to medium grained					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-57B

950

HTW DRILLING LOG

HOLE NO. MW-57B

Remedial Investigation, Mead NOP | INSPECTOR R.G. PAMELO | SHEET 8 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(SAME) Poorly graded SAND (SP), v. dense, light brown + tan, fine to medium grained				38 46	
	60		HNu= BG			9 25	w/2" spoon D#32 D=2' R=1.25
	61					56 97	
	62	Poorly graded sand (SP), v. dense, light-brown, fine grained to medium w/trace of coarse sand	HNu= BG			52 93	w/3" spoon D#33 D=2' R=2'
	63					165 175	
	64	~~Fine to medium w/trace of coarse sand~~	HNu= BG			11 21	w/2" spoon 300# hammer D#34 D=2' R=1.75'
	65					39 37	
	66	Well graded sand (SW), ~~loose~~ med. dense, light-brown, fine to coarse w/trace of fine gravel	HNu= BG			7 7	w/3" spoon D#35 D=2' R=Ø
	67					8 11	
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-57B

HTW DRILLING LOG

HOLE NO. MW-57B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: R.G. PAMELO

SHEET 9 OF SHEETS 9

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	~~(Same)~~ Well graded sand (SW), ~~loose~~ med. dense, light-brown-orange fine to coarse, w/trace of fine sand	HNu= BG			6 7 10 12	w/2" spoon D#36 D=2' R=2' STOPPED 07.29.92
	69						
	70		HNu= BG			17 23 44 56	START 07.30.92 w/3" spoon D#37 D=2' R=1.08'
	71						
	72		HNu= BG			12 19 21 41	w/2" spoon D#38 D=2' R=1.83' Boring reamed 5 7/8 in 0-74' 7-30-92
	73						
	74						BOB @ 74' BORING COMPLETED AS MONITORING WELL

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-57B

CWK 9/4/92

HTW DRILLING LOG

HOLE NO. MW-58B

SHEET 1 OF 1 SHEETS 16

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: The Winnek Companies
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N. 570385 - E. 2842782
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 5/8 tricone roller bit; 9 cm wire line Christian; 3½ x 2½ sample bbl; tungsten insert bit (4 5/8)	8. HOLE LOCATION: Atlas Missile T14N, R9E, Sec 8, SW, SE
	9. SURFACE ELEVATION: ± 1180 / 1172.97
	10. DATE STARTED: 7/29/92 0730
	11. DATE COMPLETED: 7/30/92 1400
12. OVERBURDEN THICKNESS: 134.0	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: 1.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 135.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1	X	NA	TOC	Explosives	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-58B	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean, ~~silty~~, highly organic CLAY (OL), dk brown, hard w/ abundant root hairs					START 7/29/92 0730 Boring Advanced w/ 5 5/8 Tricone Bit Drilling fluids: Bentonite gel & H_2O NO SAMPLES TAKEN LOGGED BY cuttings in the interval 0 - 109'
	2						
	3						
	4	Quantity of organic matter decreasing					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-58B

HTW DRILLING LOG

HOLE NO. MW-58B

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(Same)~~					~~Logged by Cuttings~~
		Lean CLAY (CL) lt. brown					
		firm,					
	6	(Loess)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | Sheet 3 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) lean CLAY (CL) lt brown, firm (Jones)					logged by cuttings
	15						
	16						
	17						
	18						
	19						
	20	Silty SAND (SM) lt brown fine to v. fine ~~sand~~ (alluvium)					
	21						
	22						
	23						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

HTW DRILLING LOG

HOLE NO. MW-58B

PROJECT Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 4 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Silty SAND (SM) lt. brown fine to v. fine grained (alluvium)					~~Logged by Anthony~~
	24						
	25						
	26	poorly graded SAND (SP) lt brown, fine to v. fine grained (alluvium)					
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 58B

/CORPS/4-18-82

956

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | Sheet 5 of 19 Sheets/16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					~~Used by Cutting~~
		poorly graded SAND (SP)					
		lt brown fine to v. fine					
	33	grained (alluvium)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

95%

HTW DRILLING LOG

HOLE NO. MW-58B

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					~~logged by cuttings~~
		poorly graded SAND (SP)					
		tan, fine to v. fine					
	42	grained					
	43						
	44						
	45	w/ trace med grained sand					
	46						
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

ICORPS/4-15-92

958

HTW DRILLING LOG

MW-58B

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 7 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					~~cuttings~~
		Poorly graded SAND (SP) tan, fine to v. fine grained w/					
	51	trace med sand					
		(alluvium)					
	52						
	53						
	54						
	55						
	56						
	57	w/ trace med to coarse sand					
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-7BB
SHEET 8 OF SHEETS 16

Remedial Investigation, Mead NOP
INSPECTOR J. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					~~Logged by Cuttings~~
		Poorly graded SAND (SP), grained					
		Tan fine to v. fine w/					
	60	trace med to coarse					
		sand.					
		(alluvium)					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-7BB

ICORPS/4-15-92

960

HTW DRILLING LOG

MW-58B

Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 9 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same)					~~topped by Collings~~
		Poorly graded SAND (SP)					
	69	tan, fine to v. fine grained w/					
		trace med to coarse sand					
		(alluvium)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 921.W010

HOLE NO.: MW-58B

ICORPS/4-18-82

961

B07NE003702-05070

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | SHEET 10 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					Logged by cuttings
		poorly graded SAND (SP)					
		tan, fine to v. fine grained w/					
	78	trace med to coarse sand					
	79						
	80						
	81						
	82						
		Quantity of med. and coarse grained sand increasing					
	83						
	84						
	85						
	86						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 921-W030

HOLE NO.: MW-58B

96

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead VOP | INSPECTOR: T. Hecht | SHEET 11 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Well graded SAND (SW) [redacted] grained Tan, fine to coarse w/ Trace fine to coarse gravel (alluvium)					~~Logged by Cuthrap~~
	87						
	88						
	89						
	90						
	91						
	92						
	93						
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

96

/CORPS/4-16-92

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | SHEET 12 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) well graded SAND (SW) Tan to grey fine to coarse w/ trace fine to coarse gravel (alluvium)	gravel				Logged by cuttings
	96						
	97	Poorly graded Gravel (GP) Tan to grey, fine to coarse w/ little fine to coarse sand (alluvium)	grained				
	98						
	99						
	100						
	101						
	102						
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

964

ICORPS/4-15-92

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | Sheet #13 of 18

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) poorly graded GRAVEL (GP) tan to grey, fine to coarse w/ little fine to coarse sand and trace cobbles	grained				Logged by cuttings used 750 gal H_2O & 5 bags gel ≈ 300 in screened Interval
	105						
	106						
	107						
	108						
	109	Poorly graded SAND (SP) green, ~~[illegible]~~ DENSE (est.) fine grained w/ trace med to coarse sand (alluvium)	HNu= BKG				108.9 Boring continued w/ Begin christensen wire line sampling w/ 3½ x 2½ sample bbl and 5¼ in tungsten insert bit D#1 P=2.0 R=0.8
	110						
	111	Becoming fine w/ little med to coarse sand and trace ~~clay~~ silt	HNu= BKG				D#2 P=2.0 R=0.7
	112						
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

/CORPS/4-15-92

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | SHEET 14 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	114	(Sand) poorly graded SAND (SP) green, ~~loose~~ dense fine grained w/ trace med. to coarse sand. (alluvium)	H None BKg				D#3 P=2.0 R=1.8
	115	Becoming fine grained w/ little medium to coarse sand and few silt					
	116	Becoming DARK GREEN fine to V. fine grained w/ trace med sand, few silt	H None BKg				D#4 P=2.0 R=1.5
	117						
	118	Becoming green, fine to V. fine grained	H None BKg				D#5 P=2.0 R=~~1.5~~ 1.5
	119						
	120		H None BKg				D#6 P=2.0 R=1.8
	121		H None BKg				D#7 P=2.0 R=0.7
	122						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-58B

HTW DRILLING LOG

MW-58B

Remedial Investigation Mead VOP | INSPECTOR T. Hecht | SHEET 15 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) poorly graded SAND (SP) green, ~~loose~~ Dense fine to v. fine grained					D# 8
	123	Becoming olive green, medium grained w/ little fine & coarse sand					
		Becoming green med to coarse grained w/ ~~trace~~ few fine sand	HNu= BKG				D# 9 P=2.0 R=0.7
	124						
	125						
			HNu= BKG	~~Hoag~~ 3 4oz glass 1 8oz glass #1	~~MW8-025~~ ~~125~~ MW8-058-125		D# 10 P=2.0 R=0.5 Sampled for TOC, VOC, Explosives ~~Sieve~~
	126						
	127						
			HNu= BKG				D# 11 P=2.0 R=0.5 ~~sampled~~
	128						
	129	Becoming fine grained w/ some med to coarse sand and fine gravel	HNu= BKG	#2 1 bag			D# 12 P=2.0 R=0.8 Sampled collected 129-131 for Sieves analysis
	130						
	131						

PROJECT: Remedial Investigation, Mead VOP 92KWC30

HOLE NO.: MW-58B

ICORPS/4-18-82

HTW DRILLING LOG

MW-58B

Remedial Investigation, Mead NOP | INSPECTOR: T. Hechl | SHEET 16 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	132	~~(Omadi)~~ Poorly graded SAND (SP) green ~~tan~~ Dense, fine to v. fine grained w/trace to few silt.	HNu= BKG				D#13 P=2.6 R=1.0
	133	w/ occ. silt seams - v. dark green					
	134		HNu= BKG				D#14 P=2.0 R=0.8
		SANDSTONE, orange, soft, v. weathered, fine to v. fine sand (OMADI)					
	135						Stopped 7/30/92 B.O.B. 135.0 monitoring well placed upon completion 7/30/92
	136						water lost during drilling in screened interval ≈ 300 gal
	137						
	138						
	139						
	140						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58B

CCH 8/4/92

MEW 7-28-92

(1)

HTW DRILLING LOG

HOLE NO. MW-59B

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Companies
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571255 - E.2899143
5. NAME OF DRILLER: Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 1/4-inch-dia tri-cone roller-bit	8. HOLE LOCATION: SE 1/4, sec. 8 T14N, R9E
	9. SURFACE ELEVATION: ~~1160~~ ± 1160.86
	10. DATE STARTED: 7-27-92 7:50 / 11. DATE COMPLETED: 7-27-92 10:10
12. OVERBURDEN THICKNESS: 49.0	15. DEPTH GROUNDWATER ENCOUNTERED: Water information masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 49.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~X~~ NA	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~X~~ NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (installed well)	N/A	~~X~~ MW-59B	N/A	Gene Papinaho

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Topsoil	~~N/A~~	N/A	N/A	~~N/A~~	Boring advanced w/5 1/4-inch-dia tri-cone roller-bit and drilling mud (100 lbs of Aquagel bentonite mixed with 150 gals of water)
	1	LEAN CLAY WITH SAND (CL), firm, lt brown w/ roots and root hairs w/ little of coarse grained sand					
	2	SILT (ML), soft to firm, lt brownish yellow, w/ little to some clay in fines w/ root hairs					Boring advanced without sampling. Present boring log is based on MW-59D boring log, observed cuttings and drilling characteristics
	3						
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-59B

HTW DRILLING LOG

HOLE NO. MW-59B

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	SILT (ML), firm, lt brownish yellow. w/ roots and root hairs	N/A	N/A	N/A	N/A	
	6	w/ trace of fine sand					
	7						
	8						
	9	Quantity of fine sand increasing					
	10	POORLY GRADED SAND WITH SILT (SP-SM), dense(est), yellowish gray v. fine to fine grained					
	11	w/ little silt in fines					
	12	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained					
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59B

/CORPS/4-15-92

97(

HTW DRILLING LOG

MW-59B

Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained, well sorted	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	15						
	16						
	17						
	18						
	19						
		w/trace of medium grained sand					
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59B

HTW DRILLING LOG

HOLE NO. MW-59 B

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59 B

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ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-59B

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, v. fine to fine grained	~~N/A~~	N/A	N/A	~~N/A~~	
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59B

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HTW DRILLING LOG

HOLE NO. MW-59 B

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), loose, lt yellowish gray, very fine to fine grained					
	42						
	43	w/ little of medium grained sand					
	44	w/ trace of coarse grained sand.					
	45						
	46						
	47						
	48						
	49	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC)					7-27-92 08:45 B.O.B 49.0 ft Monitoring well installed upon completion Estimated water loss ~ 60 gals
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59 B

ICORPS/4-15-92

974

CEA 7/27/92

①

HTW DRILLING LOG

HOLE NO: MW-21A

SHEET 1 OF 5 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.558978 - E.2829483
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0'-6'; 5 7/8" tricone roller bit 6'-128.5'	8. HOLE LOCATION: MW-21 SE SW SE, 23, T14N, R8E
	9. SURFACE ELEVATION: 1163.31
	10. DATE STARTED: 7-25-92/1409
	11. DATE COMPLETED: 7-25-92/1145
12. OVERBURDEN THICKNESS: ~~NA~~ 128.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ~ 33' ~~NA~~ (estimated)
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 128.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A ~~None~~	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
N/A ~~None~~	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed ~~upon completion of boring~~	NA	MW-21A	NA	John S Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean CLAY (CLL) firm, Brown moist with rootlets (Fill)					Soil/sediment logged from cuttings. Boring advanced ~~Beyond drilling~~ with 6" CFA.
	2						
	3						
	4	Becoming soft					
	5						

(5)

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-21A

HTW DRILLING LOG

MW-21A

Sheet 2 of 15 Sheets

Project: Remedial Investigation Mead NOP | NSPE: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean CLAY (CL) · ~~[illegible]~~, Dark Gray, moist with rootholes (~~Loess~~/Topsoil) firm					Stopped drilling with 6" CFA at 6' 7-25-92/1334
	6						Boring continued ~~Began washboring~~ with 6" roller bit ~~at 6'~~ 7-25-92/1408 and bentonite slurry
	7						
	8						
	9	Becomes firm, light Brown, mottled, light Gray (?), moist with iron oxide staining. (Loess)	~~BZ=B6~~ HNU=B6				~~BZ=~~ B6
	10						
	11						
	12						
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

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ICORPS/4-18-92

HTW DRILLING LOG

MW-21A

Remedial Investigation, Mead NOP | INSPECTOR: RRM | Page 3 of 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~ Lean CLAY (CL) Firm, light brown, mottled, light gray, moist with rootholes (Loess)					
	15						
	16						
	17						
	18						
			HNU				
	19		~~B2~~ = B6				
	20	20.0' Poorly Graded SAND (SP) ~~loose~~, medium dense, light gray, dry, Fine grained with Trace medium grained (Alluvium)					
	21						
	22	W/O medium grained sand					
	23						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

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HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP | INSPECTOR: RRM | SHEET 4 of 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~					
		Poorly Graded SAND (SP)					
		medium dense, light Gray					
		Dry, fine grained					
	24	(Alluvium)					
	25						
	26						
	27						
	28						
			HNU =				
	29		~~BZ=BG~~				~~BZ=BG~~
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

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HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP | INSPECTOR RRM | PAGE 5 of 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~					
		Poorly Graded SAND (SP) medium Dense, light Gray, dry, fine grained (Alluvium)					Estimated water entry ATD
	33	Becomes wet					
	34						
	35						
	36						
	37						
	38						
			HNU				
	39		~~BZ~~=BG				
	40	with Trace medium grained sand.					
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

979

B07NE003702-05088

HTW DRILLING LOG

MW-21A

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 6 OF 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~ Poorly Graded SAND (SP) Medium dense, light Gray, wet, fine grained, w/TL Trace medium grained sand (Alluvium)					
	42						
	43						
	44						
	45	w/o medium grained sand.					
	46						
	47						
	48						Stopped ~~washboring~~ at 49' 7-24-92/1611 ~~[illegible]~~
	49		HNU · BZ=BG				Started ~~washboring~~ at 49' 7-25-92/0743
	50						

/CORP3/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A 98(

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead VOP | INSPECTOR: RRM | SHEET 7 of 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above). Poorly Graded SAND (SP) medium dense, light gray wet, fine grained (Alluvium)					
	51						
	52						
	53	with Trace medium grained Sand.					
	54						
	55						
	56						
	57						
	58	w/o medium grained sand	HNU = ~~BZ~~ = BG				
	59						

PROJECT: Remedial Investigation, Mead VOP 92KW030

HOLE NO.: MW-21A

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ICORPS/4-16-82

B07NE003702-05090

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP

INSPECTOR: RBM

SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~					
		Poorly Graded SAND (SP)					
		medium dense, light Gray					
		wet, Fine grained					
		(Alluvium)					
	60						
	61						
	62						
	63						
			HNU =				
	64		BG				
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

98

/CORPS/4-15-92

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~					
		Poorly Graded SAND (SP)					
		Medium dense, light Gray,	HNU				
		Wet, fine grained	~~BZ~~ BG				
	69	(Alluvium)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77	77.0'					

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-21A

98

HTW DRILLING LOG

MW-21A

Remedial Investigation, Mead VOP | INSPECTOR RRM | SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) ~~WITH GRAVEL~~ medium dense, multi-colored wet, coarse grained, with some medium sand, and little fine sand & few fine gravel (Alluvium)					
	78						
			HNU B2-B6				~~B2-B6~~
	79						
	80						
	81	Becoming fine sand with some coarse sand, little medium sand and Trace of fine sand.					
	82						
	83						
	84	Becoming coarse with some medium sand, little fine sand and few fine gravel.					
		85.0'					
	85	Poorly Graded Gravel with SAND (GP-SP) medium dense, multi-colored wet, fine grained with some medium to coarse sand, Trace fine sand & coarse gravel (Alluvium)					
	86						

/CORPS/4-18-82

PROJECT: Remedial Investigation, Mead VOP 921-W030 | HOLE NO.: MW-21A | 984

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP | INSPECTOR: RRM | SHEET 11 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) ~~as above~~ Poorly Graded Gravel with SAND (GP-SP) medium dense, multi-colored, wet, fine grained with some medium to coarse sand, trace fine sand and coarse gravel.					
	87						
	88						
			HNU				
	89		BZ=BG				
	90						
	91	91.0' Poorly Graded SAND (SP) medium dense, light gray, wet, fine grained with little medium and coarse grained sand					
	92	Becoming fine to coarse with little fine gravel.					
	93						
	94						
	95	Becoming fine sand with little medium and coarse sand and trace of fine gravel.					

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-21A

98

ICORPS/4-18-82

B07NE003702-05094

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as Above~~ Poorly Graded SAND (SP) medium dense, light Gray wet, fine grained with little medium and coarse sand with Trace of fine Gravel	HNU = BG				
	96						
	97	with ~~out~~ medium and coarse sand					
	98	with little medium and coarse sand + Trace fine gravel					
	99						
	100						
	101	Becoming fine sand					
	102	Becoming fine To coarse sand with few fine gravel and Trace coarse gravel.					
	103						
	104						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-21A

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead VOP | INSPECTOR | SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(Same as Above)~~ (SW) WELL ~~Poorly~~ Graded SAND ~~(SP)~~ medium dense, light Gray, wet, fine to coarse grained, with few fine gravel and Trace of coarse gravel. (Alluvium)					
	105						
	106		HNU = = BG				
	107						
	108						
	109						
	110						
	111						
	112						
	113						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921 [illegible]0

HOLE NO.: MW-21A

98

B07NE003702-05096

HTW DRILLING LOG

MW-21A

Sheet 14 of 15 sheets

Remedial Investigation Mead NOP

INSPECTOR: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Same as above~~ WELL Poorly Graded SAND (SP) (SW) Medium Dense, light Gray, wet, fine to coarse grained, with few fine gravel & Trace coarse gravel, (Alluvium)					
	114						
		-POORLY GRADED SAND (SP) Dense, ~~Brown~~ gray Green, fine grained with some medium and coarse sand, and Trace of fine to coarse Gravel.					
	115						
	116						
	117						
	118						
	119						
	120						Added 40 gal. water.
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 921-W010

HOLE NO.: MW-21A

988

ICORPS/4-15-92

HTW DRILLING LOG

MW-21A

Remedial Investigation Mead VOP | INSPECTOR: RRM | 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(same as above)~~ (SAME) Poorly Graded SAND (SP) Dense, Green, wet, fine grained with Trace of Medium To Coarse sand and fine To coarse gravel					
	123						
	124	with little medium To coarse grained sand, few fine gravel and Trace of coarse gravel.					
	125						
	126		HNU = ~~B2~~=BG				Water losses: 10 gal in screened interval (during drilling mud); 20 gal during flushing; 15 gal during filter pack placement.
	127						
	128						
		128.5					Bottom of Boring @ 128.5' @ 1145 hrs 7-26-92.
	129						
	130						Monitoring well MW-21A installed upon completion. Grouting @ 10.2 lb/gal completed at 1510 hrs. 7-26-92.
	131						

PROJECT: Remedial Investigation, Mead NOP 92-WC30

HOLE NO.: MW-21A

98

CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW22A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Rig 1
SHEET 1 OF 1 SHEETS 13	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: CFDG. Failing 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" drag bit; 5" Tungsten carbide; 94mm wireline (Christensen); 7 7/8 tricone; 5 7/8 rock bit	8. HOLE LOCATION: N of Load Line 1 Sec. 14-N.565860-E 2829003
	9. SURFACE ELEVATION: ~~1180~~ 1174.50
	10. DATE STARTED: 6/15/92 — 11. DATE COMPLETED: 6/23/92
12. OVERBURDEN THICKNESS: 101'	15. DEPTH GROUNDWATER ENCOUNTERED: Mask w/ drilling fluids
13. DEPTH DRILLED INTO ROCK: 99.5 - 106' 6.5' of shale	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 106'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitor Well installed	NA	MW-22A	NA	Steven Bailey 6/19/92 thru 6/10/92

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay (CL) firm, dark brown to gray, dry w/grass and root hairs (Top soil)	HNu=B6	1			P=2.0 R=0.6 Boring advanced w/ 5" drag bit Christensen sampler 9" (6-15-92)
	2	turning moist, w/ calcareous concretions	HNu=B6	2			P=2.0 R=2.0
	3						
	4	Becoming light brown with iron staining, w/ iron nodules	HNu=B6	3			STOP 6/15/92 P=2.0 R=1.7
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

MW22B

HTW DRILLING LOG

HOLE NO. MW 22A

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 3 OF 3 SHEETS 13

ELEV a	DEPTH b.5	DESCRIPTION OF MATERIALS (SGMCS) ~~as above~~ c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	Lean Clay (CL) v. firm, light brown w/ iron staining throughout, dry w/ iron nodules w/ black manganese nodules, dx	HNu=B6	3			P=2.0 R=2.0
	7	becoming light grey w/ iron staining and iron nodules throughout.	HNu=B6	4			
	8		HNu=B6	5			P=2.0 R=2.0
	9						
	10		HNu=B6	6			P=2.0 R=2.0
	11	w/ less iron staining					
	12		HNu=B6	7			P=2.0 R=2.0
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

HTW DRILLING LOG

HOLE NO. MW22A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR KJB

SHEET 3 OF 3 SHEETS 13

ELEV a	DEPTH b/4	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean clay (CL) v. firm light gray, w/ iron staining chunks w/ iron nodules					P=2.0 R=2.0
	15	Poorly graded Sand (SP) ~~loose~~ soft, Light gray moist v fine to fine, w/ iron staining	HNu=BG	8			
	16	w/ trace of silt	HNu=BG	9			P=2.0 R=1.0
	17						
	18		HNu=BG	10			P=2.0 R=1.2 v. soft
	19						
	20		HNu=BG	11			Mix 50lbs of Aquagel Gold P=2.0 R=1.3 very soft
	21						
	22	turning a light brown to yellow. becoming wet	HNu=	12			P=2.0 R=1.2
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

99%

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW 22A

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b 23	DESCRIPTION OF MATERIALS c same as above	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	Poorly graded Sand (SP) ~~Soft~~ loose, lt brown to yellow, v fine to fine, w/ trace of silt. dry	HNu=BG	12			P=2.0 R=12
	25	w/ limonite staining	HNu=BG	13			P=2.0 R=0.9
	26						
	27		HNu=BG	14			P=2.0 R=1.1
	28	w/ multi colored grains w/ trace of medium sand					
	29		HNu=BG	15			P=2.0 R=1.2
	30						
	31		HNu=BG	16			P=2.0 R=1.1
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

HTW DRILLING LOG

HOLE NO. MW 22A

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 5 OF 5 SHEETS (1)

ELEV a	DEPTH b 22	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	Poorly graded Sand (SP) loose ~~soft~~, lt gray to pale yellow, dry, fine to fine, w/ trace of silt.	HNu=B6	~~17~~			P=2.0 R=1.3
	34						
	35		HNu=B6	~~18~~			P=3.0 R=1.5
	36						
	37						
	38		HNu=B6	~~19~~			P=2.0 R=1.3
	39	w/ limonite staining throughout					
	40		HNu=B6	~~20~~			P=2.0 R=1.1
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

HTW DRILLING LOG

HOLE NO. MW-22A

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 17 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	Poorly graded Sand (SP) ~~Soft~~, lt gray to tan v. fine to fine, moist w/ trace of medium sand.	HNu=BG	~~21~~			P=2.0 R=1.1
	42						
	43	w/ limonite staining	HNu=BG	~~22~~			Mix 50 lbs of Aquagel Gold + 150 gallons H2O P=2.0 R=1.1
	44						
	45		HNu=BG	~~23~~			P=2.0 R=1.4
	46	w/ iron staining					
	47		HNu=BG	~~24~~			P=2.0 R=1.5
	48	w/ trace of coarse sand					
	49		HNu=BG	~~25~~			P=2.0
	50						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A 99

HTW DRILLING LOG

HOLE NO. MW-22A

Remedial Investigation, Mead NOP

INSPECTOR [illegible]

SHEET ___ OF ___ SHEETS ( )

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	Poorly graded Sand (SP) med. ~~soft~~ compact, tan to brown w/ multi colored grains, fine to medium ~~sand~~, w/ trace of coarse sand.	HNu = B6	~~25~~			P = 2.0 R = 1.5
	51						
	52	w/ less coarse sand	HNu = B6	~~26~~			P = 2.0 R = 1.9
	53						
	54	w/ trace of coarse sand.	HNu = B6	~~27~~			P = 2.0 R = 1.4
	55						
	56		HNu = B6	~~28~~	~~MW-22A-55~~		P = 2.0 R = 1.6 ~~1 - 40 ml VOC~~ ~~2 - 40 ml VOC~~ ~~1 - 8 oz. jar~~ Chemical Analysis Samples
	57						
	58		HNu = B6	~~29~~			
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

HTW DRILLING LOG

HOLE NO. MW-22A

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 8 OF 8 SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same as above) Poorly graded Sand (SP) loose, v. fine fines, med. soft, tan to gray w/ tan of coarse sand					
	60		HNu=BG	~~30~~			P=2.0 R=1.2
	61						
	62		HNu=BG	~~31~~			P=2.0 R=1.4
	63						
	64		HNu=BG	~~32~~			P=2.0 R=1.2
	65						
	66		HNu=BG	~~33~~			P=2.0 R=1.25
	67						
	68		HNu=	~~34~~			P=2.0 R=1.5

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

HTW DRILLING LOG

HOLE NO. MW-22A

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 9 OF SHEETS 17

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	Poorly graded Sand (SP) loose, ~~soft~~ (v. fine to fine) tan to lt. gray w/ trace of med. sand.	HNu=BG	~~34~~			P=2.0 R=1.5
	69	Poorly graded Sand (SP) loose multi-colored ~~med. soft~~, medium ~~sands~~ w/ some fine sand, ~~multi colored sand~~ w/ trace of very fine sand.	HNu=BG	~~35~~			P=2.0 R=1.4
	70						
	71						P=2.0 R=1.0
	72	Poorly graded Sand (SP) ~~med.~~ dense, gray, v. fine to fine sand w/ trace of medium sand	HNu=BG	~~36~~			
	73						P=2.0 R=1.25
	74		HNu=BG	~~37~~			
	75	Poorly graded Sand (SP) dense, gray medium w/ trace of coarse and w/ trace of v. fine to fine sands	HNu=BG	~~58~~			Mix 50 lbs of Aquagel Gold additive 50 lbs Total 100 lbs P=2.0 R=1.3
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW 22A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b/1	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	Poorly graded Sand (SP) loose ~~medium~~ soft, fine to medium, gray ~~to~~ olive green w/ trace of coarse sand	HNu=B6	38			P=2.0 R=1.2
	79						Bit chatter @ 78-79'
	80	Poorly graded ~~Sand~~ (SP), loose, lt gray, v fine to fine sand ~~soft~~, lt ~~gray~~ w/ trace of coarse sand	HNu=B6	39			P=2.0 R=1.3
	81						Bit chatter @ 81-82'
	82	changing to some coarse sand w/ fine gravel	HNu=B6	40			P=2.0 R=0.5
	83						
	84		HNu=B6	41			P=2.0 R=1.0
	85	w/ 3" coarse sand seam	HNu=B6	42			P=2.0 R=0.9
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 22A

HTW DRILLING LOG

HOLE NO. MW22-A

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 1 OF 1 SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (SOIL) ~~or rock~~	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	Poorly graded Sand (SP) loose. v. fine to fine ~~sand, soft~~ gray w/ little medium sand w/ little coarse sand.	HNu=B6	42			P=2.0 R=0.9
	87						
	88	changes to fine to fine sands.	HNu=B6	43			P=2.0 R=1.8
	89						
	90	w/ trace of fine gravel	HNu=B6	44			P=2.0 R=1.7
	91						
	92		HNu=B6	45			P=2.0 R=1.8
	93						
	94	Poorly graded Sand (SP) ~~loose~~ medium to coarse ~~sand~~ w/ multi colored grain w/ few fine sands	HNu=	46			P=2.0 R=1.4
	95						Stop 6/16/92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW22A

ICORPS/4-15-92

1000

HTW DRILLING LOG

HOLE NO. MW-22A

Remedial Investigation, Mead NOP | INSPECTOR KB | SHEET 13 OF 13 SHEETS

ELEV a	DEPTH b 95	DESCRIPTION OF MATERIALS same as above	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly graded ~~sand~~ (SP) dense, gray, medium to coarse sand, multi colored w/ few fine sands					Start 6/17/92
	96		HNu=BG	47			P 2.0 R=0.9
	97						
		w/ bronzite staining	HNu=BG	48			P=2.0 R=1.0
	98						
	99						
		Shale; ~~firm~~ hard tan to light brown, v weathered, w/ clay, w/ red ~~oxidized~~ laminations ~~streaks~~ in the lower 6" (Omadi Shale)	HNu=BG	49			P=2.0 R=1.5
	100						
	101						Ream w/ 7 7/8" LRC-core, set 6" temp. steel casing to 101.4' Stop 6/17/92
							Ream to 102' to clean out gravel on bottom. Bit chatter
	102			Run #1			3' Corebarrel Unable to core Run 5 7/8 Rockbit to 106'
	103						
	104						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

1001

B07NE003702-05110

HTW DRILLING LOG

HOLE: MW22A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: [illegible]

SHEET 13 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	Shale, firm, laminated lt. gray to red, v. weathered (Onadi)					Drilled w/ 5 1/8" Rock bit, logged by cuttings.
	105						plugged hole 100 to 106 with bentonite pellets
	106						BOB 106' 6-23-92: Pulled 6 in steel casing. Hole collapsed 97.8 to 100.0. Boring completed as monitoring well. Total drilling fluid loss 180 gal

7CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-22A

100%

HTW DRILLING LOG

HOLE NO. MW 23A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Keystone 50 / Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" bbl Straight Shoe; 6" Reaming Shoe; 7 7/8", 9 7/8", 5 5/8" tricones; 7" Soils barrel; 4" ID Rock core barrel	8. HOLE LOCATION: Just west of Load line #1
	9. SURFACE ELEVATION:
	10. DATE STARTED: 6-24-92
	11. DATE COMPLETED: 6-26-92
12. OVERBURDEN THICKNESS: 99.3'	15. DEPTH GROUNDWATER ENCOUNTERED: 33.0'
13. DEPTH DRILLED INTO ROCK: ~~5.5'~~ BTE 5.7'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 105.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	X		1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
3	X		TOC	Exp.		100 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW 23A		Robert Ehrman

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY, Hard, Drk Brn, Dry, w/ rootlets (Loess)					Boring Advanced w/6" bbl straight ~~Bit~~ shoe followed by 6" reaming shoe with Keystone rig 6-24-92
	1	Becoming Lt. Brn mottled Lt. gray, w/ Iron oxide Staining. (Peoria Loess) w/root holes	HNu= .B6			65	D = 2.0 R = 2.0 D# 1
	2						
			HNu= B6			~~49~~ ~~48~~ 56	D# 2 D = 2.0 R = 2.0
	3						
	4	~~Moist~~ Becoming moist	HNu= B6			48	D# 3 D = 2.0 R = 2.0
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~B4~~ MW 100

B07NE003702-05112

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sac) LEAN CLAY, Hard, LT Brn mottled Lt Gray, moist, w/ Iron oxide stain and root holes. Becoming firm.					D#3
	6						
	7		HNu= BG			21	D#4 D=2.0 R=2.0
	8	Becoming Lt Gray mottled Lt Brn.					
	9		HNu= B.G.			28	D#5 D=2.0 R=2.0 Reamed to 10' w/9 7/8" tricone
	10						D#6
	11		HNu= BG			30	D=2.0 R=2.0
	12						
	13		HNu= BG			26	D#7 D=2.0 R=2.0
	14	w/ some fine Sand					

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	Poorly Graded Sand, Med Dense, Brn, fine grained moist, w/ Iron oxide Staining w/ trace of silt.	HNu= BG			66	D# 8 D = 2.0 R = 2.0
	16						
	17	Becoming LT Gray, Dry, w/ [redacted] silt grading out.	HNu= BG			74	D# 9 D = 2.0 R = 2.0
	18						
	19		HNu= BG			64	D# 10 D = 2.0 R = 2.0
	20						
	21		HNu= BG			75	D# 11 D = 2.0 R = 2.0
	22						
	23		HNu= BG			52	D# 12 D = 1.0 R = 1.0

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

1002

B07NE003702-05114

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Sand~~ Poorly Graded Sand med Dense, Lt Gray, fine, Dry					D# 13 D=2.0 R=2.0
	24		HNu= B6			75	
	25		HNu= B6 ~~HNu=~~				D# 14 D=1.0 R=1.0
	26						~~Rec~~
	27		HNu= B6	X	X	73 X	D# 15 D=2.0 R=2.0
	28						
	29		HNu= B6			69	D# 16 D=2.0 R=2.0
	30						
	31		HNu= B6			52	D# 17 D=2.0 R=2.0
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

1006

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Sand) Poorly Graded Sand, (SP) med Dense, Lt Gray, fine (grained) Dry w/trace of med Sand Becoming Wet	HNu= BG			54	D# 18 D=2.0 R= ~~0.3~~ 2.0 Water encountered ATD 33.0'
	34						
	35		HNu= BG			68	D# 19 D=2.0 R=2.0 Encountered Resistance w/6" casing at 35'
	36				~~MUC 023-036~~ 1-8oz ~~Exp~~ 1-4oz ~~TOC~~ 2-4oz ~~VOC~~		Sample MUC-023-036 collected 36'-38' for Exp, TOC, VOC
	37		HNu= BG	1 Bag Sample		P	P=3.0 R=3.0 Sample Collected 36'-39' for sieve analysis 36'-39'
	38						
	39		HNu= BG			P	P=7.0 R=7.0
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW 23A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 6 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Fine) Poorly Graded Sand, Med Dense, Lt Gray, fine, wet					
	42	w/trace med sand. and Limonitic staining					
	43						
	44						
	45						
		w/ med sand grading out.					Stopped 6-24-92
	46						Started 6-25-92
	47						P: 7.0
	48		HNu = B6			P	R: 7.0
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

100c

/CORPS/4-18-82

HTW DRILLING LOG

HOLE NO. MW 23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 7 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(fine) Poorly Graded Sand, Med Dense, Lt Gray, fine grained, wet.					
	52						
	53	w/trace of med sand					
	54		HNu: B6				P=7.0 R=6.5'
	55						
	56						
	57	w/ med sand Grading out.					
	58	w/ trace of wood frags.					
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 23A

HTW DRILLING LOG

HOLE NO. MW23A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 8 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand (SP), Med Dense, Lt Gray, fine grained, wet. w/trace of wood frags.					
	60						
	61						
	62						P = 7.0 A = 5.0
			ANu = BG				
	63						
	64						
	65						casing dropping w/ no resistance
	66						
	67	w/Little med sand and trace of coarse sand					
		w/med sand and coarse sand Grading out.					
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

1010

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 9 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand, Med Dense, LT Gray, fine ~~grained~~ sand.					
	69						
	70		HNu= BG				P=7.0 A=7.0
	71						
	72			4 Bag Sample	1x8oz ~~Exp~~ 1x4oz 2x4oz	for	Sample MWB-023 072 collected ~~for~~ 72'-74' Exp, TOC, VOC, and ~~of~~ sieve analysis
	73						
	74	w/ ~~trace~~ few med sand and trace coarse sand					
	75		HNu= BG				P=6.0 A=6.0
	76						
	77	Becomes Gray w/ little med sand and few coarse sand					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW23A

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 10 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(Saw) Poorly Graded Sand, Med Dense, Gray, fine grained, wet, w/ Little Med Sand and trace of Coarse Sand.					
	79						
		w/ trace of fine gravel.					
	80						
	81		HNu = BG				P = 8.0' R = 4.0'
	82						
	83						
	84						
	85						Encountered resistance w/6" casing.
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 11 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Sand) Poorly Graded Sand, Med Dense, Gray, Fine grained, wet, w/ little med sand and trace of coarse sand					
	88						
	89						
	90						P=7.0 B=7.0
	91		HNu= BG				
	92						
	93						
	94						Lost 147 gal water from 0'-95'
	95'						Stopped 6-25-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW23A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW23A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: BJE

SHEET 12 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Fine), Poorly Graded Sand, Med Dense, Gray, Fine, wet, w/ Little med sand and trace of coarse sand.					Started 6-26-92
	96	w/ Little fine gravel.					P = 5.0 A = 5.0
	97		HNu = B6	3 Bag Sample			Sample MWB-023-098 collected for 98-99.5' for EXP, TOC, VOC
	98			#3 Bag Sample	~~MWB-023-098~~ 1-8oz Exp. 1-4oz TOC 2-4oz VOC		Sample taken for Sieve Analysis 95'-100'
	99	w/ Some fine gravel and trace of coarse gravel. w/ mostly fine gravel.					115 gal water lost from 95'-100'
		Siltstone, Red mottled LtGray and Yellow, Soft, V. weathered, silty and Sandy					Reamed w/ 9 7/8" Tricone to 100'
	100		No sample				Cont. w/ 8 5/8" Tricone. Set 6" casing to 100.5'
	101			Run #1	Rec 4.5/4.5	RQD 98%	Advanced borehole w/ 4 7/8" x 5 5/8" core barrel. Placed Bent. Pellets to 100.7' 28 min for core run #1
	102	Becoming Gray mottled Red				DWR 100%	Loss - 0.0 U.Loss - 0.0 flushed casing with clear water prior to core run.
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW23A

1014

HTW DRILLING LOG

HOLE NO. MW23A

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 13 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Spec) ~~Boring Log~~					
		(Bnx) Shale, Grey mottled Red, Soft, v. weathered. silty and sandy					
	105						BOH 105.0' Estimated water loss in screen interval. 125 gal.
	106						Boring completed as monitoring well 6-27-92
	107						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 23A

101

B07NE003702-05124

MEW 7-28-92

HTW DRILLING LOG

HOLE NO. MW-24A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.557365 - E.2830829
5. NAME OF DRILLER: Bill Nick	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" Drag Bit & 2" Split Spoons; 9 Man Christensen Wire Line w/ 5" Tungsten inserts bit & 3½ x 2½ sample BBL; Tricone Roller Bits: 4⅝, 5⅝, 7⅞	8. HOLE LOCATION: SW of LL 2 (T14N, R8E, Sec 25, SW, NW)
	9. SURFACE ELEVATION: ≈ 1160.96
	10. DATE STARTED: 7/22/92 1100
	11. DATE COMPLETED: 7/26/92 15:00
12. OVERBURDEN THICKNESS: 125.0	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: 15.8	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 140.8	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	✓	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NONE	NA	NA	NA	NA	NA	24 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (Installed Well)	NA	MW-24A	NA.	[illegible] Hecht

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), dk brown hard w/ abundant root hairs (topsoil)	HNu = BKG			P	Start 7/22/92 1100; 5" Drag Bit w/ 2" Split Spoons; Drilling Fluids Pure H_2O; D#1 P=2.0 R=2.0
	2		NO SAMPLE			P	D#2 P=2.0 R=0
	4		HNu = BKG			P	D#3 P=2.0 R=2.0
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-24A

1010

HTW DRILLING LOG

MW-24A

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 2 OF 7

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME)					
		lean CLAY (CL) soft, lt. brown and grey, w/ Fe an Mn(?) stains and occ. root hairs (loess)					D#3
	6		HNu= BKG			P	D#4 P=2.0 R=2.0
	7						
	8		HNu= BKG			P	D#5 P=2.0 R=2.0
	9						
	10	Becoming v. Soft	HNu= BKG			P	D#6 P=2.0 R=2.0
	11						
	12	Becoming Soft	HNu BKG			P	D#7 P=2.0 R=2.0
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

/CORPS/4-15-92

HTW DRILLING LOG

Remedial Investigation, Mead NOP | INSPECTOR: J. Hecht | HOLE NO.: MW-24A | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	~~(Stiff)~~ soft FAT CLAY, (CH) ~~Brown~~, Grey w/ Fe stained relict root traces	HNu= BKG			P	D#8 P=2.0 R=2.0
	16	Poorly graded SAND (SP) med dense, lt. brown w/ dk. brown laminations fine to v. fine grained w/ trace silt (alluvium)	HNu= BKG				Boring continued with ~~Bucket~~ Chain ~~Auger~~ w/5in Tungsten insert bit D#9 P=2.0 R=1.2
	17						50# bentonite Add ~~+ bags Gel~~ + 200 gal H_2O
	18	Becoming tan w/ trace med grained SAND, no silt	HNu= BKG				D#10 P=2.0 R=0.8
	19						
	20		HNu= BKG				D#11 P=2.0 R=0.7
	21						
	22		HNu=BKG				D#12 P=2.0 R=0.7
	23						

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: 1012-24A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP

INSPECTOR J. Hecht

SHEET 4 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					D# 12
		Poorly graded SAND (SP) med dense, tan, fine to v. fine grained w/ trace med sand (alluvium)					
	24		HNu = BKG				D# 13 P = 2.0 R = 0.8
	25						50# bentonite add ~~tbag gel~~ + 200 gal H_2O
	26		HNu = BKG				D# 14 P = 2.0 R = 0.4
	27						
	28		HNu = BKG				D# 15 P = 2.0 R = 1.6
	29						
	30		HNu = BKG				D# 16 P = 2.0 R = 0.7
	31						
	32						

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 97KW030

HOLE NO.: MW-24A

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP

INSPECTOR J. Hecht

SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(same) poorly graded SAND (SP) med dense, tan, fine to v. fine grained w/ trace med sand (alluvium)	HNu BKG				D#17 P=2.0 R=1.5
	34		HNu BKG				D#18 P=2.0 R=1.1
	35						
	36		HNu BKG				D#18 P=2.0 R=0.8
	37						
	38		HNu BKG				D#19 P=2.0 R=0.7
	39						
	40		HNu BKG				D#20 P=2.0 R=0.8
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

ICORPS/4-16-92

1020

HTW DRILLING LOG

MW-24A

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 6 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) med dense, tan, fine to v. fine grained w/ trace med. sand (alluvium)					D#20
	42		HNu = BKG				D#21 P=2.0 R=0.6
	43						
	44		HNu = BKG				D#22 P=2.0 R=1.1
	45						
	46		HNu = BKG				D#23 P=2.0 R=0.7
	47						
	48		HNu = BKG				D#24 P=2.0 R=0.6
	49	Becoming Dense					
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92.KW030

HOLE NO.: MW-24A

HTW DRILLING LOG

HOLE NO. mw-24A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 7 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(same) poorly graded SAND (SP) Dense, tan, fine to v. fine grained w/trace med. Sand (alluvium)	HNu= BKG				D#25 P=2.0 R=0.6
	52						
	53		HNu= BKG				D#26 P=2.0 R=0.4 50# bentonite add ~~Hway gel~~ + 200 gal H_2O
	54						
	55		HNu= BKG				D#27 P=2.0 R=0.7
	56						
	57		HNu= BKG				D#28 P=2.0 R=0.8
	58		HNu= BKG				D#29 P=2.0 R=0.9
	59						

ICORPB/4-16-82

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: mw-24A

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP | INSPECTOR: JHecht | SHEET 8 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) Dense, tan, fine to v. fine grained w/ trace med sand (Alluvium)					D#29
	60						D#30 P=2.0 R=1.0
	61		HNu= BKG				
	62						D#31 P=2.0 R=1.3
Bottom of Pleistocene fine SAND	63		HNu= BKG				
	64						D#32 P=2.0 R=0.7
	65		HNu= BKG				
	66	SILT (MH) soft, Light brown (alluvium)					D#33 P=2.0 R=2.0
	67		HNu= BKG				
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

1023

/CONPS/4-15-92

B07NE003702-05132

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 9 OF ☐ SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) SILT (MH) soft, light brown (alluvium)					D# 34 P=2.0 R=0.7
	69	Poorly graded SAND (SP) Dense, tan, v. fine grained (alluvium)	HNu= BKG				
	70	Becoming fine to medium grained w/ trace coarse sand	HNu= BKG				D# 35 P=2.0 R=0.5
	71						
	72	w/ little coarse sand	HNu= BKG	# 1 bag Sample	MW-24-1		D# 36 P=2.0 R=0.4 Sampled for Sieve 72-74
	73						
	74		HNu= BKG				STOPPED 7/21/92 Resume 7/22/92 D# 37 P=2.0 R=0.5
	75						
	76	Becoming fine to v. fine grained w/ trace med. sand	HNu= BKG				D# 38 P=2.0 R=0.3
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

HTW DRILLING LOG

MW-244

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 10 OF 11

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) Dense, tan, fine to v. fine grained w/trace med sand. (alluvium)					D#38
	78		Hum: BKg				D#39 P=2.0 R=0.8 large rock lodged in shoe 50# bentonite add ~~1 bag gel~~ + 100 gal H_2O
	79						
	80	Becoming fine grained w/little med to coarse sand and trace fine to coarse gravel	Hum: BKg				D#40 P=2.0 R=0.5
	81						
	82	Becoming med to coarse grained w/little fine sand and Trace fine to coarse gravel	Hum: BKg				D#41 P=2.0 R=0.5
	83						
	84		Hum: BKg				D#42 P=2.0 R=0
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-244

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 11 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	well graded SAND (SW) Dense, Tan & red, fine to coarse grained w/ trace fine gravel (alluvium)	HNu= BKG				D# 43 P=2.0 R=0.6
	88						50# bentonite Add ~~bag gel~~ + 200 gal H_2O
			HNu= BKG				D# 44 P=2.0 R=0.3
	89						
	90	Poorly graded SAND (SP) Dense, Grey & Green, fine to v. fine grained w/ Little med to coarse sand and trace fine gravel (alluvium)	HNu= BKG				D# 45 P=2.0 R=0.6
	91						
	92	Becoming fine grained w/ Little med sand and trace fine gravel	HNu= BKG				D# 46 P=2.0 R=0.6
	93						
	94	well graded SAND (SW) Dense, Grey & Green, fine to coarse w/ trace fine gravel (alluvium)	HNu=BKG				D# 47 P=2.0 R=0.9
	95						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

2

1026

HTW DRILLING LOG

MW-24A

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 12 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) well graded SAND (SW) Dense, grey & green fine to coarse grained w/ trace fine gravel					D# 47
	96		HNu= BK6				D# 48 P=2.0 R=1.0
	97						
	98		HNu= BK9				D# 49 P=2.0 R=0.9
	99						
	100	Becoming fine to coarse grained w/ little fine gravel	HNu= BK9				D# 50 P=2.0 R=0.1
	101						
	102		HNu= BK6				D# 51 P=2.0 R=0.1
	103						[redacted]
	104						

(CORPS/4-15-82)

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

HTW DRILLING LOG

HOLE NO. MW-24A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 13 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	Poorly graded SAND (SP) Dense, ~~GRY~~ Green fine to v. fine grained with few coarse sand and trace fine to coarse gravel (alluvium)	HNu= BKG				D#52 P=2.0 R=0.4 50# Bentonite add ~~they get~~ 200gal H_2O
	106						D#53 P=2.0 R=0.7
	107		HNu= BKG				
	108	Becoming fine grained w/ trace med sand and trace fine gravel	HNu= BKG				D#54 P=2.0 R=0.4
	109						
	110		HNu= BKG				D#55 P=2.0 R=0.5
	111						
	112		HNu= BKG				D#56 P=2.0 R=0.7
	113						

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 14 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					D#56
		Poorly graded SAND (SP) dense, grey & green, fine to v. fine grained with Trace med to coarse sand					
	114	occ. pieces lignite (alluvium)	HNu= BKg				D#57 P=2.0 R=0.5
	115						
	116	becoming dk grey, medium grained w/ Trace coarse gravel and coarse sand	HNu= BKg	#2 1 bag sample	MW-24-2		D#58 P=2.0 R=0.3 1 bag sample for sieve 116 to 118
	117						
	118		HNu= BKg				D#59 P=2.0 R=0.7 Added 50# bentonite ~~1 bag gel~~ +200 gal H_2O
	119						
	120		HNu= BKg				D#60 P=2.0 R=0.7
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-24A

1021

CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 15 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					D#61
		Poorly graded SAND (SP)					P=2.6
		dense, dk grey, medium					R=0.9
	123	To fine grained w/ trace coarse	HNu= BKG				
		sand and coarse gravel					
	124	0.1 clay seam (alluvium)					Stopped 7/23/92
							Resume 7/24/92 add 100 gal H_2O
							D#62
							P=2.6
	125		HNu= BKG	X	X	X	R=0.9
		SHALE, dk grey, mod					
		Hard, v. weathered					
	126	(Omani)					D#63
							P=2.0
							R=0.7 200# bentonite added 4 bags gel +100 gal H_2O, Reamed
			HNu= BKG				to 127 w/ 7 7/8 in Tricone
	127					30	Installed Temp 6" casing to be removed prior to well Dev.
							casing set to 127.0, Pushed to 127.9, Driven
	128						To 128.4 w/ 140 lb hammer
							Stopped 7/28/92
							Resume 7/29/92
			Tagged to	129.0			
	129			CORE RUN # 1	REC 0.2/2.0	RQD 0% DWR 100%	Begin coring w 9 ft machine 3 3/4 x 2 1/2 core bbl. w/ 5 in. Tungsten insert bit
							Start 129.6 1600
							Stopped 130.0 1611
							Run 2.0 Lost 1.8
	130						Rec .2 AL 1.8
							Core Run 2
							C.D = 131.0
	131						

PROJECT: Remedial Investigation, Mead NOP 921KW0130

HOLE NO.: MW-24A

1030

(CORPS/4-18-92)

HTW DRILLING LOG

MW-24A

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 16 OF 17

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	132	SHALE, dk grey, MOD. HARD, V. weathered w/ occ. sand seams (±0.1') and $CaCO_3$ laminations (±0.01) (OMADI)		CORE RUN 2	Rec 1.1 Pieced over 4" 0.8/2.0	RQD 40% DWR 100%	Start 131.0, 1622 Stopped 133.0, 1635 Run 2.0 Lost 0.9 Rec 1.1 UL 0.9 C.D. = 133.2
	133		Tape check 133.2				Stopped 7/25/92 Resume 7/28/92
		sand seams more prevalent		CORE RUN 3	Rec 0.4/2.0	RQD 20% DWR 100%	Start 133.0 0800 Stopped 135.0 0805 Run 2.0 Lost 1.6 Rec 0.4 UL 1.6 CD = 134.6 Flushed to 135
	134						
		? — ? — ? —					
		SANDSTONE, yellowish grey V. loose, V. weathered w/ occ. shale seams (±0.2') (OMADI)	Tapecheck 134.6		(Fall in)		
	135			Core Run 4	Rec 0.3/2.0	RQD 0% DWR 100%	Start 135.6 0815 Stopped 137.0 0830 Run 2.0 Lost 1.7 Rec 0.3 UL 1.7 CD = 136.7
	136						
	137	SHALE seams absent	Tape check 136.7				
				CORE RUN 5	Rec 0.3	RQD 0% DWR 90%	Start 137.0 907 Stopped 137.5 910 Run 0.5 Lost 0.2 Rec 0.3 UL 0.2 CD 137.25
			Tape check 137.25				
				CORE RUN 6	Rec 0	RQD 0 DWR 90%	Start 137.5 920 Stopped 138.0 930 Run 0.5 Lost 0.5 Rec 0 U.L. 0.5 CD = 136.4 Flushed to 138
	138		Tape check 136.4				
				CORE RUN 7	Rec 0	RQD 0 DWR 90%	Start 138.0 1000 Stopped 139.0 1015 Run 1.0 Lost 1.0 Rec 0 UL 1.0 CD - 138.7 Drilled w/ 6464
	139			RUN 8	Rec 0	2.0/6"	Begin 6" split spoon Recovery = 0 D=2.0
				CORE RUN 9	Rec 1.5/1.5	RQD 100% DWR 100%	Start 139.5 1440 Stopped 141.0 1450 Run 1.5 Lost 0 Rec 1.5 UL 1.5
	140						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-24A

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-24A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS
		(same) SANDSTONE, yellowish-grey v. loose, v. weathered (OMADI)		CORE RUN 9			200# bentonite added ~~Tragagel~~ + 100 gal H_2O CD = 140.8 Started 7/26/92, BOH = 140.8
	141		Tape check 140.8'				
	142						MONITORIN well Installed upon completion 7/27/92 to 7/28/92 WATER LOSS During DRILLING REAMING of screened Interval ≈ 300 gal Total water loss ≈ ~~1400~~ gal 1700 gal
	143						
	144						
	145						
	146						
	147						
	148						
	149						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-24A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNEK COMPANIES
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Failing CFD 1250; 2" split spoons, 5" DRAG BIT; 94m Christensen Wire Line; 3 1/4 x 2 1/2 CORE BBL, Δ 5/8 Tungsten Insert bit, 5 3/4 & 7 7/8 Tricone Roller Bit	8. HOLE LOCATION: N.560322 - E.2873067 Southwest load line 2, 10 North MW-25D
	9. SURFACE ELEVATION: 1172.81
	10. DATE STARTED: 6/30/92 — 11. DATE COMPLETED: 6/30/92
12. OVERBURDEN THICKNESS: 156.6	15. DEPTH GROUNDWATER ENCOUNTERED: UNKNOWN
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: Masked w/ drilling fluids.
14. TOTAL DEPTH OF HOLE: 156.6	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NO	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
NO	NA	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitor well installed	NA	MW-25A	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean CLAY (CL) soft ok brown. (Topsoil)					Boring Advanced w/ 5 3/4 tricone Roller bit. No samples collected, logged by cuttings
	2						
	3						
	4	Becoming light brown (Loess)					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Lean CLAY (CL) soft light brown					
	6	(Loess)					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

1034

HTW DRILLING LOG

HOLE NO. MW-25A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 3 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly graded silty SAND (SM) Tan (Alluvium)					
	15						
	16						
	17						
	18						
	19						
	20						
	21	Poorly graded Clean SAND (SP) fine to v. fine (Alluvium).					
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: J. Hecht

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded Clean SAND (SP)					
	24	fine to v.fine, Tan					
		(Alluvium)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

1030

ICORPS/4-18-82

HTW DRILLING LOG

HOLE NO. MW-25A
SHEET 3 OF 48 SHEETS

Remedial Investigation Mead NOP

INSPECTOR J. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded clean SAND (SP)					
	33	fine to v. fine, Tan					
	34						
	35	w/ Trace med. sand					
	36						
	37						
	38						
	39						
	40						
	41						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: J. Hecht

SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		poorly graded clean SAND					
		(SP) fine to v. fine, Tan,					
	42	w/ Trace med sand					
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

ICORPS/4-18-93

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 7 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) Poorly graded SAND (SP) tan fine to v. fine w/ trace med. sand					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
		w/ few med sand					
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

ICORPW4-15-92

HTW DRILLING LOG

HOLE NO.: MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 8 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		poorly graded SAND (SP) tan					
		fine to v. fine w/ TRACE					
	60	med. sand					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

Remedial Investigation Mead NOP | INSPECTOR Titlecht | SHEET 9 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded SAND (SP)					
		fine to v. fine, tan with					
	69	Trace med. sand					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A
SHEET 10 OF 18 SHEETS

PROJECT: Remedial Investigation Mead NOP
INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		poorly graded sand (SP)					
		fine to v. fine, (tan)					
	78	w/ Trace med sand					
	79						
	80						
	81						
	82						
	83						
	84						
	85						
		w/ trace gravel					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 104

HTW DRILLING LOG

HOLE NO. MW-25A

Remedial Investigation Mead NOP | INSPECTOR J. Hecht | SHEET 11 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP) tan fine to v. fine w/ Trace med to coarse sand.					
	87						
	88						
	89						
	90						
	91						
	92						
	93						
	94	Poorly graded GRAVEL (GP) tan fine to coarse w/ Little fine sand					
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 104

ICORPS/4-15-92

B07NE003702-05152

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		poorly graded GRAVEL (GP) tan					
		fine to coarse w/ little					
	96	fine sand					
	97						
	98						
	99						
	100						
	101						
	102						
	103						
	104						

ICORP 6-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

1044

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 13 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		well graded SAND (SW) tan fine to coarse with TRACE fine to coarse gravel					
	105						
	106						
	107						
	108						
	109	~~Becoming sandy~~					
	110						
	111						
	112						
	113						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 14 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) well graded SAND (SW) tan fine to coarse w/ Trace fine gravel					
	114						
	115						
	116						
	117						
	118	poorly graded GRAVEL (GP) fine to coarse, green-grey w/ trace fine sand					
	119						
	120						
	121						
	122						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

104C

HTW DRILLING LOG

HOLE NO. MW-25

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 15 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) Poorly graded GRAVEL (GP) fine to coarse green-grey w/ trace fine sand					
	123						
	124	becoming sandy					
	125						
	126	Poorly graded SAND (SP) medium to coarse, green grey w/ trace fine to coarse gravel					
	127						
	128						
	129						
	130						
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

1047

ICORPS/4-18-82

HTW DRILLING LOG

HOLE NO.: MW-25A

PROJECT: Remedial Investigation, Mead NOP

NAME OF DR: T. Hecht

SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND, (SP)					
		med to coarse w/ trace					
	132	fine sand and fine gravel					
		brown to black					
	133						
	134						
	135						
	136						
	137						
	138	becoming fine to v. fine					
	139						
	140						

ICORPS/6-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP) brown to black					
		fine to v. fine					
	141						
	142						
	143						
	144						
	145						
	146						
	147						
	148						
	149						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

HTW DRILLING LOG

HOLE NO. MW-25A

PROJECT Remedial Investigation Mead NOP

INSPECTOR T. Hecht

SHEET 18 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		poorly graded SAND (SP)					
		fine to vi. fine, grey					
	150						
	151						
	152						
	153						
	154						
	155						
	156						Stopped 6/20/02
		REFUSAL					monitoring well Installed 6/20/02
	157						WATER LOSS SCREENED INTERVAL ≈ 200 gal
	158						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25A

1050

ICORPM4-18-92

CJH 7/23/92 REV. BY M.E. WILSON 7-21

HTW DRILLING LOG

HOLE NO. MW-26A

SHEET 1 OF 1 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR: The Winnek Companies
3. PROJECT: Remedial Investigation, Mead NOP
4. LOCATION: Mead, Nebraska → N.564262 - E.2832256
5. NAME OF DRILLER: Bill Vick
6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" Drag bit / 2" split spoons; 96 mm Christensen wire line w/ 3½ X 2½ core bbl & Tungsten insert bit (4⅝); Tricone Rock bits 7⅝ 4⅝
8. HOLE LOCATION: NE, NE, NW sec 24, T14N, R8E west of Load Line 2
9. SURFACE ELEVATION: ~~± 1175~~ 1172.02
10. DATE STARTED: 7/13/92 1300
11. DATE COMPLETED: 7/16/92
12. OVERBURDEN THICKNESS: 103.8
13. DEPTH DRILLED INTO ROCK: 16.2
14. TOTAL DEPTH OF HOLE: 120.0
15. DEPTH GROUNDWATER ENCOUNTERED: NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA
18. GEOTECHNICAL SAMPLES: 1 — DISTURBED: X — UNDISTURBED: NA
19. TOTAL NUMBER OF CORE BOXES: NA
20. SAMPLES FOR CHEMICAL ANALYSIS: NA — VOC: NA — METALS: NA — OTHER (SPECIFY): NA — OTHER (SPECIFY): NA — OTHER (SPECIFY): NA
21. TOTAL CORE REC.: 0 %
22. DISPOSITION OF HOLE: Monitoring well installed — BACKFILLED: NA — MONITORING WELL: MW-26A — OTHER (SPECIFY): NA
23. SIGNATURE OF INSPECTOR: [signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	lean, highly organic CLAY (OL), dk brown Hard w/ abundant Root hairs (Topsoil)	HNu: BG ~~Bkg~~			P	START 1300 ADVANCED boring w/ 5" Drag bit and 2" split spoon Drilling fluid = pure H_2O D#1 P=2.6 R=2.0
	2	lean CLAY (CL), lt. brown and Grey, soft w/ fe and Mn stains and occ. root hairs (Loess)					D#2 P=2.0 R=2.0
	3		HNu: BKg			P	
	4		HNu: BKg			P	D#3 P=2.0 R=2.0
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-26A

1051

B07NE003702-05160

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) lean CLAY (CL) lt. brown and grey soft w/ fe & MN stains (loess)					D# 3
	6		HNu = Bkg			P	D# 4 P=2.0 R=2.0
	7						
	8		HNu = Bkg			P	D# 5 P=2.0 R=2.0
	9	w/ 0.5" dia. relict root traces heavily iron(?)stained					
	10		HNu = Bkg			P	D#6 P=2.0 R=2.0
	11						
	12		HNu = Bkg			P	D#7 P=2.0 R=2.0
	13						
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

ICORPS/4-15-92

1052

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					D#8 P=1.3 R=1.3
	15	Poorly graded SAND (SP) lt brown med dense fine to v. fine grained w/ trace silt (Alluvium)	HNu= BKg			P	Hit Refusal @ 15.3'
	16	Heavily iron stained	HNu= BKg			P	D#9 P=1.3 R=1.3 Hit Refusal @ 16.6'
	17		HNu= BKg			P	D#10 P=0.4 R=0.4 Begin 94mm Christensen wire-line sampling w/ 5" barrel kit & 3½x2½ sample tbl
	18	Becoming fine to v. fine grained w/ trace med. sand	HNu= BKg				D#11 P=2.0 R=0.6
	19		HNu= BKg				D#12 P=2.0 R=0.6
	20						
	21		HNu= BKg				D#13 P=4.0 R=0.5
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

HTW DRILLING LOG

HOLE NO. mw-26A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					D#13
		Poorly graded SAND (SP) tan med. dense, fine to v. fine grained w/ trace med. sand (alluvium)					
	24		HNu = BKG				
	25						D#14 P=2.0 R=0.4
			HNu = BKG				
	26						
	27						D#15 P=2.0 R=0.7
			HNu = BKG				
	28						50# bentonite added ~~+ bag gel~~ + 200 gal H_2O
	29						D#16 P=2.0 R=0.2
			HNu = BKG				
	30						
	31						D#17 P=2.0 R=0.5
			HNu = BKG				
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					D# 17
		Poorly graded SAND (SP) tan, med dense, fine to					
	33	v. fine gravel w/ trace med					
		sand (alluvium)					D# 18 P = 3.0 R = 0
	34		~~HW~~ No sample				
	35						
	36						D# 19 P = 2.0 R = 0.2
	37		HNu = BKG				
	38						Stopped 7/13/92 Resume 7/14/92
			HNu = BKG				D# 20 P: 2.0 R = 1.0
	39						
	40		HNu = BKG				D# 21 P = 2.0 R = 0.5
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) tan, med dense, fine to v. fine grained w/ trace med sand (alluvium)					D#21 100# Bentonite added ~~2 bags gel~~ + 200 gal
	42		HNu = BKG				D#22 P = 2.0 R = 0.8
	43	becoming medium grained w/ clay seams (0.5" thick)					
	44		HNu = BKG				D#23 P = 2.0 R = 0.7
	45	becoming fine grained					
	46		HNu = BKG				D# 24 P = 2.0 R = 0.6
	47	Becoming medium grained					
	48	Becoming fine to v. fine grained	HNu = BKG				D# 25 P = 2.0 R = 0.7
	49						
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-26A

105C

HTW DRILLING LOG

HOLE NO. mw-26A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(same) Poorly graded SAND (SP) tan, ~~med~~ DENSE, fine to v. fine grained w/ trace med. grained sand (alluvium)	HNu= BKG				D#26 P=2.0 R=0
	52						XX
	53		HNu= BKG				D#27 P=2.0 R=0.6
	54		HNu= BKG				D# 28 P=2.0 R=0.8
	55						
	56		HNu= BKG				D# 29 P=2.0 R=0
	57						
	58		HNu= BKG				D# 30 P=2.0 R=0.4
	59						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-26A

105

B07NE003702-05166

HTW DRILLING LOG

HOLE NO. MW-26A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Hecht

SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		poorly graded SAND (SP) tan, dense, fine to v. fine grained					D#30
	60	w/ trace med sand (alluvium)					
			HNu = BKG				D#31 P=2.0 R=0.9
	61	w/ few med grained sand and trace coarse grained sand and fine gravel					
	62						D#32 P=2.0 R=0.4
			HNu = BKG				
	63	becoming med to coarse grained w/ trace fine sand					
	64						D#33 P=2.0 R=0.5
			HNu = BKG				
	65						
	66	v. fine to becoming fine grained w/ trace medium grained sand					D#34 P=2.0 R=0.4
			HNu = BKG				
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

1058

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation Mead NOP | INSPECTOR T. Flecht | SHEET 9 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		poorly graded SAND (SP)					D#35
		tan dense, fine to v. fine	grained				P=2.0
			HNu=				R=0.3
	69	w/ trace med sand	BKG				
		(alluvium)					added 50# ~~bag~~ Bentonite ~~gel~~ + 200 gal H_2O
	70						
							D#36
			HNu=				P=2.0
	71		BKG				R=0.3
	72						
		~~w/ trace med sand~~					D#37
			HNu=				P=2.0
	73		BKG				R=0
	74						
							D#38
			HNu=				P=2.0
	75		BKG				R=0.7
	76						
		becoming medium grained w/ few coarse sand and trace fine gravel					D#39
			HNu=				P=2.0
			BKG				R=0.5
	77						

SUGGESTED SHALLOW WELL SCREEN INTERVAL (66' TO 76')

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-26A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) poorly graded SAND (SP) Tan & Red dense, medium grained ~~sand~~ w/ few coarse grained sand and fine gravel (alluvium)					D#39
	78						
			HNu= BKG				D#40 P=2.0 R=0.8
	79						
	80						
			HNu= BKG				D#41 P=2.0 R=0.4
	81						added ~~bentonite~~ 50# Bentonite + 200 gal H_2O
	82						D#42 P=2.0 R=0.5
	83	Becoming fine grained w/ trace med to coarse sand and fine gravel	HNu= BKG	#1 Bay sample			sample collected of fine sand for sieves.
	84						D#43 P=2.0 R=1.0
			HNu= BKG				
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

ICORPS/4-15-82

HTW DRILLING LOG

MW-26A

Remedial Investigation, Mead NOP | NSPECTOR: T. Hecht | SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(same) poorly graded SAND (SP), tan, dense, ~~fine~~ ~~grained~~ w/ trace med to coarse sand and trace fine gravel	HNu= BKG				D#44 P=2.0 R=1.0
	88	WITH SAND					Driller feels Gravel
	89	Poorly graded GRAVEL (GP) Tan & ~~green~~ Red, dense, fine to coarse w/ little fine to ~~coarse~~ grained sand (alluvium)	HNu= BKG				D#45 P=2.0 R=0.8 added 1 bag gel + 200 gal H_2O
	90						
	91		HNu= BKG				D#46 P=2.0 R=0.4
	92	becoming Tan & green w/ trace fine to coarse sand	HNu= BKG				D#47 P=2.0 R=0.5
	93	WITH SILT (SP-SM)					
	94	poorly graded SAND (SP) PK GREY, Dense, fine to v. fine grained w/ trace med sand, few silt	HNu= BKG				D#48 P=2.0 R=1.0
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

ICORPS/4-18-82

HTW DRILLING LOG

HOLE NO. mw-26A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 12 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) WITH SILT (SP-SM), poorly graded SAND (SP) ~~Dk.~~ (Dk Grey, Dense), fine to v. fine grained w/ trace med sand, few silt (alluvium)					D#48
	96						
			HNu = BKG				D#49 P-2.0 R-0.3
	97						
	98	Becoming fine to medium grained					
			HNu = BKG				D#50 P-2.0 R-1.1
	99						
							add 100 gal H_2O
	100						
			HNu = BKG				D#51 P-2.0 R-1.0
	101						
	102	well graded SAND (SW), Tan to grey, fine to coarse w/ occ. coarse gravel (alluvium)	HNu = BKG				D#52 P-2.0 R-2.0 Drilling mud Turns orange
	103						
		SANDSTONE, purple & orange, fine to v. fine, weathered, no HCL (DMAPL)					Refusal add 100 gal H_2O
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: mw-26A

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HTW DRILLING LOG

HOLE NO. MW-26A
SHEET 13 OF 14 SHEETS

PROJECT: Remedial Investigation, Mead NOP
INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) SANDSTONE: Med. hard, purple and orange, fine to v. fine grained, v. weathered	HNu-Bkg				DAY 53 Hard drilling to 104.6 P=2.0 R=1.7
	105	SHALE, light brown and grey laminations, soft, v. weathered (omadi)			Borehole reamed w/ 75% tricone	0-106.0	6" Temp casing installed to 106.0 Drive on (w/ 300 lb hammer, 25 blows)
	106		Taped to 105.8				to 107.0 Removed prior to well installation 106-107 Internal lost during flushing
	107		Taped to 107.0				Stopped 7/15/92 Resume 7/16/92 w/ Christensen sampler. START 107.0 @ 1015
	108	Becoming grey & Red laminate	HNu-Bkg	CORE RUN #1	Rec 0/2.0	RQD 0% DWR 100%	Stopped 109.0 @ 1030 no recovery Driller felt ground at start of core run Cuttings grey & red shale Run 2.0 lost 2.0 Rec 0 UL 2.0
	109		Taped to 109.0				START 109.0 @ 1045
	110		HNu-Bkg	CORE RUN #2	Rec 0/2.0	RQD 0% DWR 100%	STOPPED 111.0 @ 1055 Drilling fluids turn red (sample fell in) Run 2.0 lost 2.0 Rec 0 UL 2.0
	111		Taped to 109.5				Flushed to 111.0
	112		HNu-Bkg	CORE RUN #3	Rec 0/2.0	RQD 0% DWR 100%	START 111.0 @ 1115 STOPPED 113.0 @ 1120 Run 2.0 lost 2.0 Rec 0 UL 2.0
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

HTW DRILLING LOG

HOLE NO. MW-26A
SHEET 14 OF 14 SHEETS

PROJECT: Remedial Investigation, Mead NOP
INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					Begin 4 5/8 Tricone
		SHALE, grey & red laminations					no sampling
		soft, v. weathered					
	114	(Omadi Z					
		member)					
	115		Taped	to 115.0			
				CORE RUN *4	Rec 0/5.0	RQD 0%	Begin rock coring w/ imitation diamond Chats drill.
							Start 115.0 @ 1500
	116					DWR 100%	Stopped 120.0 @ 1530
							Run 5.0 Cost 5.0
							Rec 0 UL 5.0
	117						
	118						
	119						
							B.O.B. 120
							monitoring
							well installed
	120		Taped	to 120.0			upon completion
							7/21/92
							water loss
							in screened
							Interval
	121						≈400 gal
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-26A

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-27A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.563531.09 - E.2833826
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: CFD Failing 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" Drag Bit; 2" Split Spoon; 5" Tungsten Insert bit; 44 mm Christensen wire line; 7⅞ Tricone; 2⅛ x 3½in x 5ft Core barrel	8. HOLE LOCATION: Load Line 2 C-NW-NE Sec. 24, T14N, R8E
	9. SURFACE ELEVATION: ~~X~~ 1173.72
	10. DATE STARTED: 5/27/92 — 11. DATE COMPLETED: 6/1/92
12. OVERBURDEN THICKNESS: 107'	15. DEPTH GROUNDWATER ENCOUNTERED: 14ft ATD (estimated)
13. DEPTH DRILLED INTO ROCK: Drilled 10' 4.9 washed out before coring	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~14ft ATD~~ NA
14. TOTAL DEPTH OF HOLE: 121.9'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	~~30, 31, 45~~ X	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	64%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (installed well)		MW-27A		[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) firm, light brow, DRY w/ occasional rootlets and iron nodules (Loess)	HNu = BKG	1			Boring Advanced w/ 5" Drag bit and drilling fluid sampled w/ 2" split spoons Densities are estimated Drive # 1, Push = 2.0, Recovery = 0.5'
	2						D # 2 P: 2.0 R = 2.0
	3		HNu = BKG	2			
	4		HNu = BKG	3			D # 3 P = 2.0 R = 2.0
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-27A

HTW DRILLING LOG

HOLE NO. MW-27A
SHEET 2 OF 5 SHEETS

PROJECT: Remedial Investigation Mead NOP
INSPECTOR: T. Hewitt

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) LEAN CLAY (CL) firm, light brown, with occasional iron nodules (Loess)		3			
	6						
			HNu=BKG	4			D #4 P: 2.0 R: 1.9
	7	Becoming moist					
	8						D # 5 P: 2.0 R: 1.5
	9	Poorly Graded SAND (SP) loose, tan, fine to v. fine grained Dry (Alluvium)	HNu=BKG	5			
	10						D # 6 P: 2.0 R: 0.5
	11		HNu=BKG	6			
	12						D # 7 P: 2.0 R: 0.5
	13		HNu=BKG	7			
	14	Becoming ~~Saturated~~ wet					Driller estimates water @ 14-16'

/CORPS/4-16-93

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27A

HTW DRILLING LOG

HOLE NO. 27

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
	15	Poorly Graded SAND (SP) loose, tan, fine to v. fine ~~saturated~~ grained, wet (Alluvium)	HNu=Bkg	~~8~~			D# 8 P= 2.0 R = 0.6 Boring continued with
	16						~~Begin~~ 94mm Christensen bbl wire line Tungsten insert bit (5")
	17		HNu=Bkg	~~9~~			D# 9 P= 5.0 R=0.4
	18						
	19						
	20						
	21		HNu=Bkg	~~10~~			D#10 P= 5.0 R = 0.8
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

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B07NE003702-05176

HTW DRILLING LOG

HOLE NO. mw-27

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
	24	Poorly Graded SAND (SP) loose, tan, fine to v. fine grained wet (Alluvium)	Hxu=Bkg	10			D# 10 P = 5.0 R = 0.8
	25						Recovery Poor switched to 2 foot pushes w/ Christensen
	26						
	27		Hxu=Bkg	11			D# 11 P = 2.0 R = 0.5
	28	Becoming fine grained					
	29	Becoming fine to v. fine grained	Hxu=Bkg	12			D# 12 P = 2.0 R = 1.4
	30	Becoming medium to fine grained					
	31	Becoming fine to v. fine grained	Hxu=Bkg	13			D# 13 P = 2.0 R = 1.6
	32						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-27

HTW DRILLING LOG

HOLE NO. mw-27A
SHEET 5 OF 5 SHEETS

PROJECT: Remedial Investigation Mead NOP
INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same) Poorly Graded SAND (SP) loose, tan, fine to v. fine grained, wet (Alluvium)	HNu=Bkg	14			D# 14 P=20 R=1.6
	34	w/ trace med to coarse ~~sand~~ grained	HNu=Bkg	15			D# 15 P=2.0 R=1.0
	35						
	36		HNu=Bkg	16			D# 16 P=2.0 R=1.4
	37						
	38	Becoming medium dense	HNu=Bkg	17			D# 17 P=2.0 R=1.4
	39						
	40	w/ few med to coarse ~~sand~~ grained	HNu=Bkg	18			D# 18 P=2.0 R=1.2
	41						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-27A

HTW DRILLING LOG

HOLE NO. MW-27A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 6 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), med. ~~loose~~ dense tan and orange, fine grained, wet (Alluvium)		18			
	42						Stopped 5/27/92 Started 5/28/92
	43	w/trace medium grained sand	HNu=Bkg	19			D# 19 P=2.0 R=1.3
	44						
	45	Becoming fine grained	HNu=Bkg	20			D# 20 P=2.0 R=1.2
	46						
	47		HNu=Bkg	21			D# 21 P=2.0 R=1.4
	48						
	49		HNu=Bkg	22			D# 22 P=2.0 R=1.5
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

1070

HTW DRILLING LOG

HOLE NO. MW-27A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 7 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(Same) Poorly graded SAND (SP) med. dense ~~loose~~, tan, fine grained, wet w/ little medium sand (Alluvium)	HNu = Bkg	~~23~~			D# 23 P = 2.0 R = 1.3
	52						
	53		HNu = Bkg	~~24~~			D# 24 P = 2.0 R = 1.45
	54	Becoming fine to v. fine grained	HNu = Bkg	~~25~~			D# 25 P = 2.0 R = 1.6
	55						
	56	w/ trace coarse grained sand	HNu = Bkg	~~26~~			D# 26 P = 2.0 R = 1.4
	57						
	58		HNu = Bkg	~~27~~			D# 27 P = 2.0 R = 1.0
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-27A

HTW DRILLING LOG

HOLE NO. MW-27

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Hecht

SHEET 8 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP), dense, ~~loose~~, tan to gray, fine to v. fine grained, wet (Alluvium)		27			
	60						
			HNu = Bkg	28			D # 28 P = 2.0 R = 1.1
	61						
	62						D # 29 P = 2.0 R = 1.0
		w/ trace medium grained sand	HNu = Bkg	29			
	63						
	64	w/ little coarse grained sand		Sample collected for sieve analysis			D # 30 P = 2.0 R = 1.5
	65		HNu = Bkg	30 Bag sample #1			Sample collected 64 to 68' for grain size analysis
	66			Sample collected for sieve analysis			D # 31 P = 2.0 R = 1.6
	67		HNu = Bkg	31 Bag sample #2			
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. mw-27A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(Same) Poorly ~~sorted~~ graded SAND (SP) ~~loose~~ dense, tan to grey, fine grained wet (Alluvium)	HNu=Bkg	32			D# 32 P=2.0 R=1.7
	70						
	71	w/trace coarse grained sand	HNu=Bkg	33			D# 33 P=2.0 R=1.3
	72	Becoming medium to coarse grained with trace fine gravel	HNu=Bkg	34			D# 34 P=2.0 R=0.4
	73						
	74	Becoming fine grained w/ ~~occasional~~ trace medium to coarse grained sand seams ≈ (0.1 thick)	HNu=Bkg	35			D# 35 P=2.0 R=2.6
	75						
	76		HNu=Bkg	36			D# 36 P=2.0 R=1.5
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: mw-27A

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-27

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 10 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly sorted SAND (SP) ~~loose~~ dense, tan to grey, fine grained w/trace medium to coarse grained sand (Alluvium)	HAu=Bkg	~~36~~			
	78						D* 37 P=2.0 R=1.6
	79		HAu=Bkg	~~37~~			
	80	Becoming fine grained					D* 38 P=2.0 R=1.3
	81		HAu=Bkg	~~38~~			
	82	Becoming fine grained w/ trace ~~coarse sand~~ medium and fine gravel					D* 39 P=2.0 R=1.2
	83		HAu=Bkg	39			
	84	Well graded SAND (SW) ~~loose~~ dense, grey, fine to coarse grained, with few fine gravel, wet (Alluvium)	HAu=Bkg	40			D* 40 P=~~2.8~~ 5.9 R=2.2
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

ICORPB/4-18-92

HTW DRILLING LOG

HOLE NO. MW-27

Remedial Investigation Mead NOP | INSPECTOR J. Hecht | SHEET 11 OF 95 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Well graded SAND (SW) ~~loose~~ dense, grey & green, fine to ~~coarse~~ grained, with few fine gravel (Alluvium)					
	87			40			
	88						
	89						
	90		HNu= Bkg	41			D# 41 P= 5.0 R= 2.0
	91						
	92						
	93						
	94		HNu=Bkg	42			D# 42 P= 3.0 R = 2.0
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-27

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	~~(Same)~~ Well graded SAND~~s~~ (SW) loose grey, fine to coarse ~~grained~~ with few fine gravel and trace coarse gravel (Alluvium)		~~42~~			
	97						
	98	Internal Cost, broken cobble size quartzite found in barrel		~~43~~			D# 43 P= 5.0 R= 0.3
	99						Hard drilling large rock fragments jammed in bbl
	100						
	101						
	102		HNu= BKg	Sample Collected For Sieve Analysis ~~44~~ 3			D# 44 P= 5.0 R= 2.0 Hard Drilling
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

/CORPS/4-15-92

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HTW DRILLING LOG

HOLE NO. MW-27

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same) Well graded SANDS (SW) ~~loose~~ dense, grey, fine to coarse w/ few fine to coarse gravel, wet (Alluvium)		44			
	105						
	106						Drilling fluid turned orange. Reamed to 107 w/ 7⅞ Tricone Bit. Stopped 5/28/92
	107	FAT CLAY (CH) soft, orange w/ little purple cemented medium grained sand (Omadi ?)		45			Started Drilling 5/29/92. Placed 8" diameter flush joint casing to 110.5. Casing was dropped & buried in bedrock ≈ 3' on 5-30-92. Casing removed after coring
	108						
	109						
	110						110.48 bottom of casing. Interval lost, washed out of casing
	111						Drilling Stopped 5/29/92
	112	SHALE, grey & reddish brown laminations, ~~mod stiff to~~ hard V. weathered, few med. sand	Thermo Bkg	Core Run #1 46	Rec 0.9/5.0	RQD 18% BWR 90%	Begin 5/31/92 Continuous Coring 3½ x 2½ Christensen core bbl Chris drill bit 4½" diameter
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-27A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) SHALE, grey and reddish-brown laminations, ~~med stiff to~~ hard, v. weathered, few med. sand grains					
	114			46			
	115						
	116						
	117	Becoming grey, reddish-brown	HNu: Bkg	Core Run #2	Rec 5.5/5.0	RQD ~~HP~~% 112	0.5' material protruding from lower bottom of core bbl.
	118				5.5/4.9	DWR 80%	Probably from last run
				47			
	119						
	120						
	121						Monitoring well placed upon completion 6/1/92 BOB TD@ 121.9'
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-27A

/CORPS/4-18-82

HTW DRILLING LOG

HOLE NO. MW-27

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

Narrative on well installation

Boring advanced to bedrock (107') Casing was imbedded 3' into bedrock and excess material flushed resulting in sample loss from 107 to 111.9. Cuttings suggest orange clay and fine sand.

Coring showed shale to a depth of 121.9 so core hole was backfilled with bentonite pellets to 107.5 and casing was pulled up from 110 to 107. 4-8 sand was added (w/out tremie because funnel would not fit over casing lift nipple) to 106.5 (taped) Casing was pulled to 105

Monitoring well materials were assembled and introduced to boring. well was discovered to be too high, sand was taped at 103.5. Volume calculations suggest that too much filter pack sand was added.

Driller (using tremie pipe) began flushing sand with water to loosen the sand and reposition well. After less than one minute of flushing well was EASILY pushed down to 106.5

filter pack sand was added and casing pulled slowly until sand reached 94'. Boring sat over nite, sand was taped at 95' in the morning. More sand was added to 94'

Pure Gold grout was tremied (w/o side deflector) w/ pipe end ≈6' above filter pack. Grout was incorrectly mixed at 9.8 (should be 10-10.2) This grout was added to ≈ 85'

Remaining grout mixed to 10.0 and tremied w/ side deflector to ≈ 5'

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

ICORPS/4-16-92

CBH 7/9/92

HTW DRILLING LOG

HOLE NO. MW-28 A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.557660-E2835306
5. NAME OF DRILLER: Terry Taber	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8-inch-dia tri-cone roller-bit	8. HOLE LOCATION: MW-28A at NE NW SE NE sec. 25, T14N, R8E
	9. SURFACE ELEVATION: ~~07-07-92~~ ~~1164±~~ 1169.88
	10. DATE STARTED: 07-07-92 / 11. DATE COMPLETED: 07-07-92
12. OVERBURDEN THICKNESS: 138.0 ft	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 0.5 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: — N/A
14. TOTAL DEPTH OF HOLE: 138.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): — N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	~~N/A~~	~~N/A~~	~~N/A~~

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
—	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	N/A	MW-28A 7-7-92	N	Gene Paprocki

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	TOPSOIL	HNV Background (BG)				Boring advanced as mud rotary w/ 7 7/8-inch-dia tri-cone roller bit and drilling mud (~~7 bags~~ - 200 lbs of "Aquagel" bentonite plus water) Densities are estimated ~~Soil desc~~ Materials description is based on cuttings observed and boring log MW-28D
		LEAN CLAY (CL) AND SILT (ML), firm, dk yellow w/ root hairs					
	2						
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-28A

108C

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SILT (ML), soft, dk yellow	HNU: BG ~~Back-ground only~~				
	6						
	7	w/ root hairs					
	8						
	9						
	10	POORLY GRADED SAND (SP), med. dense, light grayish yellow, very fine to fine grained					
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	SAME: POORLY GRADED SAND (SP), loose, yellow, v. fine to fine grained	HNU: background				
	15						
	16						
	17	w/ ~~occasional grains~~ trace ~~of~~ coarse grained sand					
	18						
	19						
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

/CORPS/4-15-92

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HTW DRILLING LOG

MW-28A

Remedial Investigation, Mead NOP

INSPECTOR: Gene Pappanato

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	23	SANE: POORLY GRADED SAND (SP), loose to med. dense, yellow, very fine to fine grained	HNU: ~~Back-ground~~ BG				
	24						
	25	Becoming med. dense lt brownish gray, w/ ~~occasional~~ trace ~~grains of~~ medium grained sand					
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	SAME: POORLY GRADED SAND (SP), med. dense, light brownish gray, v. fine to fine grained	HNU: BG ~~Back ground~~				
	33	w/ ~~occasional grains~~ trace of medium grained sand.					
	34						
	35	Becoming dense, yellowish gray, fine grained					
	36						
	37	POORLY GRADED SAND WITH CLAY (SP-SC), dense, yellowish gray, fine grained					
	38	w/ occasional seams and partings of lean, bluish gray clay					
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

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HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), dense, light yellowish gray, v. fine to fine grained	HNU: BG ~~Background~~				
	42						
	43	Becoming light gray					
	44						
	45						
	46	w/ trace to little of multi-colored medium grained sand					
	47						
	48						
	49						
	50						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

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HTW DRILLING LOG

HOLE NO. MW-28 A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 7 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP) ~~loose to~~ med. dense, light yellowish gray, v. fine to fine grained.	HNU: BG ~~Back ground~~				
	51						
	52						
	53						
	54						Approximately 100 gals of drilling water (mud) lost
	55	w/ separate layer of dense, multi-colored, medium grained sand (approx. 1.0-1.5 ft thick)					
	56						
	57						
	58						
	59						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28 A

1001

HTW DRILLING LOG

HOLE NO. MW-28 A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 8 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP), ~~medium~~ dense, light yellowish gray, fine grained	HNU: BG ~~Background~~				
	60						
	61						
	62						
	63	w/ seams and partings of whitish gray, lean clay (SP-SC)					
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28 A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 9 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), ~~loose~~ dense, light yellowish gray, very fine to fine grained	HNU: ~~Background~~ BG				
	69						
	70						
	71						
	72						Approximately 50 gals of water lost 100 lbs ~~2 bags (200 lbs)~~ of Aquagel added to drilling mud
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, light yellowish gray, fine grained	HNU: BG ~~Background~~				
	78	w/ small lenses of whitish gray, lean clay w/ ~~occasional~~ trace pebbles of fine gravel					
	79	w/ ~~occasional grains~~ trace of medium and coarse grained sand					
	80						
	81	POORLY GRADED SAND (SP), ~~med.~~ dense, lt gray, v. fine to fine grained					
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinaku

SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, fine grained	HNU: BG ~~back~~ ground				
	87						
	88						
	89						
	90	POORLY GRADED SAND WITH GRAVEL (SP), dense, multi-colored, mostly coarse grained sand ~~&~~ w/ ~~occasional~~ trace fine gravel					
	91						
	92						
	93	Quantity of gravel increasing					
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

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HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 12 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	POORLY GRADED SAND (SP) med. dense, multi-colored, coarse grained	HNU: 86 ~~Back-ground~~				Approx. 50 gals of water lost from 90 to 95 bgs
	96						
	97						
	98	POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained sand w/ subrounded fine gravel					
	99						
	100						
	101	POORLY GRADED SAND (SP), ~~med~~. dense, very lt gray, fine grained					
	102						
	103	POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained w/ subrounded gravel					
	104						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 13 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	SAME: POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained	HNU: B6				
	105	w/ subrounded gravel					
		Quantity and size of					
	106	gravel increasing					
	107						
		w/ separate layers (1.0 to 4.0 inch thick) of poorly					
	108	graded sand (SP), dense, lt yellow, v. fine to fine grained					
	109						
	110						
	111						
	112						
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

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HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 14 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained sand w/ subangular and subrounded fine gravel	HNU = BG				
	114						
	115						
	116						
	117	POORLY GRADED SAND (SP), med. dense, multi-colored, coarse grained					
	118						
	119	POORLY GRADED GRAVEL WITH CLAY (GP-GC), dense, multi-colored, coarse, subangular w/ seams and partings of gray lean clay					
	120						
	121	POORLY GRADED GRAVEL (GP), med. dense, multi-colored, fine, subrounded.					
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 15 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	POORLY GRADED SAND WITH CLAY (SP-SC), loose, grayish yellow, fine grained w/ little of med. and coarse grained sand	HNU: BG ~~Back-ground~~				
	123	w/ seams and partings of lean, grayish yellow clay					
	124	POORLY GRADED GRAVEL WITH SAND (GP), loose, multi-colored, subrounded, fine w/ some coarse grained sand					
	125	POORLY GRADED SAND (SP), loose, gray, fine grained					
	126						
	127	POORLY GRADED GRAVEL AND SAND WITH CLAY (GP-GC), dense multi-colored, well-rounded, fine, w/ lean, olive gray clay, w/ little coarse grained sand					
	128	POORLY GRADED SAND (SP), med. dense, multi-colored, medium grained					
	129						
	130	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, gray, fine grained w/ layer 3-inch-thick of lean, olive gray, clay					
	131						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-28A

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	131	POORLY GRADED SAND WITH CLAY (SP-SC), loose, gray, fine grained, w/ seams and partings of lean, olive gray clay	HNU: .86 ~~Back-ground~~.				
	132						
		trace fine w/ ~~occasional~~ gravel					
	133						
	134	POORLY GRADED SAND (SP) loose, gray, fine grained					
	135						
	136	trace w/ ~~occasional~~ fine subrounded gravel					
	137						
		w/ layer (~0.8 ft thick) of coarse gravel and cobbles					
	138	POORLY GRADED SAND WITH SILT (SP-SM), dense light whitish gray, fine grained					
	139						B.O.B 138.6 Boring completed as monitoring well MW-28A 7-7-92
	140						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28A

HTW DRILLING LOG

HOLE NO. MW-29A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: US Army Corps of Engineers
SHEET 1 OF ~~6~~ SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.553790 - E.2836802
5. NAME OF DRILLER: Roger Hunter	6. MANUFACTURER'S DESIGNATION OF DRILL: Keystone 50 / Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drive bbl straight shoe; 7" Reaming Shoe; 5 5/8", 7 7/8, 9 7/8" tricone; 6" Denison Barrel; 2 1/2" Split Spoon; 4"x10" rock core barrel; 7 7/8" soil barrel	8. HOLE LOCATION: SE,SW,SW Sec 30 T14N R9E
	9. SURFACE ELEVATION: ± 1157 1158.10
	10. DATE STARTED: 6-1-92 / 11. DATE COMPLETED: 6-16-92
12. OVERBURDEN THICKNESS: 137.1'	15. DEPTH GROUNDWATER ENCOUNTERED: 45.5' (estimated)
13. DEPTH DRILLED INTO ROCK: 5.9'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 143.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
13	X	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	98 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed		MW 29A		[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY, Hard, Drk Brn, ~~moist~~ Dry, w/ rootlets (Loess)	HNu= BG			46	Drive #1 D=2.0 R=2.0 Advance boring with 6" drive bbl straight shoe followed by 6" reaming shoe every 2" interval 6/1/92 w/ Keystone cable-tool rig
	2	Becoming LT Brn.					
	3		HNu= BG			65	D#2 D=2.0 R=2.0
	4	LEAN CLAY (CL) Hard ~~Becoming~~ LT Brn ~~and~~ moist, LT Gray mottled w/ rootholes and Iron oxide(?) staining. (Peoria Loess)	HNu= BG			30	D#3 D=2.0 R=2.0
	5						

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW 29

/CORPS/5-15-92

1096

B07NE003702-05205

HTW DRILLING LOG

HOLE NO. MW 29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 2 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY, Hard, LtBrn and Lt Gray mottled, moist, w/ rootholes and Iron oxide (?) staining (Loess)		3			
	6						D#4 D = 2.0 R = 2.0
	7		HNu = BG	4		43	
	8	Becoming Firm, moist					
	9		HNu = BG	5		15	D#5 D = 2.0 R = 2.0
	10	Becoming soft					Reamed to 10' w/ 9 7/8 in Tricone D#6 D = 2.0 R = 2.0
	11		HNu = BG	6		17	
	12						
	13		HNu = BG	7		17	D#7 D = 2.0 R = 2.0
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

HTW DRILLING LOG

HOLE NO. MW 29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(as above)					
	15	Poorly Graded Sand (SP), Med Dense, Lt Gray, fine ~~grained~~, Dry. w/ trace of med ~~grained~~ Sand (Alluvium)	HNu= B6	8	8	64	D#8 D=2.0 R=2.0
	16						
	17		HNu= B6	9		70	D#9 D=2.0 R=2.0
	18	~~Becoming~~ Dry					
	19		HNu= B6	10		37	D#10 D=2.0 R=2.0
	20						
	21		HNu= B6	11		37	D#11 D=2.0 R=2.0
	22		HNu= B6.	12		42	D#12 D=2.0 R=2.0
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

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HTW DRILLING LOG

HOLE NO. MW 29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 4 OF 16 SHEETS 17

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sme) ~~as above~~) (SP) Poorly Graded Sand, Med Dense, lt brown, fine grained, dry, w/ trace of med ~~coarse~~ sand		X			
	24						
	25		HNu= BG	13		41	D#13 D=2.0 B=2.0
	26						
	27		HNu= BG	14		42	D#14 D=2.0 B=2.0
	28						
	29		HNu= BG	15		41	D#15 D=2.0 B=2.0
	30						
	31		HNu= BG	16		52	D#16 D=2.0 B=2.0
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW 29A
SHEET 6 OF ~~16~~ 17 SHEETS

PROJECT: Remedial Investigation, Mead NOP
INSPECTOR: BJE

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) ~~as above~~) Poorly Graded Sand (SP), Med Dense, Lt Gray, fine ~~grained~~, dry w/ trace of med ~~grained~~ sand					
	33		HNu= BG	17		51	D#17 D=2.0 R=2.0
	34		HNu= BG	18		80	D#18 D=2.0 R=2.0
	35						
	36		HNu= BG	19		75	D#19 D=2.0 R=2.0
	37						
	38		HNu= BG	20		61	D#20 D=2.0 R=2.0
	39						
	40		HNu= BG	21		43	D#21 D=2.0 R=2.0
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

1100

HTW DRILLING LOG

HOLE NO. MW29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 6 OF ~~16~~ 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~As above~~) (SP)) Poorly Graded Sand) Med Dense, LT Gray, fine ~~grained~~ dry, w/ trace of med ~~grains~~ sand		~~21~~			
	42						
	43		HNu= BG	~~22~~		67	D#22 D=2.0 R=2.0
	44						
	45		HNu= BG	~~23~~		66	D#23 D=2.0 R=2.0
	46	Becoming wet without Med ~~grained~~ sand ~~Gradesout~~					Groundwater encountered ATD 45.5'
	47		HNu= BG	~~24~~		46	D#24 D=2.0 R=1.3' Reamed Borehole to 48' ~~w/ [illegible]~~ ~~cement~~ 7" sets 6 boring Stopped 6-1-92
	48						Started 6-12-92 Reamed hole with 7 3/8 barrel
	49		HNu= BG	1		P	P=6.0' R=5.0'
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW29 1101

HTW DRILLING LOG

HOLE NO. MW29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 7 OF ~~16~~ 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as above)					
		Poorly Graded Sand (SP), ~~Mod~~ Dense, LT Gray, fine ~~sand~~ grained,					
	51	wet,					
				X			
	52			~~Sieve analysis Bag Sample~~			~~Sample collected for sieve analysis 48-54~~
	53						
	54						
	55						
				X			P=5.0'
	56		HNu: B6	~~Sieve Analysis Bag Sample~~			A=5.0'
	57						~~Samples Collected for sieve analysis 54-59~~
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW29

HTW DRILLING LOG

HOLE NO. MW 29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) ~~as above~~ (SP) Poorly Graded sand, Med Dense, Lt Gray, Wet, Fine ~~grained~~ grained,					
	60						P = 7.5 R = 7.0
	61	w/ trace of ~~grained~~ med to coarse sand	HNu: BG	3			
	62			~~Sieve Analysis Bag Sample~~			~~Sample collected for sieve analysis 59-66.5~~
	63	w/ 3" layer of fine to ~~grained~~ coarse sand w/ trace of fine gravel.					
	64						
	65						
	66						
	67			Bag sample #1 4			P = 6.0 R = 5.8 Sample collected 66.5 to 72.5' for grain size analysis
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

HTW DRILLING LOG

HOLE NO. MW29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 9 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(Sac) as Above~~ (SP) Poorly Graded ~~Sand~~ Med Dense, Lt Gray, ~~fine grained~~ wet, w/ trace of med to coarse grained Sand.		1			
	69		HNu= B.G	~~Sieve Analysis Bag Sample~~			Sample collected for sieve analysis
	70	W/ med to coarse grained sand ~~grading out~~					
	71						
	72						
	73						
	74		HNu= B.G.	8 ~~Sieve Analysis Bag Sample~~			P=6.1' B 6.1'
	75	~~Becoming Sin~~ W/ some med ~~grained~~ Sand and some coarse ~~grained~~ sand					
	76	W/ trace coarse sand med sand grading out.					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW29

HTW DRILLING LOG

HOLE NO. MW 29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 10 OF ~~16~~ 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as above~~ Poorly Graded Sand (SP) Med Dense, Lt. Gray.		6			
	78	fine ~~grained~~ grained, wet. w/trace coarse sand.					Stopped 6-12-92
							Started 6-13-92
	79	w/ trace of med sand ~~and~~ w/ coarse sand ~~grading out~~					
	80			6 ~~Sieve~~			P = 6.4' R = 6.4'
	81		HNu = BG	~~Analysis~~ ~~bag~~ ~~Sample~~			
	82						
	83	w/ med grained sand ~~grading out.~~					
	84						
	85			7			
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

1101

B07NE003702-05214

HTW DRILLING LOG

HOLE NO. MW 29A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 11 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(Sand) as above~~ Poorly Graded Sand (SP), Med Dense, Lt Gray, fine ~~grained~~, wet					
	87	~~Becoming fine to coarse grained sand w/ some fine gravel (multi colored)~~ WELL GRADED SAND WITH GRAVEL (SW), dense, lt gray (sand) and multi-colored (gravel), fine grained sand and fine gravel	HNu= BG	~~7~~ ~~Sieve Analysis~~ ~~hor~~ ~~Sample~~			P = 7.5 A = 3.5
	88						
	89						
	90						
	91	~~(Becoming fine grained sand)~~ POORLY GRADED SAND (SP), dense, lt gray, fine grained, wet					
	92						
	93		HNu= BG	~~8~~ ~~Sieve Analysis~~ ~~hor~~ ~~Sample~~			P = 4.0 A = 5.0
	94	Becoming fine to coarse grained sand w/ trace of fine gravel.					
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 29

ICORPS/4-15-92

1101

HTW DRILLING LOG

HOLE NO. MW 29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 12 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c WELL	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	(SW)	~~Sm~~ ~~as above~~ ~~Poorly~~ graded ~~Sand~~ Med Dense, Lt. Gray, fine to coarse ~~grained~~ w/trace of fine gravel	grained				
		Becoming fine ~~grained~~ grained w/gravel grading out.		9			
	96						7" soils barrel plugged continued with ~~dropped in~~ 7 7/8" tricone and circulated larger particles out of borehole then cont. w/ ~~7"~~ soils barrel. 7 7/8"
	97	Becoming ~~Poorly graded Sand, Med Dense, Med, fine to coarse grained, wet,~~ w/ ~~trace~~ few fine gravel		9 ~~Sieve Analysis bag Sample~~			
	98	~~very oxidized~~ w/heavy Iron oxide staining	HNu=				P=7.0 R=4.0
	99						
	100						
	101						
	102						
	103	Becoming (Lt Gray) fine ~~grained~~ w/some med to coarse ~~grained~~ w/gravel grading out		10			
	104						

(CORPS/4-15-82)

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29

110'

B07NE003702-05216

HTW DRILLING LOG

HOLE NO. MW29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 13 OF ~~16~~ 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as above)					
		~~Poorly~~ Well Graded ~~Gravel~~ sand (SW),					
		Med Dense, Lt Gray, Fine					
		to Coarse ~~gravel~~, wet,		~~No~~			
	105	w/trace fine gravel.		~~Sieve~~			P=7.5
				~~Analysis~~			R=0.2'
				~~Bag~~			
	106		HNu:	~~Sample~~			
			BG				
	107						
	108						
	109						
	110						
				~~No~~			P=4.0
				~~Sieve~~			R=2.0
	111			~~Analysis~~			
		POORLY GRADED SAND		~~Bag~~			
		(SP), dense, lt gray	HNu:	~~Sample~~			
			BG				
	112	~~Becoming~~ Fine ~~gravel~~ sand					
		w/ trace med ~~gravel~~ sand.					
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW29

1108

HTW DRILLING LOG

HOLE NO. MW 29A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 14 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~Same as above~~ (SP) Poorly Graded Sand, med dense, Lt Gray, fine ~~grained~~, wet, w/		10			
	114	Trace of med ~~grained~~ sand					
	115	Poorly Graded Gravel, WITH SAND (GP), loose, ~~Lt Gray~~ multi Colored, fine, wet w/ ~~fine~~ fine to ~~med~~ coarse grained sand.		11			
	116						
	117						
	118						7" soil barrel plugged
	119						Stopped 6-13-92 Flushed w/ 7 7/8" tricone bit and drilling fluids
	120						~~Cont w/ 7 7/8" tricone bit and drilling fluid~~ Sample Lost during flushing w/ 7 7/8" tricone Started 6-14-92
	121		NO Sample				
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 29A

/CORPS/4-15-92

1101

HTW DRILLING LOG

HOLE NO. MW29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 15 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as Above) Poorly Graded Gravel, (GP) WITH SAND, Loose, multi colored, fine, ~~of~~ wet, w/ fine to coarse ~~gravel~~ sand.		~~TR~~ ~~Sieve~~ ~~Analysis~~ ~~Bag~~ ~~Sample~~			Cont. Boring w/ 7 7/8" Soils barrel ~~and~~ drilling fluids
	123		HNu= BG				P=7.0'
							B=2.0'
	124						
	125						
	126						
	127	Poorly Graded Sand, (SP) ~~Med~~ Dense, Lt Gray, fine ~~grained~~, wet, w/ trace of med sand					
	128						7" Soils barrel plugged. Flushed w/ 7 7/8" Trione bit. ~~and~~ drilling fluids
	129		ND	NO	Sample	Sample lost during flushing w/ trione	~~Cont. w/ Dennison Barrel 2.8' long w/ 9" dia.~~
	130		ND				Cont. w/ Dennison Barrel 2.8' long 7" dia

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW29A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW 29A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 16 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded Sand WITH GRAVEL (SP), Med Dense, LT Gray, Fine ~~Gray~~ ~~Grained~~, wet,					
	130	w/ Little med to coarse grained Sand ~~and Little fine Gravel~~	NA				P: 2.5 R = 0
	132						
	133		NA				P: 2.5 R = 0
	134						Reamed w/ 9 7/8" tricone to 137.4' Stopped 6-14-92
	135	w/ trace of silt		No Sample			Cont. w/ 7 7/8" tricone and split spoons Started 6-15-92
	136		HNu: B6	Bag sample #2 ~~B~~ Sieve Analysis Bag Sample		40* 41 52 52	D = 2.0 R = 1.0 Placed 6" flush joint casing (FJC) to 138.2'
	137	Shale: Gray ~~and~~ mottled Brn, Soft, V. weathered, Silty, Sandy Becoming Gray 137.2'					Pulled temp. casing prior to well installation 6-17-92
	138						Stopped 6-15-92
							Started 6-16-92
	139		HNu: B6	Run #1	Rec 4.3/4.8	RQD 8290 PWR 1009	Cont. w/ 4" rock core barrel and drilling fluids

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 29A

* Blow counts are for 300# hammer fall

1111

B07NE003702-05220

HTW DRILLING LOG

HOLE NO. MW 29A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Shale: Gray, ~~[illegible]~~ Soft, v. weathered, silty, ~~S~~ sandy					
	140 ~~139~~						Lost - 0.1' U. Lost - 0.1'
							drilling time 25 min.
	141	Possible zone of core loss 141.2 to 141.3					
	142						
	143						4.8 BOH 143.0' Boring completed Monitoring Well installed ~~upon completion~~ 6-17-92 Lost 1,000 gal water in screen interval. ATD.
	144						
	145						
	146						
	147						
	148						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW29 111

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-30A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.562962 - E.2838674
5. NAME OF DRILLER: Roger Hunter	6. MANUFACTURER'S DESIGNATION OF DRILL: Keystone 501 Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drive 6bl Straight Shoe; 6" core barrel 6x7 ft; 4" core barrel double tube 4x5'	8. HOLE LOCATION: West of Load Line 3
	9. SURFACE ELEVATION: 1166.19
	10. DATE STARTED: 5-18-92 / 11. DATE COMPLETED: 5-21-92
12. OVERBURDEN THICKNESS: 101.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 40.0'
13. DEPTH DRILLED INTO ROCK: 8.9'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 110.4'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	X		1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	NA	NA	NA	NA	NA	88 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	NA	MW-30A	NA	Robert Ehren

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY, Firm, Dark Reddish Gray 10R 3/1, moist, w/ occasional rootlets and rootholes (Loess)	HNu BG				Boring Advanced w/ 6" drive 6bl Straight Shoe Followed by 6" Coring Shoe [illegible] Drive 1
	2	2.0					
	3		HNu BG				Drive 2
	4	Becoming Hard 4.0					Drive 3
	5		HNu BG				

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-30A

HTW DRILLING LOG

HOLE NO. MW-30A

Remedial Investigation, Mead NOP | INSPECTOR Robert Excell | SHEET 2 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) LEAN CLAY, Drk Reddish Gray 10R 3/1, Hard, dry, w/occasional rootlets and rootholes (Loess)					
	6						
		Becoming Lighter in color					Drive 4
	7		HNu= B6				D = 2.0 R = 2.0
	8	Becoming Firm, Grayish Brn 2.5Y 5/2 mottled Lt Gray 10YR 7/2 moist; w/rootholes	8.0				
							Drive 5
	9		HNu= B6				D = 2.0 R = 2.0
	10		10.0				
							Drive 6
	11		HNu= B6			29	D = 2.0 R = 2.0
	12		14.0				
							Drive 7
	13		HNu= B6			29	D = 2.0 R = 2.0
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-30A

HTW DRILLING LOG

HOLE NO. MW 30A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY, Grayish Brn 2.5Y 5/2 mottled Lt Gray 10YR 7/2, moist, w/iron oxide staining (Loess)					Drive 8
	15		HNu= BG			21	D = 2.0 R = 2.0
	16	w/Iron oxide concretions 16.0					
							Drive 9
	17		HNu= BG			32	D = 2.0 R = 2.0
	18	18.0					
							Drive 10
	19		HNu= BG			61	D = 2.0 R = 2.0
		19.8'					
	20	Poorly Graded Sand, Loose, Lt Gray 10YR 7/2, Fine to V. fine grained, Dry, w/Iron oxide staining in the upper 6" of the layer (Alluvium) 20.0					Drive 11
	21		HNu= BG			78	D = 2.0 R = 2.0
	22	22.0					
							Drive 12 D = 2.0 R = 2.0
	23		HNu= BG			86	

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW30A

HTW DRILLING LOG

HOLE NO. MW-30A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 4 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND, Loose, Lt. Grey 10YR 7/2, Fine to V. Fine grained, Dry					
	24	24.0 (Alluvium)					
			HNu BG			73	Drive 13 D=2.0 R=2.0
	25						
	26	26.0					
			HNu BG			112	Drive 14 D=2.0 R=2.0
	27						
	28	28.0					
			HNu BG			87	Drive 15 D=2.0 R=2.0
	29						
	30	30.0					
			HNu BG			78	Drive 16 D=2.0 R=2.0
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

HTW DRILLING LOG

HOLE NO. MW-30A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 5 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above) Poorly Graded SAND, Loose, Lt Gray, fine to V. fine Grained, Dry. (Alluvium)					Drive 17
	33		HNu= BG			81	D=2.0 R=2.0
	34	34.0'					
							Drive 18
	35		HNu= BG			55	D=2.0 R=2.0
	36	36.0'					
							Drive 19
	37		HNu= BG			56	D=2.0 R=2.0
	38	38.0					
							Drive 20
	39		HNu= BG			30	D=2.0 R=2.0
	40	40.0					
		Becoming wet.					Δ water enters ATD 40.0'
			HNu= BG			56	Drive 21 D=2.0 R=2.0
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

HTW DRILLING LOG

HOLE NO. MW-30A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 6 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND, Loose, Lt Gray, Fine to V. fin grained, wet. (alluvium)					
	42	42.0					
	43	Becoming fine grained w/ trace of med grains					Cont. Boring w/ 6" core barrel 6X7 5/8", Failing 1500. mud rotary. Reamed to 42' w/ 9 7/8" tricone bit.
	44						
	45		HNu= BG				P = 7.0' R = 7.0'
	46	w/a thin layer 4" of med to fine grained sand Becoming fine grained					
	47						
	48						
	49	49.0					
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW30A

1118

HTW DRILLING LOG

HOLE NO. MW 30A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 7 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND, Loose, Lt Gray, 10YR 7/2, Fine Grained, wet					
	51		HNu= BG				U= 4.0' B= 4.0'
	52						
		53.0'					Stopped 5-18-92
	53						Started 5-19-92
	54						
	55						
	56		HNu= BG				P= 6.5' R= 6.5'
	57						
	58	w/ thin layers of coarse to med grained sand.					
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RJE

SHEET 8 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded SAND, loose, lt Gray 10YR 5/2, fine grained w/ 10% fine wet					
	60	w/ thin layers of coarse to med grained sand to 59.5'					
	61		HNu= ND				P=5.5' B=5.5'
	62	w/ trace of med grained sand					
	63						
	64						
	65	65.0'					
	66	w/ layers of med to coarse sand 66.5 to 67.5	HNu= ND				P=5.0 B=5.0
	67						
		w/ coarse fine sand					
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW30A

112

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RJE

SHEET 9 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		becoming medium sand					
	69						
		70.0					
	70	w/few fine gravel max dia. 0.4"					
	71						
	72						P: 6.0'
			HNu = ND				R: 6.0'
	73						
	74						
		w/no gravel. Becoming fine to v. fine grained.					
	75						
		76.0'					
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

1121

B07NE003702-05230

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR:

SHEET 10 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same As Above) Poorly graded SAND, loose, Lt Gray 10YR 7/2; fine to fine grained; wet.	HNu= ~~ND~~ BG				P= 3.0 R= 3.0 100 gal lost.
	78						
	79	79.0					
	80						
	81		HNu= ND				P= 6.0 R= 6.0
	82	Becoming coarse grained w/some fine grains. A trace of fine gravel (max dia. 0.4") Becoming fine grained w/few coarse grains					
	83						
	84						
	85	85.0 W/ trace ~~few~~ coarse grained sand					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW30A

112

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 11 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(see above) Poorly Graded SAND, Loose, LT GRAY, fine to v.fine grained, wet,					
	89	w/ trace of coarse grains					P = 6.0
							B = 6.0
			HNu =				
	88		ND				
	87						
		w/some coarse grained Sand and trace of fine gravel					
	86						
		91.0'					
	91						
	92						
		93.0'					
	93	Poorly Graded Gravel w/Sand, Loose, Lt Gray, fine grained (MAX 0.75") subrounded wet, little fine to coarse grained sand					
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 12 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded Gravel w/Sand, (coarse, brown, fine grained [illegible]) subrounded, wet,					
	96	w/Little fine to coarse grained Sand w/trace of coarse gravel.	HNu= ~~[illegible]~~ 66				P=7.0 R=2.0
	97						
	98	w/Some fine to coarse grained Sand	98.0'				
			HNu= 66			300# hammer 160 151 29/a3'	2.5" Split Spoon SS sample D=1.3' R=0.6'
	99						
		99.5'					
	100		110.4 101.5 8.9 No sample				
	101						Pulled temp casing, reamed with 8" mud rotary tricone
		101.5'					Advanced 5.5" flush joint casing to 102.2' Stopped 5-20-92
	102	Shale: Red And Gray Laminae, mod. Hard, v. weathered, Clayey. Becoming Gray w/ some Iron oxide stain w/No lamination		Run # 1	Rec 7.5/8.5	AQD ~~[illegible]~~ 79% DWR 100%	Cont. Boring w/ 4"x5.5"x12' Core barrel and water. Add 40 lbs of bentonite. 31 sec. viscosity 5-21-92
	103						
	104						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-30A

1124

HTW DRILLING LOG

HOLE NO. MW-30A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR:

SHEET 1 OF 3 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		W/ Little ~~Sand~~ v. fine Sand					
	105						
	106	W/ No iron oxide staining					
		106.5'					
	107	Silty Sandy Shale: Gray, mod, Hard v. weathered, Non-fissil, w/ some sand and silt.					
	108						
	109						
		Sandstone: ~~Sandy~~, Lt Gray, soft, thin bedded, fine grained					
	110						
				BOH measured after removing core at 110.0'			BOH - 110.4' Total water lost in formation during drilling 500 gal. approx. monitoring well Placed 5-27-92
	111						
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 30A

HTW DRILLING LOG

HOLE NO. MW-31A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska, N.558621-E.2840307
5. NAME OF DRILLER: Bob Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner-Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Mud Rotary; 7 7/8 Tricone; 9 7/8 Tricone Ream; 2 1/8 x 3 1/2 in x 5 ft Core Barrel; 4 3/4 Hrizone	8. HOLE LOCATION: NW-NW Sec 30, T14N, R9E
	9. SURFACE ELEVATION: ~~1166 FEET~~ 1164.94
	10. DATE STARTED: 6-1-92
	11. DATE COMPLETED: 6-11-92
12. OVERBURDEN THICKNESS: 106'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked w/ drilling fluids
13. DEPTH DRILLED INTO ROCK: 106'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 112'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Grain size	52: 26, 32/33, 46/46, 51		1 of 1 107-112'

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	NA 4 samples, 1 split, 1 QA	NA	TOC 4 samples 1 split NA 1 QA	Explosives 4 samples 1 split NA 1 QA		100%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitor well installed		MW-31A		Todd Frazier 6/9/92

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS Hnu 10.7	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		6" Gravel and mud to coarse sand with silt, light brown, moist (fill)	BG	1		P	D = 2.0' R = 13"
			BG = Back Ground				
	1	Lean clay, hard, moist, light brown w/ iron oxide staining and kysoliths (Peoria Loess)					Advanced boring with 7 7/8 in tricone with drilling fluid, sampled with 3 in spoon followed by 2 in spoon.
	2						
	3		BG	2		P	D = 2.0' R = 14"
	4		BG	3		P	D = 2.0' R = 16"
	5						

/CORPS/5-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 112 B1 MW-31A

HTW DRILLING LOG

HOLE NO. MW-31 A

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME AS ABOVE) LIGHT BROWN, LEAN CLAY, HARD, MOIST, (PEORIA LOESS)	BG	←	3	-	
	6						
	7	with trace ~~more~~ silt / fine Sand	BG	←	4	P	P = 24" R = 22"
	8	POORLY GRADED SAND MED DENSE, LT GRAY, FINE GRAINED, MOIST, w/ LIMONITE STAINING	BG	←	5	P	P = 24" R = 0" Repushed R = 2"
	9						
	10		BG	←	6	P	P = 12" R = 3"
	11						
	12		BG	←	7	P	P = 24" R = 12"
	13		BG	←	8	8 15 24 41 - USING	D = 24" R = 13' 300 lb hammer
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 112 MW31A

HTW DRILLING LOG

HOLE NO. MW-31A

Remedial Investigation, Mead NOP | INSPECTOR Todd Frizzly | SHEET 3 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d HNU	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	12	(Same) ~~AS ABOVE~~ POORLY GRADED SAND, MED DENSE, LT GREY, FINE GRAINED, MOIST, w/ LIMONITIC STAINING					
	13						3" SPLIT SPOON 24" = D 13" = R
	14	becoming DRY	0	9		6 11 15 16	
	15						2" SPLIT SPOON 24" = D 13" = R
	16	~~DRY~~	0	10		5 8 10 12	
	17						3" SPLIT SPOON 24" = D 12" = R
	18	~~STRATIFIED~~	.2	11		15 21 21 24	
	19						2" SPLIT SPOON 24" = D 8" = R
	20		1.0	12		10 11 12 16	
	21		-USING 300 lb hammer + drive 4 ft				

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 112E MW-31A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-3 KPA

Remedial Investigation, Mead NOP

INSPECTOR [illegible]

SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d (HNU)	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	21	(Gravel) ~~as above~~ Poorly Graded SAND (SP), med. dense, lt gray, Fine, moist w/ limonitic staining				8 F1 23 33	3" SPLIT spoon 24" = D 14" = R
	24 22	~~moist~~	0	13			MOISTURE DUE TO DRILLING FLUID ?
	23						2" SPLIT SPOON
	26 29		.2	14		10 17 21 24	24" = D 8 = R
	27 25	becoming WET				9 14 18 21	3" SPLIT spoon 24" = D 12" = R ~~CHEMICAL SAMPLES TAKEN FOR EXPLOSIVES (8015), TPH (418.1), AND VOC (8021)~~. N.F Moisture possibly due to drilling Fluid
	29 26		0	15			
	29 27	becoming DRY				11 18 20 21	3" SPLIT spoon 24" = D 12" = R
	28 30		1.0	16			
29	31						2" SPLIT spoon
	30			17		R D 7 10 17 20	

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. MW-3

/CORPS/4 16-82

HTW DRILLING LOG

HOLE NO. MW-31~~2~~A

Remedial Investigation, Mead NOP

INSPECTOR [illegible]

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	30	(SAME) ~~Gr. Aggr.~~ Poorly graded SAND (SP), med dense, lt gray, fine, dry	1.0	17			24"=D 10"=R
	31						3" SPLIT SPOON
	32	~~DRY~~	.2	18		25 ~~12~~ 33 ~~24~~ 41 ~~42~~ 43 ~~56~~	24"=D ~~10"=R~~ 11= 13"=R
	33						2" SPLIT SPOON
	34		.6	19		16 ~~28~~ ~~21~~ 20 ~~23~~ ~~12~~ 21 ~~21~~ ~~23~~ 23 ~~23~~ 11	24"=D 12"=R
	35						3" SPLIT SPOON
	36	~~DRY~~	.4	20		17 21 109 201	24"=D 16"=R
	37						2" SPLIT SPOON
	38	becoming DRY TO MOIST	.8	21		17 21 ~~25~~ 31	24"=D 12"=R Moisture possibly due to drilling fluids
	39						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31A

HTW DRILLING LOG

HOLE NO. MW-31 ~~3~~A

Remedial Investigation Mead NOP

INSPECTOR [illegible]

SHEET 6 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	39	(SAME) ~~As above~~ Poorly graded SAND (SP), med dense, lt gray, fine, dry to moist ~~becoming fine sand~~ with some med sand	.2	22		15 50 99 117	3" split spoon 24" = 17 17" = R
	40						
	41					25 31 44 67	2" split spoon 24" = D 16" = R
	42	becoming Dry with ~~some~~ dk brown striations	.3	23			
	43			24		29 70 118 194	3" split spoon 24" = D 18 = R
	44	~~Dry~~ becoming fine sand ~~and sand stone~~	0				
	45	~~becoming fine sand~~ with some fine gravel	0	25		45 53 72 79	2" split spoon 24" = D 17" = R
	46						
	47			26	MW-31-47		Samples taken for chem. analysis 4oz for VOC 4oz for TOC 8oz for Explosives
	48						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW 31~~04~~

Remedial Investigation, Mead NOP | INSPECTOR Joe Frank | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Gravel as above Poorly graded SAND (SP), med dense, lt. gray, fine, dry with few fine gravel becoming wet	0	26		20 25 35 47	3" split spoon D=24" R=14" BAG COLLECTED FOR GRAIN SIZE
	49						
		wet	0	27		2 4 6 8	2" split spoon D=24" R=10
	50						
	51						
			.4	28		19 25 34 59	3" split spoon D=24" R=14"
	52						
	53						
		trace fine gravel	0	29		9 27 41 24	3" split spoon D=24" R=14"
	54						
	55						
			0	30		2 4 5 5	2" split spoon D=24" R=19"
	56						
	57						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31~~04~~

B07NE003702-05241

HTW DRILLING LOG

Remedial Investigation, Mead NOP | INSPECTOR Todd Fryrk | HOLE NO. MW-31 | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	58	(Same) ~~as above~~ Poorly graded SAND (SP), med dense, lt gray, fine, wet		31	~~31~~ TT	16 21 24 32	2" split spoon 24" = D 16" = R
		with layer of ~~poorly graded~~ gravel lens from 58.5 to 58.6 w/ (ALLUVIUM)	.2				
	59						
	60	with poorly graded gravel lens from 60 to 60.2 (ALLUVIUM)	0	32	~~32~~ TT MW-31-59	10 35 64 86	3" split spoon 24" = D 18" = R Bag collected for grain size, chemical samples taken 3-4oz jars collected for VOC, 3-4oz jars collected for TOC 3-8 oz jars
	61	Poorly graded gravel, dense, lt. gray, fine ~~[illegible]~~ wet with some coarse gravel and med and fine sand (ALLUVIUM)	0	33	~~32~~ TT MW-31-59	25 81 152 446	Collected for explosives from 61-63 feet ~~and composited total remaining sample from 59-61 feet~~ TT 3" split spoon D = 24" R = 23"
	62	Poorly graded ~~sand~~ fine, dense, lt. gray, wet ~~to~~ some med. ~~gravel~~ sand, wet (ALLUVIUM)					
	63						
	64	With trace gravel @ 64.4 ft poorly graded ~~sand~~ fine lt. gray, wet, ~~w/ trace~~ of coarse gravel, dense (ALLUVIUM)	.2	34		16 27 74 160	2" split spoon 24" = D 24" = R
	65			35		23 46 53 180	3" split spoon
	66						

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-31

HTW DRILLING LOG

MW-364

Remedial Investigation Mead NOP | INSPECTOR: Joe Zayek | SHEET 9 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) ~~AS ABOVE~~ Poorly graded SAND, dense, lt gray, fine w/ trace coarse ~~sand~~, gravel, wet	0	35			
	67	with trace fine gravel with trace silt	.2	36		10 21 34 70	2" split spoon D=24" R=13"
	68						
	69		.2	37		19 28 32 41	2" split spoon D=24" R=12"
	70	poorly graded ~~coarse~~ sand, dense ~~with some fine sand trace med sand~~, lt gray, ~~[illegible]~~ ~~coarse~~ fine w/ trace med sand, wet					
	71		.2	38		15 23 35 65	2" split spoon D=24" R=13"
	72						
	73	with ~~coarse~~ fine sand, moist, ~~hard~~ stiff 73.5 to 73.6	0	39		19 48 71 95	3" split spoon D=24" R=13"
	74	poorly graded ~~sand~~ sand and med with ~~trace~~ fine sand, (lt. gray) (dense) wet (alluvium)					
	75	poorly graded ~~fine sand~~ fine w/ trace med sand, (lt. gray) (dense) wet.					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-364

HTW DRILLING LOG

MW-31A

Remedial Investigation, Mead NOP | INSPECTOR: [illegible] | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	75	POORLY GRADED ~~SAND~~ SAND MED ~~SAND~~ WITH FINE SAND TRACE SILT AND FINE GRAVEL, (M. DENSE) WET, (LT. GRY) (ALLUVIUM)	0	40		3 8 12 18	2" SPLIT SPOON 24" = D 12" = R
	76						
	77						
	FINE	~~LT. GRY~~ POORLY GRADED ~~FINE~~ SAND DENSE, lt gray W/SOME MED SAND TRACE ~~FINE~~ GRAVEL, ~~DENSE~~, WET (ALLUVIUM)	.3	41		23 43 59 142	3" SPLIT SPOON 24" = D 17" = R
	78						
	79	POORLY GRADED ~~SAND~~ SAND, dense, lt gray MED ~~SAND~~ WITH FINE SAND TRACE COARSE SAND, FINE GRAVEL, AND SILT, ~~DENSE~~, WET, ~~LT. GRAY~~ (ALLUVIUM)	.2	42		6 29 59 79	2" SPLIT SPOON 24" = D 18" = R
	80						
	81	POORLY GRADED ~~SAND~~ SAND dense, lt gray FINE ~~SAND~~ WITH MED SAND, TRACE COARSE SAND, ~~LT. GRAY~~, ~~DENSE~~, WET (ALLUVIUM)	0	43		45 67 55 32	3" SPLIT SPOON 24" = D 12" = R
	82						
	83	WITH TRACE FINE GRAVEL	.2	44		1 4 9 8	2" SPLIT SPOON
	84						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW3(A

113

HTW DRILLING LOG

HOLE NO. MW-31~~00~~A

Remedial Investigation, Mead NOP

INSPECTOR Todd Fry

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	84	(Same) ~~as above~~ Poorly graded SAND, dense, lt gray, fine to med w/ trace coarse sand, wet	.2	44			2" split spoon
	85					STOP DRILLING 6-3-92 START DRILLING 6-4-92	
	86	Poorly graded SAND, dense, lt gray, ~~fg~~ med ~~with~~ trace fine gravel and fine sand, ~~lt gray~~, ~~dense~~, wet, (ALLUVIUM)	0	45		18 32 48 36	3" split spoon 24" = D 15" = R
	87						2" split spoon
Fine	88	Poorly graded ~~sand~~ ~~fine~~ sand, dense, lt gray w/ ~~and~~ silt ~~with~~ some ~~fg~~ gravel trace coarse sand, ~~lt gray~~ wet	0	46		7 6 7 11	24" = D 24" = R
	89	poorly graded ~~fine~~ gravel with sand, dense, Lt Gray, fine to coarse gravel, wet					3" split spoon
	90		0	47		9 15 14 15	24" = D 11" = R
	91						2" split spoon
	92		0	48		4 5 9 9	24" = D 24" = R
	93						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW31A

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-31-A

Remedial Investigation, Mead NOP

INSPECTOR [illegible]

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	93	(Same as above	0	45	~~45~~ MW-31-53	18 26 16 23	3" split spoon D = 24" R = 12" Samples taken for chemical analysis: 4oz Jar for VOC, 4oz Jar for TOC 8oz Jar for EXPLOSIVES, BAG FOR GRAIN SIZE
	94						
	95	poorly graded fine sand with trace coarse sand and gravel, Lt. Gray, dense, wet	.8	46	MW-31-53	11 26 45 49	2" split spoon 24" = D 24" = R
	96	poorly graded fine gravel with fine to coarse sand, Lt. Gray, Dense, wet					
	97		0	47		15 36 12 15	3" split spoon 24" = D 12" = R
	98						
	99	~~Gravel becoming~~ more coarse becoming fine to coarse gravel	.1	48		15 26 42 38	2" split spoon 24" = D 24" = R
	100						
		2" seam of dk brown gravel					
	101	increasing coarseness to gravel with ½" gravel becoming common		49		30 45 49 51	3" split spoon 24" = D 24" = R
	102						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW3(A

HTW DRILLING LOG

HOLE NO. MW-31 A

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same as above	.4	49			
	103						~~2" split spoon~~
	104		.7	50		18 25 24 21	24" = D 16" = R
	105						~~3" split spoon~~
	106	~~BEDROCK - common (?) shale Reddish brown w/ gray streaks, highly plastic slightly viscous~~ SHALE, redlish brown w/ gray streaks, soft to firm, with calcareous nodules (~1mm)		51		23 25 45 60	24" = D Reamed to 9 7/8 in with tricone ~~0-106.5 ft~~ on 6/10/92. 0-106.5 Set temporary 6 in PVC casing to 107 ft. Pulled temp casing prior to well installation 6/11/92 Stop 6/9/92
	107						
	108	Samples as above ~~Bottom of Bore~~ calcareous w/ calcareous nodules in gray shale	0.2	Core Box 52	5.0 / 5.0' ~~MW-031-112~~ ~~For EXP, VOC, TOC, GS~~	100% RQD 100% DWR	~~Start 6/9/92 Ream w/ 7 7/8 in tricone bit~~ Start coring 6/10/92 w/ 3" Core barrel. Ream corehole with 4 3/4 in tricone. Plug corehole with 4-8 sand 109 to 112, bentonite pellets 107 to 109 (6/11/92)
	109						
	110					Attempted	Complete as monitoring well (6/11/92). Hole collapse during installation, pull riser + screen. (6/11-92). Wash out w/ 9 7/8 in tricone. Reinstall monitoring well 6/12/92.
	111						

Move to end of log

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW31 A

/CORPS/4-16-92

1138

HTW DRILLING LOG

HOLE NO. MW-31A

Remedial Investigation Mead NOP | INSPECTOR [illegible] | SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	11.6	same as above	0.2	52		5.0 / 5.0'	Analytical samples taken for VOC - 4oz x 2 TOC - 4oz Explosives - 8oz MWB-031-112
	112	Bottom of boring					
		13. Depth into Rock insignificant. Split spoon Samples were collected to 107 Reaming 0-106.5 Coring 107-112					Total drilling water loss 1187 gals used, 416 gals in hole, 300 gals in pit = 451 gals lost to formation

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-31A

113

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-32A

1. COMPANY NAME Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR Woodward-Clyde Consultants
SHEET 1 OF 12 SHEETS	
3. PROJECT Remedial Investigation, Mead NOP	4. LOCATION Mead, Nebraska
5. NAME OF DRILLER Tom Poyton	6. MANUFACTURER'S DESIGNATION OF DRILL Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 3/4" OD / 4 1/4" I.D. HSAs	8. HOLE LOCATION MW-32 - N.55438 - E.2892035
	9. SURFACE ELEVATION 1151.95
	10. DATE STARTED 6-26-92 1438 hrs
	11. DATE COMPLETED 6/27/92 @ 0855 hrs
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED 44'
13. DEPTH DRILLED INTO ROCK 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED not recorded
14. TOTAL DEPTH OF HOLE 99.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none	NA	NA	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
none	NA	NA	NA	NA	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed monitoring well	NA	MW-32A	NA	J Jotman

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to hard, dark ~~grayish~~ brown, moist (Topsoil)					Boring logged from cuttings. Boring advanced w/ 7 3/4" HSAs.
	1						
	2						
	3	3.5'					
	4	LEAN CLAY (CL), firm to hard, light brown, moist (Loess) ↳ with slight reddish tint	B2=BH=Bkg				
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-32A

B1 1140

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL), firm to hard, light brown w/ reddish tint, moist (Loess)					
	6						
	7						
	8						
	9						
	10						
		becoming soft to firm					
	11						
	12						
	13						
	14		B2-B14-BK4				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL), soft to firm, light brown - reddish tint, moist (Loess)					
	15						
	16						
	17	17.0'					
		Poorly graded SAND (SP), medium dense, light brown to tan, dry, (alluvium)					
	18	fine grained					
	19						
	20						
	21						
	22						
	23	becoming mostly tan					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32A

114

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), medium dense, tan, dry, fine grained					
	24	(alluvium)	B2=BH=Bkg				
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A 114

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), medium dense, tan, dry, fine grained					
	33	(alluvium)					
	34		B2=BH=BKg				
	35						
	36						
	37						
	38						
	39						
	40						
		becoming moist					
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32 A 1144

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling / Don Johnson | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), medium dense, tan, ~~fine~~, moist, fine grained					
	42	(alluvium)					
		becoming fine with trace of medium sand					
	43						
	44						Stop 6-26-92 1530
							Resume 6-27-92 0756
							J Johnson Replaces J Ritterling as site geologist
	45	Becoming wet					Continued to log from cuttings
	46						
	47						
	48						
	49						
	50						

CORPS 4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A 114

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling / J. JOHNSON

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded Sand (SP), medium dense, Tan to grey ~~[illegible]~~, wet, fine grained (alluvium)					
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
			Bz: 1/5 = 0%				
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A 1146

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling / J Johnson

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly graded Sand (SP), med dense, Tan to ~~light~~ gray, fine grained. ~~wet~~ wet					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A 1147

B07NE003702-05256

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling / J JOHNSON | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded Sand (SP), med Dense, Tan to grey, f-fine grained, ~~wet~~ (alluvium) wet					
	69		HNu = HS = 0g				
	70						Water Added To Inside of Augers Tape Check indicates 1.8' of material inside Augers.
	71						
	72						
	73						
	74		HNu HS = 88-B6				~~Time 0830~~
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32 1148

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling / Jo Johnson | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above)					
		Poorly graded Sand (SP),					
		med Dense, Tan to gray, wet,					
	78	fine grained,					
							Time 0836
	79						
	80						
	81						
	82						
	83						
	84						
	85	~~Drilling indicates (Coarser)~~ 85					85 Drilling indicates coarser material
		85 Poorly graded Gravel (GP) w/ sand, Dense, Lt grey, wet, Fine to Coarse graded					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW32A 114

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling / J Johnson | SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded Gravel (GP) with Sand, Dense, Light gray, wet Fine to Coarse grained ~~wet~~ (alluvium)					
	87						
	88						fcg ~~[illegible]~~
	89						
	90						
	91						
	92						
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A 1150

HTW DRILLING LOG

HOLE NO. MW-32A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling / J JOHNSON | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded GRAVEL (GP), Dense, Light Gray, wet, fine grained,					
	96						
	97						Note: 50 gal water Lost During Drilling in Screened interval; 100 gallons Lost Total
	98						
	99						99' @ 0853
	100						Bottom of Boring 99.5' @ 0858 Finished Drilling 6/27/92
	101						Note: Completed Boring with Monitoring well MW-32A
	102						
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32A

1151

ICORPS/4-15-82

Cell 7/13/92

REDRILL

HTW DRILLING LOG

HOLE NO. MW-33A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 13 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.558208 - E.2844172
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Rotary wash bore with ~~6" bit~~, 5 7/8" tricone bit.	8. HOLE LOCATION: SE NW NE sec 29 T14N, R9E MW-33 south of load line 4
	9. SURFACE ELEVATION: 1158.03
	10. DATE STARTED: ~~7-9-92~~ 7-10-92 0815
	11. DATE COMPLETED: 7-10-92 1535
12. OVERBURDEN THICKNESS: 112.0 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~51 ft (estimated)
13. DEPTH DRILLED INTO ROCK: 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 112.0 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ N/A	N/A	N/A	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ N/A	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Installed monitoring well MW-33A~~	N/A	MW-33A	N/A	J. M. Hitchy

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h (5 7/8")
	1	LEAN CLAY (CL), firm to hard, dark brown, dry (Loess/topsoil)					Boring advanced with ~~6"~~ bit (tricone) rotary wash bore. Aqua Gel - drilling-bentonite fluid. Boring logged from cuttings and from review of boring log MW-33B. Comments on consistency and density are estimated.
	2						
	3						
	4		HNU = BG				Mix fluid: 90 gal water ~~2 50#~~ Aqua Gel 100 #
	5	becoming light brown (Loess?)					

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 2 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm to hard, light brown, dry, (Loess)					
	6						
	7						
		7.5' (with silt) POORLY GRADED SAND (SP), medium dense, light brown to tan, fine grained, dry, with clay and silt (Alluvium)					
	8						
	9						
	10						
	11						
	12	12.0' POORLY GRADED SAND (SP), medium dense, tan, fine, dry (Alluvium)					
	13	Silt content decreasing					
			HNU = B6 ~~B2-BH-B6~~				
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A 1153

B07NE003702-05262

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 3 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), medium dense, tan, fine grained, dry (Alluvium)	HNU=BG				
	15						
	16						
	17						
	18						
	19						
	20						
	21	becomes grayish tan					
	22	medium to coarse grained sand seam					
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 4 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),	HNU=BG				
		moderately dense, grayish tan,					
		fine grained, dry, with trace of					
	24	medium grained sand (Alluvium)					
	25						
	26						
	27						
	28						
	29						
	30	moisture content increasing					
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33 1155

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 5 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, grayish tan, fine grained moist, with trace of medium grained sand (Alluvium)					
	33						
			HNU = BG				Add ~~to mixture~~ ed 50 gal water and ~~50#~~ 50# Aqua Gel
	34		~~B3=BH=BC~~				
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A 1156

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 6 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan, fine grained					
	42	moist, with trace of medium grained sand					
		(Alluvium)					
	43						
	44						Add ~~[illegible]~~ ed: 10 gal water
	45						
	46						
	47						
	48						
	44						
	50						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A 1157

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 7 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, grayish tan, fine grained, moist, trace of medium grained sand					
	51	(Alluvium)					
		becoming wet					
	52						
	53						
			HNU = BG				Add gel to mixture:
	54		~~B2-B4-B6~~				50 gal water and 50 lb gel Gel
	55						
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

115E

/CORPS/4-15-92

HTW DRILLING LOG

MW-33A

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling | 8 of 13 sheets

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	(SAME) POORLY GRADED SAND (SP), ~~medium~~ dense, grayish tan, fine, wet, with some medium sand, (Alluvium)	HNU = BG				
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 9 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, grayish tan, fine grained wet, with some medium grained sand (Alluvium)					
	69						
		becoming fine to medium grained with trace of coarse grained sand					
	70						
	71						
	72						
	73		HNU = BG				
	74		~~B2=BH=BG~~				
	75						
	76						
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 10 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, grayish tan, fine to medium grained, wet, with trace of coarse grained sand (Alluvium)					
	78						
							Added ~~minimum~~ 50 gal water. and 50# Aquagel
	79						
	80						
	81						
	82						
	83						
	84						Added ~~minimum~~ 30 gal water ~~and 1/2 50#~~ Aquagel and 25#
		becoming ~~mostly~~ gray with trace of fine gravel					
	85						
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1161

B07NE003702-05270

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling | SHEET 11 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), medium dense, gray & multi-colored, fine to medium grained, with ~~some~~ trace coarse grained sand and fine gravel, wet (Alluvium)					
	87	POORLY GRADED GRAVEL (GP), dense, multi-colored, fine, with trace of coarse gravel (Alluvium)					
	88						
	89		HNU = BG ~~B2=BH-BG~~				Added ~~[illegible]~~ 40 gal water and 50# AquaGel
	90						
	91						
	92						
	93						
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-33A

ICORPS/4-16-82

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 12 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED GRAVEL (GP), dense, multi-colored, fine, wet, with trace of coarse gravel (Alluvium)					
	96						
	97						
	98						
	99						
		99.5'					
		POORLY GRADED SAND (SP), dense, gray, fine to medium grained wet, with some coarse grained sand (Alluvium)					
	100						
	101						
	102						
	103						
	104						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 13 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense, grey, fine to medium grained, wet, with ~~trace~~ coarse sand (Alluvium) 104.1'					
	105	POORLY GRADED GRAVEL (GP), dense, multi-colored, fine, wet, with medium to coarse grained sand (Alluvium)					
	106	106.0'					
		106.5'					NOTE: On 7-11-92 5' cave/slough found. Added to mixture: 70 gal water and 25 ~~#/50~~ # Aquabed. Left on 7-11-92 at 1040 due to ~~heavy~~ weather.
	107	POORLY GRADED SAND (SP), dense, fine grained, light gray, wet (Alluvium ?) becoming very dense					
	108						Total drilling fluid mixed = 390 gal. ~~Estimated drilling fluid loss = 350 gal.~~
	109						Completed boring as monitoring well MW-33A.
		109.5'					
	110	POORLY GRADED GRAVEL WITH SAND (GP), dense, multi-colored, fine, wet, with some coarse sand (Alluvium)					
	111						
	112						Stop 7-10-92 1535 ~~7-11-92:~~ Bottom of borehole at 112.0'.
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1164

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-33A

SHEET 1 OF 14 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward - Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" O.D. and 4 1/2" I.D. HSA; 3" O.D. stainless steel split spoon	8. HOLE LOCATION: MW-33 SE NW NE sec 29 T14N, R9E
	9. SURFACE ELEVATION:
	10. DATE STARTED: 7-1-92 at 0905 / 11. DATE COMPLETED: 7-7-92 at 1155
12. OVERBURDEN THICKNESS: 116.5 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~51 ft (estimated)
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 116.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1 ~~106'-107'~~	✓	NA	none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
1 ~~106'-107'~~	✓	NA	TOC, ~~EXP~~	EXPLOSIVE	NA	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Installed monitoring~~ well MW-33A	X	~~MW-33~~ A	NA	J. M. Gutteling

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm to hard, dark brown, dry (Loess/topsoil)					Boring logged from cuttings. Boring advanced w/ 7 7/8" Hollow stem augers.
	1						
	2	Hole Abandoned due to caved material above screened interval. Removed screen/riser, grouted Hole 106.5 to surf. CEA 7/10/92					
	3						
	4		HNO = B6 ~~B2 = BH = Bkg~~				
	5	becoming light brown					

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-33A

1165

HTW DRILLING LOG

HOLE NO.: MW-33A

Remedial Investigation, Mead NOP

INSPECTOR: J. Ritterling

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL), firm to hard, light brown, dry (Loess)					
	6						
	7						
		7.5'					
	8	POORLY GRADED SAND (SP), medium dense, light brown to tan, fine grained, dry, with clay and silt (Alluvium)					
	9						
	10						
	11						
		12.0'					
	12	POORLY GRADED SAND (SP), medium dense, tan, fine grained, dry (Alluvium)					
	13		#NU = BG				
	14		~~B2=BK=BK~~				

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1166

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), medium dense, tan, fine grained, dry					
	15	(Alluvium)					
	16						
	17						
	18						
	19						
	20						
		becomes mostly greyish tan					
	21						
	22	medium to coarse grained sand seam					
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A 1167

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 4 of 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		medium dense, grayish tan,	HNU =				
		fine grained, dry (Alluvium)	BG				
	24	with a trace of medium grained sand	~~B2=BH=Bkg~~				
	25						
	26						
	27						
	28						
	29						
	30	moisture content increasing					
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW090

HOLE NO.: MW-33A 1168

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-33 A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 5 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(SAME) POORLY GRADED SAND (SP), ~~medium dense~~, grayish tan, fine grained moist (Alluvium) ~~with~~ ~~a trace of medium~~ grained with trace medium gravel					
	34		HNU = = 86 ~~32 BK=BKg~~				
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1169

B07NE003702-05278

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 6 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP),					
		w/ little dense, gravel tan, fine grained					
	42	moist (Alluvium) with					
		trace medium sand					
	43						
	44						
	45						
	46						
	47						
	48						
	49						Stop 7-1-92 1218
							Resume 7-7-92 0740
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33 B170

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), med. dense, grayish tan, fine grained, moist with trace medium grained sand (Alluvium)					
	51						
		becoming wet					
	52						
	53						
	54						
	55						
	56						
	57						
	58						
			B2=BH=BG				
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)	HNU =				
		POORLY GRADED SAND (SP),	B6				
		medium dense, grayish tan,					
	60	fine grained wet, with ~~trace~~ some medium grained sand					
		(Alluvium)					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 9 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), ~~medium~~ dense, grayish tan,					
	69	fine grained wet, with ~~trace~~ some medium grained sand (Alluvium)	~~B2=BH=BG~~ HND = BG				
	70	becoming fine to medium grained sand with trace of coarse grained sand					
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED SAND (SP), ~~tabac~~ gray-tan dense, fine to medium					
	78	grained, wet with trace coarse grained sand (Alluvium)					
			HNU = BG				
	79		~~B2=BH=BG~~				
	80						
	81						
	82						
	83						
	84						
		becoming mostly gray with trace of fine gravel					
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1174

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) WITH GRAVEL POORLY GRADED SAND (SP) ~~medium~~ dense, gray, fine ~~to medium~~ with multi-colored to medium grained sand, with ~~trace of~~ some coarse grained sand ~~and trace of~~ fine gravel, wet (Alluvium)					
	87	87.0					
		POORLY GRADED GRAVEL (GP) dense, multi-colored, fine grained with ~~some~~ trace of coarse grained gravel (Alluvium)					
	88		HNU = BG				
	89		~~B2-BH-BG~~				
	90						
	91						
	92						
	93						
	94						
	95						

ICORP3/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A 117!

B07NE003702-05284

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		POORLY GRADED GRAVEL (GP) dense, multi-colored, fine, wet, with trace of coarse gravel					
	96	(Alluvium)					
	97						
	98						
			HNU = BG				
	99		~~B2 = BG~~				
		99.5					
		POORLY GRADED SAND (SP) dense, gray, fine to medium grained, wet, with little coarse sand grained					
	100	(~~A~~ Alluvium)					
	101						
	102						
	103						
	104						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

117C

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), dense, gray, fine to medium grained with little coarse sand (Alluvium) 104.7					
	105	POORLY GRADED GRAVEL WITH SAND (GP), dense, multi-colored, fine, wet with medium to coarse sand (Alluvium) 106.0					3 in OD split spoon sampler used
	106	POORLY GRADED SAND (SP), dense fine grained, gray (Alluvium) becoming very dense, yellowish-orange	HS=BG	#1	MWA -033 -106	50 ~~350~~ 300	12"/12" recovery
	107						
	108						
	109						
	110	POORLY GRADED GRAVEL WITH SAND (GP) dense, multi-colored, fine grained, wet with some coarse sand (Alluvium) 109.5					
	111						
	112	POORLY GRADED SAND (SP), very dense, light gray, fine grained, wet (Alluvium ?) 112.0					
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-33A

1177

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-33A

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling | SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAMB) POORLY GRADED SAND (SP), dense, ~~fa~~ tan to yellow, fine ~~wet~~ (Allowed to grained					
	114						
	115						
	116						Stop 7-7-92 1155
		~~SAMB STOPS~~					Bottom of borehole at 116.5.
	117						Not Used 520 gal of during drilling (to mix mud.) from water table to bottom of hole. 100 gallons used during the drilling of the screened interval. Not Completed boring as monitoring well MW-33A on 7-7-92
	118						
	119						
	120						NOTE: Pulled casing of well on 7-8-92. On 7-9-92 redrilled hole to bottom of borehole and grouted to surface.
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-33A

ICORPB/4-16-92

1178

HTW DRILLING LOG

HOLE NO. MW-34A

SHEET 1 OF 14 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward Clyde Consultants
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.554153-E2846780
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker HD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 3/8" OD 4 1/4" ID HSA	8. HOLE LOCATION: MW 34 SW SW SW sec 28, T 14 N, R 9E
	9. SURFACE ELEVATION: 1154.66
	10. DATE STARTED: 6/28/92 @ 1522 / 11. DATE COMPLETED: 6-29-92 1126 hrs
12. OVERBURDEN THICKNESS: 113 ft	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 113 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~NONE~~ NA			~~NONE~~ NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~NONE~~ NA	NA	NA	NA	NA	NA	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Completed w/ monitoring well MW-34A~~	NA	~~Monitoring well MW34A~~	NA	Jon M. Glatteli

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN Clay (CL), Hard, Dark Brown Dry w/ Rootlets. (Loess - topsoil)					Boring logged from cuttings. Boring advanced with 7 7/8" O.D. and 4 1/4" I.D. hollow stem augers (HSA).
	1						
	2						
	3						
	4	Becoming Firm, Light Brown, moist					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-34A

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation Mead NOP | INSPECTOR J JOHNSON | SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) LEAN CLAY, Firm Light Brown moist (Loess)					
	6						
	7						
	8	Moisture content Decreasing					
	9						
	10	Becoming Light Brown	H/Nu=Bg				
	11						
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34A

HTW DRILLING LOG

HOLE NO. MW-34A

Remedial Investigation Mead NOP | INSPECTOR J JOHNSON | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)					
		LEAN CLAY (CL), Firm, Light Brown, moist (Loess)	HNU = 86				
	15						
	16						
	17						
	18						
	19						
	20	20.0					
		Poorly Graded Sand (SP) Dense, ~~Light~~ gray, fine to medium grained, dry, (alluvium)					
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

HTW DRILLING LOG

HOLE NO. MW34A

Remedial Investigation, Mead NOP | INSPECTOR J JOHNSON | SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)					
	~~23~~	Poorly Graded Sand (SP)					
		Dense, ~~Light~~ grayish tan fine					
	24	grained, dry (alluvium)	HNu = 0g				
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34

118

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-34A

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly graded SAND (SP), MEDIUM Dense, ~~light~~ grayish to Fine ~~grained~~ grained, dry (alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

HTW DRILLING LOG

HOLE NO. MW-34A

Remedial Investigation, Mead NOP | INSPECTOR J JOHNSON | SHEET 6 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)	HNU =				
		POORLY GRADED SAND (SP),	BG				
		MEDIUM Dense, Light grayish tan,					
	42	Fine grained, Dry (alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50	Becoming Damp					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34 A 1184

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP) Medium dense, ~~Light~~ Grayish tan fine grained, ~~Damp~~ moist (alluvium)					
	51						
	52						
	53						
	54		HNU → ~~HS=0.2~~ Bk				Drilling STOPPED 6/23/92 1630
							RESUMED 6/24/92 Drilling 0858
	55						
	56	Becoming wet					
	57						
	58						
	59		HNU ~~HS=0.2~~ Bk				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34A 118

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 8 OF 84 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE)					
		POORLY GRADED SAND (SP)					
		medium dense, light grayish tan					
	60	fine grained, wet (alluvium)					
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34A

118(

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP

INSPECTOR J JOHNSON

SHEET 9 OF 9 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) Poorly GRADED SAND (SP) MEDIUM DENSE, ~~LIGHT~~ GRAYISH tan fine ~~GRAINED~~, wet (alluvium)					
	69		HNU ~~BZ-HS-BG~~				
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34A

118

B07NE003702-05296

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP | INSPECTOR J JOHNSON | SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME AS ABOVE) POORLY GRADED SAND (SP), Medium Dense, ~~light~~ Grayish tan, fine, ~~grained~~ wet (alluvium)					
	78						
	79		4NU ~~Bq~~ = BG				
	80	~~with some coarse sand & fine g~~					
	81						
	82						
	83						
	84						
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34A

118

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-34A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) Poorly graded SAND (SP), medium dense, grayish tan, fine, wet (alluvium) grained					
	87						
	88						
	89		HNU ~~BZ=HO~~ ~~cuttings~~ = BG				
	90						
	91						
	91.5						
		Poorly graded GRAVEL (GP), ~~with sand~~, dense, varied color, ~~fine~~ grained, wet with medium to coarse sand (Alluvium)					
	92						
	93						
	94		HNU = ~~BZ=BH~~ = BG				
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34A

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation Mead NOP | INSPECTOR J. Ritterling | SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		~~Poorly graded SAND (SP),~~					
		~~medium dense, grayish tan,~~					
	96	~~fine, wet ( )~~					
		Poorly graded gravel (GP), dense,					
		varied color, fine, wet with					
	97	some medium to coarse sand					
		(Alluvium)					
	98						
		98.5'					
		Poorly graded SAND (SP),					
	99	medium dense, gray, fine grained,					
		wet, with trace medium					
		to coarse grained sand (Alluvium)					
	100	becoming dense					
	101						
	102						
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 119(MW 34A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterly | SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAMB)					
		Poorly graded SAND (SP), dense, gray, fine grained, wet					
	105	with trace medium to coarse Sand (Alluvium)					
	106						
	107						
	108						
	109	w/weathered shale fragments					
	110						
	111						
	112						
	113						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34A 1191

HTW DRILLING LOG

HOLE NO. MW 34A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SANDSTONE: soft, v. weathered, gray, v. fine grained					Bottom of Boring 113' @ 1126 6/29/92
	114						Boring Completed as ~~well~~ monitoring well MW-34A
	115						440 gal of water used during drilling.
	116						
	117						
	118						
	119						
	120						
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34A

1192

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-35A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 11 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 3/8" O.D. HSA	8. HOLE LOCATION: MW-35 - N.551638 - E.2851919
	9. SURFACE ELEVATION: 1137.42 6-24-92 0841 HRS.
	10. DATE STARTED: 6-23-92 1340 hrs
	11. DATE COMPLETED: ~~1722 6-25-92 hrs~~
12. OVERBURDEN THICKNESS: 92½ ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~50 ft
13. DEPTH DRILLED INTO ROCK: 0 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: not recorded
14. TOTAL DEPTH OF HOLE: 92½ ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): none

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			none

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
none						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well		MW-35A		Jon M. Kittelsy

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), firm, dark brown to black, (Topsoil) ↑ moist					Boring logged from cuttings
	1						
	2						
	3	3.0' LEAN CLAY (CL), firm, light brown, (Loess) ↑ moist					
	4		B2= BH = Bkg				
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1

HTW DRILLING LOG

HOLE NO. MW-35A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: J. Ritterling

SHEET 2 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL), firm, light brown, (Loess) moist					
	6						
	7						
	8						
	9	becoming soft to firm					
	10						
	11						
	12						
	13						
	14		BZ=BH=BKg				

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 3 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME					
		LEAN CLAY (CL), firm, light brown, moist (Loess)					
	15						
	16						
	17						
		Poorly graded SAND (SP), loose, tan to light brown, fine, moist (Eolian sand)					
	18						
	19	becoming mostly tan					
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	24	Poorly graded SAND (SP), loose, tan, fine, moist (Eolian sand)	B2=B11 >Bkg				
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 119t

HTW DRILLING LOG

HOLE NO. MW-35A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 5 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), loose, tan, fine, moist (Eolian sand)					
	33						
			B2=B11 =Bkg				
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 119

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 6 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), loose, tan, fmc, mdst (Folsom sand)					
	42						
	43						
	44		BZ = BH = Bkg				Stop 6-23-92 1445
							Resume 6-24-92 0750
	45						
	46						
	47						
	48						
	49		BZ = BH = Bkg				
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 119E

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP),					
		loose, tan, fine, moist (Eolian					
	51	sand)					
	52						
	53						
	54	becoming fine with occasional					
		medium grains and wet					
	55						
	56						
	57						
	58						
	59		B2=BH=PKg				

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 119

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation Mead NOP

INSPECTOR J. Ritterling

SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP), loose, tan, fine, wet, with trace of medium sand (Eolian sand)					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 120(

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP

INSPECTOR J. Ritterling

SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	69	Poorly graded SAND (SP), loose, tan, fine with trace of medium sand, wet (Eolian sand)	BZ=BH=Bkg				
	70	becoming fine with trace of medium and coarse sand					
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1201

HTW DRILLING LOG

HOLE NO. MW-35A

PROJECT Remedial Investigation, Mead NOP

INSPECTOR J. Ritterlang

SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		Poorly graded SAND (SP),					
		loose, tan, fine with trace					
	78	of medium sand (Eolian sand)					
			B2=B14=Bkg				
	79						
	80	becoming fine to coarse sand with trace fine gravel					
		81.0'					
	81	Well graded SAND (SW), loose, fine to coarse with some fine to medium gravel					
	82						
	83	fine to coarse gravel					
	84						
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 120

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-35A

Remedial Investigation, Mead NOP | INSPECTOR J. Ritterling | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAND)					
		Well graded SAND (SW), loose to medium dense, gray, fine to coarse with fine to coarse gravel					
	87						
	88						
	89		B2=B11=BKg				
	90						
		90.2					
		Poorly graded GRAVEL (GP), loose, gray, fine to coarse					
	91						Note: lost 400 gallons of water during drilling of screened interval
	92						Bottom of Boring = 92.5'
		92.5'					Stop 6-24-92 0841
		SANDSTONE					Begin placing filter pack for monitoring well at 1710. 6-24-92 (Rig - afternoon maintenance)
	93						Grouted to ~15' bgs 6-24-92 at 2030.
	94						Grouted to 10' bgs 6-25-92 at 1738.
							Screen at 81.5' to 91.5'.
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-35A

/CORPS/4-16-92

CEH 8/7/92

HTW DRILLING LOG

HOLE NO. MW-36A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker ADII
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 0-4': 6" CFA; 4-39.5': 5 7/8" Tricone roller bit. - rotary/washboring	8. HOLE LOCATION: MW-36- N.551977 - E.2857141
	9. SURFACE ELEVATION: 1076.46
	10. DATE STARTED: 8-7-92/1340
	11. DATE COMPLETED: 8-7-92/1455
12. OVERBURDEN THICKNESS: 39'	15. DEPTH GROUNDWATER ENCOUNTERED: 0.5'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 39.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed intermediate monitoring well	X	MW-36A		Robert R Mallies

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Silty CLAY (CL) firm, dark brown, moist, with organics. (Topsoil)					Boring logged from cuttings and log of MW-36D
		becomes wet.					Boring drilled with 6" CFA
	1						
	2						
		2.5' SILT (ML) firm,					
	3	lt. brown, wet with silt and trace fine sand. (Alluvium)					
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-36 B1

P204

B07NE003702-05313

HTW DRILLING LOG

MW-36B

Remedial Investigation Mead VOP | NSAE: RRM | Sheet 2 of 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	[illegible]	REMARKS h
		(same as Above)					
		SILT (ML)					
		~~loose~~, dark brown, wet,					Stopped drilling with 6" CFA at 6'
		with Trace fine sand.					8-7-92/1345
	6	(Alluvium)					
							Began rotary/ washboring with a 5 7/8" Tricone roller bit.
	7	with some gray mottling					8-7-92/1354
	8						
	9						BZ = BKG
		become ~~[illegible]~~ firm to STIFF					
	10	~~[illegible]~~, gray					
	11						
	12						
	13						
	14						

ICORPS v4-16-92

PROJECT: Remedial Investigation, Mead [illegible] 92RW[illegible]10

HOLE NO.: MW-36B

HTW DRILLING LOG

MW-36A

Remedial Investigation Mead VOP | INSPECTOR RRM | 3 of 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	[illegible] g	REMARKS h
		(Same as Above) SILT (ML) firm, gray, wet, with Trace fine grained sand. (Alluvium) 15.0'					
	15	Poorly Graded SAND (SP) dense, light brown, wet, fine sand, with Trace medium To coarse sand. (Alluvium)					
	16						
	17						
	18	becomes fine To medium grained sand.					
	19						BZ = BKG
	20						
	21	with Trace fine gravel.					
	22						
	23						

PROJECT: Remedial Investigation, Mead VOP 921[illegible]

HOLE NO. MW-36A 120E

(CORPS) 4-18-92

HTW DRILLING LOG

MW-36A

Remedial Investigation Mead VOP | ASSESSOR RRM | SHEET 4 OF 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	LOW [illegible] g	REMARKS h
		(same as above) Poorly Graded SAND (SP) dense, light brown, wet, fine To medium grained, with Trace [illegible] sand To fine gravel. (alluvium)					
	24						
	25						
	26						
	27	becomes medium dense					
	28						
	29						BZ = BKG
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead VOP 92[illegible]0

HOLE NO.: MW-36A

1207

/CORPS/4-18-92

HTW DRILLING LOG

MW-36A

Remedial Investigation, Mead NOP | INSPECTOR: RRM | SHEET 5 of 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	FLOW CONTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, fine to medium grained with Trace of coarse Sand to fine gravel. (Alluvium)					
	33						
	34						
	35						
	36	becomes medium to coarse grained with Some fine gravel.					
	37						Note: EST. drilling fluid loss in screen interval 10gal, 40 gal flushing drilling fluid, 20gal. loss in placement of filterpack. Total loss = 70gal.
	38						
	39						BZ = BKG 39.2' Bottom of Boring 39' 8-7-92/1455 Completed boring as intermediate monitoring well. MW-36A.
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW 110

HOLE NO.: MW-36A 1208

ICORPS/6-15-92

HTW DRILLING LOG

HOLE NO. MW-37A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINJEK COMPANY
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.596992-E2855713
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 3/4 DRAG BIT; 2" / 3" SPLIT SPOON; 9 7/8 TRICONE; 7 7/8 TRICONE; 140 / 300 LB HAMMER	8. HOLE LOCATION: ~NE SEC 3 T13N R9E
	9. SURFACE ELEVATION: 1082.68
	10. DATE STARTED: 6-14-92/0935
	11. DATE COMPLETED: 6-16-92
12. OVERBURDEN THICKNESS: 42'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUID
13. DEPTH DRILLED INTO ROCK: 6.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 48.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	X		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
NA						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed		MW-37A		LISA TRAVAGLIO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) SOFT, DARK BROWN, MOIST, W/ TRACE FINE SAND W/ ROOTLETS	HNU= BKG				BORING ADVANCED W/ 4 3/4 DRAG BIT W/ 3" SPLIT SPOON FOLLOWED BY 2 IN SPOON BEGAN 0935 D=2.0' R=1.7' D#1
	2		HNU= BKG.				(2 IN SPLIT SPOON) D=2.0' R=1.6' D#2
	3	POORLY GRADED SAND (SP) FIRM BROWN, W/ IRON STAINING, DRY, FINE					
	4	LEAN CLAY (CL) FIRM, LT. BROWN W/ IRON STAINING, MOTTLED W/ DARK BROWN, MOIST, W/ OCCASIONAL ROOTLETS	HNU= BKG.				(3 IN SPLIT SPOON) D=2.0' R=2.0' D#3
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 120

B07NE003702-05318

HTW DRILLING LOG

HOLE NO. MW-37A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) LEAN CLAY (CL) FIRM, LT. BROWN, MOIST, W/IRON STAINING AND OCCASIONAL ROOTLETS.					
	6						(2 IN SPLIT SPOON) D=2.0' R=2.0' D #4
	7		HNU= BKG.				
	8						(3 IN SPLIT SPOON) D=2.0' R=2.0' D #5
	9	BECOMING GRAY W FEW VERY FINE SAND.	HNU= BKG.				
	10						(2 IN SPLIT SPOON) D=2.0' R=1.2' D #6
		POORLY GRADED SAND, DENSE, GRAY, FINE, MOIST.	HNU= BKG.				
	11						
	12						(3 IN SPLIT SPOON) D=2.0' R=2.0' D #7
		BECOMING DARK GRAY, V. FINE	HNU= BKG.				
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 1210

HTW DRILLING LOG

HOLE NO. mw-37A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15		HNU= BKG.				2IN SPLIT SPOON D=2.0' R=0.0 D#8 CATCHER WAS UP SIDE DOWN.
	16	W/SOME SILT					3IN SPLIT SPOON D=2.0' R=2.0'
	17		HNU= BKG.				D#9
	18	BECOMING FINE SAND W/TRACE SILT					2IN SPLITSPOON D=2.0' R=2.0'
	19		HNU= BKG.				D#10
	20	BECOMING FINE SAND W/TRACE COARSE					3" SPLIT SPOON D=2.0' R=2.0'
	21		HNU= BKG.				D#11
	22		HNU= BKG.				2IN SPLITSPOON D=2.0' R=1.0' D#12
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-37 1211

HTW DRILLING LOG

HOLE NO. mw-37A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) FIRM, LT BROWN W/OCCASIONAL IRON STAINING MOIST. W/ TRACE FINE SAND					
	24	BECOMING LT. BROWN W/ GRAY MOTTLING.					3IN SPLIT SPOON D = 2.0' R = 2.0' D#13
	25	POORLY GRADED SAND (SP) LOOSE, BROWN, FINE TO MED. WET	HNU= BKG.				
	26	BECOMING COARSE					START DRIVING W/ 140lb HAMMER 2IN SPLIT SPOON D = 2.0' R = 1.8' D#14
	27	BECOMING MED W/ COARSE	HNU= BKG.				
	28						NO SAMPLE 28-30 FT ACCIDENTALLY DRILLED THROUGH INTERVAL W/ 4 3/4 DRAG BIT
	29	- - - - - - -	HNU= BKG.				
	30	POORLY GRADED SAND (SP) LOOSE, BROWN, COARSE, WET, W/TRACE OF FINE GRAVEL.					3IN SPLIT SPOON D = 2.0' R = 0.6' D#15
	31		HNU= BKG.				
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-37 1212

HTW DRILLING LOG

HOLE NO. MW-37A

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(SAME) POORLY GRADED SAND (SP) LOOSE, BROWN, MULTICOLORED (RED, ORANGE, BROWN, GRAY) COARSE, WET BECOMING MED SAND W/ LITTLE COARSE	HNu= BKG.			18 14 40 56	2 IN SPLIT SPOON D=2.0' R=2.0' D#16
	34						
	35	BECOMING BROWN, ORANGE COARSE	HNu= BKG.			5 28 69 72	3 IN SPLIT SPOON D=2.0' R=1.5' D#17
	36						
	37		HNu= BKG.	#1 BAG SAMPLE		14 26 36 55	2 IN SPLIT SPOON D=2.0' R=0.6' D#18 COLLECTED SAMPLE FOR SIEVE ANALYSIS
	38	POORLY GRADED SAND, LOOSE BROWN, FINE, W/SOME COARSE AND LITTLE MED. (39.5 to 40.0')					3 IN SPLIT SPOON D=2.0' R=0.7' D#19
	39		HNu= BKG.			30 60 67 62	
	40		HNu= BKG.	#2 BAG SAMPLE		45 98 127 82	2 IN SPLIT SPOON D=2.0' R=1.8' SWITCHED TO 300 lb HAMMER
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 1213

HTW DRILLING LOG

HOLE NO. MW-37A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND BROWN AND ORANGE, FINE W/FEW COARSE AND SOME MED, WET					SAMPLE COLLECTED FOR SEIVE ANALYSIS 40. - 41.5FT
	42	SANDSTONE SOFT, ORANGE, W/BLACK, FINE, VERY WEATHERED, WEAKLY CEMENTED.	HNU= BKG.			47 122	D=1.0' R=1.0' D#21 STOPPED 6-14-92
	43		HNU= BKG.	CORE RUN#1	REC 0.2' / 5.0'	RQD 0% DWR 100%	RESUMED 6-16-92 BEGAN REAMING W/ 9 7/8 TRICONE TO GET CASING. CASING SEALED WITH 2FT BENTONITE PELLETS RESUMED 6-16-92
	44	W/3IN LAYER OF SANDSTONE DARK RED, V. HARD, STRONGLY CEMENTED					CORED FROM 43' TO 48' LOST 4.8FT CORE BARREL CAUGHT ON BOTTOM OF PVC CASING, BREAKING SEAL. BORING COMPLETED AS INTERMEDIATE RATHER THAN DEEP (BEDROCK) WELL.
	45						
	46						
	47						PLACED TEMPORARY 6IN CASING TO 42.5FT. PULLED 6IN PVC CASING PRIOR TO INSTALLATION OF MONITORING WELL
	48						B.O.H. 48FT. PLUGGED CORE HOLE 41.5' TO 48.0FT W/BENT. PELLETS COMPLETED BORING AS MONITORING WELL 6-10-92
	49						95 100gal LOST TO FORMATION
	50						

ICORPB/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37A 1219

MEW 8-5 8/11/92

HTW DRILLING LOG

HOLE NO. MW 38

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.551510 - E.2860457
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.0", 2.5", 2.0", 1 3/8" Split Spoons; 5.25" Soils Barrel; 7.25" Denison Barrel; 7 7/8" Tricone	8. HOLE LOCATION: NW NW SE Sec 35 T9E R14N Platte Valley 2-4 mi. SE of Load line 4
	9. SURFACE ELEVATION: ~~1081±~~ 1079.61
	10. DATE STARTED: 8-4-92 0809
	11. DATE COMPLETED: 8-4-92 1400
12. OVERBURDEN THICKNESS: 49.2'	15. DEPTH GROUNDWATER ENCOUNTERED: 6.0' ATD
13. DEPTH DRILLED INTO ROCK: 1.8'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 51.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed		MW 38		[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) Firm, Drk Gray, moist, w/trace Sandy w/ rootlets ~~[illegible]~~ ~~[illegible]~~ (Alluvium)					Advanced Boring w/ 7 7/8" tricone bit and 3.0", 2.5", 2.0", 1 3/8" Splitspoons.
	1	Poorly Graded Sand, (SP) med Dense (Est), Lt Gray, fine ~~Ground~~ grained, moist, ~~[illegible]~~ (Alluvium)	HNu= B6			P	P=2.0' R=2.0
	2						
SANDY	3	LEAN CLAY (CL) Soft to v. soft, Drk Gray, moist to wet, Sandy. (alluvium)	HNu= B6			P	P=2.0' R=1.8'
	4	Becoming lighter in color w/ Sand content increasing w/ 4" Sand layer.	HNu= B6			P	P=1.5 R=1.5
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW 38

HTW DRILLING LOG

HOLE NO. MW 38

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Soil: ~~Sandy~~ Silt (ML), soft, (Est), Gry, ~~moist~~ wet, w/ Little v. fine sand. (Alluvium)					
	6		HNu= BG			P	P=1.5 R=0.8 water encountered ATD 6.0'
	7	Becoming Dark Greenish Gray w/ root hairs and root holes ~~w/ trace sand~~ w/ ~~sand according~~ Trace sand					mixed drilling fluids. 168 gal water ~~+2 #50 bags~~ 100# of Bent. viscosity 38 sec. P=2.0 R=2.0
	8		HNu= BG			P	
	9	Becoming Greenish Gray					
	10		HNu= BG			P	P=2.0 R=2.0
	11						
	1		HNu= BG			P	
	12						
	13		HNu= BG			P	
	14	Poorly Graded Sand, med Dense (Est), Greenish Gray, fine grained, wet. (Alluvium)					added 18 gal water to pit. Reamed to 14' w/8.25" Soils barrel

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 38

/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW38

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(Sme) Poorly Graded Sand (SP) Med Dense (EST), Greenish Gray, ~~wet~~, fine ~~grained~~ wet. (Alluvium)					Cont Boring w/ 8.25" soils barrel. Added ~~Sand~~ ~~bag~~ of Bent. to pit.
	16						
	17	Silt (ML) Med Dense (EST), V. Dk Gray to Black, moist to wet, ~~Sandy~~ w/ some ~~Sand~~. v. fine sand	HNu 86			P	P=7.0 R=7.0
	18						
	19	Poorly Graded Sand (SP) Med Dense (EST), tannish Gray, fine, ~~wet~~ wet, w/ trace of ~~Biotite~~ MICA.					
	20						
	21	Silt (ML) Med Dense (EST), Greenish Gray, moist w/ some ~~Sand~~ V. fine sand					
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: BJE

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HTW DRILLING LOG

HOLE NO. MW38

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	Poorly Graded Sand (SP) loose (EST), Lt Gray, fine, wet, w/ few med Sand and trace coarse sand.					P=7.0' R=3.5'
	25		HNu= B6			P	
	26						
	27						
	28						Added 35gal water to pits
	29		HNu= B6			P	P=3.5 R=2.0
	30	w/ ~~little~~ some med sand ~~trace~~ and coarse sand ~~and trace gravel~~ some fine gravel					
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW38

1211

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW 38

Remedial Investigation, Mead NOP | INSPECTOR BOE | SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Some) Poorly Graded ~~Sand~~ (SP) Loose (Est), LT Gray, fine, wet, w/ ~~little~~ Some	NOT TAKEN			P	P=1.5 R=0
	33	med Sand ~~and~~ ~~trace~~ coarse Sand ~~and~~ ~~trace~~ Some med ~~and~~ ~~trace~~ Gravel and trace coarse Gravel					Added ~~another~~ ~~bag~~ of #50 Bent
	34						
	35		HMu= B6			P	P=7.0 R=3.5
	36						
	37						
	38	W/ ~~trace~~ Some ~~Some~~ ~~Gas~~ med Sand, trace coarse Sand ~~and~~ trace fine Gravel. ~~[illegible]~~					
	39						Added 50 gal water to P/Ds.
	40	Becoming med Dense (Est).	HMv= B6			P	Cont. w/ 7.25" Denison Barrel. P=1.0 R=1.0
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38

HTW DRILLING LOG

HOLE NO. MW 38

Remedial Investigation Mead NOP

INSPECTOR BJE

SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP) med Dense (Est), Lt brg, fine, wet, w/ some med sand and trace of coarse sand and fine gravel	HNu= BG			P	P = 1.0' R = 1.0'
	42						
	43		HNu= BG			~~BG~~ P	P = 2.0 R = 2.0
	44						Added 100 gal water to pits
	45		HNu= BG			P	P = 2.0 R = 2.0
	46						
	47		HNu= BG			P	P = 2.0 R = 2.0
	48						Added 130 gal water to pits
	49		HNu= BG			P	P = 2.0 R = 2.0
		Sandstone: yellow, soft, v. weathered, fine grained. (@ modi)					Removed from 40' to 50' w/ 7 7/8" trione
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38

ICORPS/4-15-92

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HTW DRILLING LOG

HOLE NO. MW 38

Remedial Investigation, Mead NOP | INSPECTOR BOE | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) SANDSTONE: ~~Light Gray~~ Yellow, soft, v weathered, fine (Omadi)					Cont. w/ 7 7/8" tricone
	51						Stopped 1400 8-4-92
							~~Stopped~~ BOB 51.0'
							Monitoring Well installed upon completion 8-5-92
	52						Lost 370 gal drilling fluids in screen interval
	53						
	54						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW38

1221

/CORPS/4-15-92

MSW 8-7 8/11/92 (A)

HTW DRILLING LOG

HOLE NO. MW 39A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: US Army Corps of Engineers
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.554556 - E.2862408
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3.0, 2.5, 2.0, 1 3/8 spoons; 8.25" Soils barrel; 7 7/8" tricone	8. HOLE LOCATION: ~~NE/SE NE~~ Sec 35 T9E R14N 2-3 mi. NSE of Load line 4
	9. SURFACE ELEVATION: ~~1081 ±~~ 1080.63'
	10. DATE STARTED: 1500 8-6-92
	11. DATE COMPLETED: 8-7-92 1315
12. OVERBURDEN THICKNESS: 48.5	15. DEPTH GROUNDWATER ENCOUNTERED: 5.0' ATD
13. DEPTH DRILLED INTO ROCK: 2.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 51.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA 0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
N/A	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	N/A	MW-39A	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), Firm, v. Drk Gray to Black, moist w/ Abundant Rootlets w/high organic content. (Topsoil)	HNu= B6			P	Burly Advanced w/ 7 7/8" Tricone and 3.0, 2.5, 2.0, 1 3/8 split spoons. Filled temp pit w/ 150 gal water + ~~2 bags~~ 100# Bent. P=2.0 A=2.0
	2						
	3	SILT (ML), Loose (EST), Tannish Gray, moist to wet, w/ rootlets.	HNu= B6			P	P=2.0 A=2.0
	4		HNu= B6			P	P=1.5 A=1.3
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW 39A

B07NE003702-05331

HTW DRILLING LOG

HOLE NO. MW 39

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Silt (ML), Loose (Fst), Tannish Gry, moist to wet, w/ rootlets					Δ water enters hole @ TD 6'
	6		HNu= B6			P	P=1.5 R=1.5
	7	LEAN CLAY (CL), Firm, V. Drk Gry to Black, moist to wet, w/ High organic content. (Alluvium)					added 20 gal water to pit.
	8	Silt (ML), Loose (Fst), greenish Gry, moist to wet,	HNu= B6			P	P=2.0 R=2.0
	9	V fine w/ little sand					
	10	w/ Snd content increasing.	HNu= B6			P	P=2.0 R=2.0
	11	Poorly Graded Sand (SP), Loose (Fst), greenish gray, V. fine grained, moist to wet, w/ little silt.					Stopped 8-6-92 1550 Started 8-7-92 0700
	12		HNu= BC			P	P=1.5 R=1.0
	13		HNu= B6			P	P=1.5 R=0.9
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 39

HTW DRILLING LOG

HOLE NO. MW39

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: BJE

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Cont) Poorly Graded Sand (SP), Loose (Est), Greenish Gray, v.fine, wet, w/ some silt and clay					
	15						P=6.0 A=1.0
	16	LEAN CLAY (CL), Firm, Greenish Gray, moist, w/some silt, trace and abundant wood frags. (Alluvium)	HNu= BG			P	
	17						
	18						
	19						
	20						
	21		HNu= BG-			P	P=6.0 A=6.0
	22	Poorly Graded Sand (SP), Med Dense (Est), LT Gray, fine, wet, w/trace of med and coarse sand and fine gravel					
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39

1224

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW39

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	(SW) Poorly Graded Sand (SP), Med Dense (SP), LT brn, fine, wet, w/ trace of med and coarse sand and fine gravel					
	25						
	26	w/Some med sand and few coarse sand and Trace fine gravel					Added 55 gals water ~~w/~~ 50# ~~bag~~ of Bent.
	27		HNu= B6			P	P=4.0 A=4.0
	28						
	29						
	30		HNu= B6			P	P=3.0 A=3.0
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39

1225

B07NE003702-05334

HTW DRILLING LOG

HOLE NO. MW39

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	Some) Poorly Graded Sand (SD), med Dense (Est), Lt Gray, fine, wet, w/Some med Sand and few coarse sand and trace fine gravel.					
		W/coarse sand and gravel content increasing					P=2.0 R=2.0
	34	W/ med and coarse sand and fine gravel grading out	HMu= BG			P	
	35						~~Added 55 gal water + 1 #50 bag of Bent.~~
		W/Some med sand and trace of coarse Sand and fine gravel.					
	36						P=4.0 R=2.5
	37		HMu= BG			P	
	38						Added 55 gal water + 1 #50 bag of Bent.
	39						
	40		HMu= BG			P	P=7.0 R=3.0
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW39

HTW DRILLING LOG

HOLE NO. MW 39

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	Sand Poorly Graded Sand (SP), Med Dense (EST), Lt Gry, fine, wet, w/ some med sand and trace coarse sand and fine gravel					
	43	W/ Some med to Coarse Sand and Little fine gravel and trace coarse gravel.					
	44						
	45						
	46						Added 74 gal water + ~~1 bag~~ 50# of Bent.
	47						P= [redacted] 3.0 A= 3.0
	48		HNu= 86			P	
	49	Sandstone. Lt Gray, soft, V. weathered, fine grained (@ mod)					Added 50 gal water to pits. Cont. w/ 7 7/8" tricone
	50						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 39

HTW DRILLING LOG

HOLE NO. MW 39

PROJECT Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Bmc) Sand Stone: LT Gray, Soft, V. weathered, fine grained. (Omadi)					
	51						BOH 51.0' monitoring well installed upon completion 8-7-92
	52						153 gal fluids lost in well.
	53						
	54						
	55						
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 39

1228

8/4/92

HTW DRILLING LOG

HOLE NO. MW40A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.567321 - E.2845437
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2.5" split spoon; 8.25" Soils barrel; 7.25" Denison barrel; 5.5" core barrel; 3.0, 2.0, 1 3/8 split spoons	8. HOLE LOCATION: Just North Land line 4
	9. SURFACE ELEVATION: ~~1170±~~ 1169.67'
	10. DATE STARTED: 7-22-92 1230
	11. DATE COMPLETED: 7-27-92 1400
12. OVERBURDEN THICKNESS: 127.6'	15. DEPTH GROUNDWATER ENCOUNTERED: 49' ATD (estimated)
13. DEPTH DRILLED INTO ROCK: 17.4'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 145.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
4	X	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
3	X	NA	TOC	Exp.	NA	91 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (Installed well)	NA	MW40A	NA	Robert Ehrman

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) from to Hard, Dk Brn ↓ w/ rootlets moist, (Topsoil)	HNu=			P	Advanced Boring w/ ~~6.5~~" split spoons ~~w/~~ 10" tricone ~~w/~~ Drilling fluids 3.0" 2.5" 2.0" 1 3/8" spoons Mixed 1940 gals water + ~~200~~ 1000# ~~bags~~ Bent. viscosity 51 sec.
	1	Becoming Brn. (Loess)	B6	3.0			
	2	Becoming LT. Brn. ~~(Possibly loess)~~					P=2.0 A=1.7
	3		HNu= B6	2.5		P	P=2.0 A=1.4
	4	Becoming Hard, dry w/ rootholes	HNu= B6	2.0		P	P=1.5 A=0.5
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW40A

1229

B07NE003702-05338

HTW DRILLING LOG

HOLE NO. MW 40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) LEAN CLAY (CL), Hard, Lt. Brn, moist w/ rootholes.					
	6	Becoming Lt. Brn Mottled Lt. Gray. (Peoria Loess)	HNu BG	1 3/4		P	P = 1.5 R = 0.7
	7						
	8		HNu BG	3.0		P	P = 2.0 R = 2.0
	9						
	10		HNu BG	2.5		P	P = 2.0 R = 1.6
	11						
	12		HNu BG	2.0		P	R = 1.5 R = 1.3
	13		HNu BG	1 3/8		P	P = 1.5 R = 0.9
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

123C

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	15	(Same) LEAN CLAY (CL), Firm to Hard, Lt. Brn mottled Lt. Gray, dry, w/ root holes	HNu= B6			P	P=2.0 R=2.0
	16	Poorly Graded Sand, Med Dense (Est), Lt. Gray, fine grained, dry.	HNu= B6	3.0		P	P=1.0 R=0.8
	17			2.5			cont. Boring w/8.25" Soils barrel.
	18						
	19		HNu= B6			P	P=7.0' R=6.5'
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92[illegible]030 | HOLE NO.: MW40A

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand, med Dense (Est), LT Grey, ~~Dry~~ fine grained, dry					
	24						
	25						P=5.0' R=5.0
	26	Becoming wet	HNu= BG			P	~~[illegible]~~ ?
	27	w/trace of med sand					
	28						
	29						
	30		HNu= BG			P	P=6.0 R=6.0
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

1232

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand, med Dense (Est), Lt. Gray, fine grained, wet,					
	33						
	34						
	35						
	36						P=5.0' R=4.0'
	37		HNu= BG			P	
	38						
	39						
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

1232

B07NE003702-05342

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), med. dense, lt gray, fine grained, wet					
	42	w/trace of coarse grained sand					P=6.0'
		w/ coarse and med, sand Grading out				P	R=6.0'
	43		HNu= BG				
	44						
		w/ trace of med and coarse sand and fine gravel.					
	45						No appreciable water loss 0-46'
							Stopped 7-22-92 1715
	46						Started 7-23-92 0700
	47						
		w/ med and coarse sand Grading out	HNu= BG			P	P=6.0' R=5.5'
	48						
	49						→ water encountered ATD
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

1234

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 7 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded Sand (SP), med Dense (Est), Lt. Gray, fine, wet.					
	51						
	52			Bag Sample #1	1-8 oz JAR ~~EXP~~ 2-4 oz JAR ~~VOC~~ 1-4 oz JAR ~~TOC~~ MWC-040-052		Sample MWC-040-052 collected 52-54 ft for Explosives, VOC, TOC, grain size.
	53						
	54						P=7.0' A=6.5'
			HNMU= BG			P	
	55						
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO. MW40A

1235

(CORPS)4-15-82

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJB | SHEET 8 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	60	(Sandne) Poorly Graded Sand (SP), med Dense (Est.), Lt Gray, fine, wet.		#2 Bag Sample	2x 4oz jar 8oz jar 4oz jar		Sample MWB-040-054 Collected 5/9/06 1H for Explosives, VOC, TOC and grainsize P=6.0' R=6.0'
	61		HNu^ B6			P	
		W/few med sand and trace coarse sand					
	62	W/3" Layer coarse and med Sand					
	63						No water loss from 46' - 65'
	64	W/3" Layer coarse and med sand					Added 780 gal water and ~~5 bags~~ 400# ~~450 gal~~ Bentonite
		W/trace med Sand					Viscosity 43 sec.
	65						
	66	W/Some med Sand and few Coarse sand and trace of fine and Coarse Gravel.	HNu= B6			P	P=7.0' R=7.0'
	67	W/med and coarse Sand and fine and coarse Gravel Grading out					
	68						

PROJECT: Remedial Investigation, Mead NOP 92ICW0030

HOLE NO.: MW40A

123C

ICORPS/4-15-82

HTW DRILLING LOG

Remedial Investigation, Mead NOP | INSPECTOR: BJE | HOLE NO.: MW40A | SHEET 9 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly graded Sand (SP), med Dense (FST), Lt. Gray, fine, wet.					
	69						
	70						
	71						
	72	Becomes ~~w/Some~~ med to coarse Sand and few fine Gravel ~~w/Some fine~~					
	73						P = 7.0' R = 5.5'
	74		1HNU= B6			P	
	75	~~Becomes~~ w/trace med to coarse Sand and fine gravel Grading out					
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW40A

CORPS 4-16-82

1237

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation Mead NOP

INSPECTOR BOE

SHEET 10 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand (SP), Med Dense (Est.), Lt. Gray, Fine, wet, W/ trace of med to coarse sand					
	78						
	79						
	80		HNu^c BG			P	P = 3.0' R = 3.0
	81						
	82						
	83						
	84	Becoming med to coarse Sand w/ few fine sand and fine Gravel.	HNu^c BG			P	P = 7.0' R = 6.5'
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

CORPS/4-15-92

1238

B07NE003702-05347

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	Becoming fine sand w/ few med to coarse sand ~~and~~					
	88	Becoming med to coarse sand w/ ~~med~~ little fine ~~sand~~ Gravel and few ~~med Gravel~~ fine sand and trace Coarse Gravel.					
	89						
	90	~~w/ Sand Gravel and trace of Coarse Gravel fine and Grading out~~ Poorly Graded Gravel w/ Sand ~~&~~ (GP-SP), med					
	91	Dense (Est), multi colored, fine, wet, w/ some med to coarse sand.				P	P=7.0' R=4.0'
	92		HNu= B6.				
	93						
	94						
	95						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 12 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		~~Brown fine w/ traces of med to coarse sand. Well cemented.~~ Poorly Graded Sand (SP),					
	96	Med Dense (Fsl), Lt Gray, fine, moist to wet, w/ trace med to coarse sand weakly cemented.					
	97	96.0' Becoming fine to coarse sand w/ trace of fine and coarse gravel.	HNu" B6			P	P=4.0 R=4.0
	98	w/ heavy Limonitic (?) staining.					
	99						
	100	w/ little fine Gravel and trace of coarse gravel					
	101	Becoming med to coarse sand ~~[illegible]~~ w/ Some fine Gravel ~~and~~ trace of coarse gravel	HNu" B6			P	P=3.0' R=3.0'
	102	Becoming fine sand w/ few med to coarse sand and trace of fine gravel.					Estimated loss of 717 gal 65' to 103'
	103	w/ trace med to coarse sand, fine gravel Grading out					
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

1210

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW40A

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: BJE | SHEET 13 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Becoming fine to coarse Sand w/ ~~some~~ little fine Gravel and trace coarse Gravel.		Bag Sample #3	3x4oz jars, 1x8oz jar		P=4.0 R=4.0
	105		HNu= BG			P	Sample MWA-040-104 collected 104-106 ft bgs for Explosives, TOC, VOC and grain size.
	106						
	107	~~Silt (ML), Greyish brown, Dense (Est), Greenish Gray, moist.~~					
	108	~~Becoming Greyish tan~~ Silt (ML), Dense (Est), Greenish Gray, moist	108'				
	109	Becoming Greyish tan	HNu= BG			P	P=4.0' R=1.0'
	110						
	111						
	112		HNu= BG			P	P=4.0' R=4.0'
	113						

CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW40A

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 14 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Saw) Silt (ML), Dense (Est), grayish tan, moist. w/ Trace Iron oxide staining and Iron nodules.					
	114						Stopped 7-23-92 1730
	115						Started 7-24-92 0700
	116		HNu= B6 =			P	P=3.0' R=1.4'
	117						No water loss 103' to 118'
	118		118.6' HNu= B6			P	Added 158 gal water to pits Reamed from 17' to 118' w/ tricone 7-24-92 Cont. Boring w/ 7.25" dia Denison barrel P=2.5' R=2.3' ~~noncohesive interbedded layers~~
	119	Poorly Graded Sand (SP), Med Dense (Est.), Gray, fine, wet, w/ some med sand and few coarse sand and trace fine gravel.					
	120						
	121			Bag Sample #4			Sample collected 120 to 127 for grain size
	122	w/ trace of med and coarse sand and fine gravel					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

124

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW40A

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 15 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded sand (SP), Med Dense (Est), Gray, wet, w/ trace of med and coarse sand and fine gravel.					stopped 7-24-92 1700
	123	Becoming med to coarse sand w/ little fine Gravel. w/ silt balls and trace silt. and bands of Limonitic staining	HNu= BG			P	Started 7-25-92 0700 Added 780 gal water 5#50 bags Bent. Viscosity 43 sec.
	124	Becoming Green in color.					P=2.5 A=2.3 No water loss in formation 118.0 - 122.5'
	125						
	126	Lt. Gray, Becoming fine sand w/ some med and coarse sand, weakly Cemented w/ gill layer of silt.	HNu= BG			P	P=2.0 R=2.0 Lost 190 gal ~~water~~ drilling fluids from 122.5' to 128.6'
	127	Becoming fine sand w/ trace of med sand					
		Iron stone: ~~v.~~ Hard, Banded, ~~v~~ ~~Red Dk~~ Red,	127.6' HNu= 127.8' BG			P	P=1.7' R=1.7 6" flush joint casing set to 7-26-92 ~~128.7'~~ 129.7' ~~Drilled w/ 5 5/8"~~
	128	Sandstone: v. soft, fine grained, ~~Red~~, (Iron oxide staining) v. weathered, heavily cemented Reddish Brn, (Dm Adi)				stopped 7-25-92 1920	
	129		No Sample			Started 7-26-92 0700	~~trione to 129~~ cont. boring w/ 5 5/8" trione. Casing pulled prior to well installation; TC-129.5'
	130			Run #1	Rec 0/50	RQD 0% DWR 100%	cont. w/ 5.5" NCore barrel 8 min
	131						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 40A

HTW DRILLING LOG

HOLE NO. MW 40A

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 16 OF 17 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Gray) Sandstone: V. Soft, fine grained, Reddish Brn, w Ironoxide staining (Omadi)					
	132						Loss - 5.0' ULoss - 4.0'
	133						TD 133.5
	134	Shale: ~~Gray~~ Soft, R Gray mottled Brn, ~~Sandy~~ V. Weathered, Sandy.					
	135	Becoming Gray.	HNu= B6			31 30 32	Cont w/ 2.5" ~~Sp~~ split spoon + 5 7/8" Tricone 3001b Hamer
	136						CD 136.0'
		Sandstone: Soft, fine grained, Brnish tan, w/ Limonitic staining (Omadi)	HNu= B6	Run #2	Rec 0.2/2.0'	RQD 0%	Cont. w/ 5.5" Core barrel.
Lost	137						Loss - 1.8 ULoss - 1.8
	138						CD 138.0'
		~~Shale~~ Iron Stone: Hard, Dk Red ~~Shale Sandy, Soft, Gray~~	HNu= B6	138.7'		153 42/02	
	139	Shale, Soft, Gray mottled Brn, V. weathered, Sandy w/ Sandstone laminations. 0.5' w/ ~~1'~~ sandstone layer		Run #3	Lost 2.3	RQD 52% DWR 100%	Loss - 0.7' U. Loss - 0.4'
Lost	140						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 40A

1244

ICORPS/4-15-92

B07NE003702-05353

HTW DRILLING LOG

HOLE NO. MW 40 A

Remedial Investigation Mead NOP

INSPECTOR BJE

SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	Loss	(Bar) Shale: soft, Gray mottled. Brn, v. weathered, Sandy					CD. ~~15~~-140.7
	141			Run #4	3.8/4.0	RQD 100%	Loss-0.2'
	142	Becoming Gray, ~~&~~ Mod. Hard, S weathered, sandy.				DWR. 100%	ULoss -0.2'
	143						
	144						
Loss							CD 143.8' ~~143.8~~ ~~CD 144.8'~~
	145						BOH 145.0' Bore back filled to 136' w/ 10-20 Sand then 136'-128.5' w/ Bent pellets 190 gal. drilling fluids lost in screen interval. monitoring well Installed Upon Completion 7-28-92 1440

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW40A

ICORPS/4-15-82

1245

B07NE003702-05354

HTW DRILLING LOG

HOLE NO. MW-41A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 10 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.567351 – E.2896790
5. NAME OF DRILLER: Robert Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2-inch and 3 inch dia split spoon samplers; 4 3/4-inch-dia drag bit; 5 7/8-inch-dia tri-cone roller-bit	8. HOLE LOCATION: NW 1/4 sec. 16, T 14 N, R 9E
	9. SURFACE ELEVATION: TMQ ± 1165.90
	10. DATE STARTED: 08.06.92 13:29 — 11. DATE COMPLETED: 08.08.92 14:10
12. OVERBURDEN THICKNESS: 82.3	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 1.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 83.3	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-41A	NA	R.G. Pacheco; G.E. Papinako

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY(CL), soft, black, wet w/ roots [TOPSOIL]	HNU = BG			P	Boring advanced w/2-inch- and 3-inch-dia split spoons followed by 4 3/4-dia drag bit; D # 1; P = 2.0'; R = 1.4'; w/ 3-inch spoon
	2		HNU = = BG			P	D # 2; P = 2.0; R = 0.3; w/ 2-inch split spoon
	3						
	4	Becoming firm, brown, moist [Loess]	HNU = = BG			P	D # 3; P = 2.0; R = 2.0; w/ 3-inch spoon
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-41A

124(

HTW DRILLING LOG

HOLE NO. MW-41 A

Remedial Investigation Mead NOP

INSPECTOR

SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
5		(SAME) LEAN CLAY (CL), soft, brown, moist	HNU = BG			P	
6		Becoming hard, light brown, dry w/ orange staining	HNU = BG			P	D#4 P = 2.0' R = 2.0' w/ 2 inch spoon
7							
8			HNU = BG			P	D#5 P = 2.0 R = 2.0 w/ 3 inch dia spoon
9							
10			HNU = = BG			P	D#6 P = 2.0' R = 2.0 w/ 2 inch dia spoon
11							
12		Becoming soft, wet	HNU = BG			P	D#7 P = 2.0' R = 2.0' w/ 3 inch dia Spoon.
13							
14							

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41 A

HTW DRILLING LOG

HOLE NO. MW-41 A

Remedial Investigation Mead NOP | INSPECTOR | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(SAME) LEAN CLAY (CL), soft, light brown, wet	HNU = = BG			P	D #8 P = 2.0' R = 2.0' w/ 2 inch dia spoon
	15						
	16		HNU = = BG			P	D #9 P = 3.0' R = 2.0' w/ 3 inch dia split spoon
	17						
	18						
	19	POORLY GRADED SAND (SP), med. dense, light brown, fine grained	HNU = BG			P	D #10 P = 1.0' R = 0.3' w/ 2-inch spoon
	20	w/ trace of fine gravel	HNU = = BG			12 25	D #11 P = 2.0'
	21	Becoming dense				38 36	R = 1.3' w/ 3-inch-dia split spoon and 300 lbs hammer
	22		HNU = BG			8 15	D #12 P = 2.0' R = 0.5'
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41 A

124E

HTW DRILLING LOG

HOLE NO. MW-41A

Remedial Investigation Mead NOP

INSPECTOR

SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense, lt brown, fine grained w/trace of medium grained sand	HNU = = BG			14 18	
	24		HNU = = BG			11 20	D # 13 P = 2.0'
	25					23 23	R = 0.8' w/ 3-inch-dia spoon
	26		HNU = = BG			7 9 13	D # 14 P = 2.0'
	27					15	R = 0.9' w/ 2 inch dia spoon
	28		HNU = BG			14 23	D # 15 P = 2.0'
	29					26 24	R = 1.0' w/ 3-inch-dia split-spoon
	30		HNU = BG				D # 16 P = 2.0'
	31						R = 0.9' w/ 2 inch dia split-spoon
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

HTW DRILLING LOG

HOLE NO. MW-41A

Remedial Investigation Mead NOP

INSPECTOR

SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(SAME) POORLY GRADED SAND (SP), dense, light brown, fine grained	HNU = BG			22 50 89 109	D #17 P = 2.0' R = 1.5' w/ 3 inch spoon
	33						
	34		HNU = BG			17 28 28 24	D #18 P = 2.0' R = 1.0' w/ 2 inch spoon
	35						
	36		HNU = BG			14 19 30 41	D #19 P = 2.0' R = 1.0' w/ 3 inch spoon
	37						
	38		HNU = BG			9 13 18 26	D #20 P = 2.0' R = 0.9' Drilling stopped 8-6-92
	39	Becoming med. dense					
	40		HNU = BG			21 38	Drilling resumed 8-7-92 D #21
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

/CORPS/4-15-92

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HTW DRILLING LOG

HOLE NO. MW-41A

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(SAME) POORLY GRADED SAND (SP), med. dense, lt brown, fine grained	HNU = BG			30 28	D #21 P = 2.0' R = 1.2' w/ 3 inch spoon
	42		HNU = BG			5 11 15 13	D #22 P = 2.0' R = 0.9' w/ 2-inch spoon
	43						
	44		HNU = BG			9 11 15 16	D #23 P = 2.0' R = 0.6' w/ 3-inch spoon
	45						
	46		HNU = BG			3 5 5 8	D #24 P = 2.0' R = 1.1' w/ 2 inch spoon
	47						
	48	POORLY GRADED SAND (SP), loose, light brown, fine to medium grained w/ trace of fine gravel	HNU = BG			3 5 6 5	D # 25 P = 2.0' R = 2.0' w/ 3-inch spoon
	49						
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

1251

B07NE003702-05360

HTW DRILLING LOG

MW-41A

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME) POORLY GRADED SAND (SP), loose, light brown, fine to medium grained w/trace of fine gravel Becoming med. dense, brown and orange	HNU = =BG			3 4 6 7	D # 26 P = 2.0' R = 1.2' w/ 2 inch dia spoon
	51						
	52	w/trace of coarse gravel	HNU =BG			9 15 16 13	D # 27 P = 2.0' R = 0 w/ 3 inch dia spoon
	53						
	54		HNU =BG			3 6 12 14	D #28 P = 2.0' R = 1.3' w/ 2-inch-dia spoon
	55	w/trace of coarse grained sand					
	56	Becoming orange	HNU = BG			13 22 25 27	D # 29 P = 2.0' R = 0.9' w/ 3 inch dia split spoon
	57						
	58	w/trace of fine gravel	HNU= BG			4 7	D# 30 P = 2.0' R = 1.0'
	59						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

125

HTW DRILLING LOG

HOLE NO. MW-41A

Remedial Investigation Mead NOP | INSPECTOR | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(SAME) POORLY GRADED SAND (SP), med. dense, orange, fine to med. grained, w/ trace of fine gravel	HNU =BG			8 12	w/2 inch dia split spoon
	60	Becoming dense, medium grained	HNU= BG			11 23	D #31 P = 2.0' R = 1.3'
	61					21 19	w/ 3 inch dia split spoon
	62		HNU= BG			8 16	D # 32 P = 2.0' R = 0.8'
	63					17 14	w/ 2 inch spoon Change of hammer from 300 lbs to 140 lbs
	64	WELL GRADED SAND (SW), v. dense, light brown, fine to coarse grained	HNU =BG			29 68	D #33 P = 2.0'
	65					102 123	R = 1.2' w/ 3 inch dia spoon
	66	POORLY GRADED SAND (SP), dense, orange, medium grained	HNU= BG			27 30	D # 34 P = 2.0'
	67	Becoming light brown, fine grained Becoming v. dense w/trace of clay				86 300	R = 2.0' w/ 2 inch dia spoon
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

/CORPS/4-15-92

125

HTW DRILLING LOG

HOLE NO. MW-41A

Remedial Investigation Mead NOP

INSPECTOR

SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), dense to very dense light brown, fine to med. grained	HNU= BG			22 93 140 (for 3")	D#35 P = 1.25' R = 1.1' w/ 3 inch spoon
	69	Becoming orange, iron oxides(?) stained	HNU= BG			3 21 ~~6~~ 53	Change to 300# hammer D # 36 P = 1.25' R = 0.8' w/ 2 inch dia spoon
	70		HNU= BG			37 67 120 129	D#37 P = 2.0' R = 1.3' w/ 3 inch dia spoon
	71	Becoming v. dense, green, fine grained					
	72	Becoming dense, fine to medium grained	HNU= BG			5 25 61 78	D #38 P = 2.0' R = 1.7' w/ 2 inch dia spoon
	73	Becoming gray to light brown, fine grained					Boring reamed w/ 5 7/8 inch tri-cone roller bit to 75 ft depth
	74						
	75	Becoming olive	HNU= BG			45 115 114 160	D # 39 P = 2.0' R = 1.5' w/ 3 inch dia split spoon
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 125

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-41A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND (SP), med. dense, olive, fine grained	HNU: BG	N/A	N/A	2 7 22 36	w/ 2" spoon D # 40 P = 2.0 R = 1.4
	78	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), v. dense ~~to dense~~, multi-colored, v. fine to coarse grained w/ seams and partings of lean dk olive and lt brown (iron ? oxides stained) clay w/ little fine gravel					End of shift 17:00
	79		HNU: BG	N/A	N/A	24 45 49 45	Drilling resumed 8-8-92 8:15 D # 41 P = 2.0 R = 1.5 w/ 3" dia split-spoon
	80	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense to v. dense, mostly fine grained w/ subordinate quantities of med. and coarse grained sand w/ thin beds, weakly cemented w/ white silt and iron oxides(?) w/ v. rich iron oxides(?) staining					
	81		HNU: BG	N/A	N/A	24 24 75 (for 4 inches)	w/ 2-inch-dia split-spoon D # 42 P = 1.3 R = 1.6 0.3 ft picked up from previous run
	82	POORLY GRADED SAND WITH CLAY (SP-SC), v. dense, yellow, white, clear, fine grained well sorted w/ little clay in fines w/ rich iron oxides(?) staining w/ seams and thin beds, weakly cemented [Comadi Member]	HNU: BG	N/A	N/A	90 200 (for 4 inches)	D # 43 P = 0.8 R = 0.8 B.O.B. 83.3 ft
	83						Boring reamed to the depth 83.0 ft w/ 5 7/8-inch-dia tri-cone roller-bit.
	84						Monitoring well installed upon completion
	85						Estimated water loss in screened interval ~ 100 gals
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41A

125

CEA 8/17/92

HTW DRILLING LOG

HOLE NO. MW-42A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker ADII
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA: 0-16'; 5 7/8" Tricone - roller bit - rotary/washboring	8. HOLE LOCATION: MW-42 N.556899 - E.2851741
	9. SURFACE ELEVATION: 1144.15
	10. DATE STARTED: 8-5-92/1345
	11. DATE COMPLETED: 8-6-92/0813
12. OVERBURDEN THICKNESS: 97.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 50'
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 97.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed intermediate monitoring well		MW-42A		Robert R Mallisel

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SILTY CLAY (CL) stiff, dark brown, moist with organics. (Topsoil)					Boring logged from observation of cutting and log of MW-42D. Boring advanced with ~~5 7/8" Tricone~~ ~~roller~~ 6" CFA.
	1						
	2.0'						
	2	LEAN CLAY (CL) stiff, light brown, moist. (Loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-42A

B1 125

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation Mead NOP

INSPECTOR RRM

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as Above) LEAN CLAY (CL) STIFF, light brown, moist (Loess)					
	6						
	7						
	8						
	9						Bz = BKG
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A 125

HTW DRILLING LOG

HOLE NO. MW-42 A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL) STIFF, light brown, moist (Loess)					
	15	WITH SILT					
		16.0'					Stopped drilling with 6" CFA at 16.0' 8-5-92/1357
	16	Poorly Graded SAND (SP) medium dense, ~~light~~ brown, moist, Fine grained (Alluvium)					Began rotary/ washboring with 5 7/8" tricone roller bit. 8-6-92/1422
	17						
	18						
	19						BZ = BKG
	20	WITH some medium grained Sand.					
	21						
	22						
	23						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 921KWC30

HOLE NO.: MW-42A

125

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained with some medium grained sand (Alluvium)					
	24						
	25						Estimated drilling fluid/water loss 20 gal.
	26						
	27						
	28						
	29						BZ = BKG
	30						
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A 1259

HTW DRILLING LOG

HOLE NO. MW-42A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) medium dense, light brown, moist, fine grained with some medium grained sand. (Alluvium)					
	33						
	34	34.0 Poorly Graded SAND (SP) medium dense, multicolored, moist, fine to medium grained with trace coarse sand to fine gravel. (Alluvium)					
	35						
	36						
	37						
	38						
	39						BZ = BKG
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) medium Dense, multi-colored, moist, fine to medium grained with Trace coarse sand to fine gravel. (Alluvium)					
	42						
		Poorly Graded SAND (SP) Medium dense, light brown, moist, fine grained. (Alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						BZ = BK
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

1261

B07NE003702-05370

HTW DRILLING LOG

HOLE NO. MW-42A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: RRM

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP) medium dense, light brown, fine grained. (Alluvium)					
	51						
		becomes dense					
	52						
	53						
	54						
	55						
	56						
	57						
	58						
		with Trace medium To Coarse Sand & fine gravel					
	59						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A 126

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation, Mead NOP

INSPECTOR RRM

SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY Graded SAND (SP) dense, multi-colored, wet fine grained with Trace medium to coarse sand & fine gravel. (Alluvium)					
	60						
	61						
	62						
	63						
	64	becomes medium to coarse grained. with Trace of gravel					
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation, Mead NOP | INSPECTOR RPM | SHEET 1 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME as Above) Poorly Graded SAND (SP) Dense, multi-colored, wet, medium to coarse grained with Trace of gravel (Alluvium)					
	69						BZ = BKG
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-42A

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Dense, multi-colored, wet, medium to coarse grained, with trace fine gravel. (Alluvium)					
	78						Stopped RWB at 79' 8-5-92/1623 BZ = BKG
	79						Began RWB at 79' 8-6-92/0948
	80						
	81						
	82						
	83						
	84						
	85						
	86						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

1265

B07NE003702-05374

HTW DRILLING LOG

HOLE NO. MW-42A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: KRM

SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		Poorly Graded SAND (SP)					
		Dense, multi-colored, wet,					
		medium to coarse grained					
	87	with Trace fine gravel.					
		(Alluvium)					
	88						
	89						BZ = BKG
	90						
	91						
	92	with few fine gravel					
	93						
	94						
	95						

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

126

HTW DRILLING LOG

HOLE NO. MW-42A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND (SP) Dense, multi-colored, wet, medium to coarse grained with few fine gravel and trace coarse gravel. (Alluvium)					NOTE: Est. water loss in screen interval: 60 gal. drilling fluid, 200 gal. water to flush drilling fluid, & 40 gal. used to place filter pack. Total loss = 300 gal.
	96						
	97						Stopped drilling 8-6-92 @ 813 hrs @ 97.5'
	98						Bottom of Boring at 97.5' Boring completed as ~~shallow~~ intermediate monitoring well MW-42A.
	99						
	100						
	101						
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42A

1267

8/6/92

HTW DRILLING LOG

HOLE NO. MW-43A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Tom Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" Tricone roller bit - rotary/wash boring.	8. HOLE LOCATION: MW-43 - N.559636 - E.2851615
	9. SURFACE ELEVATION: 1190.63
	10. DATE STARTED: 8-4-92/0832 — 11. DATE COMPLETED: 8-4-92/1156
12. OVERBURDEN THICKNESS: 102.0	15. DEPTH GROUNDWATER ENCOUNTERED: 43.5'
13. DEPTH DRILLED INTO ROCK: 0.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 102.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed intermediate monitoring well	X	MW-43A		Robert R Mallison

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Silty clay (SP) firm, very dark brown, moist (Topsoil)					Boring advanced with 5 7/8" Tricone roller bit - rotary/wash boring (surface casing set to 5' with 6" CFA)
	1.0						
	1	Lean clay (CL) firm, light grayish brown, moist (Loess)					Boring logged from cuttings and log of MW-43D
	2						
	3	Becoming light brown					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-43A

HTW DRILLING LOG

HOLE NO. MW-43A

Remedial Investigation, Mead NOP | INSPECTOR KRM | SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Lean Clay (CL) firm, light brown, moist (Loess)					Began rotary/washboring with 5 7/8" tricone roller bit at 6' 8-4-92/0848
	6						
	7						
	8						
	9						BZ = BKG
	10						
	11						
	12.0	SILT (ML) soft, light gray, moist (Alluvium)					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

HTW DRILLING LOG

HOLE NO. MW-43A

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) SILT (ML) Soft, light gray, moist (Alluvium)					
	15						
	16						
	17	16.0 Poorly Graded SAND (SP) medium dense, light gray, moist very fine to fine grained. (Alluvium)					
	18						
	19						
	20						BZ = BKG
	21						
	22						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A 127C

HTW DRILLING LOG

HOLE NO. MW-43A

Remedial Investigation, Mead NOP | INSPECTOR ARM | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP) medium dense, light Gray, moist, very fine To fine grained with Trace medium grained Sand (Alluvium)					
	24						
	25						
	26	becoming dense					
	27						
	28						
	29						
	30						BZ = BKG
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

1271

B07NE003702-05380

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) ~~Medium dense to~~ dense, light gray, moist very fine to fine grained with trace medium grained sand (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						BZ = BKG

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY GRADED SAND (SP) Dense, light gray, moist very fine to fine grained with Trace medium grained (Alluvium)					
	42						
	43						
		becomes wet					
	44						
		Becomes Multi-colored with Trace fine gravel					
	45						
	46						
	47						
	48						
	49						BZ = BKG
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					
		POORLY GRADED SAND (SP)					
		Dense, multi-colored, wet					
		very fine to fine grained					
	51	with trace medium to fine gravel. (Alluvium)					
	52						
	53	becoming coarse grained					
	54						
	55						
	56						
	57	57.0					
		POORLY GRADED SAND WITH CLAY (SP-SC)					
		dense, ~~multi-colored~~ grayish brown with multi-colored grains, wet					
	58	fine grained, with medium to coarse sand and fine gravel. (Alluvium)					
							BZ BRG
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

1274

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) POORLY Graded SAND WITH CLAY (SP-SC) dense, grayish brown, with multi-colored grains, wet, fine grained, with medium to coarse sand and fine gravel. (Alluvium)					
	60						
	61						
	62						
	63						
	64	64.0' LEAN CLAY WITH SAND (CL) hard, olive gray-brown, wet, with trace fine sand (Alluvium)					
	65						
	66	becomes light brown					
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY with SAND (CL) hard, light brown, wet, with Trace fine sand. (Alluvium)					
	69						
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

1276

B07NE003702-05385

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY with SAND (CL) hard, light brown, wet, with Trace fine Sand (Alluvium)					
	78						
	79						
	80						
	81	81.0' — — — — — — Well Graded SAND (SW) medium dense, multi-colored, wet, Fine to coarse grained. (Alluvium)					
	82						
	83						
	84	with clay					
	85	becomes dense, fine grained Sand.					
	86						

/CORPW4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

127

HTW DRILLING LOG

HOLE NO. MW-43A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 11 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Well Graded SAND with CLAY (SW-SC) dense, multi-colored, wet, fine grained. with Trace fine gravel.					
	87						
	88						
	89						BZ = BKG
	90						
	91						
	92	becomes medium dense.					
	93						
	94						
	95						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

1278

HTW DRILLING LOG

HOLE NO. MW-43A

Remedial Investigation, Mead NOP | INSPECTOR RRM | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) WELL GRADED SAND with CLAY (SW-SC) medium dense, multi-colored, wet, fine grained.					
	96	(Alluvium)					
	97						
	98	with fine gravel.					
	99						
	100						
	101						NOTE: Estimated fluid/water loss in screen-interval 20 gal drilling fluid, 30 gal to flush drilling fluid & 10 gal during filter pack placement
	102						Stopped 8-24-92/1155
	103						Bottom of Boring @ 102.0' Completed boring as intermediate monitoring well MW-43A 8-24-92/1432
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43A

CAM 8/4/92

HTW DRILLING LOG

HOLE NO. MW-44A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WCC
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Matt Cooper	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drag bit. rotary/washboring	8. HOLE LOCATION: N. 555710 - E. 2855303
	9. SURFACE ELEVATION: ~~1086.5~~ 1091.53
	10. DATE STARTED: 7-29-92/1151
	11. DATE COMPLETED: 7-29-92/1338
12. OVERBURDEN THICKNESS: 42.5	15. DEPTH GROUNDWATER ENCOUNTERED: 15.0' ATD (Estimated)
13. DEPTH DRILLED INTO ROCK: 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 42.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~none~~ NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~none~~ NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed ~~intermediate~~ monitoring well	NA	MW-44A	NA	Robert R Mallisee

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Silty clay (CL) Firm, black, moist, sandy, with abundant organics (Topsoil)					Boring logged from cuttings. Boring advanced with 6" drag bit and ~~rotary~~ ~~washboring~~ bentonite slurry
	1	1.0 — Silt with sand (ML) firm, dark brownish gray, moist, with iron oxides (?) staining, with root and root hairs. (Colluvium & Alluvium)					
	2	Becoming dark grayish brown with iron oxides (?) staining. with root hairs.					
	3						
	4	4.5' ~~Brown clay with sand (CL) firm, light gray with brown mottling.~~					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-44A

1280

HTW DRILLING LOG

MW-44A

Remedial Investigation Mead NOP | INSPECTOR: RPM | SHEET 2 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		[redacted]					
		Lean CLAY with SAND (CL) firm, bluish gray with yellow mottling					
	6	with Trace of SILT, fine grained sand & root hairs. (Alluvium)					
	7	with clayey sand (SC) and iron-manganese (?) staining.					
	8						
	9	Becoming Soft, olive and bluish gray with iron oxides (?) staining and root hairs.					BZ = BKG
	10	Becoming olive gray with Trace of coarse grained sand.					
	11						
	12						
	13						
	14	Becoming dark gray					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921.W030

HOLE NO.: MW-44A

1281

HTW DRILLING LOG

MW-44A

Remedial Investigation Mead NOP | INSPECTOR RPM | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above)					Stopped drilling ~~with 6 1/4 HSA~~
		SANDY LEAN CLAY (CL)					7-29-92/1205
		Soft, dark olive gray, wet					@ 15.0 16.0'
	15	with some fine grained Sand					~~Begin rotary wash boring with 6" drag bit.~~
		and Trace of coarse grained					~~@ 15 Drilling resumed~~
		Sand. (Alluvium)					7-29-92/1256
	16	16.0'					
	17	~~17.0'~~					
		Poorly Graded SAND					
		with CLAY (SP-SC)					
		Very loose, gray, wet,					
	18	very fine To fine grained					
		with Trace of clay					
		(Alluvium)					
	19						BZ = BKG
	20						
	21	becomes loose					
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 921WO30

HOLE NO.: MW-44A 128

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-44A

Remedial Investigation Mead NOP | INSPECTOR RRM | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly Graded SAND with CLAY (SP-SC) loose, dark gray, wet, v. fine to fine grained with Trace of clay (Alluvium)					
	24						
	25						
	26	26.0' Lean CLAY with SAND (CL) Firm, med. olive gray, wet with organic matter and Trace of fine sand. (Alluvium)					
	27						
	28						
		28.5' Poorly Graded SAND (SP) (estimated)					
	29	Med. dense, light yellowish gray, wet, fine grained, with Trace coarse Sand & fine gravel (Alluvium)	←				BZ-BKG
	30						
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44A

1283

/CORPS/4-16-82

HTW DRILLING LOG

MW-44A

Remedial Investigation, Mead NOP

INSPECTOR: RRM

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		32.5' Well Graded SAND (SW)					
	33	med. dense(?), multi-colored, wet, with some iron oxides(?) staining and trace fine gravel. (Alluvium)					
	34						
	35						
		35.5 Poorly Graded SAND with CLAY					
	36	(SP-SC) med. dense, multi-colored, wet, coarse grained with olive gray clay (Alluvium)					
	37						
	38	Becomes mostly fine grained, gray.					
	39						BZ = BKG
		40.0'					Stopped rotary wash boring with 6" drag bit. @ 42.5' 7-24-92/1335 Boring cased to 40.0'
	40	Poorly Graded SAND (SP) loose, multi-colored, wet, coarse grained with trace fine and med. sand.					
	41						

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-44A

1284

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO.: MW-44A

PROJECT: Remedial Investigation, Mead NOP | NSR: RRM

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(SAME) POORLY GRADED SAND (SP), loose, multi-colored, coarse grained, wet w/trace fine and med. grained sand					Note: Estimated drilling fluid loss in screen-interval 30 gal 90 gal used to flush drilling fluid stopped 7-29-92/1338 42.5'
	43						Boring completed as monitoring well.
	44						
	45						
	46						
	47						
	48						
	49						
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44A 128E

ccA 7/24/92

HTW DRILLING LOG

HOLE NO. MW-45A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNEK COMPANIES
SHEET 1 OF SHEETS 5	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.559523 - E.2857386
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 7/8" TRICONE BIT	8. HOLE LOCATION: SW SW SW SECTION 26 T14N R9E
	9. SURFACE ELEVATION: 1079.19
	10. DATE STARTED: 07.22.92 @ 15:22 / 11. DATE COMPLETED: 07.23.92 @ 10:18
12. OVERBURDEN THICKNESS: 39.0'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: ~~NA~~ 0.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 39.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
monitoring installed well	NA	MW-45A	NA	R.G. PACHECO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) soft, black moist w/roots (Topsoil)	HNu= ~~ND~~ BG				Boring advanced with a 5 7/8" Tricone bit and ~~drilling~~ bentonite ~~slurry~~ (1 ~~BBL~~ to 300 gal)
	1						
	2	Becoming greyish-black					
	3	LEAN CLAY (CL), soft, grayish black					
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KE030 Remedial Investigation, Mead NOP | 92KW030 | HOLE NO.: B1 MW-45A

HTW DRILLING LOG

HOLE NO. MW-45A

Remedial Investigation Mead NOP

INSPECTOR R.G. PACHECO

SHEET 2 OF SHEETS 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME AS ABOVE)					
	6	LEAN CLAY (CL), soft, grayish black					
	7						
	8						
	9						
	10						
	11						Stop 7-22-92 16:00 Resume 7-23-92 08:00
	12	11.75 Poorly Graded Sand (SP), Medium dense to dense, dark grey, very fine to fine, moist grained					
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45A

HTW DRILLING LOG

HOLE NO. MW-45A

Remedial Investigation, Mead NOP | NSPE: R. G. PACHECO | SHEET 3 OF SHEETS 5

ELEV a	DEPTH b	(SAME) DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	Poorly graded sand (SP), very loose medium grey, very fine to fine grained, wet.					
	15						
	16						
	17						
		- - - - - -					
	18	Poorly graded sand (SP), medium dense, orange-tan, very fine to fine, wet w/ some fine gravel					
	19						
	20						
	21						
	22	Becoming ~~Poorly graded sand (SP), medium dense, orange-tan~~ fine to medium grained, w/ some fine gravel					
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45A

HTW DRILLING LOG

HOLE NO. MW-45A

Remedial Investigation, Mead NOP | INSPECTOR: ~~NINA~~ R.G. PACHECO | SHEET 4 OF SHEETS 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(SAME AS ABOVE)					
	24	Poorly graded sand (SP), dense, orange-tan fine to medium grained w/ trace of fine gravel					
	25						
	26	Becoming ~~Poorly graded sand (SP)~~ medium dense, ~~orange-tan~~, ~~fine to medium~~ ~~w/ trace of gravel~~					
	27						
	28	Becoming ~~Poorly graded sand (SP)~~ ~~medium dense, orange-tan~~, medium to coarse grained w/ few fine gravel					
	29						
	30						
	31						
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45A

1289

HTW DRILLING LOG

MW-45A

Remedial Investigation, Mead NOP

INSPECTOR: RG PACHECO

SHEET 5 OF SHEETS 5

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	32	Well graded sand (SW) medium dense, orange-tan, fine to coarse grained sand wet w/fine gravel					
	33						
	34						Estimated water loss in screen interval 50 Gallons.
	35						
	36	Poorly graded gravel, with SAND (GP), medium dense, orange-tan, fine to coarse gravel w/medium to coarse grained sand					
	37						
	38	Poorly graded sand (SP), dense to very dense, orange-tan fine to medium grained, wet w/little coarse gravel					~~Tricone 5 7/8" down to 39' to end hole.~~
	39						BOB @ 39' 7-23-92 9:09 Boring completed as monitoring well 7-23-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45A

ICORPS/4-15-92

129C

CEA 7/24/92

HTW DRILLING LOG

HOLE NO. MW-46A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Woodward-Clyde Consultants
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: T. Payton	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" CFA 0'-7'; 5 7/8" tricone roller bit 7'-48'	8. HOLE LOCATION: MW-46A - N. 554654 - E. 2859809
	9. SURFACE ELEVATION: 1080.33
	10. DATE STARTED: 7-23-92 0715 / 11. DATE COMPLETED: 7-23-92 1140
12. OVERBURDEN THICKNESS: 48'	15. DEPTH GROUNDWATER ENCOUNTERED: 5' @ 0730, 7-23-92
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 48'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
none			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
none						NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
mon. well installed upon completion of hole				J. Nealon

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), soft, black, very moist, medium plastic, with roots (TOPSOIL)					Boring advanced with 6" CFA. Soil description determined from soil cuttings and from log of Boring MW-46D.
	1						1
	2	CLAYEY SILT (ML) soft, gray to grayish-black, very moist, with roots (ALLUVIUM)					2
	3						3
	4						4
	5	Becomes wet					Water encountered @ 5' 0715 hrs. 5

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-46A

291

B07NE003702-05400

HTW DRILLING LOG

HOLE NO. MW-46A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 2 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) CLAYEY SILT (ML), soft, gray to grayish black, with roots (ALLUVIUM) wet,					
	6		B2=B6				Switch to RWB @6', 0730
							Mix 120 gal water with 1/4-50# bag Aquagel
	7						
	8						
	9						
	10						
	11						
	12	POORLY GRADED SAND (SP), medium dense?, dark gray, very fine to fine grained, (ALLUVIUM)	12 wet				
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46A

HTW DRILLING LOG

HOLE NO. MW-46A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Mealon

SHEET 3 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) POORLY GRADED SAND (SP), medium dense?, dark gray, wet, very fine to fine grained (ALLUVIUM)					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46A

1293

HTW DRILLING LOG

HOLE NO. MW-46A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: S. Mealer

SHEET 4 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	(same as above) POORLY GRADED SAND (SP), medium dense?, dark gray, wet, very fine to fine grained (ALLUVIUM)					Added ½-50# bag Aquagel
	25	with a little medium and coarse grained sand					
	26						
	27		27				
	28						
	29	~~becomes very fine to fine grained with some medium grained sand~~	na				
	30	POORLY-GRADED SAND (SP), medium dense?, multi-colored, wet, with very fine to fine grained sand and trace coarse grained sand (ALLUVIUM)	medium grained				Added 60 gal water
	31						
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46A

HTW DRILLING LOG

HOLE NO. MW-46A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: [illegible]

SHEET 5 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same as above) POORLY GRADED SAND (SP), medium dense?, multicolored, wet, with very fine to fine grained sand and trace coarse grained sand (ALLUVIUM) medium grained					
	34						Added 70 gal. water and 2-50# bags Aquagel.
	35	Becomes medium to coarse grained sand with fine					
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46A

HTW DRILLING LOG

HOLE NO. MW-46A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(sandstone above) [illegible]~~					Coarse fraction increasing in grain size.
WELL		GRADED SAND (SW), medium dense?, multi-colored, wet, medium to coarse grained, with fine grained sand (ALLUVIUM)					
	42						
	43						
	44		B2=B6				Added 45 gal water and 1-50# bag Aquagel.
	45						
	46						
	47	POORLY GRADED GRAVEL (GP), medium dense?, multi-colored, fine grained, with medium to coarse sand (ALLUVIUM)	47.5				
	48	SANDSTONE, soft, light tan with minor orange mottling, very weathered, weakly cemented, wet					Bottom of Boring @ 48' at 1140 hrs 7-23-92
	49		Hole caved to 21' after flushing. Hole redrilled to 48' and caved to 43.7'. Monitoring well installed upon completion. Grouting completed at 1800 hrs, 7-23-92 with 10.0 lb/gal Pure Gold grout.				Water losses during drilling: 88 gal 0-34 101 gal 34-48 (seran filter) 100 gal flushing 52 gal in redrill 100 gal reflushing 80 gal filter pack placem
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46A

/CORPS/4-15-92

1296

B07NE003702-05405

MEW CDA 8/11/92

HTW DRILLING LOG

HOLE NO. MW-47A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNEK COMPANIES
SHEET 1 OF 4 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" DRAG BIT & 2" split spoon; 94mm Christensen wire-line; 6" Tungsten Insert & Tricone roller 7 7/8" & 4 5/8"; 3" core / 5" core bbl w/ Tungsten Insert	8. HOLE LOCATION: N' Admin Area - N.579959 - E.2826325
	9. SURFACE ELEVATION: ~~NA~~ ~~1199±~~ 1199.30
	10. DATE STARTED: 8/4/92 1430
	11. DATE COMPLETED: 8/8/92 1630
12. OVERBURDEN THICKNESS: 126.0'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 9.25	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 135.25	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	~~80-82'~~ X	~~130-135~~	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	~~NA~~	~~NA~~	~~NA~~	~~NA~~	89 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-47A	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Highly organic CLAY (OL) Firm, V. DK brown w/ occ. root hairs (Top soil)				P	Begin 8/4/92 @ 1430 Boring Advanced w/ 5" Drag Bit & 2" split spoon D#1 P=2.6 R=1.7 Drilling Fluids - Pure H_2O
	1	lean CLAY (CL), light brown, firm w/ occ root hairs, Fe stains (Loess)	HNu BKG				
	2						D#2 P=2.6 R=0.6
	3		HNu BKG			P	
	4	becoming soft & Grey	HNu BKG			P	D#3 P=2.0 R=2.0
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-47A

129

B07NE003702-05406

HTW DRILLING LOG

MW-47A

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | PAGE 2 of 14

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					D# 3
	6	Lean CLAY (CL), Soft, lt brown & grey w/ Fe stains (Loess)					
			HNu BKG			P	D# 4 P=2.0 R=2.0
	7						
	8						
			HNu BKG			P	D# 5 P=2.0 R=2.0
	9						
	10						
		w/ Fe & mn(?) staining	HNu BKG			P	D# 6 P=2.0 R=2.0
	11						
	12						
			HNu BKG			P	D# 7 P=2.0 R=2.0
	13						
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW010

HOLE NO.: MW-47A

1298

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(Same) LEAN CLAY (CL), soft, lt brown & grey w/ Fe & mn (?) stains (LOESS)	HNu BKG			P	D#8 P=20 R=1.0 Hit Refusal @ 15.8 Begin 9 Stem Christ. wire line w/ Tung. Bit 3.8 x 2½ sample BBL
	16	(SC) Clayey SANDY, med dense light brown, fine to v. fine grained sand w/ occasional heavily iron stained zones Alluvium	HNu BKG				D#9 P=2.0 R=0 Drilling Fluids - Bentonite + H_2O
	17						
	18						D#10 P=2.0 R=0.3 100# ~~bags~~ bentonite + 100 gal H_2O
	19	Becoming v. fine	HNu BKG				
	20	POORLY GRADED SAND (SP) med dense, Tan, fine grained w/ trace med sand (Alluvium)	HNu BKG				D#11 P=2.0 R=0
	21						
	22		HNu BKG				D#12 P=20 R=0.8
	23						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 4 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP) med dense, Tan, fine grained					D#12
	24	w/ Trace med sand (Alluvium)					
	25	w/ little med sand	HNu BKJ				D#13 P=2.0 R=1.0
	26		HNu BKY				D#14 P=2.0 R=0.4
	27						
	28		HNu BKY				D#15 P=2.0 R=0.4
	29						
	30		HNu BKY				D#16 P=2.0 R=0.4
	31						
	32						Stopped 8/6/92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

ICORPS/4-15-82

1300

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 5 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					RESUME 8/5/92
		Poorly graded SAND (SP) med dense, ~~lt brown~~ TAN, fine grained	HNU BKG				D #17 P = 2.0 R = 0.1
	33	w/ ~~Trace~~ Little med sand					100# Bentonite ADDED ~~2 bags CEC~~ + 300 gal H_2O
	34		HNU BKG				D #18 P = 2.0 R = 0.9
		becoming lt brown w/ Trace med sand,					
	35	Little silt					
	36		HNU BKG				D #19 P = 2.0 R = 0.4
	37						
	38		HNU BKG				D #20 P = 2.0 R = 0.7
	39						
	40		HNU BKG				D #21 P = 2.0 R = 0.3
	41						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

1301

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) med DENSE, ~~tan~~ lt brown fine grained w/ Trace med SAND and little silt (Alluvium)					DA#21
	42		HNu BKG				DA#22 P=2.0 R=1.2
	43						
	44		HNu BKG				DA#23 P=2.0 R=0.2
	45						
	46	Becoming fine grained to v. fine	HNu BKG				DA#24 P=2.0 R=0.9
	47						
	48		HNu BKG				DA#25 P=2.0 R=0.4
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO. MW-47A

ICORPW4-18-92

HTW DRILLING LOG

HOLE NO. mw-47A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(same) Poorly graded SAND (SP) med dense, Lt brown fine to v. fine grained w/ Trace med sand and little silt (alluvium)	HNu BKg				D# 26 P=2.0 R=0.3
	52		HNu BKg				D#27 P=2.0 R=0.6
	53						
	54	w/ occ. BLACK SILTY LAMINATION ≈0.02' THICK	HNu BKG				D#28 P=2.0 R=0.6
	55						
	56	Becoming Green Gray fine to v. fine grained w/ TRACE silt	HNu BKg				D# 29 P=2.0 R=0.7
	57						
	58	Becoming pale Blue-Gray, v. fine grained	HNu BKg				D#30 P=2.0 R=0.7
	59						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-47A

1308

B07NE003702-05412

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded SAND (SP) Dense, blue-gray & very fine grained (alluvium)					D#30 DRILLER CHANGED DRILLING MUD (TOO SANDY) 150# bentonite mixed ~~[illegible] gal~~ + 300 gal H_2O
	60		HNu BKG				D#31 P=2.0 R=1.0
	61	w/Trace med to coarse grained sand and occ. green silt laminations (0.01")					
	62		HNu BKG				D#32 P=2.0 R=1.1
	63	Becoming fine to v. fine grained w/little med to coarse sand					
	64		HNu BKG				D#33 P=2.0 R=1.2
	65	~~w/ med~~ MED to coarse SAND Absent					
	66		HNu BKG				D#34 P=2.0 R=0.8
	67	Becoming v. fine grained					
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)	HNu				D#35
			BKc				P=2.0
		Poorly Graded SAND (SP)					R=1.4
	69	Dense, grey, V. fine grained					
	70						
		w/ trace silt	HNu				D#36
			BKc				P=2.0
							R=1.3
	71						
	72						
			HNu				D#37
			BKy				P=2.0
							R=0.6
	73						
	74						
			HNu				D#38
			BKy				P=2.0
							R=1.8
	75						
	76						
			HNu				D#39
			BKy				P=2.0
							R=1.0
	77						

ICORPB/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 9 OF 11 SHEETS

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
		(same) Poorly graded SAND (SP) Dense, grey, v. fine grained w/ trace silt					D#39
	78		HNu BKG				D#40 P=2.0 R=2.0
	79						
	80		HNu BKG	# 1 bag Sample	MW-47-1		D#41 P=2.0 R=1.6 sample collected for sieve analysis 80-82'
Bottom of Pleistocene Fine Sand	81						
	82		HNu BKG				D#42 P=2.0 R=1.7
	83						
	84	w/Trace med to. coarse sand	HNu BKG				D#43 P=2.0 R=1.3
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-47A

1306

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation Mead NOP | INSPECTOR T. Heck | SHEET 9 OF 14 SHEETS

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
		(Same) poorly graded SAND (SP), Dense, Grey, ~~&~~ v. fine grained w/ little med to coarse sand and trace coarse gravel (alluvium)	HNU Bkg				D#44 P=2.0 R=1.3
	87						
	88						Stopped 8/5/92 Resume 8/6/92
		becoming fine grained w/ little coarse sand and fine gravel	HNU Bkg				D#45 P=2.0 R=0.4
	89						
	90						D#46 P=2.0 R=0
			No Sample				
	91						
	92	becoming fine to v. fine grained with TRACE coarse sand	HNU Bkg				D#47 P=2.0 R=1.0
	93						
	94	becoming fine to v. fine w/ Some coarse sand and fine gravel	HNU BKG				D#48 P=2.0 R=0.6
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-47A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) Dense, grey, fine to v. fine grained w/ some coarse sand and fine gravel (alluvium)					D#48
	96		HNU BKG				D#49 P=2.0 R=0.7
	97						
	98	Becoming fine to v. fine	HNU BKG				D#50 P=2.0 R=0.8
	99						
	100		HNU BKG				D#51 P=2.0 R=0.7
	101						
	102		HNU BKG				D#52 P=2.0 R=0.6
	103	Becoming med to coarse grained w/ little fine to coarse gravel and few fine sand					
	104						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

1308

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	(Same) Poorly graded SAND (SP) Dense, grey, ~~fine~~ med. to coarse grained w/ little fine to coarse gravel and few fine sand (alluvium)	HNU BKG				D# 53 P = 2.0 R = 0.4
	106						
	107		No Sample				D# 54 P = 2.0 R = 0 Logged by cuttings add 100 gal H_2O
	108		HNU BKG				D# 55 P = 2.0 R = 0.3
	109	w/ Trace cobbles					ADD ~~1 bag gel~~ 50# bentonite + 100 gal H_2O
	110	Poorly graded Gravel (GP) (mostly fine) green & grey fine to coarse gravel w/ little fine to coarse sand, trace cobbles (alluvium)	HNU BKG				D# 55 P = 2.0 R = 0.2 ADD ~~1 bag gel~~ 50# bentonite
	111						
	112		HNU BKG				D# 55 P = 2.0 R = 0.1
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-47A

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-47A

Remedial Investigation Mead NOP

OPERATOR T. Hecht

SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same)					Logged by cuttings
		Poorly graded GRAVEL (GP) (mostly fine) green & grey, fine to coarse w/ little fine to coarse grained sand, Trace cobbles (alluvium)					D# 55 CHANGED mud pit, 4 bags gel & 200 gal H_2O
	114		HNU #6				D# 56 P = 3.0 R = 0.4
	115						Drilled 2', bit dropped 1'
	116						ADDED 200 gal H_2O
	117						
	~~117~~						D# 57 P = 5.0 R = 0
	118	~~POORLY GRADE~~	~~No sample~~				Bit fell through 117-122, v. loose gravel ... driller says sand cutting = fine gravel & coarse sand last circulation
	119						
	120						added 300 gal H_2O ~~2 bags gel~~ and 100# bentonite
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 42KW030

HOLE NO.: MW-47A

1310

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	123	(Same) Poorly graded GRAVEL (GP) green, Gray, fine to coarse (mostly fine) w/ little fine to coarse sand, TRACE cobbles (alluvium					Logged by cuttings bit fell through interval, actually drilled 0.5' lost circulation add 400 gal H_2O Hole caves in around pipe
	124						Added 100# Bentonite ~~2 bags gel~~ + 250 gal H_2O
	125						3 bags gel + 200 gal H_2O ~~Drill~~
	126						Stopped 8/6/92
	127	SHALE, MOD. HARD, red and yellow mottled V. weathered (OMAI)				67/0.3'	Drilling mud turns red Resume 8/7/92 REAMED 0-129.5 w/ 7 7/8 Tricone b.t SET 6" Temp Casing to 127.8' HAMMERED w/ 300 lb 0.3' Casing removed prior to well installation Interval cont during flush & ream
	128						
	129						
	130	Becoming Red, yellow & Gray mottled	HNu BKG	Core Run #1	REC 1.7 / 2.1	DWR 100% RQD 81%	Stopped 8/7/92 ~~Resume 8/10/92~~ Start 129.9 @ 1827 Stop 132.0 @ 1350 Run Length = 2.1' REC = 1.7' ~~Core~~ Run 2.1 Cont 0 Rec 1.7 Ln 0 Cp = 132.0
	131						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

B07NE003702-05420

HTW DRILLING LOG

HOLE NO. MW-47A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		SHALE: MOD HARD, Red yellow & Grey mottled		Core Run 1			
	132	V-weathered (OMADI)					CD = 132.0
							Start 130.0 @ 1745 Stopped 135.0 @ 1810
			NNW	Core	Rec	RQD 66%	Run 3.0 Lost 0.1
			BKG	Run 2	2.9/3.0		Rec 2.9 vr 0.1
	133					DWR 100%	CD = 135.25
					Pieces over 4" = 2.0		
	134				2.0/3.0		
	135						BOH = 135.25
							MONITORING WELL INSTALLED upon completion 8/9/92
	136						Water lost in screened interval. 1350 gal
	137						
	138						
	139						
	140						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-47A

/CORPS/4-15-92

8/8/92 MEW 8-8-92

HTW DRILLING LOG

HOLE NO. MW-48D A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES
SHEET 1 OF 15 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.574818 - E.2829897
5. NAME OF DRILLER: BOB KINGSLEY/Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500/Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" & 3" SPLIT SPOON; 4 3/4" DRAG BIT; 300# HAMMER; 94 mm Christensen sampler; 7 5/8" tri-cone roller-bit	8. HOLE LOCATION: NW NW NW Sec 12 T14N R8E
	9. SURFACE ELEVATION: 1190.91
	10. DATE STARTED: 08.04.92 @ 8:19
	11. DATE COMPLETED: 08.07.92 15:40
12. OVERBURDEN THICKNESS: 122.0	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS.
13. DEPTH DRILLED INTO ~~ROCK~~ bedrock: 2.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 124.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	N/A	MW-48~~B~~A	N/A	R. G. PACHECO.

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay (CL), hard, black, wet w/roots	HNu = BG			P	Boring advanced w/2" and 3" split barrel samples followed by a 4 3/4" drag bit. Sample taken w/3" spoon D#1 D=2' R=1.5'
	2	Becoming ~~Hard~~, light-brown					W/2" spoon
	3		HNu = BG			P	D#2 D=2' R=1.75'
	4						
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-48~~D~~A

131

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP | INSPECTOR R. G. PACHECO | SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same) Lean clay (CL), hard light-brown, wet	HN_u= BG			P	w/3" spoon D#3 D=2' R=2'
	6						w/2" spoon D#4 D=2' R=2'
	7		HN_u= BG			P	
	8	Becoming soft					w/3" spoon D#5 D=2' R=2'
	9		HN_u= BG			P	
	10	w/brown spots					w/2" spoon D#6 D=2' R=2'
	11		HN_u= BG			P	
	12	w/brown spots					w/3" spoon D#7 D=2' R=2'
	13		HN_u= BG			P	
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D A

1314

HTW DRILLING LOG

HOLE NO. MW-48A

Remedial Investigation, Mead NOP

INSPECTOR: [illegible]

SHEET 3 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	HNU SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	Lean clay (CL), soft, light-brown, wet					w/2" spoon D#8 D=2' R=2'
	15		HNU= BG			P	
	16						w/3" spoon D#9 D=2' R=2'
	17	Silt (ML) ~~soft~~ loose, light brown w/trace of fine sand	HNU= BG			P	
	18	Poorly graded sand (SP), loose, light-brown, very fine.					w/2" spoon D#10 D=2' R=0.5'
	19		HNU= BG			P	
	20	Becoming medium dense				12	w/3" spoon D#11 D=2' R=1.17
	21		HNU= BG			22 28 39	w/300# Hammer
	22	Becoming ~~loose~~ dense, fine	HNU= BG			11 18	
	23						

ICORPS/4-TB-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

131b

B07NE003702-05424

HTW DRILLING LOG

MW-48D A

Remedial Investigation, Mead NOP | INSPECTOR: R.G. PACHECO | SHEET 4 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	HNU SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same) Poorly graded sand (SP), ~~loose~~ dense, light-brown, fine				21 23	
	24	Fine w/trace of medium	HNu= BG			13 18	w/3" spoon D# 13 D= 2' R=1.33'
	25					21 23	
	26		HNu= BG			9 13	w/2" spoon D# 14 D= 2' R=0.83'
	27					18 20	
	28		HNu= BG			13 25	w/3" spoon D#15 D= 2' R=0.89'
	29					36 43	
	30	becoming, medium dense, Fine w/trace of medium	HNu= BG			9 14	w/2" spoon D# 16 D= 2' R=0.83'
	31					15 16	
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

1316

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP | NSPE: R. G. PACHECO | SHEET 5 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	~~(same)~~ Poorly graded sand (SP), ~~loose~~ light-brown, fine dense				11	w/3" spoon D#17 D=2' R=1.17
	33		HNu= BG			14 20 25	
	34	becoming medium dense				6	w/2" spoon D#18 D=2' R=1.04'
	35		HNu= BG			10 19 25	
	36					14	w/3" spoon D#19 D=2' R=1.5'
	37		HNu= BG			23 29 33	
	38	becoming dense, Fine w/some silt layers				8	w/2" spoon D#20 D=2' R=1.08'
	39		HNu= BG			17 28 37	
	40					18	w/3" spoon D#21 D=2' R=1.42'
	41					24	

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 131, MW-48DA

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP | INSPECTOR R.G. PACHECO | SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	(Same) Poorly graded sand (SP), ~~medium~~ dense, light brown, fine				26 30	
	42		HNu= BG			7 13 23 30	w/2" spoon D#22 D=2' R=1.33'
	43						
	44		HNu= BG			15 28 40 48	w/3" spoon D#23 D=2' R=1.42'
	45						
	46	becoming Fine w/trace of medium Sand	HNu= BG			12 22 35 63	w/2" spoon D#24 D=2' R=1.5'
	47						
	48	w/trace of medium Sand	HNu= BG			13 25 22 32	w/3" spoon D#25 D=2' R=1.67'
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-48DA

Remedial Investigation, Mead NOP | INSPECTOR R.G. PACHECO | SHEET 1 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(Same) Poorly graded Sand (SP), dense, light brown, fine w/trace of medium sand.				2	w/2" Spoon D#26
						5	D# 2'
	51		HNu=				R=0.83'
			BG			9	
						14	
	52						STOPPED 08.04.92
						21	STARTED 08.05.92 Sampling resumes with 2" & 3" split spoon and 300# hammer
						42	
	53		HNu=				
			BG			51	w/3" Spoon D#27
						42	D= 2' R=0.92'
	54					17	w/2" spoon D#28
						23	D=2'
			HNu=				R= 1.08'
	55		BG			27	
						34	
	56					15	w/3" spoon D#29
						21	D=2'
			HNu=				R=0.79'
	57		BG			25	
						19	
	58						w/2" spoon
			HNu=			2	D#30
			BG			4	D=2'
							R=0.92'
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP

NSPECTOR R.G. PARKES

SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Same) Poorly graded sand (SP), dense, light-brown, fine w/ trace of medium sand				9 13	
	60					19 40	w/3" spoon D#31 D=2' R=0.83'
	61	Becoming very dense	HNu= BG			88 100	
	62					4 10	w/2" spoon D#32 D=2' R=1.33'
	63		HNu= BG			24 42	
	64					25 25	w/3" spoon D#33 D=2' R=1.0'
	65		HNu= BG			31 49	
	66					6 8	w/2" spoon D#34 D=2' R=1.42'
	67		HNu= BG			14 22	
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D A

1320

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP | INSPECTOR: R. G. PACHELO | SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same) Poorly graded sand (SP), dense, light-brown fine w/trace of medium sand	HNu= BG			11 19 28 37	w/3" spoon D#35 D=2' R=0.92'
	70		HNu= BG			7 12 20 27	w/2" spoon D#36 D=2' R=1.33'
	72		HNu BG			19 39 50 40	w/3" spoon D#37 D=2' R=1.0'
	74		HNu= BG			4 6 13 14	w/2" spoon D#38 D=2' R=0.83'
	76	w/ trace of silt.				8 10	w/3" spoon D#39 D=2' R=1.25'
	77						

ENGINEER SHALLOW ... ENGINEERING INTERVAL IS 10.83'

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D A

HTW DRILLING LOG

MW-48DA

Remedial Investigation, Mead NOP | INSPECTOR: R. G. PACHECO | SHEET 5 OF 5 SHEETS 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(Same) Poorly graded sand (SP), dense, light-brown, fine w/trace of medium sand				11 23	
	78					9 21	w/2" spoon D#40 D=2' R=0.83'
	79		HNu= BG			29 28	
	80					30 70	w/3" spoon D#41 D=2' R=1.67'
	81	Becoming very dense	HNu= BG			240 305	
	82	w/iron staining w/traces of clay				4 7	w/2" spoon D#42 D=2' R=1.33'
	83		HNu= BG			27 44	
	84	w/trace of fine gravel (Top of Sand + gravel unit 84 ft)				30 58	w/3" spoon D#43 D=2' R=1.75'
	85		HNu= BG			85 85	
	86						

← SUGGESTED SHALLOW WELL SCREEN INTERVAL 73' TO 83' bgs →

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

132

HTW DRILLING LOG

HOLE NO. MW-48DA

Remedial Investigation, Mead NOP | INSPECTOR R. G. FAMIELO | SHEET 11 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	HNu SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	Poorly graded sand (SP), dense, light-brown, fine to medium w/iron staining.				6	w/2" spoon D#44
						7	D=2'
	87		HNu=				R=1.5'
			BG			22	
						34	
	88	w/orange spots				18	w/3" spoon D#45
							D=2'
	89		HNu=			27	R=1.0'
			BG			36	
						32	
	90	Well graded sand (SW), ~~loose~~ medium dense, light-brown, fine to coarse				6	w/2" spoon D#46
						9	D=2'
	91		HNu=				R=1.5'
			BG			14	
						19	
	92	w/trace of fine gravel				17	w/3" spoon D#47
						31	D=2'
	93		HNu=				R=1.58'
			BG			44	
						72.	
	94					42	w/2" spoon D#48
			HNu=				D=2'
			BG			52	R=2'
	95						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

HTW DRILLING LOG

HOLE NO. MW-48DA

Remedial Investigation, Mead NOP | INSPECTOR R. G. PACHELO | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	(Same) Well graded sand (SW) very dense light-brown fine to coarse, w/ trace of fine gravel				53 56	STOPPED 08.05.92
	96	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense to dense, lt yellowish brown, fine grained w/ layer (2-inch-thick) of coarse grained sand - fine gravel cemented w/ lean, yellow clay	HNU: BG (0.4 ppm)	N/A	N/A	N/A	Boring reamed to 96 ft depth w/ 7 7/8-inch-dia drag-bit Drilling resumed 8-6-92 11:45 w/ 94 mm Christensen sampler D # 49 P = 2.0 R = 0.5
	97						
	98		HNU: BG	N/A	N/A	N/A	50 lbs of bentonite added to drilling fluid D # 50 P = 2.0 R = 1.2
	99	w/ layer - 4-inch-thick of coarse grained sand - fine gravel cemented w/ lean, white, non-calcareous clay					
	100		HNU: BG	N/A	N/A	N/A	50 lbs of bentonite added to drilling mud D # 51 P = 2.0 R = 0.5
	101	Becoming mostly coarse grained w/ small lumps of lean light brown clay					
	102	w/ trace fine gravel w/ small lumps, seams and partings of lean light brown clay	HNU: BG	N/A	N/A	N/A	50 lbs of bentonite added to drilling mud D # 52 P = 2.0 R = ~~0.6~~ 0.8 Approx. 200 gals of water lost
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

1324

/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-48D A

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 1B OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	POORLY GRADED SAND (SP), loose, multi-colored, coarse grained and POORLY GRADED GRAVEL (GP), loose, multi-colored, fine w/trace coarse, well-rounded gravel, max. size 1.0 inch w/trace fine grained sand	HNU: BG	N/A	N/A	N/A	D # 53 P = ~~2.0~~ 1.0 R = 0.6
	105						100lbs of bentonite added to drilling mud. Interval 105-106 ft washed away
	106	w/trace of lean sandy clay - small, iron oxides stained lumps	HNU: BG	N/A	N/A	N/A	D # 54 P = 2.0 R = 0.6
	107	POORLY GRADED SAND AND POORLY GRADED GRAVEL WITH CLAY (SP-SC-GP-GC) loose to med. dense, multi-colored, coarse grained sand and fine gravel w/layers of fine grained sand cemented w/lean white, non-calcareous clay w/seams and partings of lean, dk gray clay w/little coarse, subangular gravel, max. size 1.3 inch					
	108		HNU: BG	N/A	N/A	N/A	D # 55 P = 2.0 R = 1.0
	109						
	110		HNU: BG	N/A	N/A	N/A	D # 56 P = 2.0 R = 0.3
	111	Max. size of coarse grave 1.5 inch.					
	112	w/layer - 4 inch-thick - of poorly graded, grayish yellow, fine grained sand	HNU: BG	N/A	N/A	N/A	D # 57 P = 2.0 R = 1.1
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-48D A

HTW DRILLING LOG

HOLE NO. MW-48D A

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: Gene Papinako

SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, coarse grained w/ separate layers cemented	HNU: BG	N/A	N/A	N/A	D # 57 P = 2.0 R = 1.1
	114	w/ lean, dk gray, earthy clay w/ little fine gravel — POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), dense, multi-colored, subrounded, fine	HNU: BG	N/A	N/A	N/A	D # 58 P = 2.0 R = 1.5
	115	w/ little coarse grained sand w/ trace coarse gravel. max. size 1.6 inch w/ separate layer - ¼ inch thick					
	116	cemented w/ lean, olive gray clay	HNU: BG	N/A	N/A	N/A	D # 59 P = 2.0 R = 1.0
	117	w/ thin beds cemented w/ lean, dk gray clay and lean, olive gray clay max. size of gravel 1.5 inch					50 lbs of bentonite added
	118	Becoming ~~clay~~ poorly graded clayey gravel with sand (GC) w/ limestone cobbles	HNU: BG	N/A	N/A	N/A	to drilling mud D # 60 P = 2.0 R = 0.8
	119						
	120	w/ little silt in fines	HNU: BG	N/A	N/A	N/A	D # 61 P = 2.0 R = 0.5
	121	w/ red and yellow iron oxides staining					
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D A

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ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-48DA

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	POORLY GRADED SAND WITH CLAY (SP-SC), dense, white, v. fine grained, micaceous w/seams and partings weakly cemented w/iron oxides w/trace of silt in fines w/layer - 3 inch - thick - of lean, dk yellow clay Becoming lt olive, weakly cemented [Omadi member]	HNU: 86	N/A	N/A	N/A	D # 62 P = 2.0 R = 1.7 Hole reamed with 7 7/8 in tricone to 122 ft B.O.B 124.0 ft
	123						
	124						Monitoring well installed upon completion
	125						
	126						
	127						
	128						Water loss in the screened interval ~ 250 gals
	129						
	130						
	131						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48DA

1327

REV. BY MEWILSON 7-2-92

HTW DRILLING LOG

HOLE NO. MW-53A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANY
SHEET 1 OF 2 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N. 563497 - E. 2850294
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER - DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 3/4 DRAG BIT; 3 IN / 2 IN SPLIT SPOON; 5 7/8 TRICONE BIT; 6 1/4 TRICONE BIT	8. HOLE LOCATION: ~~NE 1/4~~ SE NW NE SEC 21 T14N R9E / OLD LANDFILL
	9. SURFACE ELEVATION: ~~1148~~ 1134.02
	10. DATE STARTED: 6/28/92 / 0910
	11. DATE COMPLETED: 6/30/92 / 1205
12. OVERBURDEN THICKNESS: 99.9	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: 1.1	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 101.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
— NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring Installed well	NA	MW-53A	NA	LISA TRAVAGLIN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), FIRM, DARK BROWN, MOIST W/ ROOTLETS	HNu= BKG.			P	ADVANCED BORING W/ 4 3/4 DRAG BIT AND 3 IN SPLIT SPOON, heat quite slurry D#1 P=2.0' R=1.2'
	2		HNu= BKG.			P	2 IN SPOON D#2 P=2.0' R=1.2'
	4		HNu= BKG.			P	W/ 3 IN SPOON D#3 P=2.0' R=2.0'
	5	W/OUT ROOTLETS					

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: ~~B1~~ MW-53A

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HTW DRILLING LOG

HOLE NO. mw-53A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) (CL) LEAN CLAY, FIRM, DARK BROWN, MOIST, W/OUT ROOTLETS (LOESS)					
	6	BECOMING BROWN	HNU= BKG.			P	W/2 IN SPOON D#4 D=2.0' R=1.3' LOSING WATER DOWN HOLE. APPROX 2.5 GAL SO FAR
	7						
	8		HNU= BKG.			P	W/3 IN SPOON D#5 D=2.0' R=2.0'
	9	W/TRACE FINE SAND					
	10		HNU= BKG.			P	W/2 IN SPOON D#6 D=2.0' R=2.0'
	11	POORLY GRADED SAND (SP) LOOSE BROWN, MOIST, V. FINE grained (ALLUVIUM)					
	12	V. DENSE, BECOMING V. FINE grained W/TRACE MED.	HNU= BKG.			23 54 66 85	W/3 IN SPOON D#7 D=2.0' R=1.4' ADVANCED W/140lb HAMMER
	13	W/OUT MED grained					
	14						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-53A

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B07NE003702-05438

HTW DRILLING LOG

MW-53A

Remedial Investigation, Mead NOP | INSPECTOR: LAT | SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(GRAVEL) POORLY GRADED SAND (SP) ~~LOOSE~~ MED. DENSE, BROWN, FINE grained, MOIST				9 12 13 22	W/2 IN SPOON D#8 D=2.0' R=1.5' ADVANCING W/300 lb. HAMMER
	15	BECOMING LT. BROWN, W/ SOME VF FINE SAND	HNU= BG.				
	16	BECOMING DENSE, BROWN, FINE GRAINED W/ TRACE MED				14 25 37 40	W/3 IN SPOON D#9 D=2.0' R=1.4' MIXING MUD (50# AQUAGEL) DRILLING WATER GOING INTO HOLE NEAR SURFACE (~3')
	17	ALTERNATING LAYERS OF LT BROWN, V. FINE SAND (1.0 IN TO 2.0 IN) AND BROWN, FINE SAND (1.5 IN TO 2.0 IN) 17.0' TO 23.0'	HNU= BG.				
	18					9 14 18 19	W/2 IN SPOON D#10 D=2.0' R=1.1' LOST APPROX. 30 GAL INTO HOLE drilling water
	19		HNU= BG.				
	20					14 19 23 25	W/3 IN SPOON D#11 D=2.0' R=1.2'
	21		HNU= BG.				
	22					11 9 11 12	W/2 IN SPOON D#12 D=2.0' R=2.0'
	23		HNU= BG.				

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) ~~LOOSE~~ MED. DENSE, BROWN, FINE grained ONLY					
	24	BECOMING LT. BROWN, V. FINE, DRY					
	25	BECOMING BROWN, FINE, MOIST	HNU= BG.			7 9 10 12	W/3 IN SPOON D#13 D=2.0' R=1.0'
	26						
	27	BECOMING LT. BROWN, V. FINE grained ONLY	HNU= BG			4 6 11 15	W/2 IN SPOON D#14 D=2.0' R=1.4'
	28	BECOMING V. DENSE, V. FINE grained W/TRACE MED. MOIST					
	29		HNU= BG.			19 38 45 45	W/3 IN SPOON D#15 D=2.0' R=1.3' PUT 1/2 BAG AQUAGEL RIGHT INTO HOLE TO TRY TO SEAL OF UPPER FEW FT. WHERE WE ARE LOSING WATER. PUT 5 1/8 THICKNESS INTO GEL AND TURNED SWITCHING TO 140 lb. HAMMER
	30						
	31		HNU= BG.			6 10 10 12	W/3 IN SPOON D#16 D=2.0' R=0.7' SET PVC TEMP. CASING ~~DOWN~~ TO 9' TO KEEP FROM LOSING H2O. GAINED CIRCULATION BACK. LITTLE OR NO H2O LOSS. 300 lb HAMMER
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

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B07NE003702-05440

HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) MED. ~~LOOSE~~, BROWN, FINE, MOIST W/ TRACE MED GRAINED	DENSE,				
	42	BECOMING FINE, SOME MED AND TRACE GRAVEL (DENSE, GRAINED)	HNu= BG.			13 24 26 28	W/ 3 IN SPOON D#22 D=2.0' R=1.3'
	43						
	44		HNu= BG.			2 6 8 10	W/ 2 IN SPOON D#23 D=2.0' R=1.7'
	45						
	46	~~LEAD~~ (CL) CLAY, FIRM, TAN, MOIST	HNu= BG.			P	W/ 3 IN SPOON D#24 D=2.0' R=2.0'
	47	SILT ~~FIRM~~ (ML) LOOSE, GRAY, MOIST					
	48	W/ TRACE COARSE grained SAND	HNu= BG.			P	W/ 2 IN SPOON D#25 P=2.0' R=1.3'
	49	W/ IRON NODULES AND STAINING					
	50						STOPPED 6-28-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

ICORPS/4-15-92

HTW DRILLING LOG

MW-53A

Remedial Investigation, Mead NOP | INSPECTOR: LAT | SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(SAME) POORLY GRADED SAND (SP) LOOSE BROWN. FINE grained MOIST W/ TRACE MED.	HNu= BG.			2 4 6 8	W/2 INSPOON D#17 D=2.0' R=1.1' ADDITIONAL WATER LOST 20GAL MIXING MORE MUD ~~BAG~~ (50#)
	34	BECOMING V. FINE TO FINE GRAINED W/SOME MED.	HNu= BG.			5 5 5 5	W/3IN SPOON D#18 D=2.0' R=1.6'
	36	BECOMING MED. DENSE, FINE grained W/TRACE MED.	HNu= BG.			2 5 8 10	W/2IN SPOON D#19 D=2.0' R=1.4'
	38	BECOMING DENSE MED TO COARSE GRAINED W/SOME GRAVEL AND LITTLE FINES.	HNu= BG.			8 16 18 9	300LB HAMMER W/3IN SPOON D#20 D=2.0' R=1.1'
	39	BECOMING ORANGE/RED					
		BECOMING BROWN					
	40		HNu= BG.			5 7 12 15	W/2IN SPOON D#21 D=2.0' R=1.2'
	41						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

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HTW DRILLING LOG

MW-53A

Remedial Investigation, Mead NOP | INSPECTOR: LAT | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN (CL) CLAY, FIRM, BROWN, MOIST W/SOME V. FINE SAND AND IRON MOTTLING					RESUMED 6-29-92 REAMED DOWN TO 50.0' W/4 3/4 DIAG BIT
	51	POORLY GRADED ~~BECOMING~~ SAND (SP) ~~LOOSE~~ DENSE, VERY FINE GRAY, MOIST, W/TRACE SILT	HNu= BG.			22 30 32 45	D#26 D=2.0' R=1.5' ADVANCED W/3 IN SPLIT SPOON AND 300 lb HAMMER
	52						W/2 IN SPOON
	53		HNu= BG.	BAG SAMPLE #1		6 14 26 40	D#27 D=2.0 R=1.5' COLLECTED SAMPLE FOR SIEVE ANALYSIS 52-54 (A bag)
	54	BECOMING FINE GRAINED, BROWN	HNu= BG.			14 23 28 41	W/3 IN SPOON D#28 D=2.0' R=1.4'
	55	~~BECOMING~~ SILT (ML) ~~LOOSE~~ DENSE, GRAY, ~~SOFT~~ MOIST					
	56	POORLY GRADED SAND (SP), MED. DENSE, GRAY, ~~BECOMING~~, V. FINE, ~~SAND~~ W/CLAY MOIST	HNu= BG.			7 20 31 48	W/2 IN SPOON D#29 D=2.0' R=1.5'
	57	BECOMING FINE SAND, BROWN					
	58	W/TRACE MED.	HNu= BG.			27 43 79 87	W/3 IN SPOON D#30 D=2.0' R=1.6'
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1334 MW-53A

HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation Mead NOP

INSPECTOR LAT

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(GW) V. DENSE POORLY GRADED SAND (SP) ~~LOOSE~~, BROWN, V. FINE TO FINE MOIST, W/ TRACE MED					
	60	W/ GRAY LAMINATIONS	HNU= BG.			4 16 23 33	W/2 IN SPOON D# 31 D=2.0' R=1.7'
	61						
	62	BECOMING FINE-TO MED. W/ TRACE COARSE.	HNU= BG			14 31 34 41	W/3 IN SPOON D#32 D=2.0' R=1.2'
	63						
	64	~~BECOMING MED. DENSE~~	HNU= BG.			6 11 17 27	W/2 IN SPOON D#33 D=2.0' R=2.0'
	65						
	66	LEAN CLAY (CL) FIRM, BROWN W/ GRAY LAMINATIONS AND IRON STAINING					
		(ML) SILT, GRAY, ~~FIRM~~ LOOSE, MOIST W/ IRON NODULES	HNU= BG			P	W/3 IN SPOON D#34 D=2.0' R=2.0'
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

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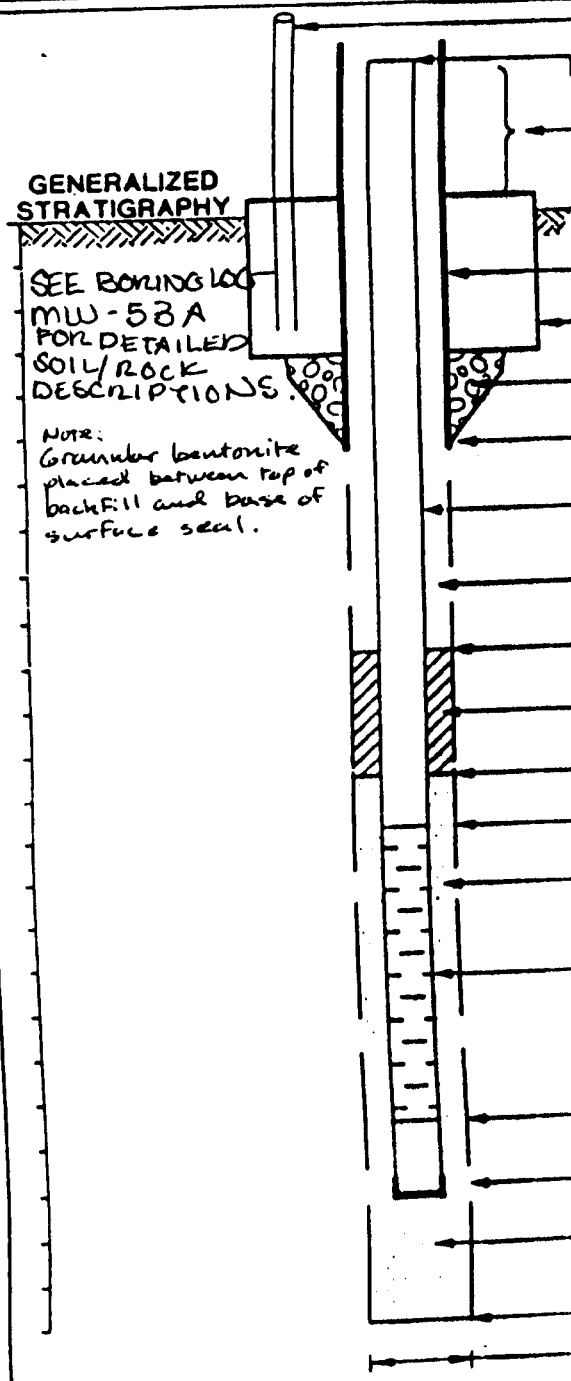
/CORPS/4-15-92

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD N.O.P.
Location: MEAD, NEBRASKA
Installed by: WINNEK COMPANY
Inspected by: LISA TRAVAGLIO (WCC)
Method of Installation: FILTER PACKED AND PURE GOLD GROUT PLACED THROUGH 1" TREMIE. 4 CENTRALIZERS @ 86' 66' 46' 36'
Remarks:

Monitor Well No. MW-53A
Project No. 92KW070
Date 6-30-92
Time 1000



Number / Type of Protective Post
Elevation of top of riser pipe
Height of riser above ground
Ground Elevation
I.D./Type of surface casing: 4IN x 4IN x 7FT STEEL
Dimen. / Type of Surface Pad: 3FT x 3FT x 4 IN
Type of surface seal
Depth of surface seal
I.D./Type of riser pipe: 2" DIA SCH 40, FLUSH JOINT
Depth to top of backfill
Type of backfill
Depth of top of seal: ~16.0 FT
Type of seal: PURE GOLD GROUT
Grout WT = 10.2 lb/GAL.
Depth of top of filter pack: 20-40 BUFFER SAND TO 85.1
Depth of top of screen: 87.0 FT
Type of filter pack: 4-8 SILICA SAND FROM 98.5' TO 84.4'
20-40 BUFFER SAND FROM 84.4' TO 83.1'
I.D./Type of screen: 2" SCH 40 MILL SLOT
Screen slot size: 0.020 IN
Depth of bottom of screen: 97.0 FT
Depth of bottom of plugged bank section: 97.5 FT
Type of backfill below monitoring well: 101.0' TO 95.5' BENT PELLETS / 4-8 SAND BEGINNING @ 98.5'
Depth of bottom of boring: 101.0'
Diameter of boring: 6"

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Woodward-Clyde Consultants

HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(GNME) (ML) LOOSE SILT, ~~FINE~~, GRAY, MOIST W/ IRON NODULES	HNu= BG.			P	W/2 IN SPLIT SPOON D #35 D = 2.0' R = 2.0'
	70						
	71		HNu= BG.			P	W/3 IN SPOON D#36 D = 2.0' R = 2.0'
	72						
	73	W/OUT IRON NODULES	HNu= BG.			P	W/2 IN SPOON D#37 D=2.0' R=2.0'
	74						
	75		HNu= BG.			P	W/3 IN SPOON D#38 D = 2.0' R = 2.0'
	76		HNu= BG.			P	W/2 IN SPOON D#39 D = 2.0' R = 2.0'
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 53A

HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) SILT (ML), LOOSE, GRAY, MOIST					
	78	BECOMING SILT W/ LITTLE SAND	HNu= BG.				W/ 3IN SPOON D#40 D=1.0' R=0.7'
	79	BECOMING SILT W/ LITTLE FINE SAND, ~~FIRM~~ MED. DENSE IRON MOTTLING	HNu= BG.			6 5 7 10	W/ 2IN SPOON D#41 D=2.0' R=2.0'
	80						
	81		HNu= BG.			PUSHED 6IN 17 24 62	W/ 3IN SPOON 300lb. HAMMER D#42 D=2.0' R=1.4'
	82	W/ SOME FINE SAND					
	83	POORLY GRADED SAND (SP); V. DENSE, ~~BECOMING~~ ORANGE FINE TO MED, ~~SAND~~ grained	HNu= BG.			14 30 42 36	W/ 2IN SPOON D#43 D=2.0' R=1.1'
	84	BECOMING MED TO COARSE W/ SOME ~~FINES~~ SILT, MULTI-COLORED					
	85	BECOMING FINE W/ LITTE MED. GRAINED	HNu= BG.			20 31 37 47	W/ 3IN SPOON D#44 D=2.0' R=1.6'
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-53A

ICORPS/4-15-92

133c

HTW DRILLING LOG

HOLE NO. mw-53A

Remedial Investigation Mead NOP

INSPECTOR LAT

SHEET 11 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		WELL ~~POORLY~~ GRADED SAND (SP), V. DENSE ~~LOOSE~~, MULTICOLORED BROWN, MOIST. ~~BECOMING MED.~~ FINE TO COARSE GRAINED W/SOME ~~FINES. SILT~~ FINE SAND (ALLUVIUM)					
	87						W/2 IN SPLIT SPOON
	88	W/TRACE GRAVEL	HNU= BG.			6 13 19 26	D#45 D=2.0' R=1.7'
	89						W/3 IN SPLIT SPOON
	90		HNU= BG.			9 15 24 37	D#46 D=2.0' R=0.0' CATCHER MESSED UP
	91						2 IN SPLIT SPOON
	92	BECOMING ORANGE, FINE	HNU= BG.			14 20 27 33	D#47 D=2.0' R=1.4' LOST 30GAL SO FALL FROM 83.0' TO 95.0'
	93						W/3 IN SPOON
	94		HNU= BG.			6 7 14 24	D#48 D=2.0' R=1.3'
		LEAN CLAY (CL), FIRM, BROWN, MOIST					
	95	POORLY SORTED SAND (SP), ~~LOOSE~~ MED. DENSE ORANGE, FINE TO MOIST, grained					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

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HTW DRILLING LOG

HOLE NO. MW-53A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
V. DENSE		POORLY GRADED SAND (SP) ~~LOOSE~~, MULTI COLORED BROWN, ~~MOIST~~ WET MED TO COARSE GRAINED		BAG SAMPLE #2		22 34 44 46	W/ 3 IN SPOON D#49 D=2.0' R=1.4' SAMPLE COLLECTED FOR SIEVE ANALYSIS LOST ANOTHER 25 GAL (95-97) drilling fluid
	96		HNU= BG.				
	97	BECOMING DARK BROWN	HNU= BG.			7 18 19 26	W/ 2 IN SPOON D#50 D=2.0' R=2.0'
	98	BECOMING ORANGE, FINE TO MED GRAINED					
	99		HNU= BG.			20 65 140 200	W/ 3 IN SPOON D#51 D=1.7 R=1.3
	100	SANDSTONE: ~~LOOSE~~ ~~ORANGE~~, ~~FINE~~ ~~MOIST~~ ~~POORLY GRADED~~, ORANGE, SOFT, FINE & WET GRAINED					STOPPED 6-29-92
	101	101.0					RESUMED 6-30-92 REAMED HOLE W/ 6 1/4 TRICONE ~~DOWN~~ TO 101.0' B.O.B 101.0' BACKFILLED WITH BENTONITE PELLETS FROM 101.0 TO 85.0 MW-53A BORING ~~UPON~~ COMPLETED ~~GET~~ AS MONITORING WELL
	102						
	103						TOTAL DRILLING WATER LOSS 130 GAL. (55 GAL IN SCREEN INTERVAL)
	104						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-53A

1340

REVIEWED BY MATT WILSON 7-1-92

HTW DRILLING LOG

HOLE NO. MW-54A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNER COMPANY
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N 564186 - E 2850294
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER - DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" SPLIT SPOON; 140/300lb HAMMER; 4 3/4 DRAG BIT; 5 7/8 TRICONE	8. HOLE LOCATION: NE 1/4 SEC 21 T14N R9E / LANDFILL
	9. SURFACE ELEVATION: 1119.31
	10. DATE STARTED: 6-26-92 / 0920
	11. DATE COMPLETED: 6-27-92 / 1645
12. OVERBURDEN THICKNESS: 81.5'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: 2.0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 83.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	X		

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW-54A		LISA TRAVAGLIN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) FIRM, DARK BROWN, MOIST W/ROOTLETS	HNu= BKG.			P	ADVANCED W/ 4 3/4 DRAG BIT AND 3IN SPLIT SPOON D#1 P=2.0' R=1.3'
	2		HNu= BKG.			P	W/2IN SPOON D#2 P=2.0' R=1.4'
	4		HNu= BKG.			P	W/3IN SPOON D#3 P=2.0' R=2.0'
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1

1341

B07NE003702-05450

HTW DRILLING LOG

HOLE NO. mw-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) (CL) LEAN CLAY, FIRM, DARK BROWN, MOIST, W/ ROOTLETS					
	6	W/OUT ROOTLETS	HNu= BKG.			P	W/2 IN SPOON D#4 D=2.0' R=1.2'
	7	BECOMING SANDY W/ TRACE MED.					
	8	POORLY GRADED SAND (SP), LOOSE ~~BECOMING~~ BROWN. ~~POORLY GRADED SAND~~, WET, FINE, W/ TRACE CLAY	HNu= BKG.			P	W/3 IN SPOON D#5 D=2.0' R=2.0'
	9						
	10		HNu= BKG.			P	W/2 IN SPOON D#6 D=2.0' R=1.3'
	11						
	12	LEAN CLAY (CL), ~~FIRM~~ SOFT, DARK BROWN WET, W/ TRACE FINE SAND, MOTTLED W/ IRON STAINING	HNu= BKG.			P	W/3 IN SPOON D#7 D=2.0' R=0.4'
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

1342

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	LEAN	(SAME) (CL) CLAY & SOFT, BROWN, WET W/ FINE SAND. TRACE					W/2 IN SPOON
	15		HNu= BKG.			P	D# 8 D = 2.0' R = 1.5'
	16						W/3 IN SPOON
	17		HNu= BKG.			P	D# 9 D = 2.0' R = 2.0'
	18	BECOMING DARK BROWN					W/2 IN SPOON
	19		HNu= BKG.			P	D# 10 R = 2.0' D = 2.0'
	20						W/2 IN SPOON
	21		HNu= BKG.			P	D# 11 D = 2.0' R = 2.0'
	22		HNu= BKG.			P	W/2 IN SPOON D# 12 D = 2.0' R = 1.0'
	23	BECOMING GRAY					

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP) DENSE ~~LOOSE~~ GRAY, FINE TO MED, WET W/ TRACE GRAVEL.					
	24						
	25		HNU= BKG.	BAG SAMPLE #1		8 5 5 5	W/3IN SPOON ADVANCING W/ 140 lb. HAMMER D#13 D=2.0' R=0.3' SAMPLE TAKEN FOR SEIVE ANALYSIS
	26	BECOMING FINE TO COARSE MULTICOLORED (RED, ORANGE, GRAY, BROWN)					
	LEAN	CLAY (CL) FIRM, GRAY, MOTTLED W/ IRON STAINING, W/ FINE SAND.	HNU= BKG.			8 24 28 14	W/2IN SPOON D#14 D=2.0' R=2.0' WATER LOSS ~40 GAL
	27	POORLY GRADED SAND (SP) TRACE ~~DENSE~~, ~~LOOSE~~, ~~GRAY~~ MULTICOLORED (RED, ORANGE, GRAY, BROWN), FINE TO MED, WET W/ TRACE GRAVEL					
	28	BECOMING FINE TO MED. W/TRACE COARSE SAND AND GRAVEL					
	29		HNU= BKG.			15 13 13 33	W/3IN SPOON D#15 D=2.0' R=1.3'
	LEAN	CLAY (CL) ~~W/ MOTTLE~~, FIRM, GRAY, W/ IRON STAINING. W/ TRACE V. FINE SAND					
		POORLY GRADED SAND, MED. DENSE ~~LOOSE~~, BROWN, V. FINE TO FINE W/ TRACE MED., WET.					
	30	BECOMING MED. TO COARSE MULTICOLORED, W/ TRACE GRAVEL	HNU= BKG.			13 14 18 23	W/2IN SPOON D#16 D=2.0' R=1.8'
	31	BECOMING FINE W/ TRACE MED GRAY					
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

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/CORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	POORLY GRADED SAND (SP), ~~DENSE~~ BROWN, FINE W/SOME MED. MOIST ~~POORLY GRADED~~ SAND (SP), DENSE ~~BECOMING~~ MED TO COARSE MULTICOLORED W/SOME GRAVEL. POORLY GRADED SAND (SP), DENSE ~~MULTICOLORED, M~~ BROWN, FINE W/SOME MED, MOIST	HNu= BKG.			17 42 85 163	W/3IN SPOON D#17 D=2.0' R=2.0'
BECOMING	34 35	COARSE SAND W/GRAVEL W/TRACE FINES, ~~WET~~, WET ~~LOOSE~~ BECOMING FINE W/SOME MED, MOIST	HNu= BKG			28 69 88 49	W/3IN SPOON D#18 D=2.0' R=1.2' MIXING 1 BAG AQUAGEL INTO DRILLING MUD.
BECOMING	36 37	COARSE TO MED SAND BECOMING FINE W/SOME MEDIUM	HNu= BKG.			14 22 28 51	W/2IN SPOON D#19 D=2.0' R=1.7'
	38 39	W/TRACE MED.	HNu= BKG.			20 56 80 56	W/3IN SPOON D#20 D=2.0' R=0.5'
	40 41		HNu= BKG.			13 10 14 50	W/2IN SPOON D#21 D=2.0' R=0.8'

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 6 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	LEAN	(CL) FIRM CLAY, ~~STIFF~~, BROWN W/ FINE SAND					
	42	POORLY GRADED ~~BECOMING FINE SAND (SP) DENSE~~ FINE SLIGHTLY CEMENTED, BROWN W/SOME CLAY	HNu= BKG.			9 22 34 38	W/3IN SPOON D#22 D=2.0' R=1.0' WATER LOSS TO DATE = ~20GAL.
	43	BECOMING COARSE, LOOSE, WET, MULTICOLORED, W/ GRAVEL AND BOUND W/ CLAY					
	44	LEAN (ML) SILT DENSE, ~~BECOMING~~ LT. BROWN ~~SILT~~ W/ BLACK LAMINATIONS AND GRAVEL @ 43.2' AND IRON NODULES	HNu= BKG.			8 24 32 36	W/2IN SPOON D#23 D=2.0' R=1.0'
	45	W/IRON LAMINATIONS W/OUT BLACK					
	46		HNu= BKG.			P	W/3IN SPOON PUSHED SAMPLE D#24 P=2.0' R=0.0.
	47						
	48		HNu= BKG.			P	W/2IN SPOON D#25 P=2.0' R=0.3' PUSHED SAMPLE
	49						
	50	~~BECOMING MORE~~ LEAN CLAY (CL) FIRM, LT BROWN W/OUT LAMINATIONS					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

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HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY ~~SORTED~~ GRADED SAND (SP) LOOSE, BROWN, MOIST W/SILT FINE				(140 lb) 100 (300 lb)	W/3 IN SPLIT SPOON D#26 D=2.0' R=1.9' ADVANCING SPLIT AND 140 lb. HAMMER THEN 300 lb. WATER LOSS TO DATE = 300 GAL
LETH	51	SILT (ML), LT. BROWN, FINE MOIST, W/ LARGE ~~SHOX~~ SLOUX QUARTZITE GRAVEL (3")	HNu= BKG.			16 19 21	
	52						W/2 IN SPOON D#27 D=2.0' R=1.3'
	53	~~BECOMING LT. BROWN~~	HNu= BKG.			6 7 9 15	
	54	W/LARGE GRAVEL AND COARSE SAND					W/3 IN SPOON D#28 D=2.0' R=1.8'
WITH		1" FINE SAND, BROWN W/TRACE MED.	HNu= BKG.			6 10 21 22	
	55	~~BECOMING~~ POORLY GRADED SAND (SP), LOOSE, MOIST, ORANGE FINE TO MED					
	56	BECOMING LT. BROWN W/TRACE COARSE BECOMING BROWN	HNu= BKG.			5 16 33 42	W/2 IN SPOON SWITCHED TO 140 lb HAMMER D#29 D=2.0' R=1.1'
	57						
	58		HNu= BKG.			32 56 130 120	W/3 IN SPOON D#30 D=2.0' R=1.5
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

HTW DRILLING LOG

HOLE NO. MW-5A-A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) (SP) DENSE POORLY GRADED SAND, ~~LOOSE~~, BROWN, FINE W/TRACE MED. MOIST.					
	60						
	61		HNU= BKG.			8 7 31 42	W/2IN SPOON D#31 D=2.0' R=1.0'
	62						STOPPED 6-26-92 RESUMED 6-27-92
	63		HNU= BKG.				
	64						
	65	WITH 1" APPROX GRAVEL BOUND W/ FINES AND CLAY BECOMING ~~POORLY SORTED SAND, LOOSE~~, ORANGE/BROWN	HNU= BKG.			50 60 60 50	W/3IN SPLITSPOON D#32 D=2.0' R=1.2'
	66	BECOMING ORANGE W/TRACE GRAVEL					
	67	BECOMING MED SAND, W/SOME COARSE.	HNU= BKG.			20 35 42 39	W/2IN SPOON D#33 D=2.0' R=1.6'
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-5A-A

HTW DRILLING LOG

HOLE NO. MW-54A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	69	(SAME) (SP) POORLY GRADED SANDY, LOOSE ORANGE/BROWN, MED TO COARSE, W/SOME FINES, MOIST W/GRAVEL FINE	HNU= BKG.			10 49 55 65	W/3IN SPOON D#34 D=2.0' R=0.5'
	70						
	71		HNU= BKG.			8 18 38 16	W/2IN SPOON D#35 D=2.0' R=0.8
	72	W/OUT GRAVEL BECOMING FINE TO MED. W/TRACE COARSE. BECOMING FINE, BROWN					
	73	2" COARSE SAND AND FINE GRAVEL BOUND BY FINES, MULTI COLORED (RED, ORANGE, BROWN), MOIST	HNU= BKG.	BAG SAMPLE #2		40 65 73 60	W/3 IN SPOON D#36 D=2.0' R=1.2
	74						
	75	BECOMING FINE, BROWN W/TRACE COARSE AND MED.	HNU= BKG.			8 13 20 34	W/2 IN SPOON D#37 D=2.0' R=0.9'
	76	BECOMING MED W/FINE					
	77	SILT(ML) ~~DENSE~~ MOIST W/LARGE GRAVEL (~~QUARTZITE~~ SIOUX)	HNU= BKG.			40 100 92 44	W/3IN SPOON D#38 D=2.0' R=1.3'

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-54A

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/CORPS/4-15-92

B07NE003702-05458

HTW DRILLING LOG

HOLE NO. mw-54A

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP) LOOSE, ORANGE/BROWN, MED W/ SOME FINES.					
	78	BECOMING ORANGE W/ 2" STRONGLY CEMENTED RED SANDSTONE					W/2IN SPLIT SPOON D# 39 D= 2.0' R= 1.7'
	79		HNU= BKG.			30 30 70 80	1045 BEGIN REAMING W/5 7/8 TRICONE TO 80.0' ADVANCING BEYOND 80.0' CONTINUE SPLIT SPOONING.
		FAT CLAY (CH), FIRM, BROWN, W/ BLACK LAMINATIONS					
	80	POORLY GRADED GRAVEL (GP), DENSE, BROWN FINE W/ SOME COARSE SAND, BOUND W/ CLAY					W/3IN SPLITSPOON D#40 D=2.0' R=2.0'
	81		HNU= BKG.			6 71 85 150	
		SANDSTONE: ORANGE/TAN, ~~LOOSE~~ 50 FT, FINE moist, (OMADI) POORLY CEMENTED					
	82		HNU= BKG.			50 140 270	W/2IN SPLIT SPOON D# 41 D=1.5' R=1.3'
	83						
	84						B.O.B. 83.5' BORING COMPLETED AS MONITORING WELL 6-27-92 WATER LOST IN SCREEN INTERVAL = 35GAL
	85						
	86						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: mw-54A

1350

CEH 7/9/92

REVIEWED BY MR. WILSON

HTW DRILLING LOG

HOLE NO. MW-55A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEF COMPANY
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.563703 - E.2850533
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER - DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 3/4 DRAG BIT; 2 IN / 3 IN SPLIT SPOONS; 7 7/8 IN TRICONE; 5 7/8 in Tricone	8. HOLE LOCATION: (Landfill) SW NE NE, sec 21, T14N, R9E
	9. SURFACE ELEVATION: ~~1128~~ 1124.12
	10. DATE STARTED: 7-1-92 / 0920
	11. DATE COMPLETED: 7/7/92 @ 1125
12. OVERBURDEN THICKNESS: 85 ft	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: 2 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 87 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	✓		NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
monitoring well installed ~~upon completion of hole~~	NA	MW-55A	NA	LISA CHAVASLIN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) FIRM, BROWN, MOIST, W/ ROOTLETS (Loess)	HNU= BG.			P	ADVANCED BORING W/ 4 3/4 DRAG BIT AND ADD WATER; 3 IN SPLIT SPOON; D#1; D=2.0'; R=2.0'
	1						
	2		HNU= BG.			P	W/ 2 IN SPOON; D#2; D=2.0'; R=1.9'
	3						
	4	BECOMING SOFT W/OUT ROOTLETS	HNU= BG.			P	W/ 3 IN SPOON; D#3; D=2.0; R=1.7'
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-55A B1

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B07NE003702-05460

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 2 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	POORLY GRADED SAND (SP) LOOSE, BROWN (MOIST) V. FINE (grained)					
	7	BECOMING LT. BROWN, DRY	HNU= BG.			D	W/2IN SPOON D#4 D=2.0' R=0.9
	8						W/3IN SPOON
	9		HNU= BG.			D	D#5 D=2.0' R=0.0'
	10	~~MED.~~ DENSE, BECOMING DARK BROWN FINE W/ TRACE MED. MOIST (GRAINED)				12 17 23 23	W/2IN SPOON D#6 D=2.0' R=1.6'
	11	BECOMING LT. BROWN, V. FINE GRAINED	HNU= BG.				ADVANCED W/ 140lb. HAMMER
	12			#1		12 23 31 37	W/3IN SPOON D#7 D=2.0' R=0.9'
	13	BECOMING V. FINE TO FINE GRAINED	HNU= BG.	bag sample			sample collected for sieve analysis 12'-14' bag
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A 1352

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 3 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) DENSE ~~LOOSE~~ LT BROWN MOIST V. FINE TO FINE GRAINED		~~1~~ ~~bag~~ ~~Sample~~		10 15 29 38	W/2 IN SPOON D#8 D=2.0' R=1.8'
	15	BECOMING LT. BROWN	HNU= BG				
	16	BECOMING FINE GRAINED W/TRACE MED.					
						11 29 29 31	W/3 IN SPOON D#9 D=2.0' R=1.3'
	17	W/LITTLE GRAVEL AND TRACE COARSE SAND	HNU= BG.				1030 Added ~~MIXING MUD 2 BAGS~~ AQUAGEL 100#
	18	W/OUT GRAVEL					
						5 15 29 43	W/2 IN SPOON D#10 D=2.0' R=1.5'
	19		HNU= BG.				
	20	BECOMING FINE SAND W/TRACE COARSE AND MED.					W/3 IN SPOON
			HNU= BG.			33 52 41 26	D#11 D=2.0' R=1.4'
	21	BECOMING MED TO COARSE GRAINED W/LITTLE ~~FINES~~ SILT, MULTICOLORED MED					
	22	BECOMING V. FINE GRAINED W/SOME MED.	HNU= BG.			8 13 31 28	W/2 IN SPOON D#12 D=2.0' R=2.0'
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 4 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DENSE ~~LOOSE~~, POORLY GRADED SAND (SP) MULTICOLORED RED, MOIST, MED TO COARSE GRAINED W/ LITTLE ~~FINES~~ SILT					
	24	W/TRACE GRAVEL	HNU= BG.			8 13 15 12	W/3 IN SPOON D#13 D=2.0' R=0.5 25 GAL WATER LOST
	26		HNU= BG.			9 16 18 27	W/2 IN SPOON D#14 D=2.0' R=2.0'
	28		HNU=				No sample from ~~W/ LOST~~ 28.0' TO 30.0' REAMED DOWN TO 30.0'
	30	BECOMING MED TO COARSE GRAINED W/SOME ~~FINES~~ SILT	HNU= BG.			15 35 51 61	W/ 3IN SPOON D #15 D = 2.0' R = 1.2' ADDED ~~MIXING WITH MUD~~ (~~1 BAG~~ 50# AQUAGEL)
	31	BECOMING V. FINE TO FINE GRAINED W/TRACE MED.					
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

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ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 5 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP) DENSE ~~LOOSE~~, MULTI, RED, MED TO COARSE GRAINED W/ LITTLE FINES MOIST					W/ 2 IN SPOON D#17 D = 2.0' R = 2.0'
	33	BECOMING FINE GRAINED W/ TRACE MED.	HNU= BG.			20 18 32 42	ADDED 50# ~~MIXING~~ ~~BAG~~ AQUAGEL
	34						W/ 3 IN SPOON D#18 D = 2.0' R = 1.0'
	35	LEAN CLAY (CL) FIRM, BROWN MOIST, W/ IRON STAINING	HNU= BG			46 68 72 145	
	36	W/ WELL CEMENTED RED/BLACK SANDSTONE ~~PIECE~~ (2") ROCK FRAGMENT					LOST INTERVAL DUE TO REAMING W/ 7 7/8 TRICONE TO SET TEMP. PVC CASING ~~TO KEEP HOLE OPEN~~ WATER LOST DURING REAMING = 50 GALS. to 38'
	37		HNU= BG				
	38						STOPPED 7/1/92. RESUMED 7/2/92 REAMED HOLE W/ 4 3/4 DRAG BIT WASHING UP GRAVEL
	39	POORLY GRADED ~~SAND~~ (SP) DENSE ~~LOOSE~~, BROWN FINE GRAINED W/ TRACE MED, MOIST.	HNU= BG			18 41 38 48	D#20 D = 2.0' R = 0.7 ~~ADVANCED W/ 140 lb HAMMER 9 41 ft lb~~ Began ~~9 STRIKES~~ 300 lb Hammer at 41'
	40		HNU= BG			34 84) 140 lb Hammer 18 14) 300	REAMED HOLE TO 40.0' D#21 D = 2.0' R = 0.0' GETTING GRAVEL
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 6 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) ~~LOOSE~~ DENSE BROWN, FINE GRAINED W/ TRACE MED, MOIST					
	42	~~BECOMING~~ WITH SAND (ML) SILT SOFT, GRAINED W/ FINE SAND, IRON MOTTLING					W/3IN SPOON D#22 D=2.0' R=2.0'
	43		HNu= BG.			P	
		W/OUT IRON MOTTLING					
	44						W/2IN SPOON D#23 D=2.0' R=1.5
	45		HNu= BG			P	
	46						W/3IN SPOON D#24 D=2.0' R=1.3'
		POORLY GRADED SAND (SP) ~~LOOSE~~ DENSE, BROWN W/ ORANGE MOTTLING, FINE GRAINED, MOIST				20 31 41 54	
	47		HNu= BG.				
	48	BECOMING FINE GRAINED W/ TRACE MED.				8 12 16 24	W/2IN SPOON D#25 D=2.0' R=1.6'
	49		HNu= BG				
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

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/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-55A

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	SILT (ML) MED. DENSE, ~~FIRM~~, BROWN, MOIST W/ IRON MOTTLING AND CONCRETIONS	HNU= BG.			7 9 14 17	W/3IN SPOON D#26 D=2.0' R=2.0'
		W/BLACK MOTTLING					
	52						
	53		HNU= BG.			P	W/2 IN SPOON D#27 D=2.0' R=2.0'
	54						
	55		HNU= BG.			P	W/3IN SPOON D#28 D=2.0' R=2.0'
	56	~~BECOMING V. FINE SAND~~ POORLY GRADED SAND (SP) LOOSE, BROWN, V. FINE, GRAINED, MOIST					W/2 IN SPOON D#29 D=2.0' R=1.4'
	57		HNU= BG			P	
	58	BECOMING DENSE	HNU= BG			18 15 15 13	W/3IN SPOON D#30 D=2.0' R=1.6' W/300 lb HAMMER
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

HTW DRILLING LOG

MW-55A

Remedial Investigation Mead NOP | INSPECTOR LAT (0-66') BAH (66-68') | SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(SAME)~~ POORLY GRADED SAND (SP) DENSE ~~LOOSE~~ BROWN, MOIST V. FINE TO FINE GRAINED W/ FEW SILT.					
	60						W/2IN SPOON
	61	BECOMING FINE GRAINED W/ TRACE MED.	HNU= BG			8 15 22 24	D#31 D=2.0' R=1.4'
	62						W/3IN SPOON
	63	BECOMING FINE TO MED. GRAINED	HNU= BG.			15 27 33 43	D#32 D=2.0' R=1.4'
	64						W/2.IN SPOON
	65	W/ TRACE COARSE GRAINED SAND	HNU= BG			8 14 22 26	D#33 D=2.0' R=1.60'
	66						STOPPED 7-2-92
	67		HNU= BG			6 22 36 19	resumed drilling 7-7-92 @ 0850 w/ 3" spoon D#34 D=2.0' R=1.5'
dense	68	~~[illegible]~~ SILT (ML) ~~[illegible]~~ to ~~[illegible]~~, grey, moist w/ ~~occasional~~ FEW coarse sand to fine gravel (alluvium)					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

/CORPS/4-15-92

HTW DRILLING LOG

MW-55A

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP) ~~loose to medium~~ DENSE ~~tan~~ gray, wet, medium to coarse ~~grained~~ sand w/ few ~~fine grained sand~~ (alluvium)	Hnu= B4			3 6 16 27	w/ 2" spoon D# = 35 D = 2.0' R = 1.8'
	69						
	70	~~been~~ WITH 4" thick SILT seam w/ ~~occasional~~ few coarse grained sand	Hnu= B4			13 17 28 48	w/ 3" spoon D# = 36 D = 2.0' R = 1.3'
	71	becoming very fine to fine ~~grained~~ sand					
	72	becoming fine to medium ~~grained~~ sand w/ ~~occasional~~ trace coarse ~~grained~~ sand to fine ~~grained~~ gravel, varicolored staining orang – red 1-2" bands	Hnu= B4			3 5 15 27	w/ 2" spoon D# = 37 D = 2.0' R = 1.9'
	73						
	74	becoming dense coarse ~~grained~~ sand w/ ~~occasional~~ few medium ~~grained~~ sand and fine ~~grained~~ gravel	Hnu= B4			16 31 25 40	w/ 3" spoon D# = 38 D = 2.0' R = 1.8'
	75	becoming very fine to fine ~~grained~~ sand w/ varicolored banding					
	76		Hnu= B4			2 17 18 21	w/ 2" spoon D# = 39 D = 2.0' R = 1.9'
	77						

Filter pack 4 to 20 slot screen

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-55A

HTW DRILLING LOG

MW-55A

Remedial Investigation, Mead NOP | INSPECTOR: R. Hedenkamp | SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) DENSE, TAN, RED, V. FINE TO FINE becoming medium ~~grained~~ sand					Boring reamed to 5 7/8 in from 38 to 87 ft bgs
	78	~~becoming~~ w/ trace coarse ~~grained~~ sand and fine gravel and ~~few~~ trace ~~occasional~~ cobble	Hnu= 84			15 19 20 11	w/ 3" spoon D# = 40 D = 2.0' R = 1.0'
	79						
	80	w/ 4" grey ~~clay~~ SILT seam	Hnu= 84			2 3 10 15	w/ 2" spoon D# = 41 D = 2.0' R = 1.8'
	81						
							sample collected @ 82-84 ft bgs for sieve analysis
	82	becoming medium ~~grained~~ sand w/ few fine ~~grained~~ sand and ~~occasional~~ few coarse ~~grained~~ sand to ~~coarse~~ coarse ~~grained~~ gravel	Hnu= 84	2 bag sample		11 21 24 19	w/ 3" spoon D# = 42 D = 2.0' R = 1.0'
	83						
	84	~~becoming dense to very dense, lt yellow very fine to fine grained sand~~ SANDSTONE: soft, lt. yellow, v. fine to fine, ~~poorly~~ weakly cemented, very weathered.	Hnu= 84			7 41 160 NA	w/ 2" spoon D# = 43 D = ~~2.0~~ 1.5' R = 1.5' No sample 85.5-86 ~~bad~~
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1361 MW-55A 1360

ICORPS/4-15-92

HTW DRILLING LOG

Remedial Investigation, Mead NOP | INSPECTOR: R. Hedenkamp | HOLE NO. MW-55A | SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) DENSE, TAN, RED, V. FINE TO FINE becoming medium ~~grained~~ sand					Boring reamed to 5 7/8 in from 38 to 87 ft bgs
	78	~~becoming~~ w/ trace coarse ~~grained~~ sand and fine gravel and ~~few~~ trace ~~occasional~~ cobble	HNu= B4			15 19 20 11	w/ 3" spoon D# = 40 D = 2.0' R = 1.0'
	79						
	80						
	81	w/ 4" gray ~~[illegible]~~ SILT seam	HNu= B4			2 3 10 15	w/ 2" spoon D# = 41 D = 2.0' R = 1.8'
	82	becoming medium ~~grained~~ sand w/ few ~~grained~~ sand and ~~occasional~~ few coarse ~~grained~~ sand to ~~coarse~~ coarse ~~grained~~ gravel	HNu= B4	2 bag sample		11 21 24 19	sample collected @ 82-84 ft bgs for sieve analysis w/ 3" spoon D# = 42 D = 2.0' R = 1.0'
	83						
	84						
	85	~~becoming dense to very dense, lt yellow very fine to fine grained sand~~ SANDSTONE: soft, lt. yellow, v. fine to fine, ~~poorly~~ weakly cemented, very weathered.	HNu= B4			7 41 160 NA	w/ 2" spoon D# = 43 D = ~~2.0~~ 1.5' R = 1.5' No sample 85.5-86 ~~[illegible]~~
	86						

/CORPS/4-18-82 | PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: 1361 MW-55A 3601

HTW DRILLING LOG

MW-55A

Remedial Investigation Mead NOP | INSPECTOR B. Hedenkamp | SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	(Same) ~~POORLY GRADED SAND (SP), very dense, lt yellow, very fine to fine grained sand~~ (~~alluvium~~) ~~Omadi~~				56 350	w/ 5" sampler D* = 44 D = 1.0' R = 1.0'
	87	SANDSTONE: soft, lt yellow, weakly cemented, (v. fine to fine) grained very weathered					Boring complete to 87 ft 7/7/92 @ 1125
	88	[Omadi Member]					Monitoring well MW-55A installed upon boring completion
	89						Total water loss during drilling is ~ 150 gallons
	90						total water loss over the screen interval from 74 to 84 ft is ~ 20 gals
	91						
	92						
	93						
	94						
	95						

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/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-55A

cbh 7/11/92

HTW DRILLING LOG

HOLE NO. MW-56A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Company
	SHEET 1 OF 10 SHEETS
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bob Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner-Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2 in/3 in split spoon; 4 3/4 in dry bit; 5 7/8 in tri cone bit; 7 7/8 in tricone bit	8. HOLE LOCATION: Landfill - N.563541 - E.2850602
	9. SURFACE ELEVATION: 1123.77
	10. DATE STARTED: 7/8/92 @ 1005 — 11. DATE COMPLETED: 7/9/92 @ 12:20
12. OVERBURDEN THICKNESS: 81.0 ft	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 0.5 ft ~~1.0 ft~~	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 81.5 ft ~~82.0 ft~~	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	N/A	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	N/A	N/A	N/A	N/A	N/A	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	N/A	MW-56A	N/A	Bret A Hedenkop

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	[redacted] CLAY (CL) [redacted], dk brown-black, trace very fine sand, moist w/ roots (loess)	medium; HNu = 0.4			P	boring advanced with ~~2 & 3 in split spoons and~~ 4 3/4 in dry bit ~~and~~ drilling fluid; D# = 1 3 in split spoon; D = 2.0 ft; R = 1.8 ft
	1						
	2		NS			P	D# = 2 2 in split spoon; D = 2.0 ft; R = 0 ft
	3						
	4	4.0 POORLY GRADED SAND (SP), loose ~~soft~~, tan, very fine to fine sand, trace of fines (alluvium)	HNu = 0.4			P	D# = 3 3 in split spoon; D = 2.0 ft; R = 1.0 ft
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 136: MW-56A

B07NE003702-05472

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same) POORLY GRADED SAND (SP), medium dense, tan, very fine to fine sand w/ ~~trace of clay~~ ~~little fines~~ silt in fines (alluvium)					
	6						2in split spoon
		becoming w/out fines, with trace of medium sand	Hmu= B4			P	D# = 4 D = 2.0 ft R = 1.0 ft begin using 300# hammer @ 8' bgs
	7						
	8	becoming dense					
						14	3in split spoon D#=5
	9		Hmu= B4			14 19	D=2.0 ft R=1.0 ft
						22	
	10						
		becoming tan-grey				7	2in split spoon D#=6
	11		Hmu= B4			10 13	D=2.0 ft R=1.5 ft
						28	
	12					7	3in split spoon D#= 7
			Hmu= B4			15	D= 2.0 ft R= 1.2 ft
	13					18	
						21	
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1364 MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 3 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same) POORLY GRADED SAND (SP), medium dense, tan-grey, very fine to fine sand w/ trace of med-coarse sand (alluvium)	Hmu= B4			8, 14, 20, 25	2 in spoons D# = 8 D = 2.0 ft R = 2.0 ft ~50# of aquagel added @ 16 ft
	15						
	16	with 4 in med-coarse sand seam	Hmu= B4			8, 12, 12, 15	3 in spoons D# = 9 D = 2.0 ft R = 1.2 ft
	17						
	18		Hmu= B4			6, 9, 15, 17	2 in spoons D# = 10 D = 2.0 ft R = 1.2 ft
	19						
	20		Hmu= B4			10, 11, 21, 21	3 in spoons D# = 11 D = 2.0 ft R = 1.6 ft
	21						
	22	v. fine to fine becoming with few medium sand	Hmu= B4			6, 8, 10, 12	2 in spoons D# = 12 D = 2.0 ft R = 1.4 ft
	23						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 4 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same) POORLY GRADED SAND (SP), medium dark tan-grey, very fine to fine sand w/ few medium sand (alluvium)					
	24		Hum= B4			11 17 23 26	3in spoon D# = 13 D = 2.0 ft R = 1.4 ft
	25						
	26		Hum= B4			8 10 17 20	2in spoon D# = 14 D = 2.0 ft R = 1.9 ft
	27	w/ 3in medium to coarse sand seam					
	28		Hum= B4			13 20 31 30	3in spoon D# = 15 D = 2.0 ft R = 1.8 ft
	29	becoming very fine to fine w/ few medium to coarse sand and w/ a trace of fine gravel					
	30		Hum= B4			5 7 9 11	2in spoon D# = 16 D = 2.0 ft R = 1.8 ft
	31	becoming very fine to fine w/ some medium to coarse sand and w/ few fine gravel					
	31.5	POORLY GRADED SAND with CLAY (SP-SC), medium dark tannish-grey, v. fine to fine sand (alluvium)					
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

ICORPS/4-15-92

1360

HTW DRILLING LOG

MW-56A

Remedial Investigation Mead VOP | INSPECTOR B. Hedenkamp | SHEET 5 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same) POORLY GRADED SAND with CLAY (SP-SC) medium dense, tannish grey, very fine to fine sand (alluvium)	Hnu= B4			5 16 21 33	3in spoon D#=17 D=2.0 ft R=2.0 ft
	33						
	34		Hnu= B4			7 14 22 28	2in spoon D#=18 D=2.0ft R=1.8 ft
	35	35.5 POORLY GRADED SAND (SP) medium dense tannish-grey, very fine to fine sand w/ trace of median sand (alluvium)					Sample collected 36-38 ft for sieve analysis
	36		Hnu= B4	#1 Bag Sample		7 23 28 43	3in spoon D#=19 D=2.0ft R=1.8 ft added 1-50# bag aqua gel @ 36 ft and ~50 gallons
	37	becoming dense w/ trace of ~~fines~~ silt					
	38		Hnu= B4			16 17 22 32	2in spoon D#=20 D=2.0ft R=1.0 ft
	39	with sand 39.5 SILTY (ML), medium-dense tan, with some v. fine sand (alluvium)					
	40	41.0	Hnu= B4			7 9 31	3in spoon D#=21 D=2.0ft R=2.0 ft
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF 18 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP) medium ~~dark~~ tan w/ varicolored red & orange bands, fine ~~sand~~ w/ some medium to coarse ~~sand~~ and trace fine stone gravel (alluvium)					
	42		Hmu= B4			7 10 21 28	w/ 2in spoon D# = 22 D = 2.0 ft R = 2.0 ft
	43						
	44		Hmu= B4			20 28 21 16	3in spoon D# = 23 D = 2.0 ft R = 1.0 ft
	45	Becoming Fine sand w/ a few fine to coarse gravel and trace of fines					
	46	46.0 SILT (ML), medium ~~dark~~ gray w/ trace fine gravel	Hmu= B4			3 7 18 24	2in. spoon D# = 24 D = 2.0 ft R = 1.4 ft
	47						
	48	~~Becoming~~ SILT w/ little very fine sand	Hmu= B4			[illegible] P	3in spoon D# = 25 D = 2.0 ft R = 2.0 ft
	49						
	50						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 7 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(same) SILT (ML), medium grey, w/ little very fine sand ~~and~~ ~~[illegible]~~ (alluvium)	Hmu = B4			P	w/ 2in spoon D# = 26 D = 2.0 ft R = 2.0 ft
	51						
	52		Hmu = B4			P	w/ 3 in spoon D# = 27 D = 2.0 ft R = 1.5 ft
	53						
	54		Hmu = B4			P	w/ 2in spoon D# = 28 D = 2.0 ft R = 1.8 ft
	55	~~becoming~~ SILT with a few very fine grained sand					stopped drilling @ 56 ft 1700 on 7/8/92
	56		Hmu = B4			P	resume drilling @ 0720 on 7/9/92 w/ 3" spoon D# = 29 D = 2.0 ft R = 2.0 ft
	57						
	58		Hmu = B4				w/ 2in spoon D# = 30 D = 2.0 ft R = 1.6 ft
	59						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Helen Kamp | SHEET 8 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Some) SILT (ML) medium dark gray, w/ a trace of very fine sand (alluvium)					
	60					15	w/ 3in spoon D# = 31
		60.5 POORLY GRADED SAND (SP), v. dense, tan-gray, very fine to fine ~~sand~~ with trace of medium (alluvium)	Hm= B4			42 40 63	D = 2.0 ft R = 1.8 ft
	61						
	62						w/ 2in spoon
		becoming medium fine sand w/ some medium ~~sand~~ and few coarse sand to fine gravel	Hm= B4			5 12 12 17	D# = 32 D = 2.0 ft R = 1.8 ft
	63						
	64					16 30 36 39	w/ 3in spoon D# = 33 D = 2.0 ft R = 1.8 ft
		becoming very fine to fine sand with few medium sand	Hm= B4				
	65						
	66						w/ 2in spoon
			Hm= B4			P	D# = 34 D = 2.0 ft R = 1.8 ft
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

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HTW DRILLING LOG

MW-56A

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 9 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	(Same) POORLY GRADED SAND (SP) medium-fine tanish-grey w/ a few orange-red bands, very fine to fine ~~sand~~ with few medium ~~sand~~ (alluvium) becoming fine sand w/ some medium ~~sand~~ and little coarse ~~sand~~ and trace of fine gravel	Hnu= B4			18 22 28 28	3in spoon D# = 35 D = 2.0 ft R = 1.7 ft
	69						
	70		Hnu= B4			5 5 10 10	2in spoon D# = 36 D = 2.0 ft R = 2.0 ft Sample collected 72-74 for sieve analysis
	71	becoming medium sand w/ some fine ~~sand~~, little coarse sand to fine gravel					
	72		Hnu= B4	#2 bag sample		57 52 55 48	3in spoon D# = 37 D = 2.0 ft R = 1.2 ft begin hammering with 140# hammer @ 72 ft bgs
	73	becoming dense, medium to coarse sand with little fine gravel and few fine sand					
	74		Hnu= B4			16 36 52 57	2in spoon D# = 38 D = 2.0 ft R = 1.6 ft
	75						
	76	~~No sample~~	Hnu: NA			32 56 52 51	3in spoon D# = 39 D = 2.0 ft R = 0 ft
	77						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

HTW DRILLING LOG

MW-56A

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 10 OF 10 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	~~No Sample~~					
	78 79	POORLY GRADED SAND (SP), dense, reddish tan, medium to coarse ~~sand~~ with little fine ~~sand~~ and fine gravel and few coarse gravel (sandstone) (alluvium)	Hnu= 84			16 20 42 48	2 in split spoon D# = 40 D = 2.0 ft R = 1.8 ft add 50 gallons of water ~~to pit~~
	80	FAT CLAY (CH) ~~medium~~ firm, tan grey, with little fine to coarse sand ~~(alluvium)~~				28 43 350	3 in spoon D# = 41 D = 1.5 ft R = 1.3 ft
	81	SAND STONE: ~~dense~~ soft, lt-yellow, very fine to fine sand, weakly cemented, very weathered					
	82						stop drilling @ 82' @ 1220 on 7/9/92 resume 7/10/92 @ 0745 reamed hole w/ 7 7/8 tricone to 46 1/2 ft, set surface casing Monitoring well installed 7/10/92 temporary casing pulled 7/10/92 after grouting total water loss = 500 gallons; water loss in ~~both~~ screened interval is 50 gallons

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-56A

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ICORPS/4-15-92

Reviewed by ME Wilson 7-13-92 OCH 7/13/92

HTW DRILLING LOG

HOLE NO. MW-58A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N 570183 E 2842194
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CFD 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" split spoon / 5" Drag bit; 94 Christensen wire line; 3½x 2½ Core bbl / 4⅝ Tungsten; Tuned bit, 5⅝ & 7⅝; Tricone roller bit	8. HOLE LOCATION: C-SE-SW sec. 8 (Atlas Missile) T14N, R9E
	9. SURFACE ELEVATION: ~~± 1180~~ ~~± 1175~~ 1173.05
	10. DATE STARTED: 7/1/92 1530 — 11. DATE COMPLETED: 7/12/92
12. OVERBURDEN THICKNESS: 135.0	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 9.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 144.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2 ~~NA~~	X	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
2	X	NA	TOC	Explosives	NA	58 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring Installed well	NA	MW-58A	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean, ~~silty~~, highly organic CLAY (OL), dk brown w/ abundant root hairs (Topsoil)	HNu = Bkg			P	Boring Advanced w/ 5" drag bit; 2" split spoon sampler; Drilling fluid = pure H_2O; Start 7/1/92 1530; D#1 P=2.0 R=0.6
	2						
	3		HNu = Bkg			P	D#2 P=2.0 R=1.7
	4						
	5	(CL) Lean ~~silty~~ CLAY, Light brown, firm, fr staining	HNu = Bkg			P	D#3 P=2.0 R=2.0

(CORPS/5-15-92)

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP

INSPECTOR T. Hecht

SHEET 2 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(SAME) lean ~~silty~~ CLAY (CL) lt brown, firm, Fe stains (loess)					D#3 P=2.0 R=2.0
	6						
	7		HNu= Bkg			P	D#4 P=2.0 R=2.0
	8	w/ mn(?) stains					
	9		HNu = Bkg			P	D#5 P=2.0 R=2.0
	10						
	11		HNu = Bkg			P	D#6 P=2.0 R=2.0
	12						
	13		HNu= Bkg			P	D#7 P=2.0 R=2.0
	14						

ICOHPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 3 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(Same) lean ~~silty~~ CLAY (CL), lt brown, firm, fe & Mn(?) Stains. (loess)	HNu = BKG			P	D#8 P=2.0 R=2.0
	16		HNu = BKG				Begin 96 mm Christensen wireline w/ 3½x2½ sample kit 4% tungsten insert bit. Drilling fluids: 50# bentonite 400 gal H_2O D#9 P=2.6 R=2.0
	17						
	18		HNu = BKG				~~Stopped 7/1/92~~ Resume 7/2/92
	19		HNu = BKG				D#10 P=2.6 R=1.4
	20	silty SAND (sm) lt. brown loose* ~~firm~~, fine to v. fine grained sand (Alluvium)	HNu = BKG				* density estimated
	21		HNu = BKG				D#11 P=2.0 R=2.0
	22		HNu = BKG				D#12 P=2.0 R=0.8
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

ICONPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 4 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same) Silty SAND (SM) lt. brown (med. dense) ~~firm~~, fine to v. fine grained ~~sand~~ (Alluvium)					D#12
	24						
	25		HNu= BKg				D#13 P=2.0 R=0.9
	26	WITH SILT					
		POORLY graded SAND (SP-SM) lt brown to tan (med. dense ~~+ soft~~) w/ few silt. (alluvium)					D#14
	27		HNu= BKg				P=2.0 R=0.7
	28						D#15
	29	w/ trace silt	HNu= BKg				P=2.0 R=0.7
	30						D#16
	31		HNu= BKg				P=2.0 R=1.1
		~~Becoming less silty~~ W/O silt					
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO.: MW-58A

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | SHEET 6 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded SAND (SP) med. dense, lt brown to tan, ~~loose~~					
	33	fine to v. fine grained (alluvium)	HNu = BKG				D#17 P=2.0 R=1.0
	34		HNu = BKG				D#18 P=2.0 R=0.6
	35						
	36		HNu = BKG				D#19 P=2.0 R=1.0
	37						
	38		HNu = BKG				D#20 P=2.0 R=1.3
	39						
	40	w/ trace med. grained sand	HNu = BKG				D#21 P=2.0 R=1.3
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 6 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) tan, ~~loose~~ dense, fine to v. fine w/ trace med. sand (alluvium)	HNu= Bkg				D# 21
	42		HNu= Bkg				D# 22 P= 2.0 R=0.5
	43						
	44		HNu= Bkg				D# 23 P= 2.0 R=0
	45						
	46		HNu= Bkg	#1 bag Sample	1x4oz 2x4oz 1x8oz		D# 24 P= 2.0 R= 0.6 SAMPLE # MWC-058-046 collected 46 to 48' TOC, VOC, EXPL, Sieved grain size
	47						
	48		HNu= Bkg				D# 25 P=2.0 R=1.0
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 7 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded SAND (SP)					
		Tan, ~~loose~~ dense, ~~v. soft~~, fine to v. fine	grained				D#26
	51	w/ trace med sand	HNu=				P=2.0
		(alluvium)	Bkg				R=1.0
	52	w/ few med sand					
			HNu=				D#27
	53		Bkg				P=2.0
							R=1.3
	54						
			HNu=				D#28
	55		Bkg				P=2.6
							R=1.4
	56						
		w/trace med to coarse ~~sand~~ grained sand	HNu=				D#29
	57		Bkg				P=2.0
							R=1.0
	58		HNu=				D#30
			Bkg				P=2.0
							R=0.9
	59						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

HTW DRILLING LOG

MW-58A

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 8 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded SAND (SP) ~~soft~~ dense, tan, ~~v. loose~~, fine to v. fine grained, w/ trace med to coarse sand (alluvion)					D#30
	60						
			HNu= Bky				D#31 P=2.0 R=1.0
	61						
	62						
			HNu= Bky				D#32 P=2.0 R=1.0
	63						50# ~~1 bag~~ bentonite + 200 gal H_2O added
	64						
			HNu= Bky				D#33 P=2.0 R=1.4
	65						
	66						
			HNu= Bky				D#34 P=2.0 R=1.6
	67						
	68						

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PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	69	(same) poorly graded SAND (SP) tan, ~~v. soft~~ fine to v. fine w/ trace med to coarse sand (alluvium)	ground HNu= Bkg				D#35 P=2.0 R=1.6
	70						
	71		HNu= Bkg				D#36 P=2.0 R=1.4
	72						
	73		HNu= Bkg				D#37 P=2.0 R=0.6
	74						
	75		HNu= Bkg				D#38 P=2.0 R=1.0
	76		HNu= Bkg				D#39 P=2.0 R=0
	77						

PROJECT: Remedial Investigation, Mead NOP 921-W030 | HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 10 OF 47 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same) poorly graded SAND (SP) Tan, ~~loose~~ dense, fine to v. fine	grained,				D# 39 150# ~~3 bags~~ bentonite ~~no H2O~~ added Stopped 7/2/92
	78	w/ trace med to coarse sand. (alluvium)					Resume 7/7/92
	79		HNu= Bkg				400 gal H2O added D# 40 P=2.0 R=0.9
	80						
	81		HNu= Bkg				D# 41 P=2.0 R=1.1
	82		HNu= Bkg	#2 bag sample	1x 4oz 2x 4oz 1x 8oz	grain size 82-84'	D# 42 P=2.0 R=1.0 Sample # MW3-068-082 TOC, VOC, EXPL 1 bag bentonite + 200 gal H2O added
	83						
	84		HNu= Bkg				D# 43 P=2.0 R=0.6
	85						
	86	~~[Bottom of Alluvium]~~					

SUGGESTED ~~FILTER MEDIA~~ SCREEN INTERVAL (86' to 76')

PROJECT: Remedial Investigation, Mead NOP 92KW030

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HTW DRILLING LOG

HOLE NO. MW-58A
SHEET 11 OF 17 SHEETS

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		well graded SAND, (SW)					
	dense,	tan, v. soft, fine to					D# 44
		coarse grained w/ trace fine to					P=2.0
	87	coarse gravel	HNu=				R=0.7
		(alluvium)	Bkg				
		[~~top of sand & gravel~~]					
	88						
							D# 45
			HNu=				P=2.0
	89		BKG				R=0.6
	90	w/ occasional fine grained					
		sand seams (.2-.3')					D# 46
			HNu=				P=2.0
	91		BKg				R=0.6
	92						
							D# 47
			HNu=				P=3.0
	93		Bkg				R=0.6
	94						
	95						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

HTW DRILLING LOG

HOLE NO. MW-58A
SHEET 12 OF 17 SHEETS

Remedial Investigation Mead NOP

INSPECTOR T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	dense, 96	(same) well graded SAND (SW) ~~soft dense~~ tan to grey, ~~v. loo~~, fine to coarse w/ trace fine to coarse gravel (alluvium)	HNu= BKg				D# 48 P=2.0 R=0.1
	97	WITH SAND poorly graded GRAVEL (GP) (loose) tan to grey, fine to coarse w/ little fine to coarse grained sand (alluvium)	HNu= BKg				D# 49 P=2.0 R=0
	98						
	99		HNu= BKg				D# 50 P=2.0 R=0
	100						
	101		HNu= BKg				D# 51 P=2.0 R=0
	102						
	103		HNu= BKg				D# 52 P=2.0 R=0.6
	104						

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PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 13 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) WITH SAND Poorly graded GRAVEL (GP) dense, tan to grey, fine to coarse grained					DA# 52 50# ~~bag~~ bentonite +200 gal H_2O added
	105	w/ little fine to coarse grained sand and trace cobbles (alluvium)					DA# 53 P=2.0 R=0.7
	106		HNu= Bkg				
	107						DA# 54 Hit Refusal 107.8. (Boulder?) Begin 4¾ tricone roller bit NO SAMPLE Cuttings show GVL Resume 5" Tubs. insert + wireline Stopped 7/1/92
	108		HNu= Bkg				
	109	? ? ? ? ?					Resume 7/2/92
		Poorly graded SAND (SP) dense, tan & grey, ~~v. soft~~, fine to medium grained w/ trace fine to ~~medium~~ coarse gravel (alluvium)	HNu= Bkg				DA# 55 P=2.0 R=0.4
	110						
	111						DA# 56 P=2.0 R=0
	112		HNu= Bkg				logged by cuttings
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 14 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	114	(Same) Poorly graded SAND (SP) tan/green, ~~soft~~ dense, fine to med grained w/ trace fine to ~~medium~~ coarse gravel (alluvium)	HNu = BKG				D# 57 P = 2.0 R = 0 logged by cuttings 108-135' 50# ~~bag~~ bentonite + 200 gal H_2O added
	115						
	116		HNu = BKG				D# 58 P = 2.0 R = 0.2
	117						
	118		HNu = BKG				D# 59 P = 2.0 R = 0 logged by cuttings
	119						
	120		HNu = BKG				D# 60 P = 2.0 R = 0.1 Begin drilling w/ no circulation
	121		HNu = BKG				D# 61 P = 2.0 R = 0 logged by cuttings
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 15 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) Poorly graded SAND (SP) Tan & green, ~~to soft~~ dense, fine to med grained w/ trace of fine to ~~med.~~ coarse gravel (alluvium)					D#61 logged by cuttings 108'-135'
	123		HNu= BKG				D#62 P=2.0 R=0
	124						
	125		HNu= BKG				D#63 P=2.0 R=0.1
	126						
	127		HNu= BKG				D#64 P=2.0 R=0.2
	128						
	129		HNu= BKG				D#65 P=2.0 R=0
	130						
	131						

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HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP

INSPECTOR J. Hecht

SHEET 16 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	132	(Same) Poorly graded SAND (SP) tan & green, ~~v. soft~~ (dense), fine to medium grained w/ trace fine to coarse gravel (alluvium)	HNu= Bkg				D# 66 P=2.0 R=0.1
	133		HNu= Bkg				D#67 P=2.0 R=0 Pulled rods to try split spoons. Found cobble jammed in bit preventing sample from entering bbl. Resume 96 mm wireline sampling
	134						
	135	? ? SANDSTONE (v. weathered) orange to dk. red, fine to v. fine sand, v. soft (Omadi ~~SS~~ member)	HNu= Bkg				D# 68 P=2.0 R=1.0 Drilling mud turns orange
	136						
	137		HNu= Bkg			DROVE CASING 8" w/ 74 blows H.t Refusal	Added 400 gal H_2O Reamed to 138.1 w/ 7 3/8 Tricone Installed Temp ~~Sa~~ Casing to 188.8 6" Pulled casing prior to well installation Stopped 7/8/92
	138						Resume 7/9/92 ~~Used 400 gal H_2O~~ Flushed out to 139.1 Stopped 7/9/92
	139		Tube check = 139.3 HNu= Bkg	Run#1	Rec 1.5/2.0	RQD 75% DWR 100%	Resume 7/10/92 Flushed out to 139.3 continued w/ 96mm christensen + drilling fluid) Start 1310 End 1330
	140	SHALE (v. weathered) Gray w/ black mottling, soft (Omadi ~~X~~ member)					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

/CORPS/4-15-92

138

HTW DRILLING LOG

HOLE NO. MW-58A

Remedial Investigation, Mead NOP | INSPECTOR T. Hecht | SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) SHALE, (v. weathered) Grey w/black mottling, soft (OMADT)		Run #1			~~Run #1~~
	141		Tape check 141.0				
			HNu= Bkg	Run #2	REC 0/2.0	RQD 0% DWR 100%	Lost core sample fell into hole AND was flushed out core lost 141.0-143.0 Run 2.0 lost 2.0 Rec 0 U.L. 0
	142						
	143		Tape check 143.2				Started 1330 stopped 1350
			HNu= Bkg	Run #3	REC 2.0/2.0	RQD 100% DWR 100%	
	144						
	145		Tape check 145.5				Started 1400 stopped 1420 corrected depth 144.5 BOH = 144.5
	146						Monitoring well installed upon completion 7/12/92
	147						water lost in screened interval ≈ 400 gal
	148						
	149						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-58A

1389

/CORPS/4-15-92

MEW 7-27 CAH 7/27/92

HTW DRILLING LOG

HOLE NO. MW-59 A

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 15 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.571249 - E.2844150
5. NAME OF DRILLER: Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 1/4-inch-dia tri-cone roller-bit	8. HOLE LOCATION: SE 1/4 sec. 8, T14N, R9E
	9. SURFACE ELEVATION: ~~1160±~~ 1160.63
	10. DATE STARTED: 7-25-92 15:35 / 11. DATE COMPLETED: 7-26-92 15:20
12. OVERBURDEN THICKNESS: ~ 124'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 124'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
—	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring Installed well	N/A	X	N/A	Gene Paquenaho

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Topsoil: Hard, dk brownish gray, w/abundant organic matter	~~N/A~~	~~N/A~~	N/A	~~N/A~~	Boring advanced w/ 5 1/4-inch-dia tri-cone roller-bit and drilling mud (100 lbs of Aquagel bentonite + 175 gals of water), without sampling. Boring log MW-59A is based on boring log MW-59D, observed cuttings and drilling characteristics in general
	1	LEAN CLAY WITH SAND (CL), ~~lt brown~~ firm, lt brown w/ thin beds of coarse grained sand w/ roots and root hairs					
	2	SILT (ML), soft to firm, brownish yellow, w/little to some clay in fines					
	3	w/ root hairs					
	4						
	5						

/CORPS/6-16-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1 MW-59A

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 2 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	SILT (ML), soft to firm, lt brownish yellow w/ root and root hairs	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	6						
	7						
	8	w/ trace of fine grained sand.					
	9						
	10						
	11	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained					
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

HTW DRILLING LOG

HOLE NO. MW-59A

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 3 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	15						
	16						
	17						
	18	w/ trace of med. grained sand.					
	19						Approximately 50 gals of water (mud) lost in the interval 0-20ft
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

HTW DRILLING LOG

MW-59A

Remedial Investigation Mead NOP

INSPECTOR: Gene Popinako

SHEET 4 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

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B07NE003702-05502

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP) med. dense, lt grayish yellow, v. fine to fine grained.					
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						Approximately 50 gals of water lost.
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP) loose, lt yellowish gray, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	42						
	43	w/ trace of coarse grained sand w/ little of med. grained sand.					
	44						
	45						
	46						
	47						
	48						
	49	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense, multi-colored, coarse grained, w/ seams of lean clay, w/ trace of fine gravel					
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense, multi-colored, coarse grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	51	w/ seams and small lenses of yellow, lean clay					
		w/ trace of fine gravel					
	52						
	53	w/ thin layers of poorly graded, fine grained sand					
	54						
	55						
	56						
	57	POORLY GRADED SAND WITH GRAVEL (SP), dense, multi-colored, coarse grained					100 lbs of Aquagel bentonite added to drilling mud
	58	w/ little fine gravel					
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

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/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP

INSPECTOR

SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, coarse grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	End of shift 7-25-92. 16:55
	60	w/thin clayey beds w/ little to some of fine gravel					Drilling resumed 7-26-92
	61						
	62						
	63	Gravel becoming coarser w/seams and partings of lean clay					
	64						
	65						
	66						
	67						
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

/CORPS/4-16-92

139

B07NE003702-05506

HTW DRILLING LOG

HOLE NO. MW-59 A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 9 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, mostly coarse-grained w/ subordinate quantities of fine and med. grained sands	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	69						
	70	w/ seams and parting of yellow (iron oxides stained) lean clay w/ little of fine gravel					Approximately 30 gals of water lost.
	71						
	72						
	73						
	74	w/ rich iron oxides (?) staining					
	75	LEAN CLAY WITH SAND AND GRAVEL (CL), firm, med. gray. w/ little fine gravel w/ trace of very fine sand					
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59 A

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	77	LEAN SANDY CLAY (CL), firm, med. gray w/ little to some of fine grained sand	~~N/A~~	~~N/A~~	~~N/A~~ ?	~~N/A~~	
	78						
	79						
	80						
	81						
	82						
	83						
	84	Quantity of sand increasing					
	85						
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

1399

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 11 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND WITH CLAY (SP-SC), dense, lt gray, fine grained w/ little of clay in fines	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	87						
	88	w/ trace of fine gravel					
	89	w/ seams and partings of gray, lean clay					
	90	w/ trace of coarse gravel					
	91						
	92	Layers of fine grained sand alternate with layers of coarse grained sand					
	93						
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

1400

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense, multi-colored, mostly coarse grained.	~~N/A~~	~~N/A~~	N/A	~~N/A~~	
	96	w/ several thin layers (2-4 inch thick) of lean clay					
	97	w/ little of coarse gravel					
	98						
	99						
	100	w/ thin layers of lean clay and clayey, fine grained sand					
	101						
	102						
	103						
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

1401

B07NE003702-05510

HTW DRILLING LOG

MW-59A

Remedial Investigation, Mead NOP | INSPECTOR: Gene Papinako | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	104	POORLY GRADED SAND WITH CLAY (SP-SC) AND LEAN SANDY CLAY (CL) dense, dk gray and clear,					
	105	v. fine to fine grained w/ clay in fines and					
		firm dk gray clay					
	106	w/ little coarse gravel					
	107	Clay becoming yellowish gray					
	108						
	109	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, coarse grained					
	110	w/ thin beds of fine grained sand, cemented with lean clay					
		w/ little coarse gravel					
	111						
	112						
	113						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinaka | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, coarse grained					
	114	w/seams and partings of gray, lean clay					
	115	w/layers of coarse, subrounded gravel					
	116	Becoming fine grained					
	117	w/iron oxides(?) staining					
	118						
	119						
	120	w/ layer of coarse gravel and lean clay					
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

ICORPS/4-15-92

140

B07NE003702-05512

HTW DRILLING LOG

HOLE NO. MW-59A

Remedial Investigation Mead NOP | INSPECTOR G Papivako | SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense, multi-colored, coarse grained					
	123	w/ seams and partings of clay w/ some coarse gravel and cobbles					
	124						B.O.B 124.0 ft The borehole caved in after drilling rods pull-out and had to be redrilled. Total of 350 lbs of Aquagel bentonite used for stabilization of borehole
	125						
	126						
	127						Estimated quantity of water lost during redrilling and stabilization 500 gals.
	128						
	129						Total water loss 650 gals
	130						Estimated water loss in screen interval = 150 gal Boring completed as monitoring well.

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59A

1404

(CORPS/4-15-82)

MEW 8-6 [illegible] 7/12/92

HTW DRILLING LOG

HOLE NO: MW-07D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 13 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8-inch-dia tri-cone roller-bit; 94mm Christensen sampler	8. HOLE LOCATION: NOP Lead Line 3
	9. SURFACE ELEVATION: 1161 ±
	10. DATE STARTED: 7-30-92 9:20 / 11. DATE COMPLETED: 8-5-92 17:20
12. OVERBURDEN THICKNESS: 111.8 '	15. DEPTH GROUNDWATER ENCOUNTERED: Water information masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~[illegible]~~ 21.2 '	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 133.0 '	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): 85 ± Adjacent MW-07A, 07B wells

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A	N/A	N/A	2

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
N/A	N/A	N/A	N/A	N/A	N/A	99 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled, Trenied Pure Gold - CEA	X	N/A	N/A	[illegible]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay - organic soil (CL-OL) soft, dk brown to black w/abundant organic matter, w/abundant roots, root hairs w/trace of coarse grained sand [TOPSOIL]	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	Boring advanced as mud rotary w/7 7/8-inch-dia tri-cone roller bit and drilling mud (100 lbs of Aquagel bentonite + 200 gals of water)
	2	SILT (ML), firm, lt grayish brown w/trace of clay in fines w/abundant root hairs w/trace fine grained sand Becomin lt brown [Loess]					
	3						
	4	SILT (ML) AND LEAN CLAY (CL), firm, lt brown w/iron and manganese oxides(?) mottling w/trace of mica w/root hairs					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: B1 MW-07D

140

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papineko

SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), firm, brownish yellow w/ little silt in fines	N/A	N/A	N/A	N/A	
		Becoming yellowish olive					
	6	w/ manganese oxide(?) nodules and staining					
		w/ iron oxides(?) staining					
	7	Becoming soft					
	8						
	9	Quantity of silt in fines increasing					
	10						
		Becoming lt gray, slightly fissured					
	11	w/ abundant iron(?) and manganese(?) oxides - hydroxides(?) in nodules, veinlets, stains					
	12						
	13						
		w/ calcareous nodules and small concretions					
	14						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

140t

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	14	LEAN CLAY (CL), soft to firm, lt gray to lt olive gray, w/ trace of silt in fines	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	15	w/ abundant iron(?) oxides infilling root channels					
		w/ trace of manganese oxides(?) staining					
	16	w/ trace of mica					
		Becoming lt bluish gray w/ abundant iron oxides (?)					
		POORLY GRADED SAND (SP), dense, bright yellow (iron oxides(?) stained), v. fine to fine grained, partly weakly cemented w/ iron oxides (?)					
	17	Becoming lt gray, v. fine grained					
	18	Becoming v. fine and fine grained					
		w/ trace of med. grained sand (disseminated)					
	19	Becoming lt yellowish gray					
	20						Approximately 30 gals of water (mud) lost in the interval 0-20ft
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

140'

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinacko

SHEET 4 OF [illegible] SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	24	w/ trace of med. grained sand (disseminated)					
	25	Becoming fine grained					
	26						
	27						
	28						
	29						
	30	POORLY GRADED SAND WITH CLAY (SP-SC), dense, lt yellowish gray, v. fine to fine grained					
	31	w/ seams and small lenses of white, lean, non-calcareous clay w/ partings of carbonaceous matter					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained w/ trace of silt in fines	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	33	w/ trace of med. grained sand (disseminated)					
	34						
	35						
	36						
	37	w/ trace of fine, elongated, subrounded gravel, max. size 0.5 inch.					
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

1409

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP

INSPECTOR Gene Papiwako

SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, v. fine to fine grained w/ trace of silt in fines	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	42	w/ thin beds of coarse grained sand - fine gravel					
	43						
	44						
	45	w/ trace of coarse grained sand (disseminated)					
	46						
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

1410

ICORPS/4-15-92

HTW DRILLING LOG

MW-07D

Remedial Investigation, Mead NOP

INSPECTOR: Gene Papineko

SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), med. ~~loose~~ dense to loose, lt grayish yellow, v. fine to fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	51						
	52						
	53						
	54	Becoming mostly med. grained w/subordinate quantities of fine and v. fine grained sand					
	55						
	56	Becoming mostly v. fine and fine grained w/thin beds of coarse grained sand - fine gravel (max. size - 0.4 inch)					
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

ICORPS/4-15-92

HTW DRILLING LOG

MW-07D

Remedial Investigation Mead NOP | INSPECTOR: Gene Papinako | SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP), med-loose, lt grayish yellow, v. fine to fine grained	N/A	N/A	N/A	N/A	Approx. 50 gals of water (mud) lost in the interval 40-60 ft
	60						
	61						
	62						
	63						
	64						
	65						
	66	w/layer 3-inch-thick of multi-colored, coarse grained sand					
	67						
	68	Becoming med. dense					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

ICORPS/4-16-82

141

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 9 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, v. fine to fine grained w/ thin beds and "partings" of coarse grained sand	N/A	N/A	N/A	N/A	
	69						
	70	w/trace of disseminated coarse grained sand					
	71						
	72						
	73	Becoming fine grained, well sorted					
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

HTW DRILLING LOG

HOLE NO. MW-07D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND (SP) med. dense, lt grayish yellow, v. fine to fine grained	N/A	N/A	N/A	N/A	
	78	Becoming loose					
	79						Approximately 40 gals lost in the interval 60-80 ft.
	80	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, lt grayish yellow, fine grained					
	81	w/ (trace seams and partings) of dk yellow lean clay ~~(trace)~~ w/ little disseminated coarse grained sand					
	82						
	83						
	84	Becoming chiefly coarse grained, weakly cemented w/ grayish yellow lean clay in separate thin beds					
	85	Becoming fine grained sand					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

1414

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinaka | SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND (SP), med. dense, grayish yellow, v. fine to fine grained w/ trace of disseminated med. grained sand.					
	87						
	88						
	89	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, multi-colored, coarse grained w/ little silt in fines (separate thin layers are cemented with silt)					
	90	w/ little fine gravel, elongated, subangular, max. size 0.5 inch					
	91	Quantity of silt decreasing					
	92						
	93	w/ trace of coarse gravel, subangular, max. size 1.1 inch					
	94	w/ coarse gravel and cobbles					50 lbs of Aquagel bentonite added to drilling mud. Approx. 50 gal lost at ~94-95 ft depth
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 12 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), dense, multi-colored, subangular to subrounded, coarse, max.	~~N/A~~	N/A	N/A	~~N/A~~	
	96	SIZE 1.5 inch w/ seams and partings of gray, lean, sandy clay					
	97	w/ some coarse grained sand w/ occasional cobbles					
	98						The borehole drilled with 7 7/8-inch-dia tri-cone roller bit to the depth of 100.0 ft.
	99						Temporary protective steel casing (6-inch-dia) installed into borehole and driven w/ 300 lbs - hammer to the depth of 100.4 ft.
	100	LEAN SANDY CLAY (CL), soft, lt olive yellow, stained w/ iron oxides (?) w/ little ~~fines~~ to some of fine grained sand in fines Becoming dk yellow	HNU BG (0.4 ppm	~~N/A~~	~~N/A~~	D #1 P = 2.0 R = 1.0	
	101	w/ thin broken beds of ironstone					Drilling continued w/ 94 mm Christensen continuous sampler
	102	w/ 4-inch-thick layer of ironstone	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 2 P = 2.0 R = 0.9
	103	w/ thin beds of fine gravel					
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-07D

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 13 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	104 105	POORLY GRADED SAND WITH SILT AND CLAY (SP-SC-SM), ~~m~~dense, yellowish white and yellow (iron oxides stained), very fine grained and fine grained w/ little silt in fines w/ trace of coarse gravel w/ seams and partings of white lean non-calcareous clay	HNU: BG	N/A	N/A	N/A	100 lbs of Aquagel bentonite mixed w/ 200 gals of drilling water D #3 P = 2.0 R = 0.4
	106 107	w/ little fine, well-rounded gravel (disseminated) w/ ~~occasional~~ partings of ironstone w/ layer - 3-inch-thick of coarse grained sand - fine gravel	HNU: BG	N/A	N/A	N/A	50 lbs of bentonite added to drilling mud D #4 P = 2.0 R = 0.8
	108 109	Becoming lt yellow, fine grained w/ fragments of ironstone w/ little fine gravel w/ layer - 4-inch-thick of lean white non-calcareous clay	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	50 lbs of bentonite added to drilling fluid D #5 P = 2.0 R = 0.5
	110 111	w/ layers and thin beds of coarse grained sand and fine gravel cemented w/ lean white non-calcareous clay w/ trace coarse angular gravel	HNU: BG	N/A	N/A	N/A	D #6 P = 1.0 R = 0.5
	112 113	SHALE: weathered, olive yellow, clayey, slightly fissured (slickensided) w/ angular fragments of ironstone Becoming lt bluish gray, silty and clayey w/ trace of mica	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D #7 P = 1.0 R = 0.8 D #8 P = 1.0 R = 0.9

PROJECT: Remedial Investigation, Mead NOP 921KW03C

HOLE NO.: MW-07D

(CORPS/4-16-92)

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B07NE003702-05526

HTW DRILLING LOG

HOLE NO. MW-07D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 14 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	SHALE: Hard, unweathered, bluish gray, clayey, silty w/trace of mica.	HNU: BG (0.2 ppm)	~~#~~ Box 1	~~N/A~~	~~N/A~~	Borehole reamed w/7 7/8-inch dia to the depth 112.5 ft. Temporary protective steel casing (6-inch-dia) driven w/300 lbs hammer to the depth of 112.5 ft. D#9 P=2.0 R=1.93
	114						
	115		HNU: BG	1	~~N/A~~	~~N/A~~	D#10 P=2.0 R=1.9
	116						
	117	Becoming medium gray, very thinly laminated	HNU: BG	1	~~N/A~~	~~N/A~~	D#11 P=2.0 R=1.9
	118						
	119		HNU: BG	1	~~N/A~~	~~N/A~~	D#12 P=2.0 R=1.92
	120						
	121		HNU: BG	1	~~N/A~~	~~N/A~~	D#13 P=2.0 R=1.9
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-07D

1418

HTW DRILLING LOG

HOLE NO. MW-07 D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 15 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	SHALE: Hard, med. gray, clayey, very thinly laminated.	HNU: BG	1	~~N/A~~	~~N/A~~	D# 13 P = 2.0 R = 1.9
	123		HNU: BG	Box # 2	~~N/A~~	~~N/A~~	D # 14 P = 2.0 R = 1.95
	124						
	125	w/ some carbonized flora on bedding planes	HNU: BG	2	~~N/A~~	~~N/A~~	D # 15 P = 2.0 R = 2.0
	126	w/ trace of mica					
	127		HNU: BG	2	~~N/A~~	~~N/A~~	D # 16 P = 2.0 R = 2.0
	128	w/ calcareous (dolomitic?) concretion 0.8 inch dia					
	129	Becoming slightly arenaceous (w/ trace of fine grained sand)	HNU: BG	2	~~N/A~~	~~N/A~~	D # 17 P = 2.0 R = 2.0
	130						
	131						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07 D

HTW DRILLING LOG

HOLE NO. MW-07D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	131	SHALE: Hard, medium gray, clayey, v. thinly laminated, w/ carbonaceous nodules w/ trace of fine grained sand	HNU: 86	2	N/A	N/A	D # 18
							P = 2.0
							R = 2.0
	132						
							B.O.B. 133.0 ft
	133						Boring grouted to the ground surface w/ "Pure Gold" grout and topped w/ cuttings
	134						
	135						Grout weight: 10.0 - 10.2 lbs/gals
							~~28~~ 280 gals of Pure Gold Grout placed (against pre-calculated 315 gals)
	136						
	137						
	138						
	139						
	140						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D

CDA 8/4/92

HTW DRILLING LOG

HOLE NO. MW-07D-A (abandoned)

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 12 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 1/8-inch-dia. tri-cone roller bit; 2-inch-dia split spoon; 94 mm Christensen sampler; 7 7/8-inch-dia. tri-cone roller-bit; 4 5/8 in Tungsten insert bit	8. HOLE LOCATION: NOP Load Line 3
	9. SURFACE ELEVATION: 1161 ±
	10. DATE STARTED: 7-27-92 14:00
	11. DATE COMPLETED: 7-29-92 16:15
12. OVERBURDEN THICKNESS: 98.8 ~~103.0~~	15. DEPTH GROUNDWATER ENCOUNTERED: Water information masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: ~~4.2~~ 4.2	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 103.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
N/A	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Backfilled w/Pure Gold grout	X	N/A	N/A	Gene Papenhofer

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Topsoil (silty loam and lean clay), dk brown to black, soft w/abundant organic matter, w/abundant roots, root hairs w/trace of coarse grained sand (OL-CL) — SILT (ML), firm, lt grayish brown	HNU: BG (0.4 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	Boring advanced w/ 5 1/4-inch-dia tri-cone roller bit, 2-inch-dia split-spoon sampler and drilling mud D#1 P=1.5 R=1.5
	2	w/trace of clay in fines w/abundant root hairs w/trace fine grained sand Becoming lt brown [Loess]	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#2 P=1.5 R=1.5 Drilling mud prepared: 100 lbs bentonite + 750 gals
	3	SILT (ML) AND LEAN CLAY (CL), firm, lt brown w/iron oxides(?) and manganese(?) oxides, mottling, w/trace of mica, w/root hairs	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#3 P=1.5 R=1.4
	4		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#4 P=1.5 R=1.2
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-07D2

B07NE003702-05530

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 2 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), firm, brownish yellow w/little silt in fines Becoming yellowish olive	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #4 P = 1.5 R = 1.2
	6	w/ manganese oxides nodules and staining w/iron oxides(?) staining	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #5 P = 1.5 R = 1.5
	7	Becoming soft					
	8		NNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #6 P = 1.5 R = 1.5
	9	Quantity of silt in fines increasing	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #7 P = 1.5 R = 1.5
	10						
	11	Becoming lt gray, slightly fissured w/abundant iron(?) and manganese [?] oxides - hydroxides in nodules, stains, veinlets	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #8 P = 1.5 R = 1.2
	12		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #9 P = 1.5 R > 1.3
	13						
	14	w/calcareous nodules and small concretions	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #10 P = 1.5 R = 1.5

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-07D-A

(CORPS) 4-15-92

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LEAN CLAY (CL), soft to firm, lt gray to lt olive gray, w/ trace of silt in fines w/ abundant iron oxides(?) infilling root channels	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#10 P = 1.5 R = 1.5
	15	w/ trace of manganese oxides(?) staining w/ trace of mica	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	Boring continues w/ 94 mm Christensen continuous sampler D # 11 P = 2.0 R = 1.5
	16	Becoming lt bluish gray w/ abundant iron oxides (?)					
	17	POORLY GRADED SAND (SP), dense, bright yellow (iron oxides(?) stained), v. fine to fine grained, partly weakly cemented w/ iron oxides (?) Becoming lt gray, v. fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 12 P = 2.0 R = 1.6 Appearance of sand is similar to Omidi member
	18	Becoming v. fine grained and fine grained w/ trace of med. grained sand (disseminated)					
	19	Becoming lt yellowish gray	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 13 P = 2.0 R = 1.0
	20						
	21		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 14 P = 2.0 R = 0.9
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 4 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #15 P = 2.0 R = 1.2
	24	w/ trace of med. grained sand (disseminated)					
	25	Becoming fine grained, well sorted	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #16 P = 2.0 R = 1.5
	26						
	27		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #17 P = 2.0 R = 1.2
	28						
	29		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #18 P = 2.0 R = 1.2
	30	POORLY GRADED SAND WITH CLAY (SP-SC), dense, lt yellowish gray, v. fine to fine grained w/ seams and small lenses of white, lean, non-calcareous clay w/ partings of carbonaceous matter					
	31		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #19 P = 2.0 R = 1.0
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

1424

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 5 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained w/trace of silt in fines	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D# 19 P = 2.0 R = 1.0 End of shift 16:50
	33	w/trace of med. grained sand (disseminated)	HNU BG (0.4 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	~~D#~~ Drilling resumed 7-28-92 7:35 D # 20 P = 2.0 R = 1.1
	34						
	35		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #21 P = 2.0 R = 0.8
	36						
	37	w/ trace of fine, elongated, subrounded gravel, max. size 0.5 inch.	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 22 P = 2.0 R = 1.0
	38						
	39		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 23 P = 2.0 R = 0.4
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, v. fine to fine grained w/trace of silt in fines	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #24 P = 2.0 R = 1.0
	42	w/thin beds of coarse grained sand - fine gravel					
	43		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #25 P = 2.0 ~~R = 1.0~~ R = 0.3
	44						
	45	w/trace of coarse grained sand (disseminated)	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #26 P = 2.0 R = 0.8
	46						
	47		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #27 P = 2.0 R = 0.3
	48						
	49		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #28 P = 2.0 R = 0.2
	50						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), med. ~~loose~~ dense to loose, lt grayish yellow, v. fine to fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #28 P = 2.0 R = 0.2
	51		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #29 P = 2.0 R = 0.3
	52						
	53		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #30 P = 2.0 R = 0.5
	54	Becoming mostly med. grained sand w/ subordinate quantities of fine and v. fine grained sand					
	55		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #31 P = 2.0 R = 0.6
	56	Becoming mostly v. fine and fine grained w/thin beds of coarse grained sand - fine gravel (max. size 0.4 inch)					
	57		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #32 P = 2.0 R = 0.5
	58						
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 8 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP), med. loose, lt grayish yellow, v. fine to fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 33 P = 2.0 R = 0.5
	60						
	61		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 34 P = 2.0 R = 0.5
	62						
	63		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #35 P = 2.0 R = 0.6
	64						50 lbs of Aqua-gel bentonite added to drilling mud
	65		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 36 P = 2.0 R = 0.8
	66	w/layer 3-inch-thick of multi-colored, coarse grained sand					
	67		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 37 P = 2.0 R = 1.0
	68	becoming med. dense					

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

/CORPS/4-15-92

142

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 9 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, v. fine to fine grained w/ thin beds and partings of coarse grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 37 P = 2.0 R = ~~0.8~~ 1.0
	69		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 38 P = 2.0 R = 0.8
	70	w/ trace of disseminated coarse grained sand					
	71		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # ~~38~~ 39 P = 2.0 R = 1.2
	72						
	73	Becoming fine grained, well sorted	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 40 P = 2.0 R = 0.5
	74						
	75		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 41 P = 2.0 R = 0.6
	76						
	77						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

HOLE NO. MW-07D-A

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, vi fine to fine grained.	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 42 P = 2.0 R = 0.4
	78	Becoming loose					
	79		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 43 P = 2.0 R = 0.5
	80	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, lt grayish yellow, fine grained w/ seams and partings of dk yellow lean clay (trace) w/ little disseminated coarse grained sand					
	81		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 44 P = 2.0 R = 0.8
	82						
	83		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 45 P = 2.0 R = 1.0
	84	Becoming chiefly coarse grained, weakly cemented w/ grayish yellow lean clay in separate thin beds					
	85	Becoming fine grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 46 P = 2.0 R = 0.5
	86						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

MW-07 D-A

Remedial Investigation, Mead NOP | INSPECTOR: Gene Papinako | 11/12

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND (SP), med. dense, grayish yellow, v. fine to fine grained w/trace of disseminated med. grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #46 P = 2.0 R = 0.5 50 lbs of bentonite added to drilling mud
	87		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#47 P = 2.0 R = 0.6
	88	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, multi-colored, chiefly coarse grained w/little silt in fines (separate thin layers are cemented with silt) w/little fine gravel, elongated, subangular max. size 0.5 inch.					
	89		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #48 P = 2.0 R = 0.5
	90						
	91	Quantity of silt decreasing.	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 49 P = 2.0 R = 0.8
	92						
	93	w/trace of coarse gravel, subangular, max. size 1.1 inch.	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 50 P = 2.0 R = 2.8 (Extra recovery picked up from the previous run)
	94	w/ cobbles of pink quartzite, chert, gabbroids, etc.					
	95						

CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-07D-A

HTW DRILLING LOG

MW-07D

Remedial Investigation, Mead NOP | INSPECTOR: Gene Papinako | SHEET 12 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95						Interval 95-95.5 drilled w/ 5 1/8-inch-dia tri-cone roller-bit without sampling
	96	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), dense, multi-colored, subangular to subrounded, coarse gravel, max. size 1.5 inch w/ seams and partings of gray lean clay	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #51 P = ~~2.0~~ 1.5 R = 0.5
	97	w/ some coarse grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #52 P = 2.0 R = 1.0
	98	Max. size of gravel 2.0 inch					Borehole reamed w/ 7 7/8-inch-dia tri-cone roller-bit to the depth of 99 ft
	99	SHALE: Hard, olive gray, v. thinly laminated, clayey, slightly weathered	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #53 P = 2.0 R = 0.5
	100	Becoming med. gray w/ iron oxides staining					Temporary protective casing installed into borehole to the depth of 95.5 ft where large quartzite boulder
	101	Becoming bluish gray unweathered, micaceous	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #54 was encountered P = 2.0 R = 1.0
	102	[Omadi Member]					B.O.B 103.0 ft
	103	POORLY GRADED SAND (SP), dense, grayish white, fine grained w/ iron oxides staining [Weathered Omadi Sandstone]					Borehole abandoned and grouted to the ground surface w/ Pure Gold grout (10.1 - 10.2 lbs/gal) 200 gals used
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-07D

/CORPS/4-15-82

4/12/92

HTW DRILLING LOG

HOLE NO. MW9D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.562789 - E.2845983
5. NAME OF DRILLER: J Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8.25" Solid barrel; 7 7/8, 5 7/8 tricones; 3.0, 2.5, 2.0, 1 3/8 split spoons	8. HOLE LOCATION: NW SE NE Sec 20 T14N R9E
	9. SURFACE ELEVATION: 1168.90'
	10. DATE STARTED: 8-8-92 1300
	11. DATE COMPLETED: 8-11-92 0925
12. OVERBURDEN THICKNESS: 121.6'	15. DEPTH GROUNDWATER ENCOUNTERED: 51' ATD (Estimated)
13. DEPTH DRILLED INTO ROCK: 17.4'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 139.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~X~~ NA	NA	NA	NA / 1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~X~~ NA	NA	NA	NA	NA	NA	8 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (Installed well)	NA	MW-9D	NA	[illegible]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), ~~Mod~~ Firm, Brn to Dk Brn, moist, w/ abundant rootlets. (Top soil)	AMn: B6			P	Advanced boring w/ 7 7/8" tricone. Filled pits w/ 390 gal water + ~~3 bags~~ 50# Bent.
	2	LEAN CLAY (CL), firm, ~~Becoming~~ Lt Brn, moist w/ abundant rootlets. (~~Prairie~~ Loess)					P=2.0 B=2.0
	3		HMn: B6			P	P=2.0 B=2.0
	4		HMn: B6			P	P=1.5 B=2.5
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW9D

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Bar) LEAN CLAY (CL), ~~Firm~~, Lt. Brn, moist, w/ rootlets. (~~Pedogen~~ Loess)					
	6		HMu= B6			P	P=1.5 R=1.0
	7	~~W~~ Becoming Lt Brn mottled Lt. Gray w/ iron oxide staining					962
	8		HMu= B6			P	P=2.0 R=1.5
	9						
	10		HMu= B6			P	P=2.0 R=2.0
	11						
	12		HMu= B6			P	P=1.5 R=1.5
	13		HMu= B6			P	P=1.5 R=1.5
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D 1434

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) LEAN CLAY (CL) firm ~~Hard~~, LT Brn mottled LT Gray, moist (~~Partial~~ Loess)					P=1.0
	15		HNu= BL			P	R=2.0
	16		HNu= BL			P	P=1.0 R=1.0
	17	Poorly Graded Sand (SP), med dense (Est), LT. Gray, fine grained, dry (Alluvium)					added soils water + ~~2 bags~~ 100# of Bent #50 cont boring w/ 8.25" Soils barrel.
	18		HNu= BG			P	
	19						P=3.0 R=1.0
	20						
	21		HNu= BG			P	P=6.0 R=6.0
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

HTW DRILLING LOG

HOLE NO. MW9D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 4 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Gray) Poorly Graded Sand (SP), med grained Dense (EST), Lt. Gray, fine, dry.					
	24	(Alluvium)					
	25						
	26						
	27						
	28						P=6.0 A=6.0
	29		HMu= BG			P	
	30						
	31						
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

143

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SW) Poorly Graded Sand (SP), Med Dense (EST), Lt. Gray, fine grained					
	33						
	34						P=7.0
	35		HMn= B6			P	R=7.0
	36						
	37	w/Trace of med Sand					
	38						
	39	w/ med Sand content decreasing	HMn= B6			P	P=5.0
	40						R=5.0
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

HTW DRILLING LOG

HOLE NO. MW9D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: BJE

SHEET 6 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP), Med Dense (Est), Lt. Gray, fine grained, w/trace med Sand.					
	42						
	43						
	44						
	45	w/trace of coarse sand 45'-45.3'	HMu BG			P	P=4.0 R=4.0
	46	w/med and coarse sand grading out.					
	47						
							stopped 8-8-92 1750
	48						Started 8-9-92 0800 429/962
	49	w/trace of med sand	HMu BG			P	Add 74 gal of water + ~~3 bags~~ ~~50 bags~~ 150# P=4.0 R=4.0
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

143E

HTW DRILLING LOG

HOLE NO. MW 90

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 7 OF [illegible] SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sp) Poorly Graded Sand (SP), med Dense (BST), Lt. Gray, fine grained, dry w/trace med sand					
	51	Becoming wet w/med sand grading out					Water enters borehole @ 51'
	52						
	53						
	54						
	55		HNu 86			P	P=7.0 A=7.0
	56						
	57						
	58						
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KWC30

HOLE NO.: MW90

HTW DRILLING LOG

HOLE NO. MW 9D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: BJE

SHEET 8 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SW) Poorly Graded Sand (SP), med Dense (Est), Lt. Gray, fine grained, wet,					
	60						
	61						P=7.0 R=6.8'
	62		HNu= BG			P	
	63						
	64	w/trace of med sand					
	65						
	66						
	67		HNu= BG			P	P=8.0 R=7.0
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

1440

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP), Med Dense (est), Lt. Gray, fine grained, wet, w/ trace Med Sand					
	69						
	70						
	71						
	72						
	73						
	74						
	75						P=7.0 R=7.0
		w/ trace of coarse sand				P	
	76		HMr² BG				
		w/ coarse sand Gradey out					
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR A BJE | SHEET 10 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP), Med Dense (Est.), Lt Gray, fine grained, wet, w/trace med sand					
	78						
	79	w/trace coarse sand					
	80						
	81						added 150 gal water ~~+2~~ 150 # ~~30 bags~~ Bent.
	82						
	83		HNu=86			P	P=7.0 R=4.0
	84	w/coarse sand Grading out					
	85						
	86	w/trace coarse sand					

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

ICORPS/4-15-92

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HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	87	(Sand) Poorly graded Sand (SP), Med Dense (EST), Lt. Gray, fine, wet, w/ trace of med and coarse sand.					
		W/ some med and trace of coarse sand					
	88						
	89						P=4.0 R=3.5
	90		HNu= B6			P	
	91	W/ trace of med w/ coarse sand gradually out					Cost 200 Sat water 81-99
	92						
	93						P=7.0 R=7.0
	94	w/ some med to coarse sand and little fine gravel	HNu= B6			P	
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

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HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJF | SHEET 12 OF ~~11~~ SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SW) Poorly Graded Sand (>P), med Pebbles (EST), LT. Gray, fine wet, w/ Some med to coarse sand and Little fine Gravel					
	96	W/some med sand and Little coarse ~~gr~~ sand and ~~few~~ little fine gravel and trace coarse gravel					
	97						
	98	W/ trace med and coarse sand and fine and coarse Gravel.					
	99						Added 200 gal. Water + ~~2~~ 100# bags #50 Bent.
	100	Becoming coarse sand ~~and Gravel~~ w/ Some fine Gravel and few coarse Gravel.					P=7.0' R=2.0'
	101		HMn= BG			P	Lost 200 gal in ~~this~~ interval from 99 – 106
	102						
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 13 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SM) Poorly Graded Sand (SP) ~~[illegible]~~ Med Dense (Fgt), Lt. Gray, Coarse grained, wet w/ Some Fine Gravel and few coarse Gravel.					
	105	Becoming fine sand w/ some med and coarse sand and few fine Gravel.					
	106	~~Becoming~~ Becoming coarse sand w/ some fine gravel and trace coarse gravel.					added 200 gal water + 100# ~~2#50 bags~~ of Bent.
	107	w/ occasional thin 2"-3" layers of strongly cemented fine and coarse sand.					
	108		HNu 0 BG			P	P=6.0 R=4.0'
	109						
	110						Lost 200 gal water from 106-112
	111						
	112		HNu 0 BG			P	P=2.0 R=2.0
	113	Becoming fine to coarse sand w/ trace fine Gravel					

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded Sand (SP), Med Dense (FST), Lt. Gray, fine to coarse grained, wet, w/trace fine Gravel.					
	114						added 120 gal water ~~150 long~~ 50 lb Bent.
		W/ Some fine gravel and trace of Coarse Gravel					
	115						
	116						P=6.0 R=4.0
	117		HNu= B6				
	118						
	119						
		W/4" layer of fine sand ~~with~~ strong cementation W/ thin silt ~~layer~~ lamination					Stopped 8-9-92 1715
	120	Brown Red in color					Started 8-10-92 0700 added ~~1000~~ 100 gal water + ~~50 long~~ ~~150 Bent~~.
	121		HNu" B6			P	P= ~~5.0~~ 4.6 R=3.0
		Sandstone: Tannish Red, Soft, v. weathered, fine grained, weakly cemented					
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW9D

ICORPS/4-16-92

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HTW DRILLING LOG

HOLE NO. MW9D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	123	Sandstone: ~~Reddish brown~~ Tannish Red, soft, v. weathered, fine grained, ~~Pro~~ weakly cemented (Omadi)					
	124						
	125		NO	Sample			Cont w/ 5¾" tricone Stopped 8-10-92
				Rmft 1	Acc 1.1/10.0	RQD 0%	cont. 8-18-92 Placed casing 6" dia. flush joint to 125.1 Driven w/30016 hammer.
Lost	126					DWR 95%	Cont. Boring w/ 5.5" core barrel time - 0820 - 0832
	127						mixed 475 gal water + ~~7.5 bags~~ 175# Bent.
	128						Lost 60 gal of Drilling fluids from 125 - 135'
	129						Loss - 8.9' U-Loss 5.9'
	130						
	131						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

144

B07NE003702-05556

HTW DRILLING LOG

HOLE NO. MW9D

Remedial Investigation, Mead NOP | INSPECTOR BOE | SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Sand Stone: Tannish Red, Soft, V. weathered, fine grained, weakly cemented. (Omadi)					
	132						C.D. 132.0'
Lost							
	133						
	134						
	135						
				Run # 2	Rec 0/4.0	RQD 0%	Time 0911-0925
	136						
						DWR 100%	LOSS-4.0 ULOSS-5.5 CD-137.5'
Lost	137						No water loss.
	138						
	139						BOH 139.0' monitoring well installed upon completion 8-11-92 60 gal water loss in screen interval

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW9D

144

B07NE003702-05557

CEA 7/24/92

Abandoned

HTW DRILLING LOG

HOLE NO. MW21 D

SHEET 1 OF 15 SHEETS

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Keystone 50 / Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" straight shoe BBL; 7" Reaming shoe; 8.25" Soils barrel; 9 7/8, 8 Tricone	8. HOLE LOCATION: SE SW SE Sec. 23 T14N R8E Approx 1 mile south of Load Line 1 (10 ft East of MW-21D)
	9. SURFACE ELEVATION: 1170 ±
	10. DATE STARTED: 6-28-92 / 1603 — 11. DATE COMPLETED: 7-7-92 / 0937
12. OVERBURDEN THICKNESS: ~~[illegible]~~ ~~NA~~ 125.0	15. DEPTH GROUNDWATER ENCOUNTERED: 33.0' ATD
13. DEPTH DRILLED INTO ROCK: 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 125.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	X	NA	NA ~~0~~

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA				— %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
~~Abandoned~~ Back filled CEA	X ~~Pure Bolt Grout~~	NA	NA	Robert Ehresman

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY(CL), Hard, Brn, Dry, w/ rootlets (Fill)	HNu= B6			58	Advanced Boring w/ 6" BBL Straight Shoe followed by 7" Reaming shoe every 6' w/ cable-tool method (Keystone 50 rig) D # 1 D=2.0 R=2.0
	2						D# 2 D=2.0 R=2.0
	3		HNu= B6			36	
	4	Becoming Soft, moist					D # 3 D=2.0 R=2.0
	5		HNu= B6			66	

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW21

HTW DRILLING LOG

HOLE NO. MW21

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 2 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), Hard, Dr lc Gray, moist to dry, w/ rootholes. (Loess-topsoil)					Soil has an Alluvial appearance, could possibly be fill.
	6						
	7		HNu= BG			51	DH4 D=2.0 R=2.0
	8						
	9	Becoming Firm, Lt. Brn mottled Lt. Gray, moist, w/ Iron oxide staining.	HNu= BG			61	DH5 D=2.0 R=2.0 Reamed from 0'-10' w/ 9 7/8" Tricone bit. 6-29-92
	10						
	11		HNu= BG			62	DH6 D=2.0 R=2.0
	12						
	13		HNu= BG			52	DH7 D=2.0 R=2.0
	14						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21

1450

ICOHPW4-16-92

HTW DRILLING LOG

MW-21

Remedial Investigation, Mead NOP | INSPECTOR: BJE | SHEET 3 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	15	(Same) LEAN CLAY(CL), Firm, Lt Brn mottled Lt. Gray, moist, w/ rootholes	HNu= BG			36	DH 8 D=2.0 R=2.0
	16						
	17		HNu= BG			38	DH 9 D=2.0 R=2.0
	18						stopped 6-28-92 1700 Started 6-29-92 0700
	19		HNu= BG			36	DH 10 D=2.0 R=2.0
	20	Poorly Graded SAND(SP), Med Dense (Est.), Lt. Gray, fine grained dry, w/ trace of med. grained sand and Limonitic staining (Alluvium)	HNu= BG			55	DH 11 D=2.0 R=2.0
	21						
	22	w/ med grained sand Grading out and w/ no Limonitic staining	HNu= BG			81	DH 12 D=2.0 R=2.0
	23						

ICOHPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-21

HTW DRILLING LOG

HOLE NO. MW 21

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), med Dense (Est.), Lt. Gray, fine grained, Dry					
	24						
			HNu= B6			54	D#13 D=2.0 A=2.0
	25						
	26						
			HNu= B6			53	D#14 D=2.0 A=2.0
	27						
	28						
			HNu= B6			66	D#15 D=2.0 A=2.0
	29						
	30						
			HNu= B6			75	D#16 D=2.0 A=2.0
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

HTW DRILLING LOG

HOLE NO. MW21

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 5 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded Sand (SP), med Dense (Est.), Lt. Gray, fine grained, dry	HNu= B6			72	D#17 D=2.0' R=1.0' water Encountered ATD 33.6'
	33	Becoming wet					Reamed from 10' to 33' w/ 8.25" Soils barrel 6-29-92
	34		HNu= B6			34	D#18 D=1.0' R=0.4' stopped 6-28-92
	35						started 6-29-92 Cont. Boring w/ 8.25" Soils barrel
	36						mixed drilling fluids 1700gal water w/ 17 50# bags bent. V.S-35 sec.
	37		HNu= B6			P.	P=7.6' R=4.0' Boring continued w/ Failing 1500 drill rig
	38						
	39						
	46	w/trace of Med grained Sand.					
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

ICONMS/4-18-82

145

B07NE003702-05562

HTW DRILLING LOG

MW21

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP) med Dense (Est.), Lt Gray, fine grained, wet, w/ trace of med grained sand.					
	42	42.0 - w/ Little med grained sand w/ trace of coarse grained sand.					
							P=4.0
	43						R=4.0
			HNu=			P	
	44		B6				
	45	w/ ~~trace~~ med and coarse grained Sand Grading out					
	46						
							P=7.0
	47		HNu=				R=7.0
			B6			P	
	48						
	49						
	50						

ICOHPS/6-18-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

1454

B07NE003702-05563

HTW DRILLING LOG

Remedial Investigation Mead NOP	INSPECTOR BJE		HOLE NO. MW21 SHEET 3 of 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sme) Poorly Graded SAND (SP), Med Dense (Est.), Lt Gray, fine grained, wet, w/ trace of Med Sand.					
	51						
	52						
	53	w/ ~~trace~~ occasional med. grained Sand.					
	54		HNu= B6			P	P=5.0 A=5.0
	55						
	56						
	57						
	58						
	59	med grained Sand Grades out					

ICONPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

HTW DRILLING LOG

HOLE NO. MW-21

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded SAND (SP), Med Dense (Est.), Lt Gray, Fine grained, wet.					
	60						
	61		HNu=			P	P= 7.0 A=7.0
	62		BG				
	63						
	64						Stopped 6-29-92 1700
	65						Started 6-30-92 0700
	66		HNu= BG				
	67						
	68						

ICONPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

145t

B07NE003702-05565

HTW DRILLING LOG

HOLE NO. MW21

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 9 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), Med Dense (Est), Lt. Gray, fine grained, wet.					
	69						
	70						
	71						
	72						
	73		HNu = B6	#1 Bag Sample		P	P = 7.0 R = 7.6 Collected Sample for Sieve Analysis 72'-79'
	74						
	75						
	76						
	77						Bot of fine Sand ~~76.5'~~

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

HTW DRILLING LOG

HOLE NO. MW 21

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	Poorly Graded Sand (GP), med Dense (Est.), multi colored, coarse grained, wet, w/some med sand, and little fine sand and few fine gravel					
	79						Added ~~of 400 lb~~ ~~50# bags~~ of Bent. To drilling fluids.
	80						
	81	Becoming fine grained Sand, w/ Some coarse grained sand, and little med grained sand and trace of fine Gravel	HNu= B6			P	P = 6.0 R = 6.0
	82						
	83						
	84	Becoming Coarse grained, w/ Some med sand, and Little fine grained sand and few fine Gravel					
	85	Poorly Graded Gravel (GP) with Sand (GP), Med Dense (Est.), multi colored, fine, wet, w/ Some med to coarse grained sand and trace of fine grained sand and coarse Gravel					
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

1458

ICORPS/4-16-92

HTW DRILLING LOG

MW21

Remedial Investigation Mead NOP | INSPECTOR: BJE | SHEET 11 of 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded Gravel (GP) with Sand (GP) med Dense (Est.), multi colored, fine wet grained w/ some med to coarse grained Sand, and trace of fine grained Sand and Coarse Gravel					
	87						
							P = 6.0'
							R = 3.5
	88						calc. water Loss from 0' to 91' 200 gal.
	89						
	90						Reamed from 35' to 91' w/ 9 7/8" tricone 6-30-92 1730 Stopped 6-30-92
	91	Poorly Graded Sand (SP) med Dense (Est.) Lt Gray, fine grained moist w/ Little med and coarse grained Sand, strongly cemented w/ Silt Laminations.					Started 7-1-92 0700
	92	Becoming fine to coarse w/ Little fine gravel and No cementation	Not Taken				P = 4.0 R = 0.0 Added 400# Bent. and 1200 gal of water. 6-30-92
	93						Added 250# Bent 7-1-92
	94						
	95	Becoming fine sand, w/ Little med and coarse sand and trace of fine Gravel.					

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW21

ICOHPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW 21

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded Sand (SP), Med Dense (Est), Lt Gray, fine grained, wet, w/ Little med and coarse grained sand, w/ trace of fine Gravel.					
	96					P	P = 5.0 R = 3.5
	97	w/ med and coarse grained sand Grading out	HNu= BG				
	98	w/ Little med and coarse grained Sand and trace fine Gravel.					
	99						
	100	Becoming strongly cemented w/ No cementation					
	101	Becoming fine grained Sand w/ med and coarse grained Sand Grading out	HNu= BG			P	P = 5.0 R = 3.0
	102	Becoming fine to coarse grained Sand, w/ few fine Gravel and trace of coarse Gravel. max dia (1.")					
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21

1460

ICOHPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW 21

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		~~Poorly~~ WELL Graded SAND (SW), med Dense (Est.), LT. Gray, fine to coarse ~~grained~~, wet, w/ Few fine Gravel and trace of Coarse Gravel					
	105						
	106						D = 5.0 R = 3.5
	107		HNu = B6				
	108						
	109						
		Becoming Strongly cemented					
	110	~~Becoming~~ w/ No cementation					
							D = 5.0 R = 0
	111		~~Not taken~~				
	112						
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21

ICONFS/4-16-82

HTW DRILLING LOG

MW21

Remedial Investigation, Mead NOP | INSPECTOR: BJE | SHEET 14 OF 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	114	Well (Sand) ~~Poorly~~ Graded SAND (SW), med Dense (Est), Lt Gray, fine to Coarse, w/ few fine gravel and trace of Coarse and Occasional layers w/ Strong cementation.					Estimated Water loss 91'-115' 260 gal. Reamed w/ 9 7/8" tricone from 91' to 115' 7-2-92 1700 Stopped 7-1-92
	115	POORLY GRADED SAND (SP) ~~Becoming~~ Green, Dense (Est) fine grained w/ Some med and Coarse grained sand, and trace of fine to coarse Gravel					Started 7-2-92 0700
	116		HNu= 86			P	P=2.5 R=1.5 Added 300# ~~bags~~ of Bent. 300 gal water 7-1-92
	117						~~Reamed hole not increased during w/ M. Perp. Added~~
	118						Added 250# ~~5 #50 bags~~ of Bent. and 100 gal water
	119						P=6.5 R=1.0
	120						~~Reamed 12 in second hole~~ ~~P=2.50~~ ~~R=~~
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW21

ICOHPS/4-18-92

HTW DRILLING LOG

MW 21

Remedial Investigation Mead NOP | INSPECTOR: BJE | SHEET 15 of 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sac) Poorly Graded Sand (SP) Dense (Est.), Green, Fine grained, wet, w/ Trace of med to Coarse grained Sand and fine to Coarse Gravel					Est. water Loss 115'-125' 200 gal. 7-2-92 Added 6.5 bags #50 bent 7-2-92 Reamed w/ 9 7/8" Tricone from 115' to 125' 7-2-92
	123						
	124	w/ Little med to Coarse grained Sand and Few fine Gravel and trace Coarse Gravel	HNu= B6			160 162	Cont. w/ 7 7/8" tricone, Sampled w/2.5" dia. Spt. and 300 lb Hammer 1700 Stopped 7-2-92
	125						Started 7-7-92 0700 Cont. w/ 9.25" Soils Barrel
	126					B.O.B 125.0'	Weld broke on Rods leaving 90' of rods and Soils barrel in bore hole 7-7-92 / 0937
	127						Retrieved rods and soils barrel 7-10-92/1100 Some rods used for retrieving were lost in bore hole. Bore hole Abandoned w/ Pure Gold Grout Estimated amount to fill 125' 510 gal. Amount used to fill bore hole 550 gal. Moved 10' West and Redrilled Borehole BOH 125.0'

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21

ICONPSV4-18-92

cont 7/24/92

HTW DRILLING LOG

HOLE NO. MW21D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.558979 - E.2829493
5. NAME OF DRILLER: Danny Marquis	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 9 7/8", 5 5/8" Tricone; 2.5" Split spoon; 8.25" Soils barrel; 5.5" core barrel	8. HOLE LOCATION: SE 1/4, SW 1/4, SE 1/4 sec 23 T14N, R8E approx 1 mi. South load line 1
	9. SURFACE ELEVATION: ~~1170~~ 1163.26'
	10. DATE STARTED: 7-12-92 1230
	11. DATE COMPLETED: 7-15-92 1530
12. OVERBURDEN THICKNESS: 127.3'	15. DEPTH GROUNDWATER ENCOUNTERED: 33.0' ATD
13. DEPTH DRILLED INTO ROCK: 11.7'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 139.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
1	X	NA	~~8~~ NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring Installed Well	NA	MW21D	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), Hard, Brn, Dry, w/ rootlets (Fill)					(Advanced) Boring w/ 9 7/8" tricone Dit and Drilling fluids
	1	Note: Soils descriptions Taken from Abandoned boring log MW21 where samples were not taken.					Placed 2845 gal. water 1500# ~~30 1150 bags~~ of Bentonite in pits
	2						
	3						
	4	Becoming soft, moist					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW21D

1464

B07NE003702-05573

HTW DRILLING LOG

HOLE NO. MW 21 D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), Hard, Drk Gray, moist to dry, w/ rootholes. (Loess - topsoil)					Soil has an alluvial appearance could possibly be fill.
	6						
	7						
	8						
	9	Becoming firm, LT. Brn, mottled Lt. Gray, moist, w/ Iron oxide(?) staining					
	10						
	11						
	12						
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21 D

HTW DRILLING LOG

HOLE NO. MW 21D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 3 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) LEAN CLAY (CL), firm, Lt. Brn mottled Lt. Gray, moist, w/ rootholes					
	15						
	16						
	17						
	18						
	19						
	20	Poorly Graded Sand (SP), Med Dense (Est), Lt. Gray, fine grained, dry, w/ trace of med sand and Limonitic(?) Staining (Alluvium)					
	21						
	22	w/ med Sand Grading out and no Limonitic(?) staining					
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21D

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HTW DRILLING LOG

HOLE NO. MW 21D

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 4 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), Med Dense (Est.), Lt. Gray, fine grained, Dry					
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21D

HTW DRILLING LOG

HOLE NO. MW 21 D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 5 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded Sand (SP), Med Dense (Est), Lt. Gray, fine grained, dry					
	33	Becoming Wet					→ water encountered ATD
	34						
	35						
	36						
	37						
	38						
	39						
	40	w/trace of med grained Sand.					
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21 D

HTW DRILLING LOG

HOLE NO. MW21D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR BOE

SHEET 6 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand (SP), Med Dense (Est.), Lt. Gray, Fine grained, wet, w/ trace of med. sand					
	42	w/ Little med sand and trace of coarse sand.					
	43						
	44						
	45	w/ med and coarse grained sand Grading out.					
	46						
	47						
	48						
	49						
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

/CORPS/4-16-82

HTW DRILLING LOG

HOLE NO. MW21D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 7 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded SAND (SP), Med Dense (Est.), Lt. Gray, fine grained, wet, w/trace of med Sand					
	51						
	52						
	53	w/ ~~occasional~~ few med. grained sand					
	54						
	55						
	56						
	57						
	58						
	59	med grained Sand Grades out					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

147(

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 8 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), Med Dense (Est.), Lt. Gray, fine grained, wet.					
	60						
	61						
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 9 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly Graded SAND (SP), Med Dense (Est), Lt. Gray, fine grained, Wet					
	69						
	70						
	71						
	72						
	73						~~72'-79' collected sample for sieve analysis in MW21 abandoned.~~
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

147

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	Poorly Graded Sand SP, med Dense (Est) Multi colored, coarse grained wet, w/ some med sand, and little fine sand and few fine Gravel					
	79						
	80						
	81	Becoming fine Sand, w/ Some coarse sand and Little med sand and trace of fine Gravel					
	82						
	83						
	84	Becoming Coarse, w/ some med Sand, and Little fine Sand and few fine gravel					
	85	Poorly Graded Gravel (GP) with SAND (SP), med Dense (Est.), Multi colored, fine, wet, w/ some med to coarse sand and trace fine sand and coarse Gravel.					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

HTW DRILLING LOG

HOLE NO. MW 21 D

Remedial Investigation Mead NOP | INSPECTOR BOE | SHEET 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sme) Poorly Graded Gravel with SAND, (GP) ~~SP~~, med Dense (Est), multi colored, fine, wet, w/some med to coarse grained sand and trace of fine grated sand and coarse Gravel					
	87						~~Resample~~ ~~Resample~~
	88						~~Resample Doesn't appear recovery in first boring.~~
	89						
	90						Est. water Loss 0' to 90.5' 0 gal.
	91	Poorly Graded Sand (SP) med Dense (Est), Lt. Gray, fine grained, moist, w/ little med and coarse grained sand, strongly cemented w/ silt laminations	HNu B6			P	P = 5.5 B = 5.6
	92	Becoming fine to coarse w/ Little fine Gravel and No cementation					Resampled Due to poor recovery in first boring (MW-21 - abandoned)
	93						
	94						
	95	Becoming fine grained sand, w/ little med and coarse sand and trace of fine Gravel.					

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21D

1474

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 12 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand (SP), med Dense (Est), Lt. Gray, fine grained wet, w/ little med and					
	96	coarse grained sand, w/ trace of fine Gravel					Stopped 7-12-92 1630
							Started 7-13-92 0700
							Added ~~3 bags~~ ~~#50 Bent~~ 150# bentonite
	97	w/ med and coarse grained sand Grading out					
	98	w/ Little med and Coarse grained sand and trace fine Gravel					
	99						
	100	Becoming Strongly cemented w/ no cementation					
	101	Becoming fine grained ~~sand~~ w/ med and coarse grained sand Grading out					
	102	Becoming fine to Coarse grained, ~~sandy~~ w/ few fine Gravel and trace of coarse Gravel max dia. (1")					
	103						
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

147

B07NE003702-05584

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 13 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Wet ~~Poorly~~ Graded Sand (SW) ~~(SP)~~, Med Dense (Est.), Lt. Gray, fine to Coarse grained, wet, w/ few fine Gravel and trace of Coarse Gravel.					
	105						
	106						
	107						
	108						
	109						
		Becoming Strongly cemented					No appreciable water loss 90'-110' Added 888 gal water + ~~Grout~~ 300# ~~50~~ bentonite
	110	w/ no cementation					P = 5.0' R = 0.2' ~~Rec~~
	111		HNu = BG			P	
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW21D

147E

HTW DRILLING LOG

HOLE NO. MW 21D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 14 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) ~~Well~~ Graded Sand (SW), Med Dense (Est), Lt. Gray, fine to coarse, ~~Gravel~~, wet, w/ few fine gravel and trace of coarse gravel and occasional layers w/ strong cementation					
	114						
		POORLY GRADED SAND (SP)					
	115	~~Becoming~~ Green Dense (Est), fine grained, w/ some med to coarse grained sand, and trace of fine to coarse gravel.					
	116						P=5.0' R=4.5
	117		HNu= B6			P	
	118						
	119						
	120						
	121		HNu= B6			P	P=5.0' R=5.0'
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 21D

ICORPS/4-16-92

147

B07NE003702-05586

HTW DRILLING LOG

MW21D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 15 of 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP), Dense (Est), Green, fine grained, wet, w/ trace of med to coarse grained Sand and fine to coarse Gravel					
	123						
	124	w/ Little med to Coarse Sand and few fine Gravel and trace of coarse Gravel					Est. water loss 110' to 125' 210 gal.
	125			#1			P=3.6' A=3.6'
	126		HNu= B6	Bag sample		P	Bag Sample Taken 125-128.6 for sieve analysis
	127						Est. water loss 125-128.6' 400 gal.
		~~(SM)~~ ~~Siltstone~~: Brn and Gray, Soft, U weathered, Sandy					
		Sand Stone: Gray, Soft, U. fine Grained, weak cementation w/ occasional fine well rounded Gravel. [Omadi Member]					
	128						Reamed to 128.5' w/ 9 7/8" tricone 1730 Stopped 7-13-92
	129						Cont. w/ 5 5/8" Tricone Bit Started 7-14-92 0700 Installed 6" dia. flush Joint casing from 0-129.5' Driven w/ 3001b hammer 7-14-92
	130			Run#1	Rec 0/5.0	RQD 0% DWR 100%	Cont. w/ 5.5" dia. core barrel and drilling fluids Time= 1 hr
	131						

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: 147E MW21D

(CONFW4-18-92)

HTW DRILLING LOG

HOLE NO. MW21D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 16 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	132	(Sand) Sand Stone: Lt. Gray, Soft, V. Fine grained, weak Cementation, w/ occasional Fine well rounded Gravel	~~Not Taken~~				C.D. 131.2' U-Loss-1.2' Loss-3.0' CD 132.5' Tape check 131.2'
	133		~~Not Taken~~	Run# 2	Rec 0/1.0 GET	RQD 0% DWR 100%	Loss - 1.0 U. Loss-1.3 1700 Stopped 7-14-92
	134		HMu= BG			232	Cont. w/ 2.5" Dia Spt - 3001b Hammer And 5 5/8" Tricone D=0.5 R=0.5 Started 7-15-92 0700
	135		~~Not Taken~~	Run# 3	Rec 0/1.5 GET	RQD 0% DWR 100%	Cont. w/ 5.5" Dia. Core barrel. time - 5 min. Loss - 1.5 U Loss - 1.5 Tape check 136.0'
	136		HMu= BG				Cont. w/ 2.5" dia. Spt. - 3001b Hamer 5 5/8" Tricone Bit.
	137		HMu= BG				Est. water loss 130' - 139' 50 gal.
	138		HMu= BG				
	139						BOH 139.0' Boring completed as Monitoring well ~~Installed upon completion~~ 7-16-92
	140						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 21D

HTW DRILLING LOG

HOLE NO. MW-25D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.560311 - E.2830679
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: CED Failing 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" DRAG BIT, 2" Split Spoons; 94mm Christenson wire line; 3½ x 2½ core bbl, 4¾ Tungsten bit; 4¾ tricone roller bit; 5⅝ Tricone Roller Bit; 7⅝ Tricone Roller Bit	8. HOLE LOCATION: SW 1/4 NW 1/4 SW 1/4 SEC 24 T14N, R8E Southwest of load line # 2
	9. SURFACE ELEVATION: ± ~~1170~~ 1173.12'
	10. DATE STARTED: 6/24/92 — 11. DATE COMPLETED: 6/29/92
12. OVERBURDEN THICKNESS: 157.5'	15. DEPTH GROUNDWATER ENCOUNTERED: ~~UNKNOWN~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 12.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 170.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
MW8-025-042, MW8-025-083, MW8-025-151 ~~MW8-025-167~~ 4	X	NA	TOC	Explosives	NA	11 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-25D		[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Lean CLAY (CL), soft, DK brown w/ occ. rootlets (topsoil)					Start 6/24/92 Boring Advanced w/ 5" drag bit, water, 2" split spoons. Densities are estimated
	1		HNu BKG	1			D #1 P = 2.0 R = 1.6
	2	becoming light brown, silty w/ trace v. fine sand w/ occ. iron & mn. nodules (loess)	HNu BKG	2			D #2 P = 2.0 R = 1.6
	3						
	4		HNu BKG	3			D #3 P = 2.0 R = 2.0
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-25D

HTW DRILLING LOG

HOLE NO.: MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Lean ~~silty~~ CLAY (CL) w/ trace v. fine sand, soft, light brown w/ occ. Fe & Mn staining (Loess)		3			D #3
	6						
	7		HNu BKg	4			D #4 P = 2.0 R = 2.0
	8						
	9		HNu BKg	5			D #5 P = 2.0 R = 2.0
	10						
	11		HNu BKg	6			D #6 P = 2.0 R = 2.0
	12	w/ occ. clay seams, grey (0.5 cm thick)					
	13	Becoming sandy	HNu BKg	7			D #7 P = 2.0 R = 2.0
	14	~~Top of fine sand~~ Poorly graded silty SAND (SM) loose, lt brn, fine to v. fine grained w/ silt (Alluvium)					

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 3 OF 3 SHEETS

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
							Boring "continued" Begin 94 mm Christensen wire-line sampling
	15	(Same) Poorly graded silty SAND (SM) loose, light brown, fine to v. fine grained (Alluvium)	HNu BKg	8			D #8 P = 2.6 R = 1.0
	16						
	17		HNu BKg	9			D #9 P = 2.6 R = 0.9
	18						
	19		HNu BKg	10			D #10 P = 2.6 R = 0.6
	20	Poorly graded ~~clean~~ SAND (SP), ~~loose~~ med. dense (estimated), Tan, fine to v. fine grained (Alluvium)	HNu BKg	11			D #11 P = 2.6 R = 0.8
	21						
	22		HNu BKg	12			D #12 P = 2.6 R = 0.9
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

ICORPM 4-16-92

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					D #12
		Poorly graded ~~clean~~ SAND (SP) ~~loose~~ med. dense, Tan, fine to v. fine grained		12			
	24	w/ trace med. sand (Alluvium)					
	25		HNu BKG	13			D #13 P = 2.6 R = 1.0
	26						
	27		HNu BKG	14			D #14 P = 2.6 R = 1.0
	28						
	29		HNu BKG	15			D #15 P = 2.6 R = 0.9
	30						
	31		HNu BKG	16			D #16 P = 2.6 R = 1.0
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

HTW DRILLING LOG

HOLE NO.: MW-25D
SHEET 4 OF 20 SHEETS

PROJECT: Remedial Investigation, Mead NOP
INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded ~~clean~~ SAND (SP) med. dense ~~loose~~, tan, fine to v. fine grained					
	33	w/trace med sand (Alluvium)	HNu BKG	~~16~~			D #16 P=2.0 R=1.0
	34						
	35		HNu BKG	~~17~~			D #17 P=~~2.0~~ 3.0 R=1.5
	36						
	37						
	38		NO Sample	~~18~~			D #18 P=2.0 R=0 ~~NO RECOVERY~~
	39						
	40		NO Sample	~~19~~			D #19 P=2.0 R=0 NO RECOVERY
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-25D

1484

B07NE003702-05593

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Hecht

SHEET 5 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(Same) Poorly graded ~~stony~~ SAND (SP) med. dense, ~~loose~~, fine to v. fine grained, tan w/ trace med. grained sand (Alluvium)	HNu BKg	~~20~~			D# 20 P= 2.0 R = 0.7
	43						
	44		HNu BKg	~~21~~			D # 21 P= 2.0 R= 0.9
	45						
	46		HNu BKg	~~22~~			D # 22 P= 2.0 R= 0.5
	47						
	48		HNu BKg	~~23~~ #1 Bag Sample	MWC-025-047 1x4oz 2x4oz 1x8oz		SAMPLE COLLECTED for 47 - 49 ft ~~1 bag~~ TOC ~~2 bag~~ VOC ~~1 bag~~ Explosion ~~1 bag~~ ~~Stony~~ Gram size WATER TABLE ASSUMED @ 47' D # 23 P= 2.0 R= 1.0 Stopped 6/24/92
	49						Started 6/25/92
	50		NO SAMPLE	~~24~~			D# 24 P= 2.6 R = 0 ~~No Recovery~~

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

ICORPS/4-18-92

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 6 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) ~~loose~~ med. dense, tan, fine to v. fine grained w/ trace med. grained sand (Alluvium)		~~24~~			
	51						
	52		HNa Bkg	~~25~~			D # 25 P=2.0 R=0.9
	53						
	54		HNa Bkg	~~26~~			D # 26 P=2.0 R=0.8
	55						
	56		HNa Bkg	~~27~~			D #27 P=2.0 R=1.4
	57						
	58	~~becoming fine to v. fine~~ w/ few med. sand	HNa Bkg	~~28~~ 6			D#28 P=2.0 R=1.6
	59						

ICORPM 4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

1486

B07NE003702-05595

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 7 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same)					
		Poorly graded clean SAND (SP) med. dense loose, fine to v. fine grained w/					
	60	Trace med. grained sand (Alluvium)	HNu BKg	~~29~~			D#29 P=2.6 R=1.1
	61						
	62		HNu BKg	~~30~~			D #30 P=2.0 R=1.2
	63						
	64		HNu BKg	~~31~~			D #31 P=2.0 R=0.9
	65						
	66		HNu BKg	~~32~~			D #32 P=2.6 R=0.7
	67		HNu BKg	~~33~~			D #33 P=2.6 R=1.0
	68						

ICORPS 4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

HTW DRILLING LOG

HOLE NO.: MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 8 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) poorly graded ~~clean~~ SAND (SP) ~~med. dense~~, tan, fine to v. fine grained w/ trace med. ~~sand~~ grained (Alluvium)		~~33~~			
	69						D #34
	70	w/ few med. ~~sand~~ grained sand	HNu BKG	~~34~~			P = 2.6 R = 1.3
	71						
	72	Becoming v. fine	HNu BKG	~~35~~			D #35 P = 2.6 R = 0.9
	73						
	74	Becoming fine to v. fine	HNu BKG	~~36~~			D #36 P = 2.0 R = 1.5
	75						
	76		HNu BKG	~~37~~			D #37 P = 2.0 R = 1.3
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

1488

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25D

Remedial Investigation Mead NOP | INSPECTOR J. Hecht | SHEET 9 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) med. dense loose, fine to v. fine grained, tan w/ trace med. sand. (Alluvium)					
	78		HNu BKg	~~38~~			
	79						
	80		HNu BKg	~~39~~			
	81						
	82		HNu BKg	~~40~~			
	83						
	84		HNu BKg	~~41~~ #2 Bag Sample	MWB-025 -083 1x4oz 2x4oz 1x8oz		Sample collected for ~~1.4oz~~ TOC ~~2.4oz~~ VOC ~~1.8oz~~ Explosion 1 bag ~~Grows~~ grain size Bottom of fine SAND, top of SAND & GRAVEL P=2.0 D#41 R=1.6
	85	Poorly graded SAND, loose, tan ~~brownish~~ v. fine to medium grained w/ trace gravel	HNu BKg	~~42~~			D #42 P=2.0 R=1.0
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

1489

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 10 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded ~~clean~~ SAND (SP) ~~loose~~ med. dense, tan, v. fine to med grained w/ Trace gravel (fine - med) (Alluvium)		42			
	87	well graded SAND (SW) ~~loose~~ dense, tan & red, v. fine to coarse w/ Trace fine to med. gravel (Alluvium)		43			D # 43 P = 2.0 R = 0.6
	88						
	89	Poorly graded SAND (SP) ~~loose~~ med. dense, tan, v. fine to fine grained w/ Trace med. sand (Alluvium)		44			D # 44 P = 2.0 R = 0.7
	90						
	91	Poorly graded GRAVEL (GP) ~~loose~~ dry, v. fine to coarse w/ little sand (Alluvium)					DRILLER FEELS GRAVEL
	92		NO Sample	45			D # 45 P = 2.0 R = 0 logged by cuttings ~~no recovery~~
	93		NO Sample	46			D # 46 P = 2.0 R = 0 logged by cuttings ~~no recovery~~
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

1490

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25D

Remedial Investigation, Mead NOP | INSPECTOR J. Hecht | SHEET 11 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(Same) Poorly graded GRAVEL (GP) V. loose, Tan & RED, fine to coarse w/ little sand (Alluvium)	HNu BKg	47			D #47 P=2.6 R=1.7
	97	well graded SAND (SW) med dense, fine to coarse grained Tan & Red w/ occ. orange clay laminations (Alluvium)	HNu BKg	48			D #48 P=2.6 R=1.6
	98	Poorly graded GRAVEL (GP) V. loose, Tan & RED, fine to coarse w/ few fine grained sand grains and trace ~~occ.~~ fine grained sand seams (Alluvium)	HNu BKg	49			D #49 P=2.6 R=0.7
	100		HNu BKg	50			D #50 P=2.6 R=0.6
	101		HNu BKg	51			D #51 P=2.6 R=0.9
	102	well graded SAND (SW) med dense. Tan & Red, fine to coarse, with few fine To coarse gravel (Alluvium)					
	103						
	104						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

ICORPS/4-15-92

1491

B07NE003702-05600

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: J. Hecht | SHEET 12 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	(Same) well graded SAND (SW) med. dense, fine to coarse grained Tan red w/ few fine to coarse gravel (Alluvium)		51			
	106		HNu Bkg	52			D # 52 P = 2.6 R = 0.4
	107						
	108		HNu Bkg	53			D # 53 P = 2.6 R = 0.6
	109	poorly graded SAND (SP) med dense ~~loose~~, fine to v. fine Tan grained w/ trace med. to coarse gravel (Alluvium)					
	110		HNu Bkg	54			D # 54 P = 2.0 R = 1.8
	111						
	112	well graded SAND (SW) med dense, Green-grey grained fine to coarse w/ trace med. to fine gravel (Alluvium)	HNu Bkg	55			D # 55 P = 2.6 R = 2.0
	113						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-25D

ICORPW4-16-82

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT Remedial Investigation Mead NOP | INSPECTOR T. Hecht | SHEET 13 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	114	(Same) well graded SAND (SW) med. dense, green-grey, fine to coarse grained w/ trace fine gravel and ~~occ.~~ trace orange clay laminations (Alluvium)	HNu BKg	~~56~~			D#56 P=2.6 R=1.0
	115						
	116		HNu BKg	~~57~~			D#57 P=2.0 R=1.0
	117	Poorly graded GRAVEL (GP) v. loose, green-grey w/ Trace fine grained sand (Alluvium)					Stopped 6/25/92 Resume 6/26/92
	118		HNu BKg	~~58~~			D#58 P=2.0 R=0.1
	119						
	120		HNu BKg	~~59~~			D#59 P=2.6 R=0.9
	121		HNu BKg	~~60~~			D#60 P=2.0 R=0.4
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

ICORPB/4-15-92

HTW DRILLING LOG

HOLE NO.: MW-25D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 14 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded GRAVEL (GP) loose, green-grey w/ grained Trace fine sand (Alluvium)		60			
	123	Poorly graded SAND (SP) med. dense loose, green-grey, medium grained To coarse w/ little fine To coarse gravel Alluvium)	HNu BKG	61			D#61 P=2.6 R=0.6
	125		HNu BKG	62			D#62 P=2.0 R=0.1
	127		HNu BKG	63			D#63 P=2.6 R=0.5
	129		HNu BKG	64			D#64 P=2.0 R=0.4
	130	trace w/ ~~occ~~ orange clay ~~balls~~ nodules					
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO.: MW-25D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: T. Hecht

SHEET 15 OF 22

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	132	~~(Same)~~ Poorly graded SAND (SP) med. dense, brown to black, med. to coarse grained w/ trace fine grained sand and fine gravel trace orange clay ~~with~~ nodules (Alluvium)	HNu BKG	65			D #65 P=2.0 R=1.1
	133		HNu BKG	66			D #66 P=2.6 R=0.1
	134	trace w/ ~~some~~ v. coarse gravel					
	135		HNu BKG	67			D #67 P=2.6 R=1.0
	136						
	137		HNu BKG	68			D #68 P=2.0 R=0.6
	138						
	139		HNu BKG	69			D #69 P=2.6 R=1.3
	140						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

ICORP8/4-15-92

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 16 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) Poorly graded SAND (SP) med dense, brown to black ~~med~~ becoming fine to v. fine w/ trace fine to coarse gravel (Alluvium)		69			
	141	becoming dense					D #70
	142	becoming grey, ~~dense~~	HNu BKg	70			P=2.6 R=1.5
	143	Quantity of gravel ~~gravel disappears~~ decreasing					
	144		HNu BKg	71			D #71 P=2.6 R=1.6
	145						
	146		HNu BKg	72			D #72 P=2.6 R=1.4
	147						
	148		HNu BKg	73			D #73 P=2.0 R=1.3
	149						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-25D

1496

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: J. Hecht

SHEET 17 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	150	(Same) Poorly graded SAND (SP) dense, grey, fine to v. fine grained	HNu BKG	74			D # 74 P = 2.6 R = 1.9
	151		HNu BKG	# 3 Bag Sample 75	MWA-025 -151 1x4oz 2x4oz 1x8oz		Sample collected @ 151-153 ft ~~1 bag~~ TOC ~~2 bag~~ VOC 1 ~~bag~~ Explosions ~~1 bag~~ ~~Silica~~ grain size D # 75 P = 2.0 R = 1.8
	152						
	153	w/ few med. to fine gravel	HNu BKG	76			D # 76 P = 2.0 R = 0
	154						
	155		HNu BKG	77			
	156						HARD DRILLING Stopped 6/26/92 Resume 6/27/92 Boring advanced w/ 4 3/4 Tricone roller bit ~~to 155~~ 155-157.5 without sampling Resume wire-line Drilled 2.5' NO SAMPLING
	157	Sandstone; purple-black, iron cemented, fine ~~grained~~ grained (logged from Cuttings) ~~Becoming SANDSTONE~~; brownish-orange, fine to v. fine, v. weathered (OMADI SANDSTONE)	NO SAMPLE	78			
	158						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

149

ICORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-25D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: T. Hecht

SHEET 18 OF 20 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	159	(Same) Sandstone; Brownish-orange fine to v. fine, v. weathered (OMADI)	NO SAMPLE	~~78~~			Drilled w/out sampling
	160		HNu BKG	70			6-27-92 Reamed to 161 w/ 7⅝ Tricone roller bit D# 77 P=2.0 R=0.9 Placed 6" flush joint casing to 160.5, removed after grouting.
	161						
	162		NO Sample				D# 78 P=1.0 R=0 Formation washed out
	163		NO Sample	Core Run# 1	REC 0	RQD 0% DWR 100%	6-28-92 Begin coring w/ 3½x2½ christensen core bbl w/ christensen Tungsten 4½ bit Start: ~~165.5~~ 162.5 Stopped: 165.0 Core washed out, no recovery Cuttings: fine orange sand
	164						
	165		NO Sample	Core Run#2	REC 0	RQD 0% DWR ≈ 95%	Start 165.0' Stopped 167.0 Core washed out, no recovery Cuttings, fine orange sand
	166						
	167						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

1498

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO.: MW-25D

Remedial Investigation Mead NOP | INSPECTOR: T. Hecht | SHEET 20

ELEV	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO	ANALYTICAL SAMPLE NO	BLOW COUNTS	REMARKS
		SANDSTONE, fine to v. fine light orange, v. weathered (OMADI)	HNu=0	RUN #3	REC 0.7/2.0	RQD 36%	Start: 167.0 Stopped: 169.0 sample collected
	168			#3 Bag Sample	MWD-025 -167 1x4oz 2x4oz 1x8oz	DWR 95%	1-4oz TOC 2-4oz VOA 1-8oz Explosives not enough sample for sieves Corehole reamed To 6" w/ 5 7/8 Tricone roller bit
	169		NO SAMPLE				Formation WASHED out During ream & flush
							BOH = 170.0
	170						Stopped 6/28/92
							Monitoring well Installed 6/28/92
	171						Temporary casing pulled 6/28/92 after grouting
	172						Total water loss = 2000 gal
							WATER LOSS IN SCREENED INTERVAL ≈ 1300 gal
	173						
	174						
	175						
	176						

ICORP 6-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-25D

HTW DRILLING LOG

HOLE NO. MW-28D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Companies
SHEET 1 of 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.557660 - E.2835325
5. NAME OF DRILLER: TERRY TABER	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 1/4-inch-dia. tri-cone roller-bit; 2-inch-dia split-barrel; Christensen 90 mm sampler; 7 7/8-inch-dia. tri-cone roller-bit;	8. HOLE LOCATION: NE1/4, NW1/4, SE1/4, NE1/4 sec. 25, T.14N, R8E
	9. SURFACE ELEVATION: ~~1164±~~ ~~1170±~~ 1169.43
	10. DATE STARTED: 6-27-92 / 11. DATE COMPLETED: 7-1-92
12. OVERBURDEN THICKNESS: 138.0	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 11.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 149.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	NA	~~NA~~ 1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	~~NA~~ %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-28D	NA	Gene Paparuto 91

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	TOPSOIL (OL-CL) ~~(FILL)~~ LEAN CLAY WITH GRAVEL (CL) hard, brown, w/abundant roots, root hairs, organic matter, slag, glass [FILL]	HNU: BG (Background)			P	Boring advanced w/ 5 1/4-inch-dia tri-cone roller bit, 2-inch-dia split-spoon sampler and drilling water P = 1.5 R = 1.0 D #1
	2	LEAN CLAY (CL), hard, light brown w/ dk brown mottling, w/ roots and root hairs [LOESS]	HNU: BG ~~Back-ground~~			P	P = 1.5 R = 1.2 D #2 Densities are estimated
	3	LEAN CLAY (CL) AND SILT (ML), firm, dk yellow w/ dk brown mottling, slightly micaceous, manganese oxides(?) ~~w/ pyrolusite~~ staining	HNU: Back-ground			P	P = 1.5 R = 1.0 D #3 [LOESS]
	4	w/ root hairs	HNU: Back-ground			P	P = 1.5 R = 1.2 D #4
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP | HOLE NO.: MW-28D B1

150(

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinaka

SHEET 2 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	SILT (ML), soft, dk yellow w/dk brown mottling, w/ ~~psilomelane~~ manganese oxides(?) partings, w/ small calcareous veinlets, w/ trace of mica	HNU Back-ground			P	P = 1.5 R = 1.2 D#4
	7	w/ root hairs	HNU Back-ground			P	P = 1.5 R = 1.5 D #5 [LOESS]
	8	w/ vertical fracturing; planes of jointing stained w/ ~~psilomelane-pyolusite(?)~~ manganese oxides(?) w/trace of fine sand	HNU Back-ground			P	P = 1.5 R = 1.5 D#6
	9	Quantity of sand increasing	HNU Back-ground			P	
	10	SILT WITH SAND (ML) soft, dk yellow w/ fine sand, w/small (0.3 inch dia) septarian calcareous concretions					P = 1.5 R = 1.5 D #7
	11	POORLY GRADED SAND (SP), medium dense, light grayish yellow, v. fine to fine grained, dry	HNU Back-ground			P	P = 1.5 R = 1.5 D #8
	12		HNU Back-ground				Boring continued w/Christensen 90mm continuous sampler
	13	Becoming mostly fine grained					P = 2.0 R = 1.0 D #9
	14						

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

1501

B07NE003702-05610

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 3 OF 12 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP), loose, yellow, v. fine to fine grained	HNU Back-ground				
	15						P = 2.0 R = 0.5 D #10
	16	w/ occasional angular coarse grains (quartz, quartzite, etc) w/ irregularly shaped calcareous nodules (concretions)	HNU Back-ground				
	17						P = 2.0 R = 1.2 D#11
	18		HNU Back-ground				P = 5.0 R = 2.0 D# 12
	19						
	20						
	21						
	22						Boring continued w/ bentonite based drilling mud (100 lbs + water)
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 4 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	24	POORLY GRADED SAND (SP), loose to med. dense, yellow, v. fine to fine grained	HNU Back-ground				P = 2.0 R = 0.8 D #13
	25	Becoming lt brownish gray w/ occasional grains of medium grained sand	HNU Back-ground				P = 2.0 R = 1.0 D #14
	26						
	27	w/occasional grains of medium grained sand and flat calcareous fragments (flakes)	HNU Back-ground				P = 2.0 R = 1.5 D # 15
	28						
	29		HNU Back-ground				P = 2.0 R = 1.0 D # 16
	30						
	31		HNU Back-ground				P = 2.0 R = 1.0 D # 17
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(SAME) POORLY GRADED SAND (SP), medium dense, light brownish gray, v. fine to fine grained w/occasional trace of multi-colored grains of medium size sand	HNU Back-ground				P = 2.0 R = 1.0 D #17
	33	Alternating beds of pure, homogeneous fine grained sand and of fine grained sand containing little of medium grained sand					P = 2.0 R = 1.2 D #18
	34						
	35	Becoming dense, yellowish gray, fine grained	HNU Back-ground				P = 2.0 R = 1.5 D #19
	36	POORLY GRADED SAND WITH CLAY (SP-SC), dense, yellowish gray, fine grained					
	37	w/occasional discontinuous seams and small lenses of bluish gray, lean clay	HNU Back-ground				P = 2.0 R = 1.5 D #20
	38						
	39		HNU Back-ground				P = 2.0 R = 1.0
	40						D #21
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

1504

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND WITH SILT (SP-SM), med. dense light yellowish gray, v. fine to fine grained	HNU Back-ground				Drilling resumed 6-28-92
	42	w trace to little of silt in fines					P = 2.0 R = 1.2 D#22
	43	Becoming POORLY GRADED SAND (SP), med. dense, light gray, fine grained	HNU Back-ground				
	44						P = 2.0 R = 0.5 D#23
	45		HNU Back-ground				
	46	Same fine grained sand w/ admixture (trace to little) of multi-colored medium grained sand					P = 2.0 R = 1.2 D#24
	47	Becoming only fine grained	HNU Back ground				
	48						P = 2.0 R = 0.3 D#25
	49		HNU Back-ground				P = 2.0 R = 0 D#26
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	POORLY GRADED SAND (SP), loose to med. dense, light yellowish gray, v. fine to fine grained	HNU Back-ground				P = 2.0 R = 0 D # 26
	52		HNU Back-ground				P = 2.0 R = 0.3 D # 27
	53		HNU Back-ground				P = 2.0 R = 0.8 D # 28
	55	Becoming fine grained sand w/separate layer of dense, multi-colored, medium grained sand	HNU Background				P = 2.0 R = 0.8 D # 29
	57	Becoming ~~Chiefly~~ fine grained sand	HNU Background				P = 2.0 R = 0.5 D # 30
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

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/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 8 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), med. dense, light yellowish gray, fine grained	HNU Background				P = 2.0 R = 0.6
	60						D # 31
	61		HNU Background				P = 2.0 R = 0.5
	62	Becoming POORLY GRADED SAND WITH CLAY (SP-SC), same sand w/small seams and lenses of whitish gray, lean clay, w/ ~~occasional~~ trace multi-colored grains of medium grained sand					D # 32
	63		HNU Background				P = 2.0 R = 0.5
	64						D # 33
	65	Becoming homogeneous fine grained sand	HNU: Back-ground				P = 2.0 R = 0.2
	66						D # 34
	67		HNU Background				P = 2.0 R = 0.3
	68						D # 35

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 9 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		POORLY GRADED SAND (SP), ~~loose~~ dense, light yellowish gray, very fine to fine grained	HNU: Background				P = 2.0 R = 0.3 D # 35
	69		HNU: Back-ground				P = 2.0 R = 0.1 D # 36
	70						
	71		HNU Back-ground				P = 2.0 R = 0.3 D # 37
	72						
	73		HNU: Back-ground				P = 2.0 R = 0.5 D # 38
	74						
	75		HNU: Back-ground	Bag Sample #1			P = 2.0 R = 0.5 Sample collected from 75' to 77' for Sieve analysis D # 39
	76						
	77						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

150

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 10. OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND WITH CLAY (SP-SC), ~~medium~~ dense, light yellowish gray, fine grained w/small lenses of whitish gray, lean clay, w/ ~~occasional~~ trace grains of medium and coarse grained sand,	HNU Back-ground				P = 2.0 R = 0.5 D # 40
	78						
	79	w/ ~~occasional~~ trace flat, subrounded pebbles of fine gravel Quantity of coarse sand increasing	HNU Back-ground				P = 2.0 R = 0.8 D # 41
	80	Becoming POORLY GRADED SAND (SP), ~~medium~~ dense, lt gray, very fine to fine grained					
	81		HNU Background				P = 2.0 R = 0.4 D # 42
	82						
	83		HNU Back-ground				P = 2.0 R = 0.25
	84						D # 43
	85	w/trace to little ~~of~~ multi-colored medium grained sand	HNU Back-ground				P = 2.0 R = 0.5 D # 44
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

1509

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 11 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	POORLY GRADED SAND (SP) ~~medium~~ dense, lt yellowish gray, fine grained w/ trace to little ~~of~~ medium grained, multi-colored sand	HNU Back-ground				P = 2.0 R = 0.5 D # 44
	88	Quantity of medium grained sand decreasing	HNU: Back-ground				P = 2.0 R = 0.2 D # 45
	89		HNU: Back-ground				P = 2.0 R = 0.5
	90	Becoming mostly coarse grained sand w/ ~~occasional~~ trace fine gravel					D # 46
	91		HNU: Back-ground				P = 2.0 R = 0.2 Coarse sand and fine gravel in return water but only fine sand in sampler barrel
	92	Becoming mostly fine grained					D # 47
	93	POORLY GRADED SAND WITH GRAVEL (SP), dense, multi-colored, mostly coarse grained w/ subangular and subrounded fine gravel	HNU: Background				P = 2.0 R = 0.5
	94						D # 48
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-28D

ICORPS/4-15-92

151(

B07NE003702-05619

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 12 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95 96	POORLY GRADED SAND (SP), med. dense, multi-colored, mostly coarse grained, w/ subordinate quantities of medium and fine grained sand	HNU Background				P = 2.0 R = 0.3 D # 49 100 lbs of "Aquagel" added to drilling fluid
	97 98	Becoming homogenous fine grained sand	HNU Background				P = 2.0 R = 0.6 D # 50
	99 100	~~Becoming~~ POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, mostly coarse grained w/ subrounded gravel; max. size 1.0 inch.	HNU Background				P = 2.0 R = 0.2 D # 51
	101 102	POORLY GRADED SAND (SP), med. dense, very lt gray, fine grained	HNU Background				P = 2.0 R = 0.3 D # 52
	103 104	POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained w/ ~~subrounded~~ subrounded fine gravel; max. size 0.75 inch.	HNU Background				Drilling resumed 6-29-92 P = 2.0 R = 0.8

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

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B07NE003702-05620

HTW DRILLING LOG

MW-28D

Remedial Investigation Mead NOP

INSPECTOR: Gene Papinako

SHEET 13 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	(SAME) POORLY GRADED SAND WITH GRAVEL (SP), med. dense, multi-colored, coarse grained w/ subrounded gravel; max. size 0.75 inch	HNU Back-ground				P = 2.0 R = 0.8 D #53
	105	Quantity and size of gravel increasing; max. size 2.5 inch.	HNU Background				P = 2.0 R = 0.5 D #54
	106						
	107	w/ separate layers of poorly graded sand, dense, lt yellow, v. fine to fine grained (1.0 to 4.0 inch thick)	HNU Background				P = 2.0 R = 0.1 D #55
	108						
	109		HNU Background				P = 2.0 R = 0.5 D #56
	110						
	111		HNU: Background				P = 2.0 R = 1.0 D # 57
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 14 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND WITH GRAVEL (SP), ~~med.~~ dense, multi-colored, coarse grained, w/ subangular and subrounded gravel; max. size 1.1 inch	HNU Background				P = 2.0 R = 1.0 D # 57
	114						
	115		HNU Background				P = 2.0 R = 0.3 D # 58
	116						
	117	POORLY GRADED SAND (SP), med. dense, multi-colored, coarse grained	HNU Background				P = 2.0 R = 0.3 D # 59
	118						
	119	POORLY GRADED GRAVEL WITH ~~CLAY~~ AND SAND (GP-GC), dense, multi-colored, coarse, subangular; max. size 2.25 inch, w/ seams and parting of lean clay, and coarse ~~w/ little coarse sand~~ grained sand (20%)	HNU Background				P = 2.0 R = 0.5 D # 60
	120						
	121	POORLY GRADED GRAVEL (GP), med. dense, multi-colored, fine, subrounded	HNU Background				P = 2.0 R = 1.2 D # 61
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-28D

HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 15 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	POORLY GRADED SAND WITH CLAY (SP-SC), ~~loose~~ dense, grayish yellow, fine grained w/ subordinate quantities of med. and coarse grained sand, w/ seams and partings of lean, grayish yellow clay; some of the seams are stained with iron hydroxides(?)	HNU: Background				P = 2.0 R = 1.2 D # 61
	123		HNU: Background				P = 2.0 R = 0.4 D # 62
	124	POORLY GRADED GRAVEL WITH SAND (GP), loose, multi-colored, subrounded, fine w/ coarse grained sand					
	125	POORLY GRADED SAND (SP), ~~loose~~, gray, fine grained dense	HNU: Back-ground				P = 2.0 R = 0.5 D # 63
	126	Becoming coarse grained					
	127	POORLY GRADED GRAVEL WITH CLAY (GP), dense, multi-colored, well-rounded, fine w/ lean olive gray clay	HNU: Background				P = 2.0 R = 0.3 D # 64
	128						
	129	POORLY GRADED SAND (SP), med. dense, multi-colored, med. grained w/ some fine grained sand	HNU: Background				P = ~~2.0~~ 4.0 JP 6/29 R = 0.8 D # 65
	130	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, gray, fine grained w/ layer 6-inch-thick of lean olive gray clay, w/ occasional gravel		Bag Sample #2			Sample collected 129' to 133' for sieve analysis
	131						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-

HTW DRILLING LOG

MW-28 D

Remedial Investigation, Mead NOP | INSPECTOR: Gene Papinako | SHEET 16 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	131	POORLY GRADED SAND WITH CLAY (SP-SC), ~~loose~~, dense gray, fine grained w/ seams and partings of lean, olive gray, micaceous clay w/ ~~occasional~~ trace gravel	HNU: Back-ground				P = 4.0 R = 0.8 D. # 65
	132						
	133	POORLY GRADED SAND (SP) loose, gray, fine grained	HNU: Back-ground				P = 2.0 R = 0.6 D # 66
	134						
	135		HNU: Back-ground				P = 2.0 R = 0.4 D # 67
	136	w/ ~~occasional~~ trace fine gravel					
	137	w/ ~~occasional~~ trace gravel, fine, subrounded w/ ~~occasional~~ trace cobbles	HNU: Back-ground				P = 1.0 R = 0.2 D # 68
	138						Temporary Protective casing 6-inch-dia installed and pushed to 138.4 ft. Interval 138-139 ft drilled without sampling
	139	POORLY GRADED SAND WITH SILT (SP-SM), dense, light whitish gray w/ yellow and white staining, w/ trace of fine gravel, w/ trace of mica [Weathered Oneadi Sandstone]					P = 2.0 R = 1.3 D # 69
	140						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-28 D

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HTW DRILLING LOG

HOLE NO. MW-28D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinakis | SHEET 17 OF 17 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	140	POORLY GRADED SAND WITH SILT (SP-SM), dense, light whitish gray w/yellow ~~(iron hydroxides?)~~ and white ~~(kaolinite?)~~ zones of staining, w/ fragments of kaolinite, w/ trace of v. fine gravel, w/ one single fragment of weakly cemented sandstone w/ trace of mica [OMADI ~~SANDSTONE~~ MEMBER	HNU Background				P = 2.0 R = 1.3 D # 70
	141		HNU Background				P = 2.0 R = 1.5 D # 71
	142						
	143		HNU Background				P = 2.0 R = 1.4 D # 72
	144						
	145		HNU Background				P = 2.0 R = ~~1.4~~ 1.8 D # 73
	146						
	147	w/ seams and partings of ~~kaolinite (?)~~ white non-calcareous clay	HNU Background				P = 2.0 R = 1.6 D # 74
	148						Reamed w/ 5 3/4 inch-dia. roller bit to 149.5 ft. B.O.B 149.5 ft Boring completed as monitoring well
	149						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-28D

ICORPS/4-15-82

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HTW DRILLING LOG

HOLE NO. MW-32D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. Army Corps of Engineers
SHEET 1 OF 3 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: R. Hunter USACE	6. MANUFACTURER'S DESIGNATION OF DRILL: Keystone 50 / Failing 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drive bbl straight shoe; 7" Reaming shoe; 6" Soils barrel; 7 7/8" Tricone/5 7/8" tricone; 9 7/8" tricone; 4"X5' Rock core barrel	8. HOLE LOCATION: MW-32D; N. 554431 - E. 2842035
	9. SURFACE ELEVATION: 1151.67'
	10. DATE STARTED: 5-28-92 / 11. DATE COMPLETED: 5-30-92
12. OVERBURDEN THICKNESS: 99.5'	15. DEPTH GROUNDWATER ENCOUNTERED: 44.0'
13. DEPTH DRILLED INTO ROCK: 13.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 113.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A	X	N/A	2

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
N/A	N/A	N/A	N/A	N/A	N/A	47 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
N/A	N/A	MW-32D	N/A	Robert Eckman

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) Hard, Drk Gray, moist, w/ rootlets. (Peorean Loess)	NA	1		30	Drive 1 D = 2.0 R = 2.0 Pen = 3.0 Keystone 50 rig Advanced Boring w/ 6" drive bbl straight shoe followed w/ a 7" Reaming shoe at 2' intervals
	2						
	3	Becoming Lt Brn w/ Iron oxide staining	HNu = BG	2		27	Drive 2 D = 2.0 R = 2.0 Pen = 2.25
	4		HNu = BG	3		39	Drive 3 D = 2.0 R = 2.0 Pen = 3.0
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-32D

HTW DRILLING LOG

HOLE NO. MW-32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 2 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL) Hard, Lt Brn, moist, w/rootlets		3			
	6	Becoming Brn mottled Lt Gray w/ Iron oxide Staining	HNu= BG.	4		30	Drive 4 D=2.0 R=2.0 Pen=1.5
	7						
	8	Becoming soft w/moisture content increasing	HNu= BG	5		19	Drive 5 D=2.0 R=2.0 Pen=0.5
	9						
	10	Become V.Soft, wet	HNu= BG	6		24	Drive 6 D=2.0 R=2.0 Pen=0.25
	11						
	12		HNu= BG	7		14	Drive 7 D=2.0 R=2.0 Pen=0.25
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

1518

HTW DRILLING LOG

HOLE NO. MW-32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 3 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) ~~Unsoft~~ LEAN CLAY, V. Soft, Brn mottled LT Gray, Wet, w/Iron oxide Staining.	HNu= BG	8		26	Drive 8 D = 2.0 R = 2.0 Pen = 0
	15						
	16		HNu= BG	9		60	Drive 9 D = 2.0 R = 2.0
	17	Poorly Graded Sand (SP) Med dense, Lt Gray, fine grained, moist, w/Limonitic staining.					
	18		HNu= BG	10		86	Drive 10 D = 2.0 R = 2.0
	19						
	20		HNu= BG	11		92	Drive 11 D = 2.0 R = 2.0
	21						
	22	Becoming Dry	HNu= BG	12		86	Drive 12 D = 2.0 R = 2.0
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 4 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) Poorly graded Sand (SP) Med Dense, LT Gray, fine grained, Dry, w/ Limonitic Staining		12			
	24						Drive 13 D=2.0 R=2.0
	25		HNu= B6	13		96	
	26						Drive 14 D=2.0 R=2.0
	27		HNu= B6	14		125	
	28						Drive 15 D=2.0 R=2.0
	29		HNu= B6	15		133	
	30						Drive 16 D=2.0 R=2.0
	31		HNu= B6	16		144	
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 5 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as above) Poorly graded Sand (SP) med Dense, LT Gray, fine grained, dry, W/ Limonitic staining	HNu= B6	17		43	Drive ~~16~~ 17 D=2.0 R=2.0
	33						
	34		HNu= B6	18		89	Drive ~~17~~ 18 D=2.0 R=2.0
	35						
	36		HNu= B6	19		65	Drive ~~18~~ 19 D=2.0 R=2.0
	37						
	38		HNu= B6	20		61	Drive ~~19~~ 20 D=2.0 R=2.0
	39						
	40		HNu= B6	21		62	Drive ~~20~~ 21 D=2.0 R=2.0
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 6 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) (SP), Poorly graded Sand, med Dense, LT Gray, fine grained, [redacted], w/ Limonitic staining. Dry		21			
	42	Becoming moist					Drive 21-22 D = 2.0 R = 2.0
	43		HNu= B6	22		99	
	44	Becoming Wet.					Groundwater encountered ATD 44.0'
			HNu= B6	23		96	Drive 22-23 D = 2.0 R = 2.0
	45						Failing 1500 Reamed to 46.0' w/ 9 7/8" tricone bit and drilling fluids
	46						~~Drive 23~~ ~~D = 2.0~~ ~~R =~~
	47		HNu= B6	24			Cont. Boring w/ ~~[redacted]~~ 6" dia. solid barrel and drilling fluids.
	48						P = 3.2' R = 2.0
	49	49.2'					
	50			25			

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

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HTW DRILLING LOG

HOLE NO. MW32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 7 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) (SP) Poorly graded Sand, Med Dense, LT Gray, fine grained, wet, w/Limonitic staining		25			
	51						
		w/trace of med grained Sand from 51.5 to 52.5					P = 6.8
	52		HNu = BG				R = 6.8
	53						
	54						
	55						
	56	56.0					
	57			26			
	58						
	59						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 8 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(see as above) (GP) Poorly Graded Sand, Med Dense, Lt Gray, Fine grained, Wet, w/Limonitic Staining					
	60		HNu= B6	26			P = 6.0 R = 6.0
	61	w/ [redacted] med sand Trace 61.0' to 63.0'					
	62						
	63	63.0					
	64						P = 7.0 R = 7.0
	65		HNu= B0	27			
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 9 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) (SP) Poorly graded Sand, med Dense, LT Gray, fine grained, wet, w/ Limonitic Staining					
	69			27			
	70	w/ trace of med Sand 70.0'					
	71						P = 7.0'
	72						M = 6.3'
			HNu = BG	28			
	73						
	74						
	75						
	76						
		w/ few med Sand					
	77	77.0'					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 10 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as above) Poorly graded Sand, med dense, Lt Gray, fine grained, wet, w/ Limonitic staining					
	78		HNu= BG				P= 4.0' R= 4.0'
	79			29			77 ~~78~~ - 81 taken for sieve grain size analysis.
	80						
	81	81.0'					
	82	Poorly graded Gravel w/ Sand (GP) Dense, Lt Gray, fine to coarse grained, wet.					P= 7.0' R= 5.5
	83	Poorly graded Sand, Dense, LT Gray, fine grained, wet, w/ ~~Fr~~ few coarse Sand. w/ trace fine gravel	HNu= BG	30			
	84						
	85	Poorly graded Gravel w/ Sand, Dense, Lt Gray, fine to coarse grained, wet,					Increase in drilling fluid loss
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: DJE

SHEET 11 OF 13 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	87	(Same as Above) Poorly graded Gravel w/ Sand, Dense, LT Gray, fine to coarse grained wet		30			
		88.0'					Stopped 5-28-92
	88	Poorly graded Sand, Dense, LT Gray, fine grained, wet, w/few med grained Sand and Trace of fine gravel					Started 5-29-92
	89						P = 7.0
	90						R = 4.0
	91	Poorly graded Gravel, Dense, LT Gray, fine grained, wet w/ Trace of coarse gravel and fine to coarse sand.	HNu = BG	31			90-95' Taken for sieve grain size analysis
	92						
	93						Increase in drilling fluid Loss
	94	Poorly graded, Sand, Dense, LT Gray, fine grained, wet w/ few med grained Sand and trace of fine gravel					
	95						

/CORPS/4-1-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32

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B07NE003702-05636

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 12 OF 13 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	Poorly Graded Gravel, Dense, LT Gray, fine grained, wet, w/ few med grained sand and trace of fine gravel.	HNu= NOT Taken	32			P=2.0 R=0.0
	97						Cont. Boring w/ 7 7/8" Tricone bit and drilling fluids.
	98		No sample				
	99						Reamed to 100' w/ 9 7/8" Tricone and drilling fluids
	100	Shale, Gray and Brn, soft, v. weathered, laminated, clayey.					Placed 6" dia. flush joint casing to 100.5' Casing removed following coring and prior to well installation
	101			Run# 1	Rec 3.4/5.0	RQD 18% DWR 100%	Cont. Boring w/ 4"x5' core barrel and drilling fluid.
	102	Shaley Sandstone Lt. Gray and Brn, mod Hard, v. weathered, laminated.	HNu= BG				
	103			33			
	104	Sandstone: Reddish Brn, mod. Hard v. weathered, fine grained.					

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 32

HTW DRILLING LOG

HOLE NO. MW 32

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 13 OF 3 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(for as Above)					
		Sandstone, Reddish Brown, mod Hard, V. weathered fine grained.					
	105						
	106			Run#2	Rec 2.2/7.0	RQD 16%	
	107					DWR- 95%	
	108		HVn = B6				
	109			#34			
	110						After coring Cleaned out Bore hole w/ 5 5/8" Tricone down to 113.0' Monitoring well Placed upon completion 5-30-92
	111						
	112						
	113						corrected 111.5' BOH #113.0'

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-32

1529

B07NE003702-05638

HTW DRILLING LOG

HOLE NO. MW-33D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnick EDC #1
SHEET 1 OF 1 SHEETS 15	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N. 558216 - E. 2844783
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: CFD G. Failing 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" drag bit; 2" split spoon; 5" Tungsten insert bit; 94mm wire line; 7 7/8 tricone	8. HOLE LOCATION: SE, NW, NE Sec. 29, T14N, R9E
	9. SURFACE ELEVATION: ~~1164~~ ~~±1159~~ 1157.89'
	10. DATE STARTED: 6/10/92 — 11. DATE COMPLETED: 6/14/92
12. OVERBURDEN THICKNESS: 116.5'	15. DEPTH GROUNDWATER ENCOUNTERED: Masked ~~with~~ drilling fluids ~~during drilling~~
13. DEPTH DRILLED INTO ROCK: 10.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 127'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	~~H=2~~ X	~~0~~ NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) TOC	OTHER (SPECIFY) Explosives	OTHER (SPECIFY)	21. TOTAL CORE REC.
3 ~~MWC033048~~ ~~MW033083~~ ~~MW033114~~	~~H=2~~ X	NA	TOC ~~H=2~~	Explosives ~~H=2~~	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring Well installed in ~~Omadiss~~	~~Pure Gold~~ NA	MW33D	NA	Karen Bailey

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	Lean clay (CL) firm, dark brown, moist w/ grass and Root hairs (topsoil) ~~(eolian Loess)~~	HNu=BG	X			Borings advance w/ 5" Drag bit and water and 2" split spoon D#1 P=2.0 R=0.3
	2	w/out roots or grass	HNu=BG	X			D#2 P=2.0 R=0.2
	4	Becomes dark brown w/ iron nodules and calcareous grains throughout (Loess) bottom of soil horizon ABC	HNu=BG	X			D#3 P=2.0 R=9.0
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW33D

1530

HTW DRILLING LOG

HOLE NO. MW 33

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 2 OF 2 SHEETS 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above)		3			D #3
	6	Lean Clay (CL) firm light brown w/ dark iron staining w/ nodules (limonite)	HNu=B6	4			D#4 P=2.0 R=0.6
	7						
	8	Poorly graded v. fine Sand (SP) moist, light gray to tan, v. fine to fine grained, w/ fine feldspar and dark sand grains, ~~w/ dark fine sand grains~~ dry (Alluvium)	HNu=B6	5			D #5 P=2.0 R=0.8
	9						
	10	~~Poorly graded v. fine Sand~~ becoming plus light gray, very fine. w/ clay ~~balls~~ nodules, moist.	HNu=B6	6			D #6 P=2.0 R=0.7
	11						
	12		HNu=B6	7			D #7 P=2.0 R=0.3. Added ~~Mix~~ 50 lbs of Aqua gold
	13						
	14						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33D

1531

HTW DRILLING LOG

MW33

Remedial Investigation Mead NOP | INSPECTOR [illegible] | SHEET 3 OF 3 SHEETS 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	Poorly graded Sand (SP) dense w/ v. fine to fine grained, ~~sandy gravel~~ ~~tan~~ (SP) (Alluvium) moist	tan HNu=B6	8			D#8 P=2.0 R=1.4
	16						
	17		HNu=B6	9			D#9 P=2.0 R=1.2 Begin with Christensen Sampler used 5 inch dia tungsten insert bit
	18						
	19		HNu=B6	10			D#10 P=2.0 R=1.2
	20						
	21	w/ a 0.5" medium sand seam.	HNu=B6	11			D#11 P=2.0 R=1.0
	22		HNu=B6	12			D#12 P=2.0 R=1.1
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 33

1532

HTW DRILLING LOG

HOLE NO. MW-33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 1 OF 15 SHEETS

ELEV a	DEPTH b23	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		w/ trace of medium grained sand (SP)	HNu=B6	12			D#12 P=2.0 R=1.1
	24	(SOME) ~~at above~~ Poorly graded Sand (SP) dense, tan v. fine to fine ~~sand grains~~ grained, ~~tan (SP)~~ moist. (Alluvium)					
	25	w/ a 1" medium to coarse grained sand seam	HNu=B6	13			D #13 P=2.0 R=0.9
	26						
	27		HNu=B6	14			D #14 P=2.0 R=1.2
	28						
	29		HNu=B6	15			D# 15 P=2.0 R=1.3
	30	w/ gray silt streak throughout					
	31		HNu=B6	16			D #16 P=2.0 R=0.8
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR: [illegible] | SHEET 5 OF 5 SHEETS 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (SAND) ~~[illegible]~~ c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	w/ trace of medium-coarse grained sand (SP)					D #17
	33	Poorly graded SAND (SP), dense, tan, v.fine to fine, moist	HNu=BG	17			P=2.0 R=1.0
	34	w/ 1.5" medium grained sand seam.	HNu=BG	18			D #18 P=2.0 R=1.6 Added ~~Mix~~ 50 lbs of Aqua Gold
	35						
	36		HNu=BG	19			D #19 P=2.0 R=1.4
	37						
	38		HNu=BG	20			D #20 P=2.0 R=1.5
	39						
	40		HNu=BG	21			D #21
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

HTW DRILLING LOG

HOLE NO. MW-33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 6 OF 6 SHEETS 15

ELEV a	DEPTH b 41	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) ~~as above~~ (SP) Poorly graded SAND (SP), dense, tan v. fine to fine grained, moist	HNu=B6	21			D#21 P=2.0 R=0.4
	42						
	43	w/ a few medium grained sand ~~grains~~ becoming wet	HNu=B6	22			D#22 P=2.0 R=1.1
	44						
	45	w/ a 2" medium to coarse ~~Sand~~, dense, multi colored grained wet. sand	HNu=B6	23			D#23 P=2.0 R=1.2
	46						
	47		HNu=B6	24			D#24 P=2.0 R=1.2
	48			Bag sample #1	~~MWC033048~~ #		Sample MWC-033-048 collected for D#25 P=2.0 R=1.5 ~~Sampled for~~ 2-VOA, 1-TOC, 1-Explosive, 1-~~Geotech~~ grain size 48 ft to 50 ft
	49		HNu=B6	25	3x4oz 1x8oz		
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 153 MW33

/CORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 7 OF 7 SHEETS 15

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	w/ some coarse grained sand at 50.0 ft (SAME) Poorly graded sand (SP) dense tan v. fine to fine w/ few medium to coarse grained sands, wet)	HNu=B6	~~26~~ Bag Sample			D#26 P=2.0 R=1.3 ~~Geotech sample composited w/ 48-50'~~
51							
52		~~Poorly graded Sand (SP) dense, tan v. fine to fine w/ medium to few coarse sand, wet~~	HNu=B6	~~27~~			D#27 P=2.0 R=1.2
53							
54			HNu=B6	~~28~~			D#28 P=2.0 R=1.5
55							
56			HNu=B6	~~29~~			D#29 P=2.0 R=1.3
57							
58							
59							

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

153t

HTW DRILLING LOG

HOLE NO. MW 33

Remedial Investigation, Mead NOP | INSPECTOR: RB | SHEET 8 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	(Sayre) Poorly graded sand (SP), loose, tan, v. fine to fine w/ few medium to coarse sand, wet.	HNu=BG grained	~~30~~			D#30 P=2.0 R=1.2
	60						
	61		HNu=BG	~~31~~			D#31 P=2.0 R=1.3
	62						
	63		HNu=BG	~~32~~			D#32 P=2.0 R=1.9
	64						
	65		HNu=BG	33			D#33 P=2.0 R=1.8
	66	coarse grained sand grading out ~~becoming less or not present w/ medium or coarse, mostly v. fine to fine sand w/ trace of medium sands~~					D#34 P=2.0 R=1.2
	67		HNu= BG	~~34~~			
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

HTW DRILLING LOG

HOLE NO. MW33

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 9 OF 15 SHEETS

ELEV a	DEPTH 68	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS D # 35
		(same as above)	HNu=B6	~~35~~			P=1.0 R=0.6
	69	Poorly graded sand (SP), tan, loose, v. fine to medium grained sand, wet	HNu=B6	~~36~~			STOP 6/11/92 START 6/12/92 D # 36 P=2.0 R=0.9 Added 50 lbs Aqua Gold
	70						
	71	w/ 0.5" silt seam tan to light brown	HNu=B6	~~37~~			D#37 P=1.0 R=0.5
	72		HNu=B6	~~38~~			D # 38 P=2.0 R=1.5
	73	w/ limonite staining					
	74			~~39~~			D # 39 P=3.0 R=2.0+
	75						
	76	w/ trace of coarse grained sand ~~grains~~					
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

1538

ICORPS/4-15-82

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR | SHEET 10 OF 15 SHEETS

ELEV	DEPTH 77	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
	78	(same) ~~as above~~ Poorly graded Sand (SP), dense, fine to medium ~~grained~~ Light gray, ~~fine grained~~, wet w/ multi colored grains throughout	HNu=B6	~~40~~			D#40 P=2.0 R=0.8
	79						
	80		HNu=B6	~~41~~			D#41 P=2.0 R=0.8
	81						
	82	w/some medium sand	HNu=B6	~~42~~			D#42 P=2.0 R=0.4
	83						
	84		HNu=B6	Bag sample #2 ~~43~~	~~MW033083~~ # 3x4oz 1x4oz Bag		D#43 P=2.0 Sample MWB-033-083 collected 83-85' for R=0.9 3-VOA, 4oz 3-TOC, 4oz 3-Explosive, 8oz 1-grain size
	85	w/ trace of fine gravel ~~Poorly graded Sand, dense Light gray w/ multi colored fine to medium, wet~~ w/ few coarse sand, w/ trace of fine gravel	HNu=B6	~~44~~			D#44 P=2.0 R=0.8
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 33

1539

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 15 OF 15 SHEETS

ELEV a	DEPTH 86	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS D#44
		Poorly graded Sand, dense Light gray ~~w/~~ multi colored medium to coarse wet w/ few fine sand, w/	HNu=B6	44			P=2.0 R=0.8
	87	trace of fine gravel (SP)					D#45
		Poorly graded GRAVEL, dense, multi colored ~~w/~~ fine ~~gravel~~ w/trace of coarse gravel (GP)	HNu=B6	45			P=2.0 R=0.4
	88						
	89						Added ~~Mix~~ 50lbs of Aqua Gold
		w/ iron stain throughout ~~below w/ fine gravel~~ w/ few coarse gravel					D#46
	90		HNu=B6	46			P=2.0 R=0.5 Drilling Fluid 100%
	91						D#47
	92		HNu=NA	47			P=2.0 R=0 No recovery sand cup broke Added ~~Mix~~ 100lbs of Pure Gold
	93	becoming fine gravel w/ ~~less~~ trace coarse gravel					D#48
	94		HNu=B6	48			P=2.0 R=0.4
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW33

1540

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR KB | SHEET 12 OF 15 SHEETS

ELEV a	DEPTH 95	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(same) ~~as above~~ (GP) Poorly graded gravel V. dense, multi colored ~~of~~ fine ~~gravel~~ w/ trace of coarse gravel.	HNu=BG	49			D #49 P=2.0 R=0 No Recovery only a 1.5" gravel in sand cup.
	97						
	98		HNu=NA	50			D #50 P=2.0 R=0 No recovery only a 2"+ gravel in sand cup.
	99						
	100	(SP) Poorly graded Sand, dense Light gray, medium grained ~~grained~~, wet w/ few coarse sand grains	HNu=NA	51			D #51 P=2.0 R=0.6
	101						
	102		HNu=BG	52			D #52 P=2.0 R=0.8
	103		HNu=BG	53			D #53 P=2.0 R=0.3
	104						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW33

1541

B07NE003702-05650

HTW DRILLING LOG

HOLE NO. MW-33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 13 OF 15 SHEETS

ELEV a	DEPTH 109	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS D #53
		(same) Poorly graded SAND (SP) dense lt gray medium w/ few coarse sand, wet	HNu=BG	~~53~~			P=2.0 K=0.3
	105	Poorly graded Gravel (GP), dense Light gray to multi colored moist w/ few coarse - medium fine sand grains	HNu=BG	~~54~~			D #54 P=2.0 R=0.7
	106						
	107	Poorly graded Sand (SP) dense, v. fine to fine, Light gray to buff white w/ trace of medium grained sand, wet	HNu=BG	~~55~~			D #55 P=2.0 R=1.5 Problem w/ pump
	108						
	109	with sand (GP)					D #56
	110	Poorly graded Gravel (GP) dense multi colored, fine, wet w/ few coarse sand, w/ some v. fine to fine sand, Light gray to buff white.	HNu=BG	~~56~~			P=2.0 R=0.5
	111		HNu=BG	~~57~~			D #57 P=2.0 R=0.9
	112	Poorly graded Sand (SP), v. dense v. fine to fine, Light gray to buff white w/ limonite staining streak throughout, wet (Unconsolidated Quartz Sandstone)					Stop 6/12/92
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

MEW 7/7/92

1542

HTW DRILLING LOG

HOLE NO. MW33

Remedial Investigation, Mead NOP | INSPECTOR [illegible] | SHEET 14 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		~~(Sand) (Sandstone)~~ (SP) Poorly graded Sand, soft V. fine to fine, Tan to yellow buff white w/ limonite staining throughout ~~w/~~ trace of fine gravel (~~Reworked~~ Unconsolidated wat Omadi Sandstone)	HWa=B6 MEW 7/7/92	58			START 6/13/92 D#58 P=2.0 R=1.3
	115	w/ bright yellow orange limonite staining	HWa=B6	59			D#59 P=2.0 R=1.5
	116						Reamed w/ 7 7/8 in tricone 0-116.5 Added 100 ~~Mix~~ ~~50x2~~ lbs of Aqua Gold Stop 6/13/92
	117	~~Poorly graded Sand, dense, v. fine to fine w/ trace silt, bright yellow to orange (limonite) throughout. (Omadi Member)~~	HWa=B6	59	Run #1 ~~w/ split spoon~~ ~~Christ sampler~~ MWD033117	Start 6/14/92 116.5 to 127ft (6/14/92)	Set 6" steel casing @ 116.5' (6/14/92) Reamed w/ 5 3/4 in tricone P=2.0 D#60 R=1.5 -8oz Expl. -4oz TOC -4oz VOC
	118	turning bright Red to yellow orange					
	119	SANDSTONE, bright yellow to orange (limonite), very soft, very weathered v. fine to fine grained w/ trace silt ~~(Omadi)~~	HWa=B6	60	Run #2		D#61 P=2.0 R=1.8
	120						
	121		HWa=B6	61	Run #3		D#62 P=1.0 R=0.7
	122	becoming ~~Changing to~~ gray w/ yellow orange					~~BOB 122~~

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33

1543

ICORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW33D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR KRB

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	123	117' = 7 7/8 2.61 gallons per foot 305.4 gallons 117' – 127' = 10' = 5 7/8 1.47 gallons per foot 14.7 gallons Hole Volume = 320.1 gl pit 400 gallons total water used 900 gallons 180 gallons total fluids lost.	All HNu screening equal to background and/or non-detection				~~BOB~~ ~~127.0~~ Not sampled interval 122-127 ft drilled with 5 3/4 inch tricone
	124						
	125						
	126						
	127	(SAME) SANDSTONE: Bright yellow to orange (limonite), v. soft, v. fine to fine grained w/ trace silt, very weathered [Omadi Member]					B.O.B. 127.0 6" casing pulled 6/14/92 prior to well installation. Boring completed as monitoring well.

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW33D

1544

[redacted] DRILLING LOG

HOLE NO. MW-34D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: U.S. ARMY CORPS OF ENGINEERS
SHEET 1 OF 5 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.554143 E.2846779
5. NAME OF DRILLER: ROGER HUNTER	6. MANUFACTURER'S DESIGNATION OF DRILL: KEYSTONE 50 / FAILING 1500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6" drive BBL straight shoe; 7" Reaming shoes; 6" dia Soils barrel; 5 5/8", 7 7/8", 9 7/8" tricone bits; 4" x 5' Rock core barrel	8. HOLE LOCATION: SW SW SW Sec 28 T14N R4E
	9. SURFACE ELEVATION: ~~1155~~ 1154.44'
	10. DATE STARTED: 5/31/92 — 11. DATE COMPLETED: 6-9-92
12. OVERBURDEN THICKNESS: 113 ft	15. DEPTH GROUNDWATER ENCOUNTERED: 55.5' ATD
13. DEPTH DRILLED INTO ROCK: 14.5 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: ~~NA~~
14. TOTAL DEPTH OF HOLE: 127.5 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): ~~X~~ NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
~~SPRINGTZE~~ 11	X	NA	~~0~~ NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
4	X	NA	TOC	Exp.	N/A	78 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring ~~test~~ well installed	NA	MW-34D	NA	Robert Ehrean

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS (CL) c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY, Hard, Drk Brn, Dry, w/ rootlets ~~(Loess)~~ (Loess)	Boring advanced w/ Keystone 50 cable-tool rig				~~Advanced Boring~~ w/ 6" drive bbl straight shoe followed by 6" reaming shoe every 2' interval
	1		HNu= BG	X		71	Drive 1 D=2.0 R=2.0 Pen=max
	2						
							~~Pen~~ D #2
	3		HNu= BG	X		~~49~~ 41	D=2.0 R=2.0 Pen=max
	4						
							D# 3
	5	Firm Becoming Lt Brn. moist (Pedogenic Loess)	HNu= ~~[illegible]~~ BG	X		49	D=2.0 R=2.0 Pen=2.75

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-34

~~B4~~ 1545

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 2 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) LEAN CLAY (CL) Firm, Lt Brn Gray, moist, w/ Black Dendrites w/ iron oxide (?) Staining	[redacted]	[redacted] 3			D # 3
	6						
	7		[redacted] HNu = BG	4		29	D #4 D = 2.0 A = 2.0 Pen = 2.5
	8	w/ moisture content decreasing	HNu = BG.				D # 5
	9		[redacted]	5		28	D = 2.0 A = 2.0 Pen = 2.25
	10	Becoming Lt Gray Brn mottled Lt Gray w/ Iron oxide (?) Staining	HNu = BG				D # 6
	11		[redacted]	6		30	D = 2.0 A = 2.0 Pen = 2.5
	12						D # 7
	13		HNu = BG	7		24	D = 2.0 A = 2.0 Pen = 2.25
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW34

1546

B07NE003702-05655

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 3 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) LEAN CLAY (CL), Firm, Lt Brn mottled Lt Gray, w/ Ironoxide(?) staining	HNu= BG	X		29	D #8 D = 2.0 R = 2.0 Pen = 1.5 Stopped 5-31-92
	16						Started 6-1-92
	17		HNu= BG	X		43	D #9 D = 2.0 R = 2.0 ~~Pen=~~
	18						
	19		HNu= BG	X		60	D #10 D = 2.0 R = 2.0
	20	Poorly graded sand (SP), Dense, Lt Gray, fine grained, Dry (Alluvium)					
	21		HNu= BG	X		86	D #11 D = 2.0 R = 2.0
	22		HNu= BG	X		69	D #12 D = 2.0 R = 2.0
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

1547

B07NE003702-05656

HTW DRILLING LOG

HOLE NO. MW-34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 4 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) Poorly graded Sand (SP), Dense, Lt Gray, fine grained dry (Alluvium)		~~12~~			D # 12
	24						D # 13
	25		HNu= BG	~~13~~		70	D = 2.0 R = 2.0
	26						D # 14
	27		HNu= BG	~~14~~		97	D = 2.0 R = 2.0
	28	Becoming M. Dense					D # 15
	29		HNu= BG	~~15~~		48	D = 2.0 R = 2.0
	30						D # 16
	31		HNu= BG	~~16~~		57	D = 2.0 R = 2.0
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34D

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 3 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Same as above) Poorly graded Sand (SP), Med Dense, Lt Gray, fine grained, Dry	HNu= BG	~~16~~		35	D #18 D=2.0 R=2.0
	34	~~Poorly Dense~~					
	35		HNu= BG	~~14~~		89	D # 19 D=2.0 R=2.0
	36						
	37		HNu= BG	~~20~~		49	D # 20 D=2.0 R=2.0
	38						
	39		HNu= BG	~~21~~		61	D #21 D=2.0 R=2.0
	40						
	41		HNu= BG	~~22~~		61	D #22 D=2.0 R=2.0

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34D

1549

B07NE003702-05658

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 6 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) Poorly graded Sand (SP), Med Dense, LT Grey, fine grained ~~[illegible]~~ Dry.		~~22~~			D # 22
	42						
	43		HNu= BG	~~23~~		65	D # 23 D=2.0 A=2.0
	44						
	45		HNu= BG	~~24~~		71	D # 24 D=2.0 A=2.0
	46						
	47		HNu= BG	~~25~~		~~45~~ 43	D # 25 D=2.0 A=2.0
	48						
	49		HNu= BG	26		50	D # 26 D=2.0 A=2.0
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34D

1550

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 7 OF 5 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(Same as above) (SP) Poorly Graded Sand, Med Dense, Lt Gray, fine grained, wet,	HMu= B6	~~27~~		61	D #27 D=2.0 R=2.0
	52						
	53	w/trace of med sand.	HMu= B6	~~28~~		56	D #28 D=2.0 R=2.0
	54						
	55	w/trace of ~~coarse sand~~ med and coarse sand	HMu= B6	~~29~~		54	D #29 D=2.0 R=2.0 Reamed w/9 7/8" Tricone bit to 56.0' stopped 6-1-92 Groundwater Encountered PID 65's
	56						Started 6-2-92 using D 1500 drill rig
	57		HMu= B6	Bag sample #1 ~~30~~		w/ Fail	D #30 P=6.0 R=6.0
	58			Sieve analysis SC-02 bag sample	~~3 x 8 oz MW-34 (400) 58 VOC MW-34 (400) 58 TOC MW-34-6 58 Exp (600)~~	1 x 8 oz	Sample MW 034-056 collected 56 to 62' for VOC, TOC, explosives
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

1551

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 8 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as Above) (SP) Poorly graded Sand Med Dense, LT Gray, fine grained, wet, w/ Trace med grained Sand			~~Sieve Analysis #56-62 bag sample~~		D #30
	60			30			
	61				~~Sieve~~		
	62						
					~~MW 34-62 VOC - 4oz~~		D #31
				Sieve Analysis 62-64 bag sample #2	~~MW34-62 TOC - 4oz~~		P = 7.0
	63				~~MW 34-62 Exp. 4oz~~ 3x4oz 1x8oz		R = 7.0
							Sample MWB-034-062 collected 62' to 64' for VOC, TOC, explosives, and grain size analysis
	64				~~Sieve Analysis 62-64 bag sample~~		
			HNu = ~~31~~ BG				
	65						
	66						
	67						
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW ~~P55~~ P552

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 9 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded Sand (SP), Med Dense, Lt. Gray, fine grained, wet w/ trace of med Sand.		31			D # 31 CONTINUED
	69	w/ med grained Sand grading out.					D # 32
	70						P=7.0' R=7.0
	71		HNu= B6	32	~~Sieve analysis 69-76 bag sample~~		
	72			Sieve Analysis 69-76 bag sample			
	73						
	74						
	75						
	76	w/ trace of coarse grained Sand and fine gravel	~~HNu= B6~~	33			D # 33
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34D

553

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 10 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as above) Poorly Graded Sand (SP), med Dense, Lt Gray, fine grained, wet, w/trace of coarse sand and fine gravel					
	78			~~33~~			D # 33
							P = 7.0
				Sieve Analysis 76-83 bag sample			B = 6.5'
	79		HNu = BG				
	80	w/ coarse grained sand and fine gravel grading out					
	81						
	82						
	83						
							D # 34
				~~34~~			P = 7.0
	84		HNu = BG				B = 7.6
				Sieve Analysis 83-90' Bag sample			
	85	w/ some coarse grained sand and trace of fine gravel					
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34

1554

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 11 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same as above) (SP), Poorly graded sand, med Dense, Lt Gray, fine grained wet w/some ~~med~~ coarse sand and trace of fine gravel.		~~34~~			D #34
	87						
	88						
		w/trace of coarse sand and fine gravel.					
	89						
	90						
							D #35
							P = 6.0
	91						P = 2.5'
		WITH SAND	HNu = BG	~~35~~ Sieve Analysis 90-96 Bag Sample			
	92	Poorly Graded Gravel (GP), ~~w/sand~~ Dense, ~~Hard~~ multi colored, fine grained, wet, W/some med to coarse grained sand and trace of coarse Gravel.					
	93						
	94						
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

1555

HTW DRILLING LOG

HOLE NO. MW 34 D

PROJECT: Remedial Investigation Mead NOP

INSPECTOR: BJE

SHEET 1 2 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same as above) Poorly Graded Gravel with Sand (GP) Dense, Dark Colored, Fine grained, wet, w/ Some ~~med to~~ Coarse Gravel.					
	96						Cored in to 92' after sample to 96' were taken
	97		HNu= B6	~~85~~ Sieve Analysis 96-900 Bag Sample			D #35 P= 4.0 R= 1.5'
	98						
	99	Poorly graded Sand (SP), Med Dense Gray, Fine grained, wet w/ trace med to coarse grained Sand.					
	100	Becoming V. Dense					Lifting rig up when drilling
	101		HNu= B6	~~36~~ Sieve Analysis 100-104 Bag Sample			D #36 P= 4.0' R= 3.5'
	102						
	103						
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34D

1556

B07NE003702-05665

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 13 OF 15 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(See as Above) Poorly graded Sand (SP) V. Dense, Gray, fine grained, wet w/ trace of med to coarse sand					D # 37
	105			~~37~~			P = 6.0
							R = 2.5
	106	w/ Little fine gravel and trace of coarse gravel (max dia 1.5")	HNu	~~Sieve analysis 104-110~~			
	107		B6	Bag Sample			
				~~#9~~	3 x 40z 1 x 8oz		Sample MWA-034-104 collected 104 to 110' for VOC, TOC, explosives, and grain size
	108						
	109						Stopped 6-2-92
	110						Started 6-3-92
		W/ Some Green, red, Drk gray, V. weathered Shale balls, and ~~some~~ some fine gravel and coarse gravel (max dia 3")					D # 38
	111		~~Not Taken~~	~~NO Sample~~			P = 3.0
							R = 0
	112						
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34D

1557

B07NE003702-05666

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 4 OF 5 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Sand Stone: Gray, Soft, V. weathered, fine grained, weakly cemented. 113.4'		Sieve Analysis 38th Geotech Sample		100/5"	Cont. Boring w/ 7 7/8" tricone and drilling fluids. D=0.4' R=0.4'
	114						
				NO Sample			
	115						Reamed w/ 9 7/8" ticonc bit to 116.0' Placed 6" temp casing to 116.0'
	116		X	X	X	X	
				Run #1	Rec	RQD 0%	Cont. w/ 4" core barrel and drilling fluid.
	117			Sieve Analysis has Sample #11	0.0	DWR 95%	
	118						
	119						
	120						
	121						
	122						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-34

1558

HTW DRILLING LOG

HOLE NO. MW 34D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJF

SHEET 15 OF 15 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(on manbore) Sand stone, Gray, soft, V. weathered, fine grained, well cemented					
	123						Pulled core barrel w/ no recovery
	124	124		BMH 2	ACC 2.0'	AQD 0%	
				Bag Sample	~~MW 34-124 VOC 1-4oz Jar~~ 3 x 4oz 1 x 8oz	DWA 95%	~~Pulled core barrel w/ no recovery~~ cont. w. core Barrel ad drilling
	125		X	X	X	X	~~to 125'~~
					~~MW34-124 TOC 1-4oz Jar~~		Fluids
	126				~~MW34-124 Exp 1-8oz Jar~~		Sample MWD-034-124 collected 124' to 126' for VOC, TOC, Explosives, grain size
	127						
	128						BOH 127.5' measured 126.8' monitoring well installed upon completion ~~6-9-92~~ 6-10-92

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 34

1559

B07NE003702-05668

HTW DRILLING LOG

HOLE NO. MW-35

1. COMPANY NAME	Woodward-Clyde Consultants
2. DRILLING SUBCONTRACTOR	WINNEK
SHEET 1 OF 4 SHEETS	
3. PROJECT	Remedial Investigation, Mead NOP
4. LOCATION	Mead, Nebraska N. 551632 - E. 2851919
5. NAME OF DRILLER	BILL VICK
6. MANUFACTURER'S DESIGNATION OF DRILL	CFD FAILING 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5" DRAG BIT; 2" SPLIT SPOONS; 5" TUNGSTEN INSERT BITS; 94 MM CHRISTENSON WIRE LINE; 7 7/8 IN TRICONE; 3 1/2 X 4 5/8 IN. X 5 FT. CORE BARREL
8. HOLE LOCATION	NE NE SE Sec 33 T14N R9E
9. SURFACE ELEVATION	1132.40'
10. DATE STARTED	6/2/92
11. DATE COMPLETED	6/10/92
12. OVERBURDEN THICKNESS	93 FT
13. DEPTH DRILLED INTO ROCK	21 FT
14. TOTAL DEPTH OF HOLE	114 FT
15. DEPTH GROUNDWATER ENCOUNTERED	NOT KNOWN DUE TO DRILLING FLUID INVASION
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	— N/A
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	— N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
GRAIN SIZE	34, 46, 47	N/A	NONE (NO CORE RECOVERY)

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NONE	N/A	N/A	N/A	N/A	N/A	0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Installed well	N/A	MW-35D	N/A	L. TRAVAGLIA

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) firm, dark brown, moist w/roots (LOESS ± topsoil)	HNU = BKG	1			BORING ADVANCED W/5" DRAG BIT AND 2" SPLITSPOON D#1 P = 2.0 R = 0.6
	2						
	3		HNU = BKG	2			D#2 P = 2.0 R = 0.9
	4	Becoming Light brown w/iron staining	HNU = BKG	3			D#3 P = 2.0 R = 1.9
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1

1560

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 2 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
		LEAN CLAY (CL) firm, light brown, moist w/ iron staining (LOESS)		3			
	6						
	7		HNu= BKG	4			D#4 P=2.0 R=2.0 VERY SOFT
	8						
	9	Becoming very soft with occasional root traces	HNu= BKG.	5			VERY SOFT D#5 P=2.0 R=2.0
	10						
	11		HNu= BKG.	6			SOFT D#6 P=2.0 R=2.0
	12	Becoming soft					
	13		HNu= BKG.	7			D#7 P=2.0 R=1.9
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

1561

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(SAME) LEAN CLAY (CL) soft, light brown w/ root traces and iron staining (LOESS)	HNu= BKG.	8			D#8 P=2.0 R=1.9
	16						BEGIN 5" DRAG BIT 94mm CHRISTENSON WIRE LINE SAMPLE 2" SAMPLE
	17		HNu= BKG.	9			D#9 P=2.0 R=1.8
		17.5 Poorly Graded SAND (SP) LOOSE, Grey V. fine (Alluvium)					
	18	Becoming fine with occasional iron staining	HNu= BKG.	10			D#10 P=2.0 R=1.0
	20						
	21		HNu= BKG.	11			D# 11 P=2.0 R=0.9
	22		HNu= BKG.	12			D#12 P=2.0 R=1.2
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

1562

HTW DRILLING LOG

HOLE NO. MW-35

Remedial Investigation, Mead NOP | INSPECTOR L. TRAVAGLIN | SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) Poorly Graded SAND (SP) Loose, tan fine to v fine wet (ALLUVIUM)		12			
	24						
	25		HNu= BKG.	13			D#13 P=2.0 R=1.1
	26						
	27		HNu= BKG.	14			D#14 P=2.0 R=0
	28						
	29		HNu= BKG.	15			D#15 P=2.0 R=1.5
	30	0.1' med sand seam					
	31		HNu= BKG.	16			D#16 P=2.0 R=1.5
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(SAME) Poorly Graded SAND (SP) Loose, tan, fine to V.fine wet w/occasional med. sand seams (Alluvium)	HNu= BKG.	17			D#17 P=2.0 R=1.7
	34						
	35		HNu= BKG.	18			D# 18 P=2.0 R=1.8
	36	Becoming fine with few med. sand	HNu= BKG.	19			D#19 P=1.0 R=0.8
	37						
	38		HNu= BKG.	20			D#20 P=2.0 R=1.0
	39						
	40		HNu= BKG.	21			D#21 P=2.0 R=1.8
	41						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35

Remedial Investigation, Mead NOP

INSPECTOR L. TRAVAGLIN

SHEET 6 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	42	(SAME) Poorly Graded SAND (SP) fine to v. fine, loose, tan wet w/ occasional med. to coarse sand seams (Alluvium)	HNu= BKG.	22			D#22 P=2.6 R=1.8
	43						
	44		HNu= BKG.	23			D#23 P=2.0 R=1.2
	45						
	46		HNu= BKG.	24			D#24 P=2.0 R=1.2
	47						
	48		HNu= BKG.	25			D#25 P=2.0 R=1.5
	49		HNu= BKG.	26			D#26 P=2.0 R=1.4
	50						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 7 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) Poorly Graded SAND (SP) loose, tan, fine to v. fine, wet w/occasional med. to coarse sand seam (Alluvium)		26			
	51						
	52		HNu= BKG.	27			D#27 P=2.0 R=1.4
	53						
	54	Becoming fine to med. with trace coarse sand	HNu= BKG.	28			D# 28 P= 2.0 R=1.6
	55						
	56		HNu= BKG.	29			D#29 P=2.0 R=1.5
	57						STOPPED 6/2/92 RESUMED 6/3/92
	58		HNu= BKG.	30			D#30 P=2.0 R=1.7
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

1566

HTW DRILLING LOG

HOLE NO. mw-35

Remedial Investigation, Mead NOP | INSPECTOR L. TRAVAGLIN | SHEET 8 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	60	Poorly Graded SAND (SP) Loose, tan fine to V. fine wet w/trace med. sand (ALLUVIUM)	HNu= BKG	31			D#31 P=2.0 R=1.8
	61		HNu= BKG.	32			D#32 P=2.0 R=1.6
	62						
	63		HNu= BKG.	33			D#33 P=2.0 R=1.5
	64						
	65		HNu= BKG.	SAMPLE COLLECTED 34			D#34 P=2.0 R=0.9
	66						
	67		HNu= BKG.	35			D#35 P=2.0 R=1.2
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35

Remedial Investigation, Mead NOP | INSPECTOR L. TRAVAGLIN | SHEET 4 OF 4 SHEETS 89

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded SAND (SP) loose, tan fine to V. fine wet w/trace med. sand and trace fine gravel (Alluvium)		35			
	69		HNu= BKG.	36			D#36 P=2.0 R=1.9
	70	Becoming fine to V. fine. with little coarse sand					
	71	Becoming fine to V. fine w/trace coarse sand	HNu= BKG.	37			D#37 P=2.0 R=1.8
	72						
	73		HNu= BKG.	38			D# 38 P=2.0 R=1.1
	74						
	75		HNu= BKG.	39			D#39 P=2.0 R=1.0
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1568

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	78	(SAME) Poorly Graded SAND (SP) loose, tan fine to V. fine wet w/trace med. sand	HNU= BKG.	40			D#40 P=2.0 R=1.3
	79	Becoming fine to V. fine w/trace med-coarse sand	HNU= BKG.	41			D#41 P=2.0 R=0.9
	80	Becoming fine w/little med. to coarse sand Trace fine gravel 81.0					
	81	Well Graded SAND (SW) V. loose, Gray+Pink V. fine to coarse, wet w/few fine to med gravel.	HNU= BKG.	42			D#42 P=2.0 R=0.4 LOST DRILLING FLUIDS (100 GAL.)
	82						
	83	(fine to coarse gravel)	HNU= BKG.	43			D#43 P=2.0 R=0 INTERVAL LOST
	84						
	85	w/fine cobbles	HNU= BKG.	44			D#44 P=2.0 R=0.5
	86						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1569

HTW DRILLING LOG

HOLE NO. MW-35

Remedial Investigation Mead NOP | INSPECTOR L. TRAVAGLIN | SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		well graded SAND (SW) med dense Grey, V. fine to coarse w/trace fine cobbles and coarse gravel		44			
	87						
	88		HNu= BKG.	45			D#45 P=2.0 R=0.4 LOST DRILLING FLUIDS POOR SAMPLE RECOVERY
	89						
	90	Becoming V. fine to coarse w/trace med to coarse gravel, tray clay 90.5	HNu= BKG.	SAMPLE COLLECTED FOR SIEVES 46			D#46 P=2.0 R=0.7 LOST DRILLING FLUIDS
	91	Poorly Graded Gravel (GP) V. loose, Grey, fine to coarse.					
	92		HNu= BKG.	SAMPLE COLLECTED FOR SIEVES 47			D#47 P=2.0 R=0.2
	93	93.0					
	94	SANSTONE, fine grained buff color, w/iron staining V. weathered	HNu= BKG.	48			D#48 P=2.0 R=2.0 REAMED 0-94' W/7 7/8 in TRICONE 6/4/92 6" TEMP. STEEL CASING INSTALLED TO 94' (6-4-92) REMOVED 6-10-92 PRIOR TO WELL COMPLETION STOP 6/3/92
	95						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

1570

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	96	(SAME) SANDSTONE: lt. brownish-grey weathered orange fine, v. weakly cemented loose very weathered	HNu= BKG.	CORE RUN #1 49	REC 0.0 / 5.0	RQD 0% DWR 100%	BEGIN 6-9-92 CONTINUOUS CORING 3 1/2 x 4 5/8 CHRISTENSEN CORE BARREL
	97						
	98						
	99						
	100	Becoming el. dense					SAMPLED W/ 94 mm CHRISTENSEN bbl WIRELINE TUNGSTEN INSERT BIT
	101		HNu= BKG.	50			D#49 P=2.0 R=1.8
	102						
	103		HNu= BKG.	51			D#50 P=2.0 R=1.9
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

HTW DRILLING LOG

HOLE NO. MW-35

Remedial Investigation, Mead NOP | INSPECTOR L. TRAVAGLIN | SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	105	(SAME) SANDSTONE: lt grey weathered orange fine weakly cemented, sl. dense very weathered	HNu= BKG	52			D#51 P=2.0 R=1.0
	106	w/seams (<3in) firm grey, silty shale (106'-109')					
	107		HNu= BKG.	53			D#52 P=2.0 R=1.7
	108						
	109		HNu= BKG.	54			D#53 P=2.0 R=1.8 DRILLING RESISTANCE INCREASES AT 108.7
	110	Becoming moderately cemented, dense, weathered.					
	111		HNu= BKG.	55			D#54 P=2.0 R=1.8
	112		HNu= BKG.	56			D#55 P=2.0 R=1.9
	113						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1572

HTW DRILLING LOG

HOLE NO. MW-35

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: L. TRAVAGLIN

SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(GAME)		56			D# 55
		114.0					STOPPED 6-9-92 B.O.H 114'
	114						REAMED HOLE TO 5 7/8 in. WITH MUD ROTARY 94' - 114'
	115						PLUGGED HOLE W/ BENTONITE PELLETS 106.5' TO 114' (6-9-92)
							COMPLETED AS MONITORING WELL 6-10-92
	116						TOTAL DRILLING WATER LOSS = 450 GAL.
	117						
	118						
	119						
	120						
	121						
	122						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.:

1573

B07NE003702-05682

7/22/92 REVIEWED BY LEE WILSON 7-21

HTW DRILLING LOG

HOLE NO. MW-36D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Company
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.551980-E.2857151
5. NAME OF DRILLER: Bob Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" diam split spoon; 4 3/4" drag bit; 7 7/8" tricone bit; 5 7/8 tricone bit; 4 3/4 in, 3"x5' core sampler	8. HOLE LOCATION: SE-NE Sec 34 T14N R9E
	9. SURFACE ELEVATION: 1076.55'
	10. DATE STARTED: 7/15/92 @ 1405
	11. DATE COMPLETED: 7/16/92 1210
12. OVERBURDEN THICKNESS: 39 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA water level~~ masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 10 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 49 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	N/A	N/A	N/A	N/A	N/A	NA%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
X monitoring well installed	N/A	MW-36D	N/A	Bret A Hedlund

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL) soft to medium, dk brown w/ few fine sand and roots, moist (top soil)	Hm= BG			P	boring advanced w/ 2"/3" split spoons and reamed w/ 4 3/4" drag bit and bentonite slurry w/ 3" spoon D#=1 D=2.0ft R=1.8ft
	1	becoming mottled gray					
	2		Hm= BG			P	w/ 2" spoon D#=2 D=2.0ft R=1.8ft
	3	becoming dk brown 3.5					
	4	SILT (ML), loose to medium dense, dk brown, w/ trace fine sand and roots, wet (loess)	Hm= BG			P	w/ 3" spoon D#=3 D=2.0ft R=1.9 ft
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-36D B1

1574

HTW DRILLING LOG

HOLE NO. MW-36D

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 2 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same) SILT (ML) loose to medium dense, dk brown, w/ trace vf fine sand, wet (loess)					
	6						w/ 2" spoon D# = 4
	7	becoming dk brown mottled grey	Hum= BG			P	D = 2.0 ft R = 2.0 ft
	8						w/ 3" spoon D# = 5
	9		Hum= BG			P	D = 2.0 ft R = 2.0 ft
	10	becoming medium dense to dense, grey					w/ 2" spoon D# = 6
	11		Hum= BG			P	D = 2.0 ft R = 1.7 ft
	12						w/ 3" spoon D# = 7
	13	~~no sample~~	Hum= BG			P	D = 2.0 ft R = 0 ft
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36D575

HTW DRILLING LOG

MW-36D

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenberg | SHEET 3 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	SILT (ML) medium to dense, gray w/ trace of ~~clay~~ fine sand, wet (loess)	Hm= B4			P	w/ 2in spoon [redacted]
	15	15.5					R [redacted] ft
	16	POORLY GRADED SAND (SP) ~~medium~~ dense, tan, very fine to fine ~~sand~~ grained w/ [redacted] medium sand and trace coarse sand, wet (alluvium)	Hm= [redacted] B4	[redacted] ~~Sample~~ #1 Bag sample		8 17 [redacted] 21	begin hammering split spoons using 140# hammer; w/ 3in spoon; [redacted] = 9; D = 2.0 ft; R = 2.0 ft; soil sample collected for sieve analysis.
	17						
	18	becoming fine to medium sand w/ few very fine and coarse sand	Hm= B4			6 9 15 18	w/ 2in spoon; D# = 10; D = 2.0 ft; R = 2.0 ft
	19	w/ 2" coarse sand to fine gravel seam					
	20		Hm= B4			8 12 12 18	w/ 3in spoon; D# = 11; D = 2.0 ft; R = 2.0 ft
	21	becoming fine to medium sand w/ a trace of fine gravel					
	22	becoming fine sand w/ few very fine sand and trace med sand	Hm= B4			4 6 8 12	w/ 2in spoon; D# = 12; D = 2.0 ft; R = 1.0 ft
	23						

SUGGESTED SHALLOW SCREEN INTERVAL (17' TO 27')

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-36D

157E

/CORPS/4-16-92

HTW DRILLING LOG

MW-36D

Remedial Investigation, Mead NOP | INSPECTOR: B. Heldenkamp | SHEET 4 OF 6 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Same) POORLY GRADED SAND (SP), dense, grey-tan, fine grained ~~sand~~ w/ few v-fine and medium sand, wet (alluvium)					
	24		Hm= B4			8 16 20 18	w/ 3" spoon D# = 13 D = 2.0 ft R = 1.8 ft
	25						
	26		Hm= B4			6 8 15 24	w/ 2" spoon D# = 14 D = 2.0 ft R = 1.8 ft
	27	becoming medium dense w/ some medium sand and trace coarse sand to fine gravel					
	28		Hm= B4			12 10 8 10	w/ 3" spoon D# = 15 D = 2.0 ft R = 1.2 ft
	29						
	30		~~Sample~~ ~~#2~~ Hm= B4	~~Sample~~ #2 Bag Sample		6 7 10 12	w/ 2" spoon D# = 16 D = 2.0 ft R = ~~[illegible]~~ 1.6 ft sample #2 collected for sieve analysis
	31						
	32						

← SUGGESTED INTERMEDIATE WELL SCREEN INTERVAL (26'-10'38')

← SUGGESTED SHALLOW WELL SCREEN INTERVAL (17'-27')

/CORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36D

HTW DRILLING LOG

MW-36D

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 5 OF 6 SHEETS

SUGGESTED INTERMEDIATE WELL SCREEN INTERVAL (28' TO 38') →

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same) POORLY GRADED SAND (SP), medium dense, grey tan, medium sand w/ some fine sand and trace of coarse sand to fine gravel, wet (alluvium)	Hm= BG			8 9 7 6	w/ 3" spoon D# = 17 D = 2.0ft R = 0.9ft
	33						
	34		Hm= BG			9 10 11 13	w/ 2" spoon D# = 18 D = 2.0ft R = 2.0ft stop drilling @ 1715 7/15/92
	35						
	36	becoming medium to coarse sand w/ some fine gravel and v. fine to fine sand	Hm= BG			13 12 11 15	w/ 3" spoon resume drilling @ 0745 7/16/92 @ 36ft D# = 19 D = 2.0ft R = 1.0ft
	37						
	38		Hm= BG			8 8 67 69	w/ 2" spoon D# = 20 D = 2.0ft R = 2.0ft boring reamed 0-40ft bgs @ 0900 7/16/92
	39	SANDSTONE: soft, lt tan, fine ~~sand~~ grained w/ few medium sand weathered, weakly cemented, wet ~~(alluvium)~~					
	40		6" temp.				shut surface casing set 6ft in Kaiparowits w/ 300#
			Hm= BG			8 15 28 37	w/ 2in spoon D# = 21 D = 2.0' R = 1.2 ft
	41						

PROJECT: Remedial Investigation, Mead NOP 921KW030 | HOLE NO.: MW-36D

157t

/CORPS/4-15-92

HTW DRILLING LOG

MW-36D

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	41	(Same) SANDSTONE: soft, lt tan, fine ~~sand~~ grained with few medium ~~sand~~ grained, weathered, weakly cemented, wet					
	42	~~(alluvium)~~				21	w/2in spoon D# = 2.2
	43	becoming stained brownish-orange	Hm= B4			33 60	D = 1.5ft R = 1.4ft
	44			Core run #1	rec 0.0 / 5.0	RQD 0%	Core run #1 begun 1150 7/16/92
	45		Hm= B4			DWR 90%	Water loss during drilling ~130 gallons
	46						Water loss over screen interval is ~ 20 gallons
	47						temporary steel surface casing removed 7/16/92 @ 1450
	48						BOB @ 49ft
	49						hole reamed to 5 7/8 in diam. 1210 7/16/92
	50						Monitoring well installed upon boring completion

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-36D

1579

ICORPS/4-15-92

CLH 7/14/92 Reviewed by ME Wilson 7-14-92 * Replacement

HTW DRILLING LOG

HOLE NO. MW-37D*

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: The Winnek Company
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.546956-E.2855709
5. NAME OF DRILLER: Bob Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner - Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5 9/8 in tri cone; 9 7/8 in tri cone; 7 7/8 in tri cone	8. HOLE LOCATION: 4ft south of abandoned MW-37D
	9. SURFACE ELEVATION: 1082.61'
	10. DATE STARTED: 7/12/92 @ 0950 — 11. DATE COMPLETED: 7/13/92 1120
12. OVERBURDEN THICKNESS: 41 1/2 ft	15. DEPTH GROUNDWATER ENCOUNTERED: Masked by drilling fluids
13. DEPTH DRILLED INTO ROCK: 10.3 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 51.8 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	N/A	N/A	N/A	N/A	N/A	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-37D	NA	Bud A Helap

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL) soft, dark brown, moist, w/trace fine sand, w/ root lets (top soil)					boring advanced w/ 7 7/8 in tri cone and bentonite slurry soil/sediment/rock descriptions from ~~auger~~ cuttings
	1						
	2						
	3						
	3.5	POORLY GRADED SAND (SP), ~~firm~~ loose, brown, w/ iron staining & dry, fine					
	4	LEAN CLAY (CL) firm, lt brown, w/ iron staining, mottled w/ dark brown, moist, with occasional root lets (loess)					
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-37D

1580

HTW DRILLING LOG

MW-37D

Remedial Investigation Mead NOP | NSPE: B. Hedenkamp | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(Same) LEAN CLAY (CL) firm, lt brown, w/iron staining mottled w/ dark brown, moist, w/ occasional root lets (loess)					
	6						
	7						
	8						
	9						
	10						
		10.5					
	11	POORLY GRADED SAND (SP), dense, grey, fine, moist (alluvium)					
	12						
	13						
	14						

ICOHPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 921W030

HOLE NO.: MW-37D

1581

B07NE003702-05690

HTW DRILLING LOG

MW-37D

Remedial Investigation, Mead NOP | INSPECTOR: B. Heglenkamp | SHEET 3 OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same) POORLY GRADED SAND (SP) dense, grey, fine moist (alluvium)					
	15						
	16						
	17						
	18	becoming fine sand w/ trace silt					
	19						
	20						
	21						
	22						
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D

1582

ICORPS/4-18-92

HTW DRILLING LOG

MW-37D

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	CLEAN CLAY (CL) firm, lt brown, w/occasional iron staining, moist w/ trace fine sand (alluvium)					
	24						
	25	25.0 POORLY GRADED SAND (SP), loose, brown, fine to medium grained ~~sand~~, wet (alluvium)					
	26						
	27						
	28						
	29	becoming coarse w/ trace fine					
	30						
	31						
	32						

ICOHPSV4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D

1583

B07NE003702-05692

HTW DRILLING LOG

MW-37D

Remedial Investigation Mead NOP | NSPE: B. Hedenkamp | SHEET 5 of 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same) POORLY GRADED SAND (SP) loose, brown, coarse grained w/ some fine grained, wet (Alluvium)					
	33						
	34						
	35						
	36						
	37						
	38	Becoming ~~POORLY GRADED SAND (SP), loose~~, brown, w/ some Coarse ~~and little medium sand~~					
	39						
	40						
	41						

PROJECT: Remedial Investigation, Mead NOP 42KW030

HOLE NO.: MW-37D 1584

ICONPW 4-15-92

HTW DRILLING LOG

MW-37D

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	41	(Same) ~~POORLY GRADED SAND~~ (SP)					
		~~POORLY GRADED SAND~~: 41.5					
	42	~~SAND STONE~~: ~~Soft~~ dense orange, fine grained, ~~very weathered~~, weakly cemented					boring reamed 0 to 42 feet w/ 9 7/8 in tricone. Permanent casing cemented in using bentonite cement grout 0-42 ft using 6 in id. 6 5/8 in od. PVC casing
	43						
	44						boring ~~advanced~~ reamed from 42' to 51.8' ~~bottom~~ w/ 5 7/8 in tri cone roller bit and bentonite slurry
	45						
	46						
	47						
	48						
	49						
	50						

ICONPS/4-16-92

PROJECT: Remedial Investigation, mead NOP 92KW030

HOLE NO.: MW-37 D

1585

HTW DRILLING LOG

MW-37D

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(same) ~~SAND STONE~~ POORLY GRADED SAND (SP), dense, orange, fine grained, weakly cemented.					stop drilling @ 51.8' 1120 7/13/92
	51						Bottom of boring 51.0' Monitoring well MW-37D (replacement) installed
							Total Water loss 150 gal (est.)
							Water loss in screen interval 25 gal (est.)

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D 1586

ICOHPSV4-18-82

HTW DRILLING LOG

HOLE NO. MW-37D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANY
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER - DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8 TRICONE; 5 7/8 TRICONE; 2 1/8 x 3 1/2 x 5 FT CORE BARREL; 4 3/4 DRAG BIT	8. HOLE LOCATION: NE SEC 3 T13N R9E
	9. SURFACE ELEVATION:
	10. DATE STARTED: 6-23-92/0850
	11. DATE COMPLETED: 6-24-92/0930
12. OVERBURDEN THICKNESS: ~~42'~~ 41.5'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED BY DRILLING FLUID
13. DEPTH DRILLED INTO ROCK: 9.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 51.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
						0 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW-37D		LISA TRAVAGLIN

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) SOFT, DARK BROWN, MOIST, W/ TRACE FINE SAND W/ROOTLETS.					BORING ADVANCED W/ 7 7/8 TRICONE 6-23-92
	2						
	3						
	4	POORLY GRADED SAND (SP) FIRM, BROWN, W/IRON STAINING DRY, FINE					
	5	LEAN CLAY (CL) FIRM, LT. BROWN, W/IRON STAINING, MOTTLED W/ DARK BROWN, MOIST, W/OCCASSIONAL ROOTLETS.					

/CORPS/6-18-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-37D

1587

B07NE003702-05696

HTW DRILLING LOG

HOLE NO. MW-37D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	6						
	7						
	8						
	9						
	10						
		POORLY GRADED SAND (SP) DENSE GRAY, FINE, MOIST					
	11						
	12						
	13						
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D 1588

HTW DRILLING LOG

HOLE NO. MW-37D

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) DENSE, GRAY, FINE, MOIST					
	15						
	16						
	17						
	18	BECOMING FINE SAND W/ TRACE SILT					
	19						
	20						
	21						
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D

1589

B07NE003702-05698

HTW DRILLING LOG

HOLE NO. MW-37D

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL) FIRM, LT. BROWN W/ OCCASSIONAL IRON STAINING MOIST, W/TRACE FINE SAND.					
	24						
	25	POORLY GRADED SAND (SP) LOOSE IBROWN, FINE TO MED. WET					
	26						
	27						
	28						
	29						
	30	POORLY GRADED SANDY (SP) LOOSE BROWN, COARSE WET W/ TRACE FINE					
	31						
	32						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D

1590

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-37D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: LAT

SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	33						
	34						
	35						
	36						
	37						
	38						
	39	POORLY GRADED SAND (SP) LOOSE, BROWN, W/SOME COARSE AND LITTLE MED (39.5 to 40.0')					
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37 D1591

HTW DRILLING LOG

HOLE NO. MW-37D

Remedial Investigation, Mead NOP | INSPECTOR LAT | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME) POORLY GRADED SAND (SP) BROWN AND ORANGE, FINE W/ FEW COARSE AND MED, WET — 41.5' — — —					
	42	SANDSTONE: SOFT, ORANGE W/ BLACK, FINE, VERY WEATHERED, WEAKLY CEMENTED		CORE RUN #1	REC 0.0 / 5.0	RQD 0% DWR 100%	SET STEEL CASING DOWN TO 43' RAN 5' CORE RUN (41.5' TO 46.5') CORED DOWN ANOTHER 1.5' (TO 48.0') WHILE BRING UP BARREL CAUGHT ON CASING AND BROUGHT UP CASING ABOUT 2'. GOT BARREL OUT AND PUT IN 5 7/8 TRICONE TO TRY TO RE-SEAT CASING, BRINGING UP BIT AND CASING CAME UP AGAIN ABOUT 3 FT. SEAL BROKE AGAIN. THEN PUSHED CASING DOWN W/ RIG TO 47.0' AFTER SANDSTONE HAD APPARENTLY BEEN WASHED OUT DURING CORE RUN.
	43						
	44						
	45						
	46						
	47			CORE RUN #2	REC 0.0 / 1.5'	RQD 0% DWR 100%	REAMED W/ 5 7/8 TRICONE DOWN TO 51.8' TO SET WELL.
	48						
	49						
	50						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D 1592

HTW DRILLING LOG

HOLE NO. MW-37D

Remedial Investigation Mead NOP | INSPECTOR LAT | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(SAME)					
	51						B.O.H 51.0' COMPLETED BORING AS MONITORING WELL. 6-24-92
	52						TOTAL DRILLING WATER LOST = 75 GAL
	53						
	54						
	55						
	56						
	57						
	58						
	59						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-37D 1593-

B07NE003702-05702

HTW DRILLING LOG

HOLE NO. MW 38D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" Tricone; 5 7/8" Tricone; 3" I.D. Core Barrel; 3" Split Spoon	8. HOLE LOCATION
	9. SURFACE ELEVATION
	10. DATE STARTED: 8-18-92 1000
	11. DATE COMPLETED: 8-19-92 1040
12. OVERBURDEN THICKNESS: 49.2'	15. DEPTH GROUNDWATER ENCOUNTERED
13. DEPTH DRILLED INTO ROCK: 15.8'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 65.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: 7

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
						29 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW 38D		Robert Ehm

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL), Firm, Drk Gray, moist, w/ trace Sand w/abundant rootlets (Alluvium)					Advanced Boring w/ 7 7/8" tricone and Drilling fluids. Mixed 200 Gal water w/ 2 #50 bags Bent.
	1	Poorly Graded Sand (SP), med Dense (Est), Lt Gray, fine, moist. (Alluvium)					
	2	Note: Discriptions taken from MW 38 and observations of soil cuttings.					
	3	Sandy LEAN CLAY (CL), Soft to V. Soft, Drk Gray, moist to wet, Alluvium					
	4	Becoming Lighter in color w/ sand content increasing w/ 4" sand layer.					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW 38D

HTW DRILLING LOG

HOLE NO. MW 38 D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Soil:					
	6	SILT (ML), Soft (Est), Gray, wet, w/ little V. fine Sand. (Alluvium)					
	7	Becoming Dark Greenish Gray w/ root hairs and rootholes w/ trace Sand					
	8						
	9	Becoming Greenish Gray					
	10						
	11						
	12						
	13	Poorly Graded Sand, med Dense (Est), Greenish Gray, fine Grained, wet. (Alluvium)					
	14						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38 D

1595

B07NE003702-05704

HTW DRILLING LOG

HOLE NO. MW 38 D

Remedial Investigation Mead NOP | INSPECTOR BJE | SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	15	(Sand) Poorly Graded Sand (SP), med Dense (Est), Greenish Gray, fine, wet. (Alluvium)					
	16						
	17	Silt (ML), med Dense (Est), V. Dark Gray to Black, moist to wet, w/ some V. fine sand					
	18						
	19	Poorly Graded Sand (SP), med Dense (Est), tannish Gray, fine, wet, w/ trace of mica.					
	20						added 20 gal water to pit.
	21	Silt (ML), med Dense (Est), Greenish Gray, moist w/ Some V. fine Sand.					
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW 38 D

1596

HTW DRILLING LOG

HOLE NO. MW38D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Poorly Graded Sand (SP), Loose (Est), LT Gray, fine, wet, w/few med sand and trace coarse sand					
	24						
	25						
	26						
	27						
	28						
	29						
	30	w/ Some med ~~sand~~ and coarse sand and Some fine Gravel					
	31						
	32						

CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 93KW030

HOLE NO.: MW38D

1597

B07NE003702-05706

HTW DRILLING LOG

HOLE NO. MW 38 D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Sand) Poorly Graded Sand (SP), Loose (Est), Lt Gray, fine, wet, W/ Some med ~~Sand~~ and Coarse Sand and Some fine Gravel and trace of Coarse Gravel					
	34						
	35						
	36						
	37						
	38	W/ Some med Sand, trace Coarse sand and trace fine Gravel.					
	39						
	40	Becoming med Dense (Est)					
	41						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38D

1598

HTW DRILLING LOG

MW 38D

Remedial Investigation, Mead NOP | INSPECTOR BJF | SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Some) Poorly Graded Sand (SP) med Dense (St), LT Gray, fine, wet, w/ some med Sand and trace of coarse sand and fine Gravel					
	42						
	43						
	44						
	45						
	46						
	47						
	48						
	49	Reddish Sandstone yellow, Soft to V. Soft V. weathered, fine Grained. Poorly cemented (Omadi)					Drilling w/ V. Little resistance
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38D

1599

B07NE003702-05708

HTW DRILLING LOG

HOLE NO. MW38D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 9 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	51	(Bur) Sand Stone: Reddish Yellow, Soft to V. Soft, V. Weathered, Fine Grained Poorly Cemented (Omadi.)					
	52						
	53						Driller pushed 7 7/8" Tricone from 53.0' to 54.0'
	54	Becoming Soft.	HNu= B6		Rec. 0.8'	60 116/4"	SS- 300lb Hammer. cont. w/5 7/8" tricone
	55						Set 6" flush Joint casing to 55.0 BGL
	56			Ann# 1	Rec 0/2.0	RQD 0	Cont. Boring W/3" dia. Core Barrel and Drilling fluids
	57					DWR 99%	CD-57.7
	58			Ann# 2	Rec 0/2.0	RQD 0 DWR 99%	
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW38D

ICORPS/4-15-92

1600

HTW DRILLING LOG

HOLE NO. MW38D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sand) Reddish yellow, soft, V. Weathered, fine Grained poorly cemented (bmadi)					CD 51.3'
	60			Run # 3	Acc 0 / 2.0	RQD 0	
	61					DWR 99%	CD. 61.0
	62			Run # 4	Acc 2.6 / 5.0	RQD 37%	
	63	w/ Thin lamination Iron stone				DWR 99%	lost 50 gal water 56'-65'
		Becoming Clayey 63.5' w/ Thin layer of Ironstone					
	64	Becoming Lt Gray in color. and stronger cementation					CD. - 63.4' Reamed to 65.0' w/ 5 1/8" Tricone
	65						BOH: 65.0' Boring completed as monitoring well MW39D. Lost 50 gal Drilling fluids in screen interval

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW38D

1601

B07NE003702-05710

HTW DRILLING LOG

HOLE NO. MW39D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek
SHEET 1 OF 8 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8" Tricone 4.25" tricone; 3.0" Split spoon; 3.0" I.D. core Barrel	8. HOLE LOCATION: Platt Valley 2-4 mi. SE of Load line 4
	9. SURFACE ELEVATION:
	10. DATE STARTED: 8-20-92 1100 / 11. DATE COMPLETED: 8-21-92 1105
12. OVERBURDEN THICKNESS: 48.5	15. DEPTH GROUNDWATER ENCOUNTERED:
13. DEPTH DRILLED INTO ROCK: 10.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 59.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: 1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
						57 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		MW39D		Robert Eh[illegible]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), Firm, V. Drk Gray to black, moist w/ abundant rootlets w/ high organic content (topsoil) note: Discriptions taken from MW39A and observations from cuttings					Advanced Boring w/ 7 7/8" tricone and Drilling fluids
	2						Mixed 200 gal water in temp. Pit w/ 2 #50# bags of Bent.
	3	silt (ML), Loose (Est), tannish Gray, moist to wet, w/ rootlets (alluvium)					
	4						
	5						

/CORE5/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW39D

1602

HTW DRILLING LOG

HOLE NO. MW 38D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: BJE

SHEET 2 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Same) SILT (ML), Loose (Est), Tannish Gray, moist to wet, w/ rootlets (Alluvium)					
	6						
	7	LEAN CLAY (CL), Firm, v. Dk Gray to black, moist to wet, w/ high organic content (Alluvium)					
	8	Silt (ML), Loose (Est), Greenish Gray, moist to wet					
	9	w/ Little v. fine Sand					
	10	w/ Sand Content increasing					
	11	Poorly Graded Sand (SP), Loose (Est), Greenish gray, v. fine, moist to wet, w/ Little silt.					
	12						
	13						
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38D

1603

B07NE003702-05712

HTW DRILLING LOG

HOLE NO. MW 38 D

Remedial Investigation, Mead NOP

INSPECTOR BJE

SHEET 3 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sm) Poorly Graded Sand (SP), Loose (Est), Greenish Gray, V. fine, wet, w/some silt. and clay (Alluvium)					
	15						
	16	LEAN CLAY (CL), Firm, Greenish Gray, moist, w/some silt, Trace sand and Abundant wood frags. (Alluvium)					
	17						
	18						
	19						
	20						
	21						
	22	Poorly Graded Sand (SP), Med Dense (Est), Lt Gray, fine wet, w/trace of med and Coarse Sand and fine Gravel.					
	23						

PROJECT: Remedial Investigation, Mead NOP 92.KW030

HOLE NO.: MW 38D

ICORPS/4-16-92

1604

HTW DRILLING LOG

HOLE NO. MW 38D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 4 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sand) Poorly Graded Sand (SP), Med Dense (est), Lt Gray, fine, wet, w/ trace of med and coarse sand and fine Gravel.					
	24						
	25						
	26	w/ some med sand and few coarse sand and trace fine Gravel.					
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW 38D

1605

B07NE003702-05714

HTW DRILLING LOG

HOLE NO. MW39D

PROJECT Remedial Investigation, Mead NOP

INSPECTOR BJR

SHEET 5 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	33	(Sand) Poorly Graded (Sand) (SP), Med Dense (EST), LT Gray, fine, wet, w/ Some med Sand and few coarse sand and Trace fine Gravel.					
		w/ coarse ~~and~~ sand and Gravel content increasing					
	34	W/ med and coarse sand and fine Gravel Grading out.					Added 20 gal water to pit.
	35						
		W/ Some med sand and trace of coarse sand and fine Gravel.					
	36						
	37						
	38						
	39						No water Loss 0'-40'
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39D

1606

HTW DRILLING LOG

HOLE NO. MW39D

Remedial Investigation, Mead NOP | INSPECTOR BTE | SHEET 6 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(Sw) Poorly Graded Sand (SP), med Dense (est), Lt Gray, fine, wet, w/ Some med Sand and trace coarse					
	42	Sand and fine gravel					
		W/ Some med to Coarse Sand and Little fine gravel					
	43	and trace coarse gravel					
	44						
	45						
	46	Coarse gravel ~~becoming~~ continue increasing					Drilling Resistance increasing.
	47						Added 200 gal water + 1 bag #50 Bent. Lost 200 gal drilling fluids 40' - 48.5'
	48						
		~~Transition~~					
	49	Sandstone: Lt Gray, Soft, V. weathered, fine grained, weak cementation (Omadi)					
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39D

/CORPS/4-15-92

1607

B07NE003702-05716

HTW DRILLING LOG

HOLE NO. MW 39D

Remedial Investigation, Mead NOP | INSPECTOR BJE | SHEET 7 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Sam) Sand Stone: Lt. Gray, Soft, v. weathered, fine grained, weak cementation					
	51						
	52						
	53		HNu: 86		Rec 1.1/1.5	36 72 194	9.0" split spoon w/300lb hammer Conti Boring w/ 4.25" tricone
	54						Lost 60 gal drilling fluids 48.5-55.0'
	55			Run #1	Rec 2.3/4.0	RQD 46% DWA 99%	Cont. BW/3" I. dia. core Barrel. Casing set to 55.8'
	56						
	57	SHALE: Gray, soft, v. weathered, non-laminated, silty.					
	58						
	59						Reamed to 59' w/ 5 3/4" tricone

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39D

1608

HTW DRILLING LOG

HOLE NO. MW 9D

Remedial Investigation Mead NOP | INSPECTOR B6E | SHEET 8 OF 8 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
							BOH 59.0'
							Boring Completed as monitoring well MW 39D
	60						
							60 gal drilling fluids lost in screened Interval
	61						
	62						
		Note: Monitoring well installed in temp. casing.					
	63	Gravel pack was placed through tremie pipe. Gravel pack was placed until 6" was in the Bottom of the temp. casing then the temp. casing was raised 6". This Process was repeated until Gravel pack was placed to 50.5' BGL Then P.G. Grout was placed trough tremie pipe in the temp. casing. Then the temp. casing was removed. and Grout placed to Approx. 10' BGL.					

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW39D

1609

B07NE003702-05718

MEW 8-10 CCM 8/21/92

HTW DRILLING LOG

HOLE NO. MW-41D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 11 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Robert Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner - Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7 7/8-inch-dia tri-cone roller-bit; 3 1/4 inch-ID Core Barrel; 5 1/4 ind-dia tri-cone roller-bit	8. HOLE LOCATION: NE NE SW Sec 16 T14N R9E
	9. SURFACE ELEVATION: 1165.99'
	10. DATE STARTED: 8-9-92 14:45 / 11. DATE COMPLETED: 8-10-92 13:15
12. OVERBURDEN THICKNESS: 82.0	15. DEPTH GROUNDWATER ENCOUNTERED: Masked with drilling fluids (~30?)
13. DEPTH DRILLED INTO ROCK: 11.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 93.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	N/A	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (Installed well)	N/A	MW-41D	N/A	Gene Paquette

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL), black to dk brown, soft, wet w/ abundant roots [Topsoil]	N/A	N/A	N/A	N/A	Boring advanced w/ 7 7/8-inch-dia tri-cone roller-bit and water (0 to 83 ft) Log based on cuttings, drilling characteristics, and log of MW-41A.
	2						
	3						
	4	Becoming brown, moist w/ root hairs [LOESS]					
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-41D

1610

HTW DRILLING LOG

HOLE NO. MW-41D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), firm, brown, moist	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	6	Becoming hard, light brown, dry w/ iron oxides(?) mottling					
	7						
	8						
	9						
	10						
	11						
	12	Becoming soft					
	13						
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1611

HTW DRILLING LOG

HOLE NO. MW-41D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 3 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LEAN CLAY (CL), soft, light brown, wet	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	15						
	16						
	17						
	18						
	19	POORLY GRADED SAND (SP), dense, light brown, fine grained					50 lbs of bentonite added to drilling fluid.
	20	w/trace of coarse grained sand (disseminated)					
	21						
	22						
	23						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1612

HTW DRILLING LOG

HOLE NO. MW-41D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 4 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), dense, lt grayish yellow, fine grained w/ trace of medium grained sand	N/A	N/A	N/A	N/A	
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1613

B07NE003702-05722

HTW DRILLING LOG

HOLE NO. MW-41D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 5 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, fine grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1614

HTW DRILLING LOG

HOLE NO. AW-41D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 6 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP), med. dense, lt grayish yellow, fine grained.	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	42						
	43						
	44						
	45						
	46						
	47						
	48	Becoming loose, fine to medium grained w/ trace of fine gravel.					
	49						
	50						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: AW-41D

1615

B07NE003702-05724

HTW DRILLING LOG

HOLE NO. MW-41D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 7 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), (loose) brown - orange, fine to medium grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
		w/ trace of coarse gravel					
	51						
	52						
	53						
	54						
	55	w/ trace of coarse grained sand disseminated					
	56	Becoming orange (iron oxides(?) stained)					
	57						
	58	w/ trace of fine gravel					
	59						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1616

HTW DRILLING LOG

HOLE NO. MW-41D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 8 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP) medium dense (est.) ~~loose~~, orange (iron oxides? stained), mostly medium grained w/ trace of fine gravel	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	60						
	61						
	62	Becoming mostly medium and coarse grained					
	63						
	64	WELL GRADED SAND (SW) very dense (est.) ~~loose~~, light brown					
	65						
	66	POORLY GRADED SAND (SP), dense (est.) ~~loose~~, orange, mostly medium grained					
	67	POORLY GRADED SAND WITH CLAY (SP-SC), very dense, lt brown, fine grained w/ trace of clay in fines					
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1617

B07NE003702-05726

HTW DRILLING LOG

HOLE NO. MW-41D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 9 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADED SAND (SP), dense to very dense, light brown, fine to medium grained	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
	69	Becoming loose, orange (iron oxides? stained)					
	70						
	71						
	72	Becoming olive gray, mostly fine grained					
	73	Becoming med. dense, fine to med. grained					
	74	Becoming gray to lt brown, mostly fine grained					
	75	Becoming dense, olive gray, fine grained					50 lbs of bentonite added to drilling mud
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

/CORPS/4-15-92

1618

B07NE003702-05727

HTW DRILLING LOG

HOLE NO. MW-41D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 10 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	POORLY GRADED SAND (SP), med. dense, olive gray, fine grained	N/A	N/A	N/A	N/A	
	78						
	79	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), v. dense to dense, multi-colored, v. fine to coarse grained. w/ seams and partings of lean dk olive and lt bright brown (iron oxides? stained) clay, w/little fine gravel					
	80	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense to v. dense, mostly fine grained w/ thin bed, weakly cemented w/ silt and iron oxides					Boring continued w/ 3 1/4" ID CORE BARREL and water Temporary protective steel casing, 6-inch-dia, flush-coupled, driven to the depth of 82.4 ft End of shift 18:00 8-9-92
	81						
	82	POORLY GRADED SAND WITH CLAY (SP-SC), v. dense, yellow, white, clear, fine grained, well sorted w/ little clay in fines w/ rich iron oxides staining w/ seams and thin beds, weakly cemented w/ trace of mica. w/ trace of coarse grained, well-rounded, sand (disseminated) (Omadi Member)					Drilling resumed 8-9-10-92
	83		HNU: BG (0.4 ppm)	N/A	N/A	N/A	CORE RUN #1 START 83.0 STOP 88.0 RUN 5.0 REC. 0.5 LOST 4.5 DWR 90%
	84						
	85	POORLY GRADED SAND (SP) V. dense, white and dk brown, fine grained w/ weakly cemented seams and partings					
	86						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1619

B07NE003702-05728

HTW DRILLING LOG

HOLE NO. MW-41D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 11 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND WITH CLAY (SP-SC), v. dense, dk brown, v. fine to fine grained w/ seams, partings and small pebbles of ~~none~~ weathered ironstone w/ small lenses. of clay-iron oxides composition	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	(Dk brown sand is "reworked" ironstone)
	87						
	88	Becoming dk brown and grayish yellow	HNU: BG	N/A	N/A	N/A	CORE RUN #2 START 88.0 STOP 93.0 RUN 5.0 REC. 1.0 LOST 4.0 DWR 95%
	89						
	90	w/ trace of mica					
	91						
	92	w/ small lenses (0.8-inch-long) of lean, bluish gray clay					Borehole reamed to 5 1/4 in with tricone 83 to 93 ft B.O.B 93.0 ft
	93						Monitoring well installed upon completion Total water loss: ~200 gals From this quantity approx. ~25 gals lost in the screened interval
	94						
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-41D

1620

ICORPS/4-15-92

8/4/92

HTW DRILLING LOG

HOLE NO. MW-42D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNER COMPANIES
SHEET 1 OF SHEETS 13	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.556889-E.2851740
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 7" & 3" SPLIT SPOON BARRELS; 4 3/4" TRICONE BIT; 7 7/8" TRICONE BIT; 6" ID / 6 7/8" OD STEEL CASING; 140# & 300# HAMMERS; 4 3/4 CORE BARREL	HOLE LOCATION: NE-NE-SE Sec 25 T14N R9E
	9. SURFACE ELEVATION: ~~1152±~~ 1149.02'
	10. DATE STARTED: 07.24.92 07:51 — 11. DATE COMPLETED: 07.2 .92 10:05
12. OVERBURDEN THICKNESS: 97.7'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: 11.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 50 Ft ~~NA~~ (48 hrs)
14. TOTAL DEPTH OF HOLE: 109.2'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
~~None~~ NA	~~NA~~	NA	NA	NA	NA	~~NA~~ %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	N/A	MW-42D	N/A	R.G. PACHECO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) hard dark brown, moist w/roots (Topsoil)	HNu= BG			P	Boring Advanced w/2" and 3" split barrel samplers followed by a 4 3/4" drag bit. Sample taken with a 3" spoon D#1 D=2.0ft R=1.83'
	2	Becoming light brown	HNu= BG			P	w/2" spoon D# 2 D= 2' R= 0.58'
	3						
	4		HNu= BG			P	w/3" spoon D# 3 D= 2' R= 1.42'
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-42D B1

1621

B07NE003702-05730

HTW DRILLING LOG

MW-42D

Remedial Investigation, Mead NOP | NSPE: R. G. PACHECO | SHEET 2 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(SAME) LEAN CLAY (CL), HARD, LIGHT BROWN, MOIST					
	6	Becoming soft w/roots					W/2" spoon D#4 D= 2' R= 1.0'
	7		HNu= BG			P	
	8						W/3" spoon D#5 D=2' R= 1.71'
	9		HNu= BG			P	
	10						W/2" spoon D#6 D=2' R=1.7'
	11		HNu= BG			P	
	12						W/3" spoon D#7 D= 2' R= 1.92'
	13		HNu= BG			P	
	14						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

1622

HTW DRILLING LOG

MW-42D

Remedial Investigation, Mead NOP

NSPE: R. G. PACHECO

Sheet 3 of 13 sheets

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	14	(SAME) LEAN CLAY (CL), ~~HARD~~ SOFT, LIGHT BROWN, MOIST	HNu= BG			P	w/2" spoon D#8 D=2' R=1.42'
	15	Silt (ML), soft, light-brown, moist					
	16	Poorly graded sand (SP), medium DENSE, fine to fine grained, light-brown tan, wet	HNu= BG			12 23 26 28	w/3" spoon D#9 D=2' R=1.25' Spoon driven by a 300# hammer
	17						
	18					8 13 15 17	w/2" spoon D#10 D=2' R=0.83'
	19						
	20					12 17 23 26	w/3" spoon D#11 D=2' R=1.17
	21						
	22					10 13	w/2" spoon D#12 D=2' R=0.92'
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

ICORPS/4-15-92

HTW DRILLING LOG

MW-42D

Remedial Investigation, Mead NOP | R.G. PACHECO | Sheet 4 of 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(SAME) POORLY GRADED SAND (SP), MEDIUM DENSE, VERY FINE TO FINE grained, LIGHT BROWN TAN, WET				14 19	
	24		HNu= BG			10 14 16 24	W/3" spoon D#13 D=2' R=1.42'
	25						
	26		HNu= BG			10 15 21 27	W/2" spoon D#14 D=2' R=1.58'
	27						
	28	Becoming dry	HNu= BG				W/3" spoon D#15 D=2' R=1.17'
	29						
	30						W/2" spoon D#16 D=2' R=1.0'
	31						
	32						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D 1624

B07NE003702-05733

HTW DRILLING LOG

MW-42D

Remedial Investigation, Mead NOP | NSPE: | R.G. PACHECO | Sheet 5 of 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	32	(SAME) POORLY GRADED SAND (SP), MEDIUM DENSE, LIGHT BROWN-TAN, VERY FINE TO FINE grained, DRY	HNu = BG			15 19 25 26	w/3" spoon D#17 D=2' R=0.92'
	33						
	34	Becoming ~~Poorly graded Sand (SP)~~, medium dense to dense, ~~light brown-tan~~ fine to medium grained, w/trace of fine gravel	HNu = BG			10 14 15 14	w/2" spoon D#18 D=2' R=1.0'
	35						
	36		HNu = BG			6 7 11 11	w/3" spoon D#19 D=2' R=0.92'
	37						
	38		HNu = BG			8 14 20 30	w/2" spoon D#20 D=2' R=1.33'
	39						
	40					10 22	w/3" spoon D#21 D=2' R=1.25'
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-42D

1625

B07NE003702-05734

HTW DRILLING LOG

HOLE NO. MW-42D

Remedial Investigation Mead NOP | NSPE: [illegible] | R.G. PACHECO | SHEET 6 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS (SAME) POORLY GRADED SAND (SP) MEDIUM DENSE TO DENSE, LIGHT BROWN-TAN.	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	Fine to medium w/trace of fine gravel				32 65	
	42	Poorly graded sand (SP), medium dense, light-brown-tan, very fine grained				17 24	w/2" spoon D# 22 D=2' R=1.08'
	43		HNu= BG			20 20	
	44	Becoming fine grained				7 16	w/3" spoon D#23 D=2' R=1.17'
	45		HNu= BG			31 44	
	46	Becoming very fine grained				14 17	w/2" spoon D#24 D=2' R=0.83'
	47		HNu= BG			21 20	
	48					12 13	w/3" spoon D# 25 D=2' R=0.83'
	49					11 12	
	50						

PROJECT: Remedial Investigation, Mead NOP 921.W030

HOLE NO.: MW-42D

ICORPS/4-15-92

1626

HTW DRILLING LOG

HOLE NO. MW-42D

Remedial Investigation, Mead NOP | NAME: R. G. PACHELO | SHEET 7 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	Poorly graded sand (SP), medium dense to dense, light-brown tan, medium grained w/ trace of fine gravel	HNu= BG			2 7 13 19	w/2" spoon D#26 D= 2' R=1.0'
	51						
	52	Poorly graded sand (SP), ~~medium dense to~~ dense, light-brown tan, fine grained	HNu= BG			18 40 58 70	w/3" Spoon D#27 D= 2' R=1.0'
	53						
	54		HNu= BG			7 20 30 58	w/2" Spoon D#28 D= 2' R= 1.08'
	55						
	56		HNu= BG	#1 Bag Sample		18 24 23 23	w/3" spoon D#29 D= 2' R= 0.92' Sample collected for Sieve analysis 56-58
	57						
	58					8 12	140# Hammer w/2" Spoon D#30 D= 2' R= 1.0'
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

1627

/CORPS/4-15-82

HTW DRILLING LOG

MW-42D

Remedial Investigation Mead NOP

NSPECTOR: R.G. PACHECO

SHEET 8 OF SHEETS 13

ELEV a	DEPTH b	(SAME) POORLY GRADED SAND (SP), MEDIUM DENSE TO DENSE, LIGHT BROWN, FINE — DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	w/ trace of fine gravel				14 23	
	60	Becoming fine to medium grained sand w/ trace of fine gravel	HNu= BG			15 36 43 49	w/3" spoon D#31 D=2' R=1.0'
	61						
	62		HNu= BG			11 11 14 17	w/2" spoon D#32 D=2' R=1.0
	63						
	64	Becoming medium to coarse grained w/ trace of fine gravel				18 21 25 23	w/3" spoon D#33 D=2' R=0.75'
	65						
	66	~~medium to coarse w/ trace of fine gravel~~	HNu= BG			9 9 13 18	w/2" spoon D#34 D=2' R=0.5'
	67						
	68						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

1628

HTW DRILLING LOG

MW-42D

Remedial Investigation, Mead NOP | NSPE: | R. G. PACHECO | SHEET 9 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	POORLY GRADE SAND (SP), VERY DENSE, LIGHT BROWN-TAN, fine to medium w/trace of gravel				22 53	w/3" spoon D# 35 D= 2' R= 0.92'
	69		HNu= BG			67 72	
	70	Becoming Medium to coarse grained, w/trace of fine gravel.				15 28	w/2" spoon D# 36 D= 2' R= 0.75'
	71		HNu= BG			30 50	STOPPED 07.24.92
	72	Poorly graded sand (SP), dense light-brown tan, very fine, wet. grained	HNu= BG			82 270	STARTS 07.25.92 w/3" spoon D# 37 D= 1.6' R= 0.75'
	73		HNu= BG			35 65 72 88	w/2" spoon D# 38 D= 2' R= 1.33'
	74						
	75	Becoming fine to medium w/trace of fine gravel	grained HNu= BG			83 102 116 160	w/3" spoon D# 39 D= 2' R= 1.42'
	76						
	77						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1629 MW-42D

B07NE003702-05738

HTW DRILLING LOG

HOLE NO. MW-42D

Remedial Investigation, Mead NOP | INSPECTOR R.G. PACHECO | SHEET 10 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	(SAME) POORLY GRADED SAND (SP), VERY DENSE, LIGHT BROWN-TAN, FINE TO MEDIUM, W/ TRACE FINE GRAVEL				30	W/2" spoon D#40
						65	D= 2'
	78					100	R= 1.0'
						95	
	79	Becoming fine grained				50	W/3" spoon D#41
						105	D= 2'
	80					230	R= 1.33'
						140	
	81					22	W/2" spoon D#42
						46	D= 2'
	82					62	R= 0.92'
						48	
	83					16	W/3" spoon D#43
						21	D= 2'
	84					26	R= Ø
						40	
	85					14	W/2" spoon D#44
							D= 2'
	86	Well graded sand (SW), very dense, light brown-tan, fine to coarse w/ trace of fine gravel				30	R= 1.33'

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

1630

HTW DRILLING LOG

MW-42D

Remedial Investigation Mead NOP

R.G. PACHECO

SHEET 11 OF SHEETS 13

ELEV a	DEPTH	DESCRIPTION OF MATERIALS (SAME) WELL GRADED SAND (SW) VERY DENSE, LIGHT BROWN-TAN, FINE to coarse /w trace of fine gravel	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86					42	
						58	
	87					55	w/3" spoon D#45 D=2' R=0.5
						73	
	88					46	
						48	
	89					9	w/2" spoon D#46 D=2' R=Ø
						22	
	90					23	
						28	
	91			#2 Bag Sample		42	w/3" spoon D#47 D=2' R=0.88'
						61	
	92	w/few fine gravel				46	Sample collected for sieve analysis. 91-93ft
						44	
	93	w/few fine gravel				20	w/2" spoon D#48 D=2' R=1.25'
						22	
	94					25	
						38	
	95						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1631

MW-42D

ICORPS/4-15-82

HTW DRILLING LOG

MW-42D

Remedial Investigation Mead NOP | NSPECTOR: R.G. PACHECO | SHEET 12 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	~~(GRAVEL)~~ WELL GRADED SAND (SW) VERY DENSE, LIGHT BROWN-TAN, FINE TO COARSE; w/trace of coarse gravel				35	w/3" spoon D#49 D=2' R=0.67'
	96		HNu= BG			47	
						36	6 INCH STEEL CASING DRIVEN w/1 300 LB HAMMER TO 98.7 FT BGS CASING REMOVED DURING WELL INSTALLATION.
						38	
	97		HNu= BG			63	w/2" spoon D#50 D=2.2 R=1.0
	98	Sandstone soft, orange, FINE very weathered, poorly cemented, weakly				100	→ 70 BLOWS 140# → 30 BLOWS 300#
				CORE RUN # 1	REC. 0.0' / 2.0	RQD=0% DWR=100%	START 07.27.92 Borehole continued advanced w/ core barrel sampler. 4 3/4" diameter. RUN=2.0', REC=0.0', LOSS=2.0
	99						
	100						LOSS = 2.0
				CORE RUN # 2	REC 0.0' / 1.0	RQD=0% DWR=90%	RUN=1.0', REC=0.0 LOSS=1.0' WATER LOSS≈ 20 GALLONS.
	101						
				CORE RUN # 3	REC, 0.0' / 5.0	RQD=0% DWR=85%	RUN=5.0' REC=0.0' LOSS=5.0' WATER LOSS≈ 40 GALLONS Fine to Coarse Gravel in return water during hole cleaning.
	102						
	103						
	104						

Borehole reamed w/1 7/8" dia tri-cone bit to the depth 97.7ft

STOPPED 07.25.92

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-42D

1632

HTW DRILLING LOG

HOLE NO. MW-42D

Remedial Investigation Mead NOP

NSPE: R.G. PACHECO

SHEET 13 OF SHEETS 13

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	(SAME) SANDSTONE, SOFT, ORANGE, FINE VERY WEATHERED, WEAKLY CEMENTED.		CORE RUN #3 CONT.			
	105						
	106						
						225	W/3" Spoon D#54 D=1.0 R=0"
	107			CORE RUN # 4	REC 0.0' / 2.5'	RQD 0% DWR 80%	W/300# hammer. RUN=2.5' REC=0.0' LOSS=2.5' WATER LOSS= 50 GALLONS
	108						
	109						
	110						BOB @ 109.2' BORING COMPLETED AS MONITORING WELL Borehole reamed w/5 7/8" tri-cone roller bit to the depth of 109.0 ft

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1633 MW-42D

HTW DRILLING LOG

HOLE NO: MW-43D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Companies
SHEET 1 OF 4 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska > N.559626-E.2851615
5. NAME OF DRILLER: Terry Taber	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2-inch-dia split-spoon; 5 1/4-inch-dia. tri-cone roller-bit; Christensen 94 mm continuous sampler; 7 7/8-inch-dia and 5 1/4-inch-dia tri-cone roller-bits.	8. HOLE LOCATION: SE, ~~[illegible]~~ sec. 21 T14N, R9E
	9. SURFACE ELEVATION: ~~1144 ±~~ 1140.56'
	10. DATE STARTED: 7-9-92 8:00
	11. DATE COMPLETED: 7-13-92 18:20
12. OVERBURDEN THICKNESS: 101.5	15. DEPTH GROUNDWATER ENCOUNTERED: ~~N/A (Water information~~ Masked by ~~introduced~~ drilling fluid)
13. DEPTH DRILLED INTO ROCK: ~~13.5~~ 12.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 114.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC. %
3	X	N/A	Explosives	TOC	NA	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-43D	NA	Gene Papinchak

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL-OL)					
		~~Topsoil~~: V. dk brown, rich in organic matter, w/ abundant roots, rootlets, root hairs (Topsoil)	HNU: back-ground (0.2 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	Boring advanced ~~as rotary~~ w/ 2-inch-dia split-spoon sampler ~~and~~ 5 1/4 tri-cone roller-bit and bentonite slurry with
	1	LEAN CLAY (CL), firm, lt grayish brown w/ olive gray mottling; w/ root hairs					D#1 P=1.5 R=1.5
	2	Becoming lt brown w/ orange mottling w/ limonite (?) staining, manganese oxides (?) w/ ~~pyrolusite (?)~~ nodules w/ trace of silt	HNU: background	~~N/A~~	~~N/A~~	~~N/A~~	D#2 P=1.5 R=1.3
	3	w/ root hairs w/ dk brown staining ~~(pyrolusite?)~~ w/ little silt	HNU background	~~N/A~~	~~N/A~~	~~N/A~~	D#3 ~~[illegible]~~ P=1.5 R=1.5
	4	(LOESS)	HNU background	~~N/A~~	~~N/A~~	~~N/A~~	D#4 P=1.5 R=1.5
	5						

/CORPS/6-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-43D

1634

HTW DRILLING LOG

HOLE NO. MW-43D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 2 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY (CL), firm, dk brownish yellow w/dk brown staining ~~(pyrolusite?)~~ manganese oxides(?) slightly fractured, w/~~pyrolusite~~ infilling fractures w/ little silt	HNU: Background	~~N/A~~	~~N/A~~	~~N/A~~	D #4 P = 1.5 R = 1.5
	6	Becoming lt brownish yellow, slightly micaceous	HNU: Background	~~N/A~~	~~N/A~~	~~N/A~~	D #5 P = 1.5 ~~R = 1.5~~ R = 1.2
	7						
	8	w/ root hairs	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D #6 P = 1.5 ~~R = 1.5~~ R = 1.0
	9	Becoming soft, micaceous, Quantity of silt increasing	HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D #7 P = 1.5 R = 1.5
	10						
	11		HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D #8 P = 1.5 R = 1.5
	12	SILT (ML), soft, lt grayish yellow, thinly laminated, w/trace of mica and ~~pyrolusite~~ manganese oxides(?) staining on planes of lamination	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D #9 P = 1.5 R = 1.2
	13	w/ little to some clay in fines (CL)					
	14		HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D #10 P = 1.5 R = 1.2

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

1635

/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-43D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 3 OF 4 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(SAME) SILT (ML), soft, lt grayish yellow, thinly laminated, w/ trace of mica w/ ~~pyrolusite~~ manganese oxides(?) staining w/ some lean clay in fines (CL)	HNU background	~~N/A~~	~~N/A~~	~~N/A~~	D # 10 P = 1.5 R = 1.2
	15		HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	Boring continued w/ 94 mm Christensen continuous core sampler and wire line.
	16	Becoming olive gray w/ trace of sand — POORLY GRADED SAND WITH SILT (SP-SM), med. dense, lt gray, v. fine to fine grained w/ limonite (?) nodules w/ trace of mica					D # 11 P = 2.0 R = 2.0
	17		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 12 P = 2.0 R = 0.5
	18	POORLY GRADED SAND (SP) loose to med. dense, lt gray v. fine to fine grained (Alluvium)					
	19	Becoming lt yellowish gray, well sorted, fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 13 P = 2.0 R = 0.7
	20						
	21		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 14 P = 2.0 R = 0.1
	22						
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D 1636

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 4 OF 11 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP) med. dense, lt yellowish gray, v. fine to fine grained w/ occasional grains of med. grained sand	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D #15 P = 2.0 R = 1.1
	24						100 lbs of bentonite added to drilling fluid
	25	Becoming dense, homogeneous v. fine to fine grained	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D #16 P = 2.0 R = 0.9
	26						100 lbs of bentonite added to drilling fluid
	27		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D #17 P = 2.0 R = 1.2
	28						
	29		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 18 P = 2.0 R = 1.0
	30						
	31		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 19 P = 2.0 R = 1.5
	32						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

HTW DRILLING LOG

HOLE NO. MW-43D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR

SHEET 5 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained w/ ~~occasional~~ trace grains of coarse grained sand	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	P = 2.0 R = 1.4 (D # 19 CONTIN)
	33		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 20 P = 2.0 R = 1.0
	34	w/ ~~occasional~~ trace grains of medium grained sand					
	35		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 21 P = 2.0 R = 1.2
	36	Quantity of coarse and med. grained sand increasing					
	37		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 22 P = 2.0 R = 1.0
	38						
	39	Becoming well sorted fine grained sand	HNU Back ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 23 P = 2.0 R = 1.5
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

1638

HTW DRILLING LOG

HOLE NO. MW-43D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 6 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41 42	POORLY GRADED SAND (SP) dense, lt yellowish gray, v. fine to fine grained w/ ~~several~~ few grains of multi-colored coarse grained sand	HNU Background	N/A	~~N/A~~ MWC-043-041	N/A.	D # 24 P = 2.0 R = 1.5 Sample for ~~Chemical Analysis~~ ~~MWC-043-041 taken~~
	43 44		HNU Background	N/A	N/A	N/A	D # 25 P = 2.0 R = 1.4
	45 46	w/ ~~occasional~~ trace fine gravel pebbles	HNU Background	N/A	N/A	N/A	D # 26 P = 2.0 R = 1.2
	47 48		HNU Background.	~~N/A~~ Bag sample ~~MWB-043-047~~ #1	3-4oz jars 1-8oz jar ~~MWB-043-047~~	N/A Sample MWB-043-047 collected from 47 to 49' for VOC, TOC, explosives, grain size	D # 27 P = 2.0 R = 1.0 ~~Sample MWB-043-047 taken for chem. analysis~~
	49 50		HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D # 28 P = 2.0 R = 1.0

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

1639

B07NE003702-05748

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), dense, lt yellowish gray, v. fine to fine grained w/ several thin layers (1-2 inch thick) of coarse grained sand and ~~occasional~~ trace fine gravel	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 28 (CONT.) P = 2.0 R = 1.0
	51		HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 29 P = 2.0 R = 0.8
	52						
	53	Becoming coarse grained	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 30 P = 2.0 R = 1.1
	54						
	55	Becoming fine grained w/ separate layer of coarse grained sand (2 inch thick)	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 31 P = 2.0 R = 1.5
	56	w/ zone (2-3 inch) of fine grained sand, weakly cemented w/ iron ~~hydroxides~~ oxides (?)					Boring resumed 7-10-92
	57	POORLY GRADED SAND WITH CLAY (SP-SC), dense, yellowish gray, fine grained sand w/ ~~occasional~~ trace grains of coarse sand and pebbles of fine gravel w/ seams and partings of gray lean clay (connected w/ fine gravel pebbles)	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 32 P = 2.0 R = 0.5
	58						100 lbs of bentonite added to drilling fluid.
	59						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 921KW030 | HOLE NO.: MW-43D

1640

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 8 OF 19 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND (SP) dense, lt yellowish gray, fine grained w/ ~~occasional~~ trace fine subrounded gravel	HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D # 33 P = 2.0 R = 0.8
	60						
	61	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, lt yellowish gray, fine grained w/ seams and parting of lean, white, non-calcareous, clay w/ ~~occasional~~ trace coarse grains w/ ~~occasional~~ trace fine gravel	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 34 P = 2.0 R = 0.7
	62						
	63	Becoming mostly coarse grained Quantity of clayey seams increasing w/bed (0.2 inch) of limonite (?)	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 35 P = 2.0 R = 1.5
	64	LEAN CLAY WITH SAND (CL) hard, lt olive gray (top) to dk brownish yellow, micaceous w/trace of fine sand, w/trace of silt, w/ MnO - dendrites w/ iron oxides nodules					
	65	Becoming lt brown LEAN CLAY (CL), hard, lt brown w/trace of silt	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 36 P = 2.0 R = 2.5 (0.5 ft from the previous run)
	66						
	67		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 37 P = 2.0 R = 2.0
	68						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

/CORPS/4-15-92

1641

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation Mead NOP | INSPECTOR | SHEET 9 OF SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	LEAN CLAY WITH SAND (CL), hard, lt brown w/ little disseminated fine sand, w/ trace silt, w/ trace mica	HNU background	~~N/A~~	~~N/A~~	~~N/A~~	D#37 (CONT.) P = 2.0 R = 2.0
	69	w/ occas. white, non-calcareous (kaolinite?) nodules	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#38 P = 2.0 R = 2.0
		Becoming firm, lt brownish gray w/ mica					
	70	w/ calcareous nodules					
		Quantity of fine sand in fines increasing					
	71		HNU BG	~~N/A~~	N/A	N/A	D #39 P = 6.0 R = 6.0
	72	Becoming lt pinkish brown					
	73						
	74	Becoming hard, brownish gray					
	75	Becoming lt gray w/ mica w/ Mn(?) and Fe(?) hydroxides nodules and stained spots					
	76						
	77						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-43D

ICORPS/4-15-92

1642

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP

INSPECTOR

SHEET 10 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	LEAN CLAY WITH SAND (CL), hard, lt gray, w/ fine grained sand in fines w/ trace mica w/ Fe and Mn-hydroxides mottling	HNU: Back-ground (0.2 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	D # 40 P = 4.0 R = 4.0
	78	SANDY LEAN CLAY (CL), hard, lt gray w/ iron hydroxides staining ~~(lumps, rings)~~					
	79						
	80	CLAYEY SAND (SC), dense, lt whitish gray, v. fine to fine grained					
	81	WELL GRADED SAND (SW), ~~dk~~ med. dense, dk yellow w/ red and gray grains, fine ~~to med~~ w/ trace of silt w/ iron oxides (?) staining	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 41 P = 2.0 R = 1.2
	82						
	83		HNU Back-ground	~~N/A~~	N/A	~~N/A~~	D # 42 P = 2.0 R = 1.4
	84	POORLY GRADED SAND (SP), med. dense, grayish yellow, v. fine to fine grained					
	85	WELL GRADED SAND WITH CLAY (SW-SC), dense, multi-colored, fine ~~to med~~ w/ clay lumps and small seams, w/ rich iron oxides (?) staining	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 43 P = 2.0 R = 1.6
	86						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

/CORPS/4-15-92

1643

B07NE003702-05752

HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 11 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86	WELL GRADED SAND WITH CLAY (SW-SC), dense, multi-colored w/ occasional ~~als~~ lamps and seams of lean, orange clay. w/ rich iron oxides(?) staining w/ ~~occasional~~ trace fine gravel	HNU: Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D#43 (CONT.) P = 2.0 R = 1.6
	87		HNU: Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 44 P = 2.0 R = 1.5
	88	w/ thin bands of silt-iron oxides(?) cementation					
	89	w/ seams of gray lean clay	HNU: Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 45 P = 2.0 R = 1.2
	90						
	91	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, lt gray to lt yellowish gray, fine grained w/ seams and lenses of lean, brown, stained w/ iron oxides(?) clay	HNU: Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 46 P = 2.0 R = ~~1.2~~ 1.3 40
	92						
	93	w/ ~~occasional~~ trace grains of coarse grained sand	HNU Back-ground	~~N/A~~	N/A	~~N/A~~	D # 47 P = 2.0 R = 1.5
	94	Quantity of iron hydroxides(?) in colloidal form increasing					
	95						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

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HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation, Mead NOP

INSPECTOR Gene Papinako

SHEET 12 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	95 96	WELL GRADED SAND WITH CLAY (SW-SC), med. dense, multi-colored, stained throughout with iron oxides (?) w/ lumps, seams, and partings of orange and bright yellow, lean clay.	HNU Background	~~N/A~~	~~N/A~~	~~N/A~~	D # 48 P = 2.0 R = 1.0
	97 98	w/flat, well-rounded, fine gravel	HNU Back-ground	~~N/A~~	~~N/A~~	~~N/A~~	D # 49 P = 2.0 R = 0.4
	99 100	POORLY GRADED SAND WITH CLAY (SP-SC), dense, multi-colored, coarse grained sand w/ seams and partings of gray and white lean clay, w/ iron oxides (?) staining w/ ~~occasional~~ trace sub-angular coarse gravel Max. size 1.25 inch. (Gravel include ironstone)	HNU Back-ground	~~MWA-043-099~~ Bag sample #2	~~MWA-043-099~~	~~N/A~~	D # 50 P = 2.0 R = 1.0 Sample MWA-043-099 collected 99 to 101 for explosives, VOC, TOC and grain size
	101 102	POORLY GRADED SAND (SP), dense, lt whitish gray, fine grained, well sorted w/layer - ¼ inch-thick of lean clay, dk orange, stained w/iron oxides (?)	HNU Back-ground	N/A	N/A	N/A	D # 51 P = 2.0 R = 1.4. Borehole reamed with 7 7/8-inch-dia tri-cone roller bit to the depth of 101 ft 6-inch-dia Steel Casing driven
	103 104	Becoming bright yellow (same sand but stained w/ iron oxides) Becoming white, lt grayish white w/ bright yellow stains (Omadi Member)	HNU BG	N/A	N/A	N/A	into the bedrock to the depth of 102.2 ft. Casing Removed prior to D # 52 well installation.

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

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/CORPS/4-15-92

HTW DRILLING LOG

HOLE NO. MW-43 D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinaku | SHEET 13 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	SAME: POORLY GRADED SAND (SP), dense, white and lt grayish white w/ bright yellow stains, mostly v. fine grained w/ iron oxides, w/ trace of silt	HNU BG	N/A	N/A	N/A	D # 52 P = 2.0 R = 1.2
	105	w/ thin beds (1-1.5 inch thick) of coarse sand - fine gravel, dense, multi-colored, subangular and subrounded	HNU BG	N/A	MWD-043-105	N/A	D # 53 P = 2.0 R = 1.0
	106						
	107	w/ little mica (biotite)	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 54 P = 2.0 R = 1.5
	108	w/ concentric lines of iron oxides staining					
	109	Becoming mostly fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 55 P = 2.0 R = 1.0
	110	w/ little mica (muscovite)					
	111	w/ thin bed of fine, rounded and subrounded, poorly graded gravel (GP) w/ thin bed of dark brown, silt - iron oxides cemented sand (0.2 inch)	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 56 P = ~~1.8~~ 2.0 R = 1.8
	112	Becoming orange, bright yellow, brown, richly stained w/ iron oxides (?)					
	113	Quantity of iron oxides cemented seams, partings and thin bed increasing					

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-43 D

ICORPS/4-15-92

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HTW DRILLING LOG

HOLE NO. MW-43D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 14 OF 14 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND (SP) dense, yellow (stained), med. grained, well sorted w/thin bed of rounded fine gravel, IRONSTONE(?): ~~fresh~~ mixture of limonite-hematite, very hard, dk brown when unweathered, moderately hard, earthy in weathered varieties, hues of yellow and orange w/clayey, non-calcareous seams and partings manganite (?) w/ large amount of ~~pyrolusite~~ in mixture w/ iron minerals	HNU 86	~~N/A~~	~~N/A~~	~~N/A~~	D # 57 P = 1.0 R = 1.0
	114						Refusal for Christiansen sampler at 114.0 ft B.O.B. 114.0 ft Monitoring well installed upon completion
	115						
	116						
	117						Approx. ~100 gals of water lost during drilling, reaming and filter pack placement in the screened interval.
	118						Estimated total water loss is approx. ~500 gals
	119						
	120						
	121						
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-43D

ICORPS/4-15-82

1647

REVIEWED BY ME WILSON 7-21-92

HTW DRILLING LOG

HOLE NO. MW-44D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Companies
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.555698-E.2855302
5. NAME OF DRILLER: Terry Taber	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2-inch-dia. split-spoon; 5 1/4-inch-dia. tri-cone roller bit; Christensen 94 mm continuous sampler; 7 3/8-inch-dia tri-cone roller bit	8. HOLE LOCATION: NE SW SE ~~SE 1/4~~ Sec. 27 T14N, R9E
	9. SURFACE ELEVATION: ~~1086~~ ± 1091.93'
	10. DATE STARTED: 7-14-92 13:00
	11. DATE COMPLETED: 7-16-92 12:30
12. OVERBURDEN THICKNESS: 44.0	15. DEPTH GROUNDWATER ENCOUNTERED: ~~Water information~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ~~ROCK~~ BEDROCK: 13.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 44 + 13 = 57.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	X	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
4	X	N/A	TOC	Explosives	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-44D	NA	Gene Paprenko

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY (CL)					
		(TOPSOIL) Firm, black, sandy, w/abundant organic matter, roots; SILT WITH SAND (ML), firm, dk brownish gray w/ iron oxides staining w/ root and root hairs (Colluvium + Alluvium)	HNU BG (0.2 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	Boring advanced ~~as mud rotary~~ w/ 2-inch-dia. split-spoon, 5 1/8 tri-cone roller-bit and drilling water D#1 P = 2.0 R = 1.7
	1						1
	2	Becoming dk grayish brown, w/ iron oxides staining, w/ root hairs w/ trace of mica	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#2 P = 1.5 R = 1.5
	3						3
	4		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#3 P = 1.5 R = 1.5
	5	LEAN CLAY ~~(CL), firm~~ WITH SAND (CL), fine, lt gray, w/brown mottling					5

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: B1 MW-44D

HTW DRILLING LOG

HOLE NO. MW-44D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	LEAN CLAY WITH SAND (CL), firm, bluish gray w/ yellow mottling w/ trace of silt w/ little fine grained sand w/ root hairs (Alluvium)	HNU Back-ground	N/A	N/A	N/A	D # 4 P = 1.5 R = 1.2
	6	w/ separate (2-inch-thick) layer of clayey sand (SC), fine grained ~~(2 inch thick)~~ w/ abundant iron-manganese hydroxides (?) staining					D # 5 P = 1.5 R = 1.5
	7						
	8	Becoming soft, olive and bluish gray w/ iron oxides staining w/ root hairs					D # 6 P = 1.5 R = ~~1.5~~ 1.5
	9						
	10	Becoming olive gray w/ ~~occasional~~ trace grains of coarse sand		#1 Bag Sample	~~MWC 044 010~~ 1x8oz 3x4oz		D # 7 P = 1.5 R = 1.3 Sample MWC-044-010 collected 9.5' to 11' for EXP, TOC, VOC and grain size
	11						D # 8 P = 1.5 R = 1.2
	12						
	13	Becoming dark gray	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 9 P = 1.5 R = 1.3
	14						

ICORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 921KW030

HOLE NO.: MW-44D 1649

HTW DRILLING LOG

MW-44D

Remedial Investigation, Mead NOP | INSPECTOR: G. Papinako | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	SANDY LEAN CLAY (CL), soft, dk olive gray, w/ some fine grained sand w/ trace of coarse grained sand	HNU BG	~~N/A~~	N/A	N/A	D#10 P=1.5 R=1.3
	15						
			HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#11 P=1.5 R=1.4
	16						Boring continued w/94 mm Christensen sampler
	17	POORLY GRADED SAND WITH CLAY (SP-SC), v. loose, gray, v. fine to fine grained w/ trace of clay in fines, saturated	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#12 P=2.0 R=0.8
	18						
	19		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#13 P=2.0 R=0.5
	20						
	21		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D#14 P=2.0 R=0 Sand is too loose to be picked up by sampler
	22						
	23						

SUGGESTED SHALLOW WELL SCREEN INTERVAL (16' to 26')

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44D

/CORPS/4-15-92

1650

HTW DRILLING LOG

HOLE NO. MW-44 D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 4 OF 7 SHEETS

SUGGESTED SHALLOW SCREEN INTERVAL (16' to 26')

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND WITH CLAY (SP-SC), loose, dk gray, v. fine to fine grained w/ seams and partings of lean clay	HNU BG	#2 Bag Sample	3+402 1+802	~~N/A~~	D # 15 P = 2.0 R = 1.2 Sample MWB-044-023 collected from 23' to 25' for EXP, TOC, VOC and grain size. Walls of the hole caving in. 150 lbs of bentonite added to drilling fluid
	24			~~MW-044-023~~	~~MW-044-023~~		
	25	PEAT (~~OL~~ Pt): Dense, dk brown, earthy and amorphous, w/abundant leaves and twigs	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 16 P = 2.0 R = 1.9 Strong H_2S odor
	26	LEAN CLAY ~~(CL), firm~~ WITH SAND (CL), firm, med. olive gray w/trace of fine sand w/abundant organic matter w/large pieces of unoxidized wood					
	27	w/thin layer - 3-4 inch - of micaceous, thinly laminated silt					D # 17 P = 2.0 R = 1.5
	28	POORLY GRADED SAND (SP), med. dense, light yellowish gray, fine grained w/ ~~occasional~~ trace of coarse grained sand					
	29	w/ ~~occasional~~ trace pebbles of fine gravel, well-rounded, elongated. Max. size 0.6 inch					D # 18 P = 2.0 R = 1.0
	30	Quantity of coarse grained sand increasing					
	31						D # 19 P = 2.0 R = 1.2
	32						

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44D

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HTW DRILLING LOG

HOLE NO. MW-44D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 5 OF 7 SHEETS

SUGGESTED INTERMEDIATE WELL SCREEN INTERVAL (31' TO 41')

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	WELL GRADED SAND (SW), med. dense, multi-colored, w/zones of iron oxides rich staining w/ ~~occasional~~ trace fine gravel, well-rounded, max. size 0.9 inch. w/layer - 6-inch-thick of poorly graded, fine grained sand (SP)	HNU BG	~~N/A~~	N/A	~~N/A~~	D # 19 P = 2.0 R = 1.2
	33		HNU BG	~~N/A~~	N/A	~~N/A~~	D # 20 P = 2.0 R = 1.1
	34						
	35	~~Becoming mor~~ POORLY GRADED SAND WITH CLAY (SP-SC), med. dense, multi-colored, mostly coarse grained w/ seams of olive gray lean clay	HNU BG	~~MW-044-035~~ #3 Bag Sample	~~MW-044-035~~ 3x4oz 1x8oz	N/A	D # 21 P = 2.0 R = 1.2 Sample MWA-044-035 collected 35'-37' for EXP, TOC, VOC and grain size
	36						
	37	Becoming mostly fine grained, gray	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 22 P = 2.0 R = 0.8
	38						
	39	POORLY GRADED SAND (SP), loose, multi-colored, coarse grained, w/ subordinate quantities of fine and med. grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 23 P = 2.0 R = 0.5
	40						
	41						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44D

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HTW DRILLING LOG

HOLE NO. MW-44D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinaku | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND WITH CLAY (SP-SC), loose to med. dense, multi-colored, medium grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #24 P = 2.0 R = 0.9
	42	w/ seams and partings of lean clay, gray and yellow (limonite stained) w/ thin bed of lean, white non-calcareous clay					
	43	w/ ~~some~~ little subrounded coarse gravel w/ sporadic well-rounded, elongated, fine gravel	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #25 P = 2.0 R = 1.3
	44	POORLY GRADED SAND (SP), dense, white, very fine grained, well sorted. (Omaha Formation Member)					
	45	w/ thin beds (0.2 inch) of hard, dk yellow, lean clay	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 26 P = 2.0 R = 1.5
	46	Becoming yellowish white, v. fine to fine grained.					Borehole reamed w/ 7 7/8-inch-dia tri-cone roller bit to the depth of 44.0 ft (6" steel temporary)
	47	w/ thin beds (0.1-0.2 inch) of coarse grained, multi-colored sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	Protective casing driven with hydraulic push and hammer-wire line to the depth of 46.5 ft D # 27 P = 2.0 R = 0.5 100 lbs bentonite added to drilling fluid
	48						
	49		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 28 P = 2.0 R = 0.9
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-44D

/CORPS/4-16-92

HTW DRILLING LOG

HOLE NO. MW-44D

Remedial Investigation Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND (SP), dense, white and yellow (iron oxides stained), v. fine to fine	HNU BG	~~N/A~~	N/A	~~N/A~~	D#28 P = 2.0 R = 0.9
	51	w/ thin beds of coarse grained sand	HNU BG	~~N/A~~	NWD -044 -051	~~N/A~~	D# 29 P = 2.0 R = 1.0
	52	w/ thin beds of yellow (limonite stained) silt (ML)					
	53	POORLY GRADED SAND WITH SILT (SP-SM), dense, yellowish white and yellow, v. fine to fine w/ zones of rich iron oxides precipitation	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 30 P = 2.0 R = 1.5
	54						
	55	Becoming bright yellow, v. fine and fine grained, w/ trace of mica (muscovite)	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 31 P = 2.0 R = 0.5
	56						B.O.B. 57.0ft
	57						Monitoring well installed upon completion
	58						Estimated water loss in screened interval is ~ 40 gals Total water loss in borehole ~ 250 gals
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-44D

1654

REVIEWED BY MEW 7-22-92

HTW DRILLING LOG

HOLE NO. MW-45D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: THE WINNEK COMPANIES
SHEET 1 OF SHEETS 6	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska → N.554524-E.2857375
5. NAME OF DRILLER: BOB KINGSLEY	6. MANUFACTURER'S DESIGNATION OF DRILL: GARDNER-DENVER 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" & 3" SPLIT BARRELS; 4 3/4 DRAG BIT; 7 7/8" TRICONE; 6" ID / 6 7/8" OD STEEL CA; 140# & 300# HAMMERS; 5 7/8" TRICONE BIT	8. HOLE LOCATION: SW SW SW SECTION 26 T14N R9E
	9. SURFACE ELEVATION: 1079.28
	10. DATE STARTED: 07.21.92 @ 9:40 / 11. DATE COMPLETED: 07.22.92 @ 13:35
12. OVERBURDEN THICKNESS: 39'	15. DEPTH GROUNDWATER ENCOUNTERED: MASKED WITH DRILLING FLUIDS
13. DEPTH DRILLED INTO ROCK: 10.7'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 49.7	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
4	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
	X	NA	TOC	~~EXP~~	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring well installed	NA	MW-45D	NA	R.G. PACHECO

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	LEAN CLAY (CL) soft v black moist w/roots (Topsoil)	HNu= BG			P	Boring Advanced w/ 2" and 3" split barrel Samples followed by a 4 3/4" drag bit and drilling fluid Sample taken w/ 3" Spoon D# = 1 D= 2.0 ft R= 2.0 ft.
	2	Becoming greyish-black	HNu= BG			P	W/2" Spoon D# 2 D= 2.0 ft R= 2.0 ft.
	3	~~LEAN CLAY (CL) loose to soft medium dense, grayish black~~					
	4		HNu= BG				W/3" Spoon D# 3 D= 2.0 ft. R= 2.0 ft.
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-45D B1

1655

B07NE003702-05764

HTW DRILLING LOG

MW-45D

Remedial Investigation mead NOP | R.G. PACHECO | SHEET 2 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	5						
	6	(Same) LEAN CLAY (CL) soft, grayish black	HNu= BG			P	w/2" spoon D#4 D=2.0 ft R=2.0 ft.
	7						
	8	~~(Same)~~	HNu= BG			P	w/3" spoon D#5 D=2.0 ft. R=2.0 ft.
	9						
	10	~~(Same)~~	HNu= BG			P	w/2" spoon D#6 D=2.0 ft. R=2.0 ft.
	11	11.75					
	12	Poorly Graded Sand (SP) Medium dense to dense, dark grey, very fine to fine ~~sand~~ grained, moist (Alluvium)	HNu= BG	#1 Bag Sample	3x4oz 1x8oz	17 15 12 6	w/3" spoon D#7 D=2.0 ft. R=2.42 ft. R= Sample MWC-045-012 Collected 12'-14' for TOC, VOC, EXP & Sieve
	14						

PROJECT: Remedial Investigation, mead NOP 921-W030

HOLE NO.: MW-45D

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ICOMPW 4-18-92

HTW DRILLING LOG

MW-45D

Remedial Investigation, Mead NOP

Driller R.G. PACHECO

Sheet 3 of 6

ELEV a	DEPTH b	(SAME) DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	14	Poorly graded sand (SP), very loose, medium grey, very fine to fine grained, ~~sand~~, wet	HNu= BG			1 2 2 11	W/2" Spoon D#8 D= 2' R= 2'
	16	~~(Same)~~	HNu= BG			8 18 25 23	W/3" spoon D#9 D= 2' R= 16"
	18	Poorly graded sand (SP) medium dense orange-tan very fine to fine ~~sand~~ grained, wet w/some ~~small~~ fine gravel ~~particles~~	HNu= BG			Ø 6 22 29	Spoon went down by its own weight. W/2" spoon D#10 D= 2' R= 2'
	20	~~(Same)~~	HNu= BG			5 9 20 27	W/3" spoon D#11 D= 2' R= 16" Sample MWB-045-022 collected for TOC, VOC, EXP, Sieve
	22	Becoming ~~Poorly graded sand (SP), medium dense orange tan, fine to medium, ~~sand~~ fine grained w/some ~~small gravel~~~~	HNu= BG	#2 Bag Sample	3x4oz 1x8oz	4 5	W/2" spoon D#12 D= 2'
	23						

SUGGESTED SHALLOW WELL SCREEN INTERVAL 17' TO 27'

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45D

1657

ICOHPS/4-18-92

HTW DRILLING LOG

MW-45D

Remedial Investigation Mead NOP | NSPE: R. G. PACHECO | Sheet 4 of 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	23	(SAME)	HNu= BG			14 7	140# Hammer
	24–25	Poorly graded sand (SP), dense, orange-tan, fine to medium grained w/ trace of fine gravel	HNu= BG			19 23 27 20	w/3" spoon D#13 D=2' R=12"
	26–27	Becoming ~~Poorly graded sand (SP), medium, orange-tan, fine to medium w/trace of gravel~~ dense	HNu= BG			4 7 11 11	w/2" spoon D#14 D=2' R=18"
	28–29	Becoming ~~Poorly graded sand (SP), very loose, orange-tan,~~ medium dense, medium to coarse grained Sand w/few fine gravel.	HNu= BG			7 8 9 10	w/3" spoon D#15 D=2' R=12"
	30–31	~~(Same)~~				2 4 8 10	w/2" spoon D#16 D=2 R=12"
	32						

SUGGESTED SHALLOW WELL SCREEN INTERVAL

SUGGESTED INTERMEDIATE WELL SCREEN INTERVAL (28'TO 38')

/CORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45D

1658

HTW DRILLING LOG

MW-45D

Remedial Investigation Mead NOP | INSPECTOR: R.G. PACHECO | SHEET 5 OF 6

SUGGESTED INTERMEDIATE WELL SCREEN INTERVAL 28' TO 38'

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	32	Well graded sand (SW), ~~loose~~ medium dense, Fine to coarse grained ~~Sand~~ (orange-tan) w/ few fine gravel	HNu= BG			7 7 7 6	w/3" Spoon D#17 D=2' R=3"
	33						
	34	(~~Same~~)	HNu= BG	3 Bag Sample	3x4oz 1x8oz.	5 8 8 9	Sample MWA-045-034 Collected 34' to 36' for EXP, TOC, VOC, Sieve w/2" Spoon D#18 D=2' R=20"
	35						
	36	Poorly graded gravel, (GP) medium dense, ~~Fine to coarse~~ gravel (orange-tan) w/ medium to coarse grained sand.	HNu= BG			7 8 9 8	w/3" Spoon D#19 D=2' R=2" 7-21-9 Reamed to 77½ in with tricone 0 to 39 ft bgs. Drove 6 in steel casing to 40.5 ft. Casing removed after well installation.
	37						
	38	Poorly graded sand with gravel (SP), dense to very dense, fine to medium grained (orange-tan) w/ little coarse gravel	HNu= BG.			5 32 50 23 80	w/2" Spoon #140 Hammer 3" #140 Hammer 3" #300 Hammer D#20 D=2' R=24" stop drilling 7-21-92
	39						
	40	Sandstone: soft, lt-tan w/minor orange mottling, very weathered, weakly ~~cemented, [illegible]~~					
		(~~Same~~)	HNu= ND			13 26	07.22.92 Resume drilling #300 Hammer D#21 D=2' R=14"
	41						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-45D

1659

/CORPS/4-16-82

HTW DRILLING LOG

MW-45D

Remedial Investigation Mead NOP | NSPE: | R.G. PACHECO | 6 6

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	41					50 250	
	42 43	(SAME) Sandstone: Soft, orange w/minor tan-mottling very weathered, weakly cemented, wet	HNu= ND	4 Bag Sample	3x4oz 1x8oz	37 72 150	Sampled MWD-045-042 Collected 42' to 44' for EXP TOC, VOC and Sieve w/3" D#22 D=18" R=18"
	44					450 over 1/10'	Tricone 5 7/8"
	45	~~(Same)~~	HNu= ND			40 200	w/2" Spoon D#23 D=1', R=12"
	46	~~(Same)~~	HNu= ND			43 76	w/3" Spoon D#24 D=1' R=Ø
	47	~~(Same)~~	HNu= ND			44 80	w/2" Spoon D#25 D=1.0' R=12"
	48	~~(Same)~~	HNu= ND			48 183	w/3" Spoon D#26 D=1.0 R=7"
	49					100 300	w=2" Spoon D#27 D=1.0 R=7" Estimated Water Loss at sample interval 100 gall
				Boring completed as monitoring well MW-45D (7-22-92)			Tricone 5 7/8" down to 49.7' to end hole BOB @ 49.7'

PROJECT: Remedial Investigation, Mead NOP 92KW1030

HOLE NO.: MW-45D

1660

/CORPS/4-15-82

Reviewed by MEW, bom 7-15-92

HTW DRILLING LOG

HOLE NO. MW-46D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: Winnek Company
SHEET 1 OF 7 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bob Kingsley	6. MANUFACTURER'S DESIGNATION OF DRILL: Gardner-Denver 500
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 3/4" drag bit; 2"/3" split barrel sampler; 7 7/8" tri cone; 6 in id / 6 7/8 in od steel casing; 5 7/8 in tri cone; 140 # + 300 # hammers	8. HOLE LOCATION: MW-46D - N.554642 - E.2859809
	9. SURFACE ELEVATION: 1080.33'
	10. DATE STARTED: 7/13/92 @ 1555 — 11. DATE COMPLETED: 7/14/92 @ 1705
12. OVERBURDEN THICKNESS: 47 1/2 ft	15. DEPTH GROUNDWATER ENCOUNTERED: masked by drilling fluids
13. DEPTH DRILLED INTO ROCK: 11 1/2 ft	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 59 ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
2	X	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	NA	NA	NA	NA	NA	NA %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Completed as monitoring well	NA	MW-46D	N	Bret A Hedenkop

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	LEAN CLAY (CL), soft dk brown-black, moist w/ roots (top soil)	Hmm: BG			P	boring advanced w/ 2"/3" split barrel samplers followed by 4 3/4 in drag bit w/ 3 in spoon add bottom sluice. D# = 1 D = 2.0 ft R = 2.0 ft
	1						
	2	becoming greyish-black					
		2.5					
	3	SILT (ml), loose to medium dense, greyish-black, moist w/ roots (loess)	Hmm: BG			P	w/ 2" spoon D# = 2 D = 2.0 ft R = 2.0 ft
	4		Hmm: BG			P	w/ 3" spoon D# = 3 D = 2.0 ft R = 1.0 ft
	5						

/CORFS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: 1661 MW-46D

HTW DRILLING LOG

MW-46D

Remedial Investigation, Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 2 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	(same) SILT, loose to medium dense, greyish-black, moist w/ root channels					
	6	becoming black	Hmu= BG			P	w/ 2" spoon D# = 4 D= 2.0 ft R= 2.0 ft
	7						
	8		Hmu= BG			P	w/ 3" spoon D# = 5 D = 2.0 ft R = 1.6 ft
	9						
	10		Hmu= BG			P	w/ 2" spoon D# = 6 D = 2.0 ft R = 1.8 ft
	11	11.5					
	12	POORLY GRADED SAND (SP), ~~to~~ medium dense, dk grey, ~~moist~~ very fine to fine ~~sand~~, moist (alluvium)	Hmu= BG			17 28 20 31	stop drilling @ 12 feet @1630 7/13/92 w/ 3" spoon using 140# hammer D# = 7 D = 2.0 ft R = 1.4 ft resume drilling @ 0740 7/14/92
	13	becoming dense					
	14						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1662 MW-46D

HTW DRILLING LOG

MW-46D

Remedial Investigation Mead NOP | INSPECTOR: B. Helenkamp | SHEET 3 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	(Same) POORLY GRADED SAND (SP), ~~dense~~ medium grey, very fine to fine ~~sand~~ w/ few clay, wet (alluvium)	dense Hm= BG			7 14 7 14	2" spoon D# = 8 D = 2.0 ft R = 1.6 ft
	15						
	16					4 4 7 8	3" spoon D# = 9 D = 2.0 ft R = 2.0 ft
	17	SILT (ML) loose to medium dense, grey w/ dk grey mottling, w/ few very fine to fine ~~sand~~, wet (alluvium)	Hm= BG				
	18					P	2" spoon D# = 10 D = 2.0 ft R = 1.2 ft
	19	SAND WITH SILT (SP-SM), medium dense, dk grey, very fine to fine ~~sand with silt~~, wet (alluvium)	Hm= BG				
	20					21 33 29 37	w/ 3" spoon D# = 11 D = 2.0 ft R = 1.8 ft Sample collected 20-22 ft for sieve analysis
	21	POORLY GRADED SAND (SP), ~~[illegible]~~ dense, grey, very fine to fine ~~sand~~ w/ few medium sand and trace of coarse sand (alluvium)	Hm= BG	Bag Sample			
	22	becoming loose, tarnish grey, fine sand w/ some medium sand and little fine sand, trace of coarse	Hm= BG			4 2 2 4	w/ 2" spoon D# = 12 D = 2.0 ft R = 1.6 ft
	23						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-46D

1663

B07NE003702-05772

HTW DRILLING LOG

HOLE NO. MW-46 D

Remedial Investigation, Mead NOP | INSPECTOR B. Hedenkamp | SHEET 4 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	(Sand) POORLY GRADED SAND (SP), loose, tannish grey, fine ~~sand~~ w/ some medium sand, little fine sand and trace of coarse sand, wet (alluvium)					
	24		Hm= B4			10 17	w/3" spoon D# = 13 D= 2.0ft
	25	Becoming med. dense				16 14	R= 1.2 ft
	26		Hm= B4			4 10	w/2" spoon D# = 14 D= 2.0ft
	27	becoming ~~medium~~ ~~dense~~, medium sand w/ some very fine to fine sand and few coarse sand to fine gravel				14 15	R= 1.4 ft
	28		Hm= B4			15 18	w/ 3" spoon D# = 15 D= 2.0 ft
	29	w/4" coarse sand - fine gravel seam				19 17	R= 1.2 ft
	30		Hm= B4			6 8	w/2" spoon D# = 16 D= 2.0 ft
	31					15 18	R= 1.4 ft
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1664 MW-46D

HTW DRILLING LOG

MW-46D

Remedial Investigation Mead NOP | INSPECTOR: B. Heidenkamp | SHEET 5 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	(Same) POORLY GRADED SAND (SP), dense, grayish tan, medium ~~sand~~ with w/ some very fine to find sand and few coarse sand to fine gravel, wet (alluvium)	medium Hmu= B4			16 19 24 22	w/ 3" spoon D# = 17 D= 2.0ft R=0.4 ft
	33						
	34		Hmu= B4			5 7 9 10	w/ 2" spoon D# = 18 D= 2.0ft R= 1.4 ft
	35						
	36		Hmu= B4			10 22 15 15	w/ 3" spoon D# = 19 D= 2.0ft R=1.0 ft
	37						
	38	becoming w/out fine gravel	Hmu= B4	2 Bag Sample		5 7 10 21	w/ 2" spoon D# = 20 D= 2.0ft R=1.6 ft collected sample for sieve analysis 38 to 40 ft bgs
	39						
	40	~~No sample~~	Hmu=			10 15 12 12	w/ 3" spoon D# = 21 D = 2.0ft R = 0 ft
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 1665 MW-46D

HTW DRILLING LOG

MW-46D

Remedial Investigation Mead NOP | INSPECTOR: B. Hedenkamp | SHEET 6 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	~~No sample~~					
	42	42.0 WELL GRADED SAND (SW), medium dense, reddish-tan, very fine to coarse sand w/ few fine gravel and wet (alluvium)	Hm= B4			6 6 9 13	w/2" spoon D#=22 D=2.0ft R=1.2ft
	43						
	44	44.5 POORLY GRADED GRAVEL (GP), medium dense, reddish tan, fine gravel w/ many fine to coarse sand, wet (alluvium)	Hm= B4			8 11 10 11	w/2" spoon D#=23 D=2.0ft R=1.2ft
	45	Subrounded to subangular					
	46		Hm= B4			8 10 12 93	w/2" spoon D#=24 D=2.0ft R=1.6ft boring reamed to 48½ ft bgs w/ 7⅞" tri cone
	47	47.5 SANDSTONE: soft, lt tan w/ minor orange mottling, very weathered, weakly cemented, wet (alluvium)					
	48		Hm= B4			110 125	w/2" spoon D#=25 D=1.0ft
	49			CORE RUN #1	REC 0.0' / 5.0'	RQD= 0% DWR= 90%	R=0.8ft. stop drilling @ 49 ft 7/14/92 @ 1130
	50						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: (RUN 5.0' LOSS 0.0' REC 0.0' U.L. 5.0')

MW-46D

1666

ICORPS/4-15-92

HTW DRILLING LOG

MW-46D

Remedial Investigation, Mead NOP | INSPECTOR: B. Helen Kay | SHEET 7 OF 7 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	(SAME) SANDSTONE: soft lt tan, w/ minor orange mottling, very weathered, weakly cemented (alluvium)		CORE RUN #1 (CONT.)			Temporary 6 in Steel casing hammered w/ 300# hammer to 50.0 ft bgs ~~Core run #1 49-54 ft bgs~~ ~~Core run #2 54-59 ft bgs~~ Coring complete to 59 ft 7/14/92 @ 1705 ~~C.D. 54.0'~~ boring reamed to 5 7/8 in diam to 58 1/2 ft
	51						
	52						
	53						
	54						
	55			CORE RUN #2	REC 0.0' / 5.0'	RQD = 0%	RUN 5.0 LOSS 5.0 REC 0.0 U.L. 5.0 C.D. 59.0 ft Water loss estimated to be 300 gals
	56					DWR = 90%	Water loss over screen interval is 25 gallons.
	57						temporary steel casing removed 7/15/92 @ 1000
	58						Bottom of boring 59.0
	59						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-46D

1667

B07NE003702-05776

8/18/92

HTW DRILLING LOG

HOLE NO. MW-48D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: The Winnsik Companies
SHEET 1 OF 6 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska
5. NAME OF DRILLER: Bill Vick	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CID 1250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8½" Tricone rollerbit; 5" Chris Drill rock core of 3" bbl, 94m Christensen; wire line w/ 3½ x 2½ small bbl, 5⅞ tricone roller bit	8. HOLE LOCATION: N.5748[3.-E.2829888 Intersection (SW) 10th & K streets
	9. SURFACE ELEVATION: ~~NA~~ 1191.19
	10. DATE STARTED: 8/11/92 0900
	11. DATE COMPLETED: 8/13/92
12. OVERBURDEN THICKNESS: 119.6	15. DEPTH GROUNDWATER ENCOUNTERED: ~~NA~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ROCK: 13.4	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 133.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—	NA	NA	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
—	NA	NA	NA	NA	NA	15 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
installed well	NA	MW-48D	NA	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	1	lean highly organic CLAY ~~silty~~ (CL) dark brown w/ numerous rootlets (topsoil)					Boring Advanced ~~to~~ with 8½ Tricone roller bit, Drilling fluids c water and bentonite gel. No samples taken until 120' 0-120 logged by cuttings, inspection and half trucks.
	2	becoming light brown (loess)					
	3						
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-48D

1668

HTW DRILLING LOG

MW-48D

Remedial Investigation Meadow NOP

INSPECTOR: J. Hecht

SHEET 2 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same) Lean Clay (CL) hard lt. brown					
	6						
	7						
	8						
	9						
	10						
	11						
	12	Becoming soft					
	13						
	14						

PROJECT: Remedial Investigation, Meadow NOP 921-W-030

HOLE NO.: MW-48D

1669

ICORPS/4-18-82

B07NE003702-05778

HTW DRILLING LOG

MW-48D

Remedial Investigation, Mead NOP | INSPECTOR: T. Hecht | SHEET 3 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same) Lean CLAY, soft, lt-brown					
	15						
	16						
		Silt (ML) loose, lt. brown w/trace fine sand					
	17						
	18	Poorly graded SAND (SP) loose, lt-brown, v. fine (alluvium)					
	19						
	20	Becoming med. dense					
	21						
	22	Becoming dense, fine					
	23						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D

1670

/CORPS/4-15-92

HTW DRILLING LOG

MW-48D

Remedial Investigation Mew NOP | INSPECTOR T. Hecht | 4 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP)					
		Dense, lt. brown, fine w/					
	24	Trace of med sand					
		(alluvium)					
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Mew NOP 92[illegible]030

HOLE NO.: MW-48D

1671

B07NE003702-05780

HTW DRILLING LOG

MW-48D

Remedial Investigation Mead NOP

INSPECTOR: J. Hecht

Sheet 5 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP)					
	33	Dense, lt. brown, fine					
		w/ trace med sand					
		(alluvium)					
	34						
	35						
	36						
	37						
	38						
	39						
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW48D

1672

HTW DRILLING LOG

MW-48D

Fecals Investigation Meau NOP

INSPECTOR: T. Hecht

PAGE 6 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(Same)					
	42	Poorly graded SAND (SP) Dense, lt. brown, fine w/ trace med sand (alluvium)					
	43						
	44						
	45						
	46						
	47						
	48						
	49						
	50						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Meau NOP 92KW030

HOLE NO.: MW-48D

1673

HTW DRILLING LOG

MW-48D

Remedial Investigation, Mew. NOP | INSPECTOR: T. Hecht | SHEET 7 of 10

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP)					
		dense, lt. brown, fine					
	51	w/ trace of med. sand					
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						

PROJECT: Remedial Investigation, Mew NOP 921-W030

HOLE NO.: MW-48D

1674

ICORPS/4-16-82

HTW DRILLING LOG

MW-48D

Remedial Investigation, Meadow NOP | INSPECTOR: T. Hecht | PAGE 8 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP)					
		dense, lt. brown, fine					
	60	w/ trace med sand					
	61						
		Becoming V. Dense					
	62						
	63						
	64						
	65						
	66						
	67						
	68						

ICORPS/4-18-82

PROJECT: Remedial Investigation, Meadow NOP 92KW030

HOLE NO.: MW-48D

1675

B07NE003702-05784

HTW DRILLING LOG

MW-98D

Remedial Investigation Mea. NOP | INSPECTOR: Hecht | SHEET 9 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded ~~SAND~~ (SP)					
		~~Dry~~. Dense, lt. brown, fine					
	69	w/trace med. sand					
		(alluvion)					
	70						
	71						
	72						
	73						
	74						
	75						
	76						
	77						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-98D

1676

HTW DRILLING LOG

MW-48D

Remedial Investigation, MEW, NOP | INSPECTOR: T. Hecht | SHEET 10 OF

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same)					
		Poorly graded SAND (SP)					
		dense, lt. brown, fine					
	78	w/ trace med sand					
		(alluvium)					
	79						
	80						
	81	Becoming V. Dense					
	82						
		w/ iron stains & trace of clay					
	83						
	84						
		w/ trace fine gravel					
	86						
	86						

ICORPS/4-18-82

PROJECT: Remedial Investigation, MEW NOP 92KW030

HOLE NO.: MW-48D

1677

B07NE003702-05786

HTW DRILLING LOG

MW-48D

Remedial Investigation Area: NOP

NAME OF DR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		(same) Poorly graded SAND (SP) dense, lt. brown, fine to medium w/iron staining (alluvium)					
	87						
	88						
	89						
	90	well graded SAND (SW) medium dense, lt. brown fine to coarse w/trace fine gravel. (alluvium)					
	91						
	92						
	93						
	94						
	95						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Area NOP 92KW030

HOLE NO.: MW-48D

1678

HTW DRILLING LOG

MW-48D

Remedial Investigation, Meadow NOP

INSPECTOR: T. Hecht

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	96	(same) well graded SAND (SW) v. dense, lt-brown, fine to coarse w/ trace fine grave (alluvium)					
	97	Poorly graded SAND w/ CLAY (SP-SC) med dense to dense lt. yellowish brown, fine grained					
	98						
	99						
	100						
	101						
	102						
	103						
	104						

ICORPS/4-15-82

PROJECT: Remedial Investigation, Meadow NOP 92-[illegible]030

HOLE NO.: MW-48D

1679

HTW DRILLING LOG

MW-48D

Remedial Investigation Meau NOP | INSPECTOR: Hecht | SHEET 13 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
DEPTH ERROR	104	Poorly graded SAND (SP) loose, multi colored, coarse and poorly graded GRAVEL (GP) loose multi-colored, fine w/trace coarse well-rounded gravel. + trace fine sand					WRONG DEPTH Log should start @ 105'
	105						
	106						
	107						
	108						
	109						
	110						
	111						
	112						

PROJECT: Remedial Investigation, Meau NOP 921-W030

HOLE NO.: MW-48D

1680

ICORPS/4-15-82

HTW DRILLING LOG

MW-48D

Remedial Investigation Mean NOP | INSPECTOR: J. Hecht | 14 of 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	114	Poorly graded SAND with CLAY and GRAVEL (SP-SC) dense, multi colored, coarse w/ clay layers					
	115	Poorly graded GRAVEL with CLAY and SAND (GP-GC) dense, multi-colored, subrounded fine, w/ little coarse sand trace coarse gravel					
	116						
	117						
	118	w/ limestone cobbles					
	119						Driller feels soft sandstone @119.4
	120						
	121	SANDSTONE, soft, white v.fine, poorly cemented, v weathered w/ occ. cemented laminations and grey seams OMAD1	HAVE BKG				Begin 44 mm Christensen w/ 3½ x 2½ sample bbl, w/ 5" Tungsten insert bit DX 1 P = 1.7 R = 1.1
	122						

PROJECT: Remedial Investigation, Mean NOP 921-W030

HOLE NO.: MW-48D

1681

ICORPS/4-18-82

HTW DRILLING LOG

MW-48D

Remedial Investigation Mead NOP | NAME OF DRILLER: T. Hecht | SHEET 15 OF

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	123	(Same) SANDSTONE, soft, white v. fine, poorly cemented, v. weathered w/occ. cemented laminations and grey seams (OMADi)	HNu BKG			0.5'/15 0.8'/24	D#2 P=2.0 R=0.3
	124						Stopped 8/11/92 Resume 8/12/92 Installed Temp. 6" casing to 122.9' w/ 300 lb hammer, lost casing seal removed casing to 123.7 Fishing! 124 - 126.9 Flushed out
	125		NO SAMPLE				
	126						
	127		NO SAMPLE		Rec 0/2.0	DWR 90% RQD 0%	Start 126.9 16:00 Stopped 128.9 15:05 Run 2.0 Lost 2.0 Rec 0 UL 2.0 CD = 128.9
	128						
	129		NO SAMPLE		Rec 0/2.0	DWR 90% RQD 0%	Start 128.9 1608 Stopped 130.9 1615 Run 2.0 Lost 2.0 Rec 0 UL 2.0 CD = 130.9
	130						
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D

1682

/COAPS/4-15-92

HTW DRILLING LOG

MW-48D

Remedial Investigation Mead NOP | INSPECTOR T. Hecht | Ice

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	132	SANDSTONE, soft, white v. fine, poorly cemented, v. weathered w/ shale laminations ≈ 0.05' (Omadi)	HNW BKG		Rec 0.9/2.0	DWR 90% RQD 45%	Start 130.9 1700 Stopped 132.9 1710 Run 2.0 lost 1.1 Rec 0.9 UL 0 CD = 132.1 sample fell out
	133						Stopped 8/12/92 Resume 8/13/92 Reamed to 133.0' w/ 5⅞ Tricone bit Installed monitoring well 8/13/92 Water loss in screened interval ≈ 200gal
	134						
	135						
	136						
	137						
	138						
	139						
	140						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-48D

ICORPS/4-18-92

1683

B07NE003702-05792

MW-7-27-92 CH 7/27/92

HTW DRILLING LOG

HOLE NO. MW-59D

1. COMPANY NAME: Woodward-Clyde Consultants	2. DRILLING SUBCONTRACTOR: WINNEK COMPANIES
SHEET 1 OF 1 SHEETS	
3. PROJECT: Remedial Investigation, Mead NOP	4. LOCATION: Mead, Nebraska N.571245 - E.2844159
5. NAME OF DRILLER: Dane Elliott	6. MANUFACTURER'S DESIGNATION OF DRILL: Failing CF-15
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2-inch-dia. split-spoon sampler; 5 1/4-inch-dia. tri-cone roller-bit; Christensen 94 mm contin. sampler; 7 7/8-inch-dia tri-cone roller-bit	8. HOLE LOCATION: NE 1/4, NE 1/4, SW 1/4 ~~SE 1/4~~ sec. 8 T14N, R9E
	9. SURFACE ELEVATION: ~~1160 ±~~ 1160.42'
	10. DATE STARTED: 7-21-92 10:30
	11. DATE COMPLETED: 7-24-92 15:30
12. OVERBURDEN THICKNESS: 125.0	15. DEPTH GROUNDWATER ENCOUNTERED: ~~Water information~~ Masked by drilling fluid
13. DEPTH DRILLED INTO ~~ROCK~~ bedrock: 14.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 139.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
3	X	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC.
NA	N/A	N/A	N/A	N/A	N/A	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Monitoring (installed well)	N/A	X	N/A	Gene Papmahr

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LEAN CLAY WITH ORGANICS (OL-CL), ~~Topsoil~~ Hard, dk brownish gray, w/abundant organic matter ~~(OL-CL)~~ (Topsoil)	HNU: Background (BG-0.2ppm)	~~N/A~~	~~N/A~~	P	Boring advanced w/5 1/4-inch-dia tri-cone roller-bit, 2-inch-dia split-spoon and drilling water D#1 P=1.5 R=1.5
	1	LEAN CLAY WITH SAND (CL) firm, lt brown, slickensided w/iron oxides on slide planes w/root and root hairs w/thin beds of coarse grained sand w/little silt [Modified Loess]	HNU BG	~~N/A~~	~~N/A~~	P	D#2 P=1.5 R=1.5
	2	SILT (ML), soft to firm, lt brownish yellow, w/little to some of clay in fines [Loess]	HNU BG	~~N/A~~	~~N/A~~	P	D#3 P=1.5 R=1.4
	3	w/root hairs	HNU BG	~~N/A~~	~~N/A~~	P	D#4 P=1.5 R=1.2
	4						
	5						

/CORPS/5-15-92

PROJECT: 92KW030 Remedial Investigation, Mead NOP

HOLE NO.: MW-B1 59D

1684

HTW DRILLING LOG

HOLE NO. MW-59 D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 2 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	5	SILT (ML), soft to firm, lt brownish yellow w/ dk brown and black mottling, dry w/little clay in ~~fines~~ matrix	HNU BG	~~N/A~~	~~N/A~~	P	D #4 P = 1.5 R = 1.2
	6	w/ roots and root hairs w/ iron and manganese hydroxides in nodules and small veinlets [Loess]	HNU BG	~~N/A~~	~~N/A~~	P	D #5 P = 1.5 R = 1.5
	7						
	8	w/ trace of fine grained sand	HNU BG	~~N/A~~	~~N/A~~	P	D #6 P = 1.5 R = 1.0
	9	Quantity of sand increasing	HNU BG	~~N/A~~	~~N/A~~	P	D #7 P = 1.5 R = 1.0
	10	POORLY GRADED SAND WITH SILT (SP-SM), dense, lt yellowish gray, v. fine to fine grained w/little silt in ~~fines~~ matrix w/ trace of mica [Alluvium]	HNU BG	~~N/A~~	~~N/A~~	P	D #8 P = 1.5 R = 0.8
	11						
	12	POORLY GRADED SAND (SP), med. dense, lt yellowish gray, v. fine to fine grained	HNU BG	~~N/A~~	~~N/A~~	P	D #9 P = 1.5 R = 1.0
	13						
	14		HNU BG	~~N/A~~	~~N/A~~	P	D #10 P = 1.5 R = 1.0

ICORPS/4-18-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-59 D

1685

B07NE003702-05794

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 3 OF 17 SHEETS 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	POORLY GRADED SAND (SP), med. loose, lt yellowish gray, v. fine to fine grained, well sorted. (Alluvium)	HNU BG	~~N/A~~	~~N/A~~	P	D #10 P = 1.5 R = 1.0 Drilling continued w/Christensen sampler
	15	Becoming med. dense w/trace of silt in fines matrix	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	Drilling mud prepared: 100 lbs of Aquagel + 150 gals of water
	16						D # 11 P = 2.0 R = 1.8
	17	Becoming mostly fine grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 12 P = 2.0 R = 1.5
	18						
	19	w/sporadic grains of med. grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 13 P = 2.0 R = 1.0
	20						
	21		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 14 P = 2.0 R = 1.8
	22						
	23						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

1686

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 4 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	23	POORLY GRADED SAND (SP), med. dense (est), lt brownish gray, v. fine to fine grained	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 15 P = 2.0 R = 1.8
	24						
	25	Becoming lt yellowish gray	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 16 P = 2.0 R = 1.2
	26						
	27		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 17 P = 2.0 R = 1.0
	28						
	29		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 18 P = 2.0 R = 0.5
	30						
	31		HNU BG	~~N/A~~	N/A	~~N/A~~	D # 19 P = 2.0 R = 0.6
	32						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59 D

HTW DRILLING LOG

HOLE NO. MW-59D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 5 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	POORLY GRADED SAND (SP), med. dense, H grayish yellow, v. fine to fine grained	~~HNU~~ BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 19 P = 2.0 R = 0.6
	33		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 20 P = 2.0 R = 0.5
	34	Becoming ~~med~~ dense to loose					
	35		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 21 P = 2.0 R = 1.0
	36						
	37	Becoming loose (est.)	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 22 P = 2.0 R = 0.2
	38						
	39		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 23 P = 2.0 R = 0.4
	40						
	41						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead JOP 92KW030

HOLE NO.: MW-59D

1688

HTW DRILLING LOG

HOLE NO. MW-59 D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 6 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	POORLY GRADED SAND (SP) loose, lt yellowish gray, very fine to fine grained	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 24 P = 2.0 R = 0.5
	42						
	43	w/little of multi-colored med. grained sand w/trace (sporadic grains) of coarse grained sand.	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 25 P = 2.0 R = 1.0
	44						
	45		HNU BG	N/A	N/A	N/A	D # 26 P = 2.0 R = 0.7
	46						
	47		HNU BG	MWB-059-047 #1	N/A	N/A	D # 27 P = 2.0 R = 0.2 Approx. 50 gals of drilling fluid lost during D # 28
	48						
	49	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC) med. dense, multi-colored, mostly coarse grained, w/lenses of lean, iron oxides stained clay w/trace of fine gravel	HNU BG	N/A	N/A	N/A	D # 28 P = 2.0 R = 1.0
	50						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 7 OF 16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense(est) multi-colored, mostly coarse grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 28 P = 2.0 R = 1.0
	51	w/ seams and lenses of lean, bright yellow (limonite stained) clay w/ ~~occasional~~ trace of fine, sub-rounded gravel	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 29 P = 2.0 R = 0.4
	52						100 lbs of bentonite added to drilling mud
	53	w/ separate thin layers of poorly graded, fine grained sand	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 30 P = 2.0 R = 1.0
	54	w/ thin beds of coarse grained sand cemented with clay					
	55		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 31 P = 2.0 R = 0.8
	56	Quantity of gravel increasing					
	57	POORLY GRADED SAND WITH GRAVEL (SP), dense(est) multi-colored, coarse grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 32 P = 2.0 R = 1.0
	58	w/ little fine subangular and subrounded gravel w/ thin separate layers of poorly graded fine grained sand					
	59						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-59D

ICORPS/4-15-92

1690

HTW DRILLING LOG

HOLE NO. MW-59D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 8 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), dense (est), multi-colored, coarse grained	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #33 P = 2.0 R = 0.8
	60	w/ thin beds cemented with clay w/ little to some of fine gravel w/ thin separate layers of fine grained sand					
	61		HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D #34 P = 2.0 R = 0.3
	62	Size of gravel increasing					Approx. 50 gals of water lost. Shift ended 17:00
	63	w/ seams and partings of lean clay in assoc. w/ coarse gravel	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	Drilling resumed 7-22-92 11:15 D #35 P = 2.0 R = 0.5
	64	Max. size of gravel 2.5 inch.					
	65		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D #36 P = 2.0 R = 0.4
	66						
	67	WELL GRADED SAND WITH GRAVEL, med. dense, multi-colored, w/ little fine to coarse gravel, Max. size 1.5 inch., elongated, subangular	HNU: BG	N/A	N/A	N/A	D #37 P = 2.0 R = 0.6
	68						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

HTW DRILLING LOG

HOLE NO. MW-59 D

Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), dense (est.), multi-colored w/ seams and partings of bright yellow (limonite stained), lean clay w/ little fine gravel, elongated, subrounded	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 37 P = 2.0 R = 0.6
	69		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 38 P = 2.0 R = 0.5
	70						
	71	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense (est.) multi-colored, coarse grained, w/ seams and partings of yellow, lean clay w/ thin beds of whitish gray, fine grained sand w/ little fine ~~grained~~ gravel	HNU: BG	~~N/A~~ MWA--059--071 #2	~~N/A~~	~~N/A~~	D # 39 P = 2.0 R = 0.8 50 lbs of bentonite added to drilling mud.
	72						
	73	Becoming stained throughout w/ iron oxides (?) w/ layer - 3.5 inch thick - of densely packed fine, subrounded gravel in lt gray, lean clay	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 40 P = 2.0 R = 0.6 50 lbs of bentonite added to drilling mud
	74						
	75	LEAN CLAY WITH SAND (CL), firm, medium gray w/ trace to little of very fine grained sand w/ iron oxides nodules	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 41 P = 2.0 R = 1.2
	76						
	77						

/CORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59 D

1692

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 10 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	LEAN SANDY CLAY (CL), firm, med. gray w/ little fine grained sand, w/ iron oxides nodules	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 42 P = 2.0 R = 1.0
	78	w/ small lenses of dk olive gray, lean clay					
	79	w/ small (1-1.5-inch-dia) ironstone concretions	HNU BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 43 P = 2.0 R = 2.2 (0.2 ft recovered from the previous run)
	80						
	81		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 44 P = 2.0 R = 1.5
	82						
	83	w/ manganese hydroxides(?) staining (dendritic pattern)	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 45 P = 2.0 R = 2.5 (0.5 ft recovered from the previous run)
	84	w/ white non-calcareous nodules (kaoline?)					
	85		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 46 P = 2.0 R = 1.0
	86						

ICORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-59D

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET ~~12~~ 11 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	86	POORLY GRADED SAND WITH CLAY (SP-SC), dense, lt gray, mostly fine grained	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 46 P = 2.0 R = 1.0
	87	w/trace to little of clay in fines w/trace of coarse grained sand w/trace of fine gravel	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 47 P = 2.0 R = 0.8
	88	w/seams and partings of gray, lean sandy clay					
	89	w/trace of coarse gravel	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 48 P = 2.0 R = 0.5
	90						
	91	Alternating layers of coarse grained and fine grained sand	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 49 P = 2.0 R = 0.8
	92	w/trace of coarse gravel, subrounded, max. size 1.5 inch.					Shift ended 17:00
	93	w/trace of silt w/iron oxides staining	HNU: BG (0.4 ppm)	~~N/A~~	~~N/A~~	~~N/A~~	Drilling resumed 7-23-92 7:45 D # 50 P = 2.0 R = 0.8
	94						
	95						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: 59D

1694

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET ~~13~~ 12 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense, multi-colored, mostly coarse grained	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D# 51 P = 2.0 R = 1.0
	96	w/ layer - 2 inch thick - of soft, lt gray, lean clay w/ layer - 4 inch thick - of firm, dk gray, lean clay, w/ manganese oxides staining					
	97	w/ little subangular coarse gravel; max. size 1.0 inch	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D# 52 P = 2.0 R = 0.3
	98						
	99		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D# 53 P = 2.0 R = 0.5
	100	w/ layer - 2 inch thick - of firm, med. gray w/ yellow mottling, lean clay (CL) w/ layer - 3 inch thick - of dense, med. gray, fine grained, poorly graded. clayey sand (SC)					
	101		HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D# 54 P = 2.0 R = 0.6
	102	w/ layer - 3-inch thick - of firm, dk gray, lean clay (CL) w/ little to some of coarse well-rounded ~~fine~~ gravel. Max. size 1.2 inch					
	103	w/ layer - 2-inch-thick of poorly graded sand with clay, dk gray and clear, very fine and fine grained	HNU: BG	—	~~N/A~~	~~N/A~~	D # 55 P = 2.0 R = 0.4
	104						

/CORPS/4-15-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

1695

B07NE003702-05804

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation Mead NOP

INSPECTOR Gene Papinako

SHEET 13 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104	POORLY GRADED SAND WITH CLAY (SP-SC) AND LEAN CLAY WITH SAND (CL), dense, dk gray and clear, v. fine to fine grained,	HNU: BG	N/A	N/A	N/A	D # 55 P = 2.0 R = 0.4
	105	w/ little clay in fines, sand and firm, dk gray clay matrix w/ trace of fine sand in fines alternating	HNU: BG	N/A	N/A	N/A	D # 56 P = 2.0 R = 0.5
	106	w/ little of elongated, subrounded and subangular coarse gravel; max. size 1.8 inch					
	107	Clay becoming med. gray w/ yellow (iron oxides) mottling	HNU: BG	N/A	N/A	N/A	D # 57 P = 2.0 R = 0.5
	108	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), dense, multi-colored (but mostly in hues of yellow), w/thin beds cemented w/ white lean kaoline(?) clay, w/ little coarse, subrounded					
	109	gravel; max. size 1.5 inch.	HNU: BG	N/A	N/A	N/A	D # 58 P = 2.0 R = 0.6
	110	Quantity of fine grained sand increasing					
	111	POORLY GRADED SAND WITH CLAY (SP-SC), med. dense (est) grayish yellow, fine grained w/ seams and partings of yellow lean clay w/ subordinate quantities of coarse and med. grained sand	HNU: BG	N/A	N/A	N/A	D # 59 P = 2.0 R = 0.5
	112						
	113						

/CORPS/4-16-92

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

1696

HTW DRILLING LOG

HOLE NO. MW-59D

PROJECT: Remedial Investigation, Mead NOP

INSPECTOR: Gene Papinako

SHEET ~~13~~ 14 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113	POORLY GRADED SAND WITH CLAY (SP-SC), dense (est.) multi-colored, coarse grained w/ seams and partings of firm med. gray, lean clay	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D #60 P = 2.0 R = 2.0
	114						
	115	POORLY GRADED GRAVEL WITH CLAY (GP-GC), dense (est) multi-colored, coarse, well-rounded and subrounded, max. size 1.5 inch	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D #61 P = 2.0 R = 1.0
	116	POORLY GRADED SAND WITH CLAY (SP-SC), dense (est.) yellowish gray, fine grained w/ white, lean, non-calcareous clay in fines,					
	117	w/ iron oxides staining w/ trace of coarse and med. grained sand.	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D #62 P = 2.0 R = 0.5
	118	Becoming loose (est)					
	119		HNU: BG	—	~~N/A~~	~~N/A~~	D #63 P = 2.0 R = 0.8
	120	w/ layer - 4 inch thick of poorly graded gravel with clay (GP-GC), well-rounded, elongated, max. size 1.6 inch in white, non-calcareous, lean clay matrix					
	121		HNU: BG	—	~~N/A~~	~~N/A~~	D #64 P = 2.0 R = 1.0
	122						

PROJECT: Remedial Investigation, Mead NOP 92KW030

HOLE NO.: MW-59D

/CORPS/4-15-92

1697

B07NE003702-05806

HTW DRILLING LOG

HOLE NO. MW-59D

Remedial Investigation, Mead NOP | INSPECTOR Gene Papinako | SHEET 15 OF 16 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	122	POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), med. dense (pt) multi-colored, coarse grained w/ seams and partings of white, non-calcareous, lean clay w/ little coarse gravel, well-rounded, max. size 1.6 inch.	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 64 P = 2.0 R = 1.0
	123		HNU: BG	MWA-059-122 #3	~~N/A~~	~~N/A~~	D # 65 P = 2.0 R = 1.2
	124	Becoming mostly fine grained sand. Becoming mostly coarse grained. w/ white lean clay in fines.					
	125	POORLY GRADED SAND WITH CLAY (SP-SC), dense, white, very fine to fine grained, firm, well sorted w/ partings of bright yellow (limonite stained), lean clay [Omadi Member]	HNU: BG	~~N/A~~	N/A	N/A Temporary	D # 66 P = 2.0 R = 1.5 Borehole reamed to 129 ft with 7 7/8-inch-dia tri-cone roller-bit. Protective 6-inch-dia steel casing driven to 127.5 ft depth with 300 lb. hammer. Casing removed during well installation
	126						
	127	w/ ~~occasional~~ trace (occasional grains) of coarse, well-rounded sand	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 67 P = 2.0 R = 1.0
	128						
	129	Becoming yellow (iron oxides stained)	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 68 P = 2.0 R = 0.5
	130						
	131						

PROJECT: Remedial Investigation, Mead NOP 92KW030 | HOLE NO.: MW-59D

/CORPS/4-15-92

1698

HTW DRILLING LOG

MW-59D

Remedial Investigation, Mead VOP | INSPECTOR: Gene Papinako | DATE: 7-16 / 7-16

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	131	POORLY GRADED SAND WITH CLAY (SP-SC), dense, white and yellow, v. fine and fine grained	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 69 P = 2.0 R = 1.1
	32	w/partings, seams, and thin beds of firm, dk yellow (iron oxides stained), lean clay					
	133		HNU: BG	~~N/A~~	N/A	N/A	D # 70 P = 2.0 R = 1.2
	134						
	135	CLAYEY SAND (SC), dense, dk yellow (iron oxides stained), fine grained, w/some lean clay in fines	HNU: BG	~~N/A~~	~~N/A~~	~~N/A~~	D # 71 P = 2.0 R = 1.5
	136	w/thin beds (0.1 - 0.2 inch) of coarse grained sand					
	137		HNU: BG	~~N/A~~	N/A	~~N/A~~	D # 72 P = 2.0 R = 1.3
		POORLY GRADED SAND WITH CLAY (SP-SC), dense (est.) white and yellowish white, mostly fine grained					
	138						B.O.B. 139.0 ft 7-24-92 15:30
		Becoming weakly cemented w/white, non-calcareous, lean clay					
	139						Monitoring well installed upon completion. 7-25-92 Estimated water loss 790 gals, including 185 gals lost in screened interval
	140						

ICORPS/4-16-82

PROJECT: Remedial Investigation, Mead NOP 92KW0030 | HOLE NO.: MW-59D

1699

B07NE003702-05808

DRAFT REPORT

REMEDIAL INVESTIGATION REPORT OPERABLE UNIT NO. 2 (GROUNDWATER) FOR FORMER NEBRASKA ORDNANCE PLANT MEAD, NEBRASKA

DACA 41-92-C-0023

Prepared for
Department of the Army
U.S. Army Engineers District
Kansas City District
Corps of Engineers
Kansas City, Missouri

February 1993

Woodward-Clyde

Woodward-Clyde Consultants
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Volume IV of IV

APPENDIX B
GROUNDWATER MONITORING WELL INSTALLATION REPORTS

APPENDIX B TABLE OF CONTENTS

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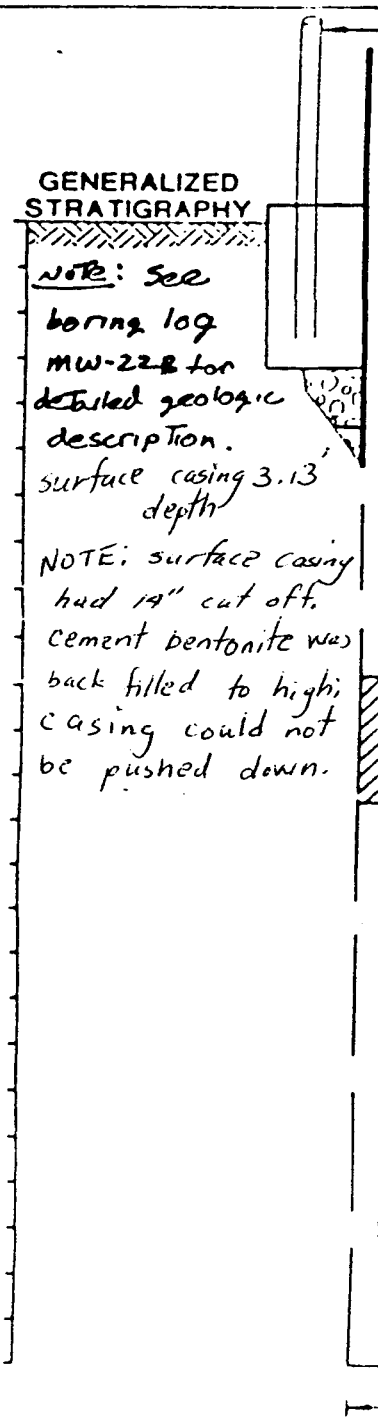
DEEP GROUNDWATER MONITORING WELL INSTALLATION REPORT 70

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mallisee — DYG 7-19-92
Method of Installation: Rotary w/washboring, filter pack sand & Valclay grout placed
Remarks: with 1" Tremie pipe. Used 75 gal. of water for washboring and used 250 gal. of water for filter pack installation

Monitor Well No. MW-22B
Project No. 92KW030
Date 6-27-92
Time 1543



Number / Type of Protective Post per Cluster: 6
Elevation of top of riser pipe: 1176.24'
Height of riser above ground: ~~1180~~ 1181.86'
Ground Elevation: 1174.38'
I.D./Type of surface casing: 4"x4"x7' Box Steel (galvanized) 7/2/92
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete 7/2/92
Type of surface seal: SAKrete Concrete ~~Cement Fill~~ 7/2/92
GRANULAR BENTONITE 4.0' 7/2/92
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of backfill: Cement\Bentonite Grout 7/1/92
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Valclay Grout
Depth of top of filter pack: 55.0'
Depth of top of screen: 58.0'
Type of filter pack: 20-40 Silica Sand
I.D./Type of screen: 2" I.D. Schedule 40 PVC factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 68.0'
Depth of bottom of plugged bank section: 69.0'
Type of backfill below monitoring well: 20-40 Silica Sand
Depth of bottom of boring: 70.0'
Diameter of boring: 6"

Woodward-Clyde Consultants

FIGURE 3-3

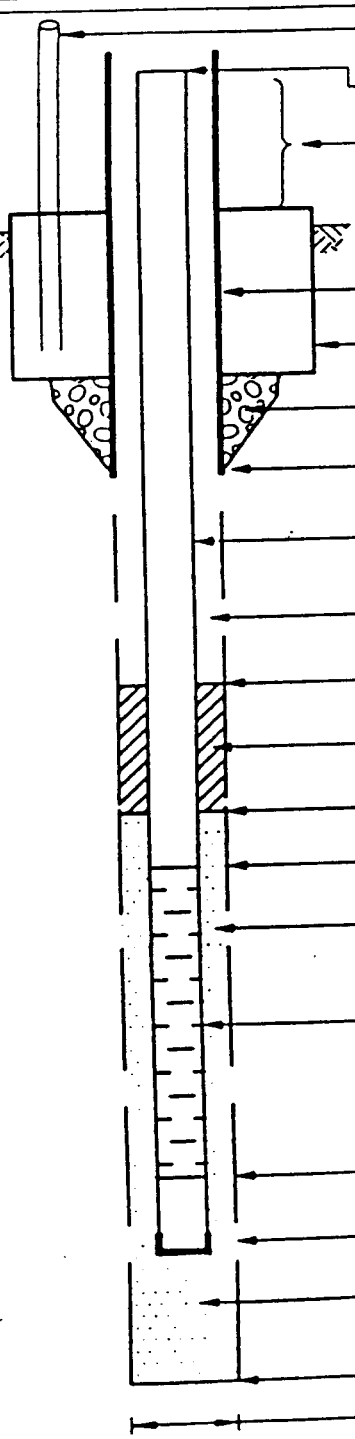
GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC-Omaha
Inspected by J. Rittenhouse (WCC)
Method of Installation 5 7/8" tricone bit - rotary wash boring. Filter pack and "Pure Gold" grout placed through 1" tremie pipe. Approximately 230 gal water lost in screen interval during drilling and placement of filter pack. 1 centralizer placed above screen at 66'.
Remarks

Monitor Well No. MW-23B
Project No. 92KW030
Date 7-13-92
Time 1345

GENERALIZED STRATIGRAPHY

See boring log MW-23B for detailed geologic description.



Number / Type of Protective Post per Cluster	8
Elevation of top of riser pipe	1173.50'
Height of riser above ground	1.88'
Ground Elevation	1171.62'
I.D./Type of surface casing	4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad	3'x3'x4" / Concrete 4-mix
Type of surface seal	Granular Bentonite / 4-mix Concrete
Depth of surface seal	5.0'
I.D./Type of riser pipe	2" Schedule 40 PVC Flush-jointed
Type of backfill	Cement / Bentonite
Depth of top of seal	14.0'
Type of seal	tremied "Pure Gold" grout (Cal. vol. (74 gal) Placed vol. (70 gal))
Depth of top of filter pack	63.5
Depth of top of screen at joint	67.5
Type of filter pack	10-20 Silica Sand (Cal. vol. (253 lb) Placed vol. (280 lb))
I.D./Type of screen	2" Schedule 40 PVC factory-slotted
Screen slot size	0.010"
Depth of bottom of screen at joint	77.5
Depth of bottom of plugged bank section	78.0
Type of backfill below monitoring well	8" of natural sand slough, 4" 10-20 silica sand
Depth of bottom of boring	79.0
Diameter of boring	6"

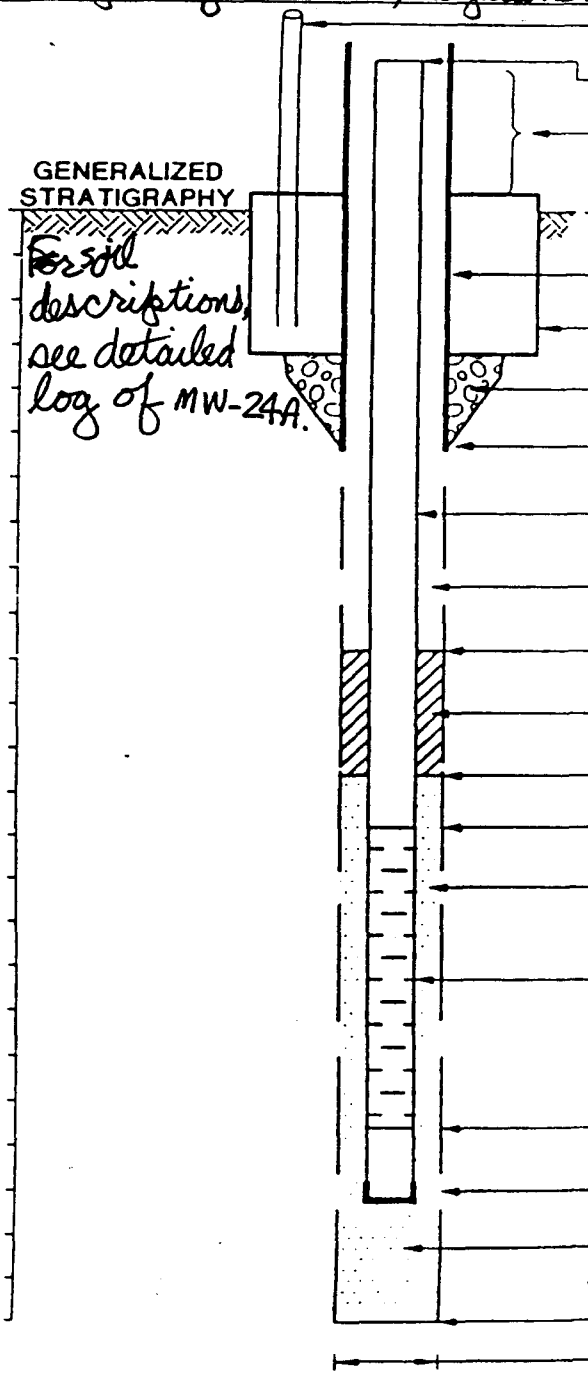
FIGURE 6-3 ORIGINAL

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: WCC
Inspected by: J. Nealon
Monitor Well No.: MW-24B
Project No.: 92KW030
Date: 7-29-92
Time: 1408

Method of Installation: RWB. Tremied 20/40 sand and Pure Gold grout.

Remarks: Centralizer at 55'. Drilling fluid losses: 0'-54', 150 gallons; 54-67.5 (screened interval), 40 gallons; flushing, 30 gallons; filter pack placement, 20 gallons.



Number / Type of Protective Post per cluster: 8

Elevation of top of riser pipe: 1163.05'

Height of riser above ground: 2.19'

Ground Elevation: 1160.86'

I.D./Type of surface casing: 4" x 4" x 7' GAL.

Dimen. / Type of Surface Pad: 3'x3'x4" U-mix Concrete

Type of surface seal: Granular Bentonite/U-mix concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2 inch / Schedule 40 PVC

Type of backfill: Cement/Bentonite

Depth of top of seal: ~~16'~~ 12.0'

Type of seal: Pure Gold grout @ 10.4 lb/gal (55 gal est) (70 gal act.)

Depth of top of filter pack: 53.0'

Depth of top of screen: 56.0'

Type of filter pack: 20/40 silica sand (250 lb est.) (250 lb act.)
Sieve test D_{30} = NA

I.D./Type of screen: 2 inch / Sch 40 factory slotted PVC

Screen slot size: 0.010 inch

Depth of bottom of screen: 66.0'

Depth of bottom of plugged bank section: 66.5'

Type of backfill below monitoring well: 20/40 silica sand 66.5-67.2; natural sand slough 67.2-67.5

Depth of bottom of boring: 67.5

Diameter of boring: 6" (0-6') 5 7/8" (6-67.5')

FIGURE 6-3

CEM 7/16/92

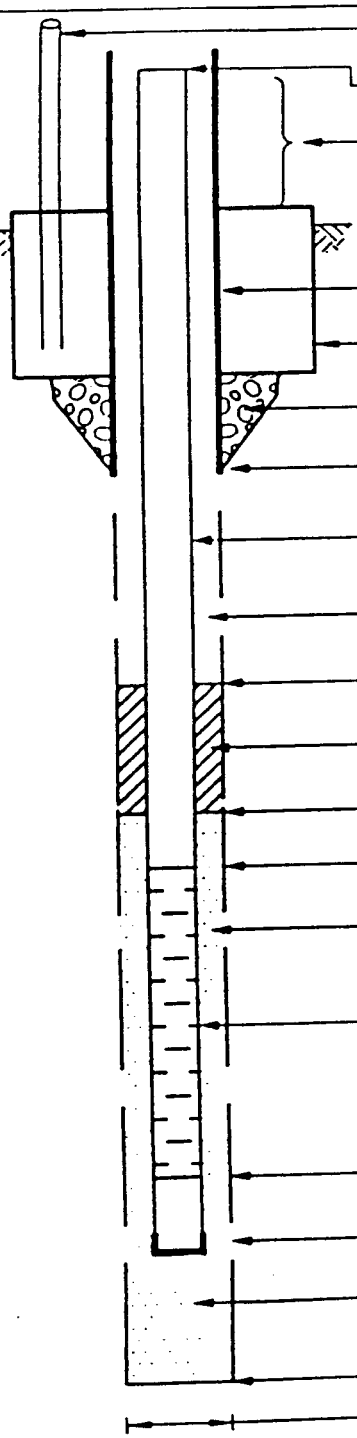
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, Nebraska
Installed by: WCC - Omaha
Inspected by: J. Ritterling (WCC)
Method of Installation: 5 7/8" Tricone roller bit - rotary wash boring. Filter pack and grout placed through 1" tremie pipe.
Remarks: 10 gal used for drilling fluid, 150 gal used to flush fluid, and 30 gal water used for filter pack placement. Total lost in screen interval = 190 gal.

Monitor Well No.: MW-25B
Project No.: 92K W030
Date: 7-14-92
Time: 1430

GENERALIZED STRATIGRAPHY

See boring log MW-25B for detailed geologic description.



Number / Type of Protective Post per Cluster: 12
Elevation of top of riser pipe: 1174.29'
Height of riser above ground: 1.78'
Ground Elevation: 1172.51
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" / U-mix Concrete
Type of surface seal: Granular Bentonite / U-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" Sch 40 flush joint PVC
Type of backfill: Cement / Bentonite
Depth of top of seal: ~~5.0'~~ 9.5' RBP 7-16-92
Type of seal: tremied "Pure Gold" grout (10.5 lbs/gal)
Cal. vol. (~~256 lb~~ 75 gal) Placed vol. (~~600~~ 100 gal)
Depth of top of filter pack: 70.0
Depth of top of screen: 74.0
Type of filter pack: 10-20 Silica Sand
Cal. vol. (256 lb) Placed vol. (280 lb)
I.D./Type of screen: ~~0.010~~ 2" Schedule 40 PVC factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen at joint: 84.0
Depth of bottom of plugged bank section: 84.5
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 85.0
Diameter of boring: 6"

Woodward-Clyde Consultants

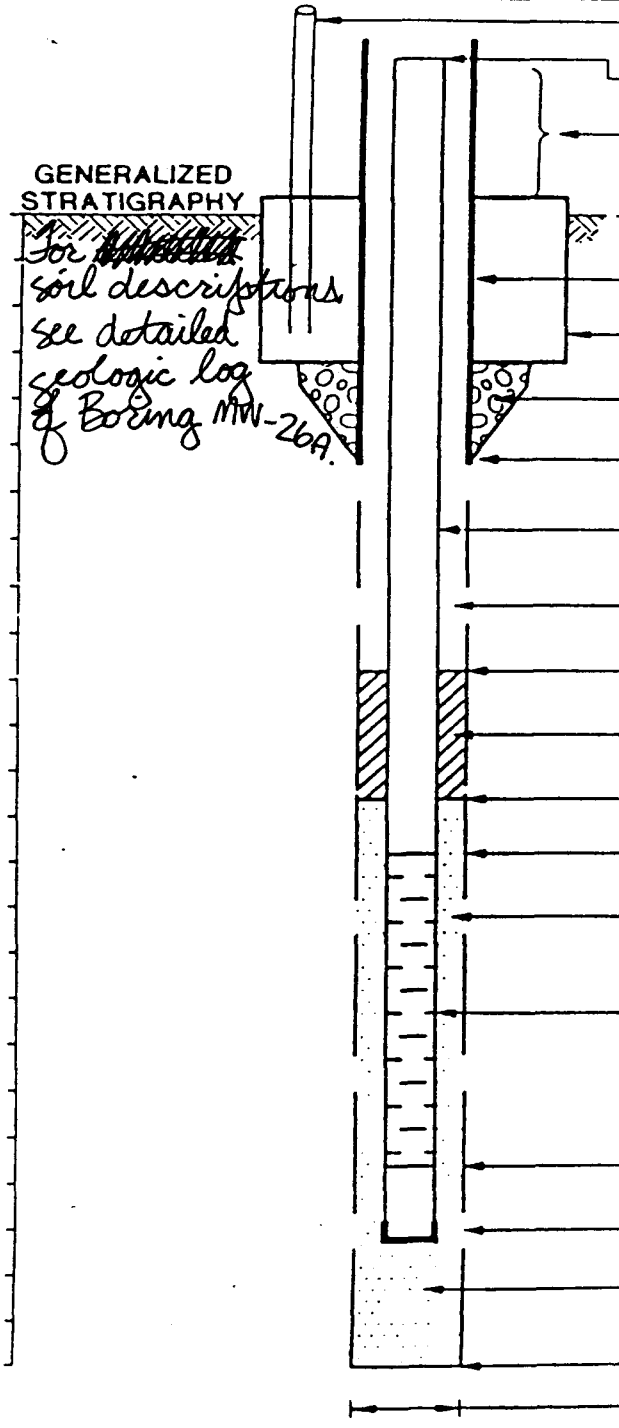
FIGURE 6-3 OOH 8/14/92

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Woodward-Clyde Consultants
Inspected by: John Nealon

Monitor Well No. MW-26B
Project No. 92KW030
Date 7-28-92
Time 1429

Method of Installation: RWB. Tremied 10/20 sand and Pure Gold grout. Centralizer at 65'.
Remarks: Water losses: 170 gallons, 0-64'; 35 gal, 64'-77.5' (screened interval); 40 gallons, flushing; 20 gallons, filter pack placement



Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1173.74'
Height of riser above ground: 1.74'
Ground Elevation: 1172.00'
I.D./Type of surface casing: 4"x4"x7' GAL. Stee
Dimen. / Type of Surface Pad: 3'x3'x4" v-mix concrete
Type of surface seal: Granular Bentonite/v-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2in/Schedule 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: 10'
Type of seal: Pure Gold grout at 10.2 lb/gal (80 gal est; 100 gal actual)
Depth of top of filter pack: 63.0
Depth of top of screen: 66.0
Type of filter pack: 10/20 silica sand (2.2-100# bags 2.5-100# bags used) Sieve test D_{30} = 0.27
I.D./Type of screen: 2 inch/Schedule 40 PVC, factory slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 76.0'
Depth of bottom of plugged bank section: 76.5'
Type of backfill below monitoring well: Natural sand slough 76.5-77.5'
Depth of bottom of boring: 77.5'
Diameter of boring: 6" (0-~~77.5~~ 6') 5 7/8" (6 - 77.5')

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NDP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mallisee JYG 7-14-92
Method of Installation: Hollow-Stem Augers, filter pack sand and Volclay grout
Remarks: placed with 1" Tremie pipe. 300 gallons of water used to drill the boring. 100 gallons of water used for filter pack installation.

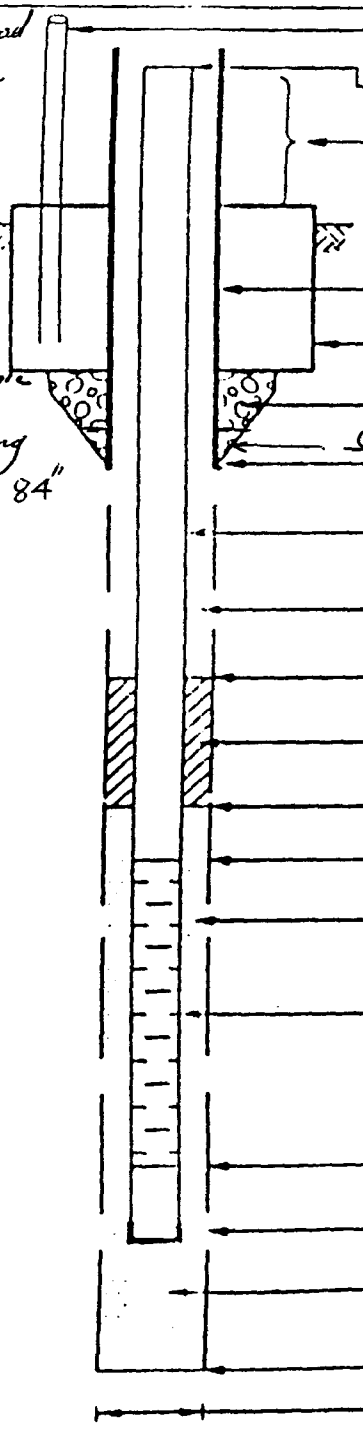
Monitor Well No. MW-27B
Project No. 92KW030
Date 6-24-92
Time 1850

surface casing/pad installed by WCC

GENERALIZED STRATIGRAPHY

Note: See boring log MW-27B for detailed geologic description.

surface casing depth — 4.84"



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1175.64'
Height of riser above ground: ~~2.00~~ RBP 1.94'
Ground Elevation: 1173.70' 7/7/92
I.D./Type of surface casing: 4"x4"x7' GALVANIZED BOX 7/7/92
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete 7/7/92
Type of surface seal: SAKRETE Concrete
GRANULAR Bentonite 3'
Depth of surface seal: ~~5.0~~ N/A 7/7/92
I.D./Type of riser pipe: 2" I.D. Sch. 40 PVC
Type of backfill: Cement/bentonite grout 7/2/92
Depth of top of seal: ~~10~~ 4'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 58'
Depth of top of screen: 61'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" I.D., Schedule 40 PVC factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 71'
Depth of bottom of plugged bank section: 72'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 73'
Diameter of boring: 8"

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by J. Ritterling (WCC)

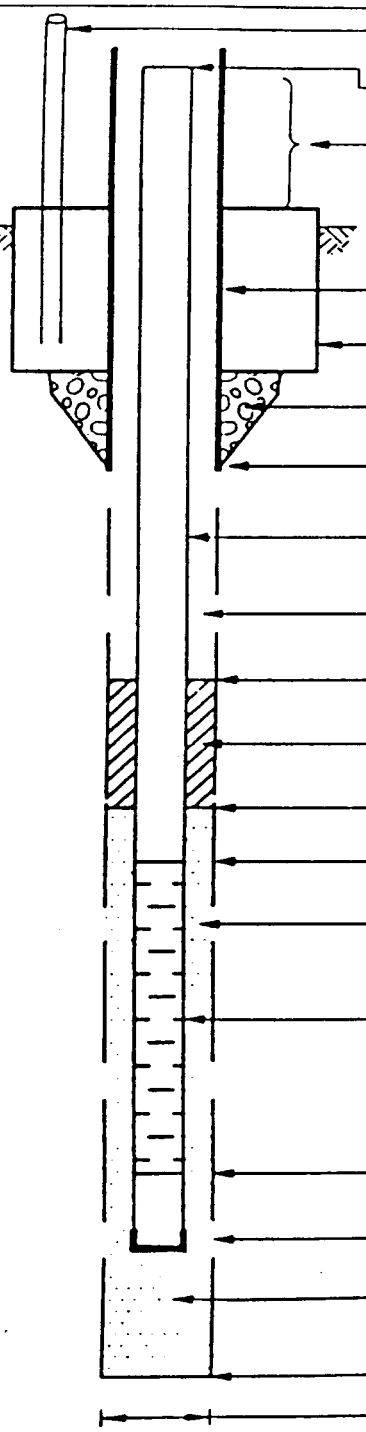
Monitor Well No. MW-28B
Project No. 92KW030
Date 7-15-92
Time 1445

Method of Installation 5 7/8" tri-cone roller bit - rotary wash bore. Placed filter pack and Pure Gold grout through 1" tremie pipe. Placed one centralizer above the screen at ~66' below ground. Estimated water loss in screen interval includes: 60 gal drilling fluid, 140 gal to flush fluid, 30 gal to place filter pack. Total = 230 gal.

Remarks

GENERALIZED STRATIGRAPHY

See boring log MW-28B for detailed geologic description.



- Number / Type of Protective Post per cluster: 12
- Elevation of top of riser pipe: 1172.11'
- Height of riser above ground: ~~2.09~~ RBP 2.09'
- Ground Elevation: 1170.02'
- I.D./Type of surface casing: 4"x4"x7' Galvanized steel
- Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
- Type of surface seal: Granular Bentonite/u-mix cement
- Depth of surface seal: 5.0'
- I.D./Type of riser pipe: 2" sch 40 PVC, flush joint
- Type of backfill: Cement/Bentonite
- Depth of top of seal: 10.0'
- Type of seal: Tremied "Pure Gold" grout (10.3 lbs/gal) Cal. Vol. (66 gal) Placed Vol. (95 gal)
- Depth of top of filter pack: 63.5'
- Depth of top of screen: 67.5'
- Type of filter pack: 10-20 Silica Sand Cal. Vol. (256 lb) Placed Vol. (280 lb)
- I.D./Type of screen: 2" Schedule 40 PVC Factory-slotted
- Screen slot size: 0.010"
- Depth of bottom of screen: 77.5'
- Depth of bottom of plugged bank section: 78.0'
- Type of backfill below monitoring well: 6" natural sand dough, 6" 10-20 Silica Sand
- Depth of bottom of boring: 79.0'
- Diameter of boring: 6"

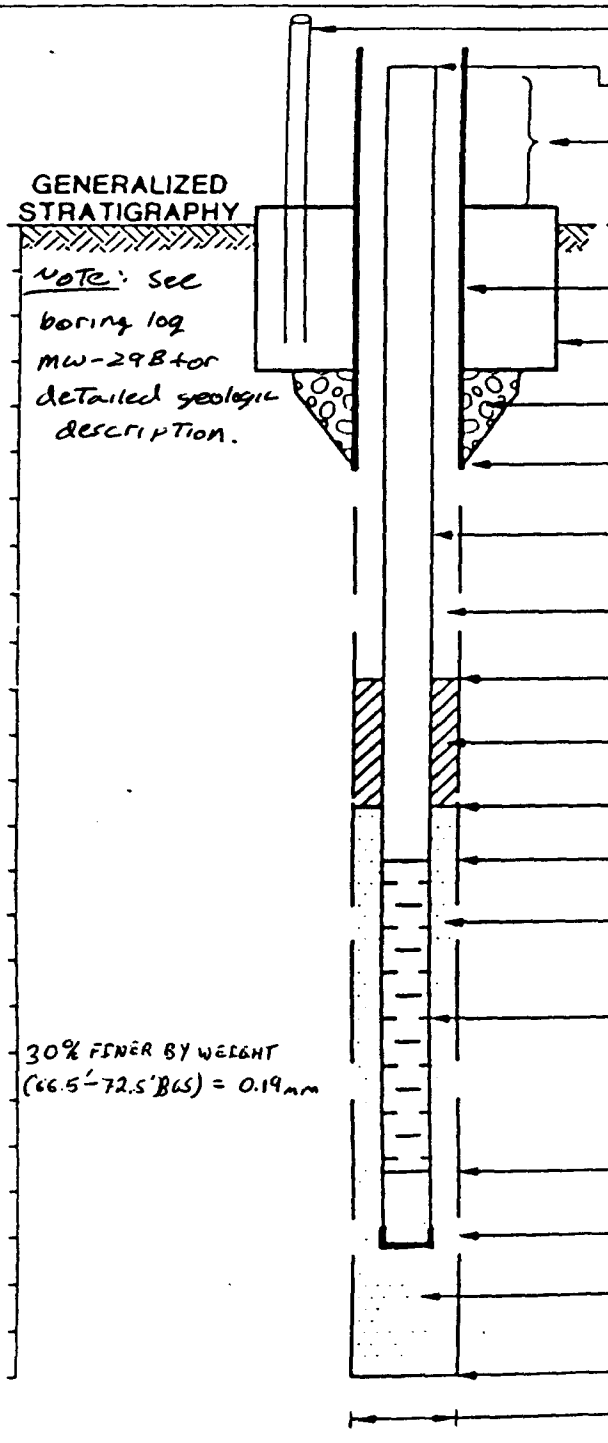
Woodward-Clyde Consultants

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead WOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mellisee
Method of Installation: Hollow-Stem Augers, filter pack sand and Volclay grout
Remarks: placed with 1" Tremie pipe. Used 150 gallons of water to drill boring and used 100 gallons of water for filter pack installation.

Monitor Well No.: MW-29B
Project No.: 92KW030
Date: 6-25-92
Time: 1910

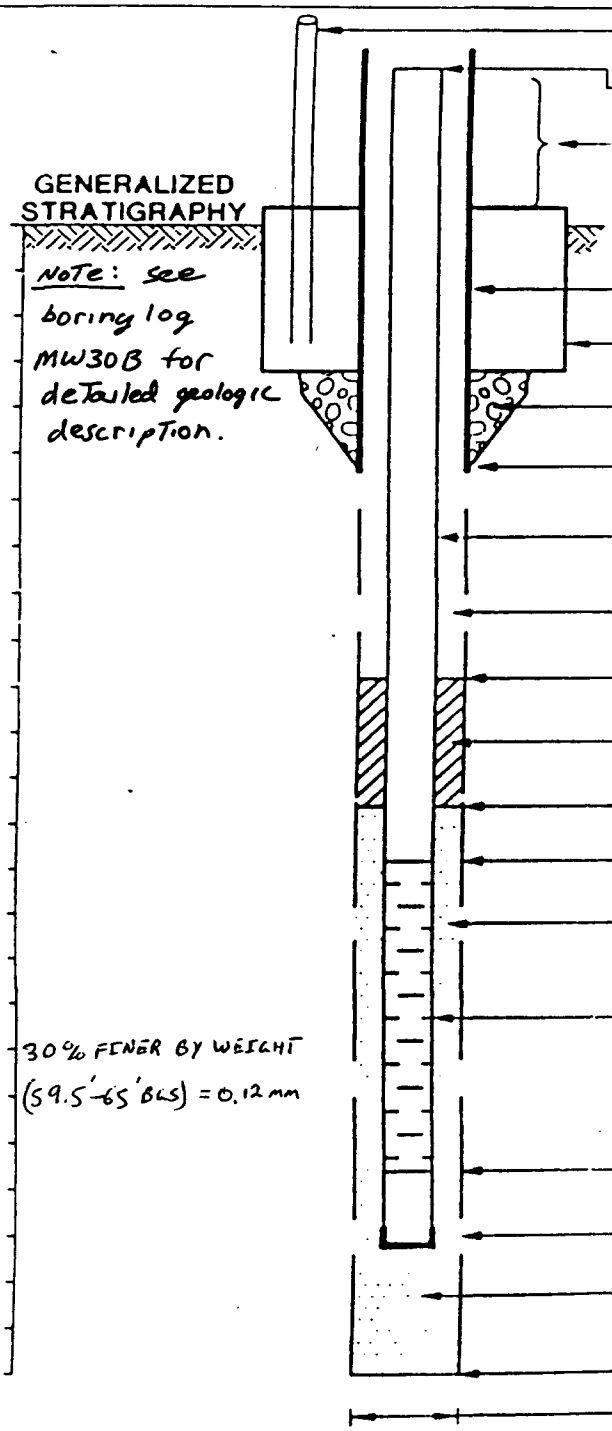


Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1160.63'
Height of riser above ground: 2.28'
Ground Elevation: 1158.35'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
Type of surface seal: Granular Bentonite/u-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of backfill: cement/bentonite grout
Depth of top of seal: ~~10'~~ RBF 8.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 61'
Depth of top of screen: 64'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" I.D. Schedule 40 PVC factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 74'
Depth of bottom of plugged bank section: 75'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 76'
Diameter of boring: 8"

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mullisee
Monitor Well No.: MW-30B
Project No.: 92KW030
Date: 6-26-92
Time: 1628
Method of Installation: Hollow-Stem Augers, filter pack sand and Volclay grout
Remarks: placed with 1" Tremie pipe. Used 120 gallons of water to drill the boring and used 100 gal. of water for filter pack installation

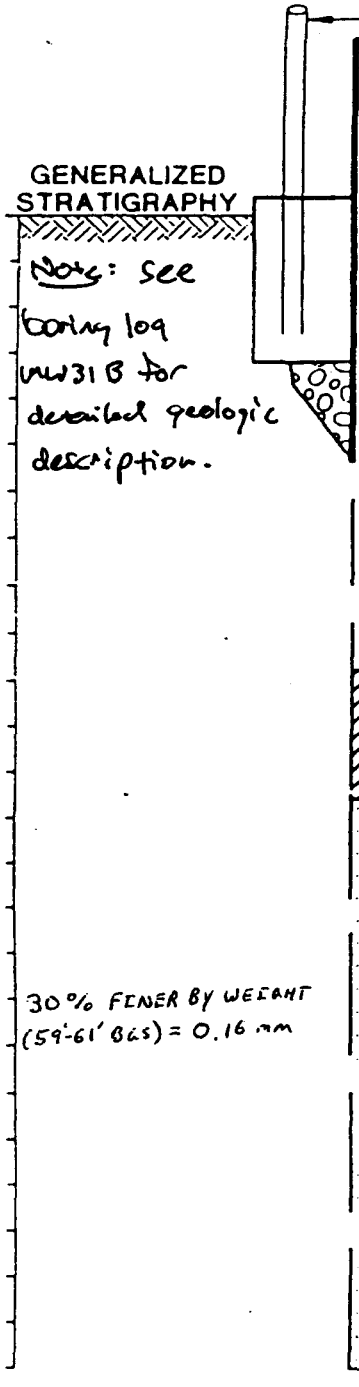


Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1167.96'
Height of riser above ground: 1.93'
Ground Elevation: 1166.03'
I.D./Type of surface casing: 4"x4"x7' galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
Type of surface seal: concrete/Granular Bentonite
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D., Schedule 40 PVC
Type of backfill: cement/bentonite grout
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 56.0'
Depth of top of screen: 59.0'
Type of filter pack: 20-40 silica sand
I.D./Type of screen: 2" I.D., Schedule 40 PVC factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen: 69.0'
Depth of bottom of plugged bank section: 70.0'
Type of backfill below monitoring well: 20-40 Silica Sand
Depth of bottom of boring: 70
Diameter of boring: 8"

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, Ne
Installed by: WCC OMAHA DRILL CREW (LINE 55)
Inspected by: R. MALLISSEE
Method of Installation: HOLLOW-STEM AUGERS, filter pack sand and Volclay grout
Remarks: placed w/ 1" tremie pipe. Used 100 gallons of water for filter pack installation and Used 250 gallons of water to drill the boring.

Monitor Well No.: MW-31B
Project No.: 92KW030
Date: 6-23-92
Time: 1522 HRS

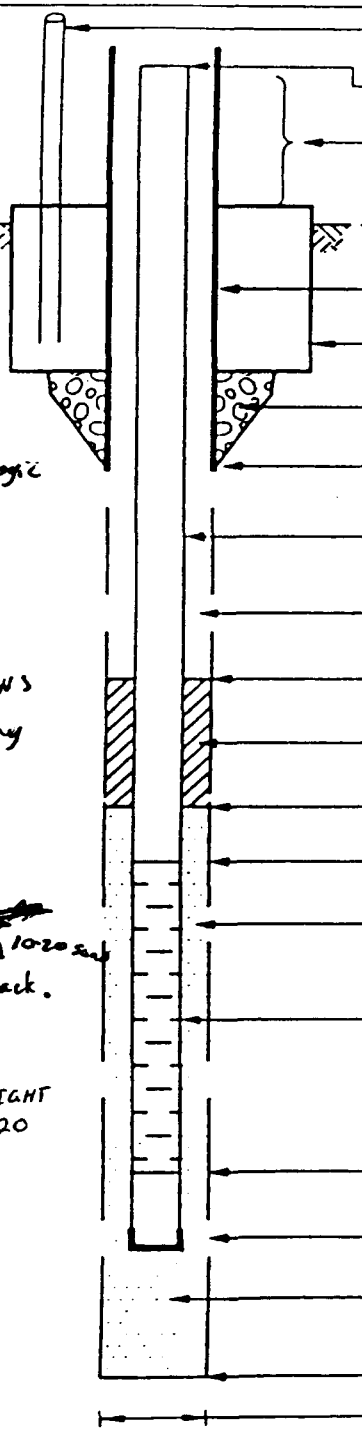


Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1166.54'
Height of riser above ground: 1.89'
Ground Elevation: 1164.65'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" V-mix Concrete
Type of surface seal: V-mix concrete / Granular Bentonite
Depth of surface seal: 5'
I.D./Type of riser pipe: 2" I.D., Schedule 40 PVC
Type of backfill: Cement/bentonite grout
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 47.0'
Depth of top of screen: 50.0'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" I.D., Schedule 40 PVC Factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 60.0'
Depth of bottom of plugged bank section: 61.0'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 62.0'
Diameter of boring: 8"

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: MEAD NEBRASKA
Installed by: Woodward Clyde Consultants
Inspected by: JON JOHNSON
Monitor Well No.: MW 32-B
Project No.: 92KW030
Date: 6/28/92
Time: 1400 hrs
Method of Installation: 20-40 sand and Pureyold Grout installed through 1" dia Tremie Pipe
Remarks: 40 gallons of water used during Installation of Filter Pack
7 3/4" Hollow-stem augers

GENERALIZED STRATIGRAPHY



Note
See Boring log MW-32 B for detailed geologic Description.

Note
Used 40 gallons of water during installation of Filter Sand.

Note
150 Lb of ~~Sand~~ 10-20 sand used in Filter pack.

30% FINER BY WEIGHT (77'-81' (BGS) = 0.20

Number / Type of Protective Post per cluster	~~8~~ 12 FBP
Elevation of top of riser pipe	~~2.0~~ 1153.70'
Height of riser above ground	1.79'
Ground Elevation	1151.91'
I.D./Type of surface casing	4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad	3'x3'x4"/u-mix Concrete
Type of surface seal	Granular Bentonite/u-mix Concrete
Depth of surface seal	5.0'
I.D./Type of riser pipe	2" dia/Sch 40 flush joint PVC
Type of backfill	CEMENT/Bentonite grout
Depth of top of seal	10'
Type of seal	"Pure Gold" grout
Depth of top of filter pack	69.0'
Depth of top of screen	71.0'
Type of filter pack	10-20 silica Sand
I.D./Type of screen	2" dia Sch 40 Flush joint PVC
Screen slot size	0.010"
Depth of bottom of screen	81.0'
Depth of bottom of plugged bank section	81.5
Type of backfill below monitoring well	10-20 Silica Sand
Depth of bottom of boring	82.0
Diameter of boring	7 3/4"

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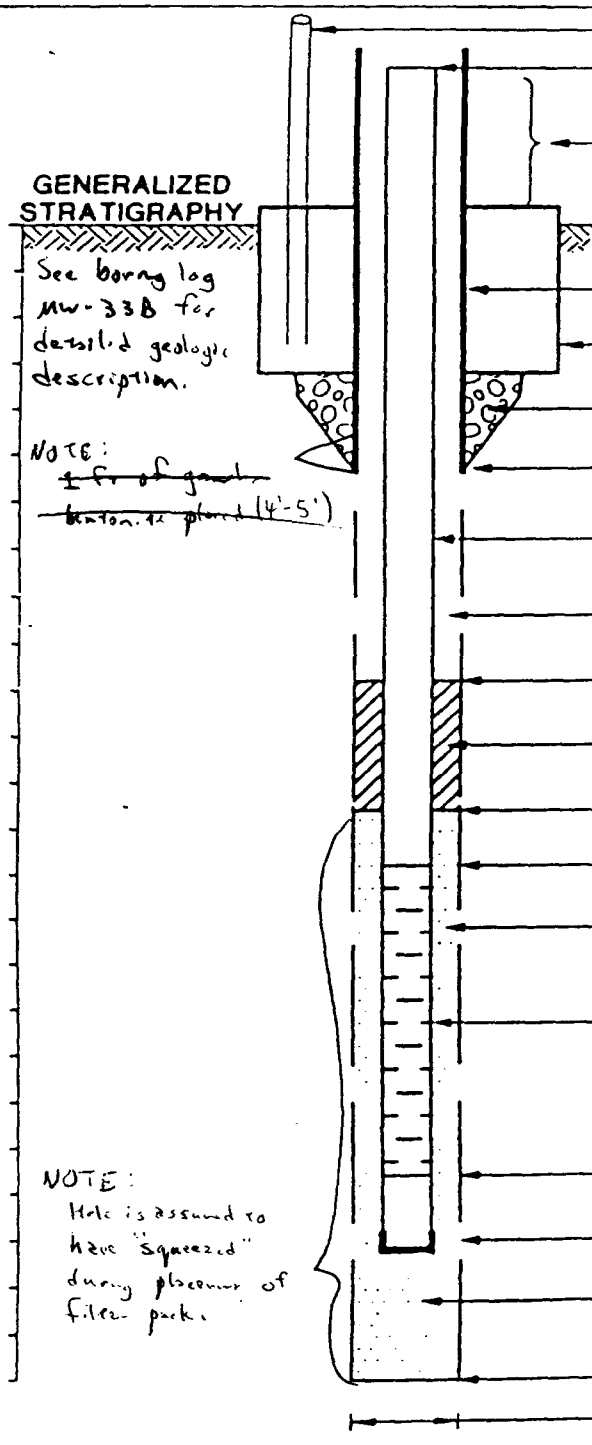
FIGURE 6-3

CEN 7/7/92

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by J. R. Eterling (WCC)
Method of Installation 7 7/8" O.D. and 4 1/4" I.D. hollow stem augers. Placed filter pack and Pure Gold grout through 1" tremie pipe. Approximately 520 gal drilling water loss (including ~160 gal bentonite drilling fluid) and 50 gal placed during filter pack.
Remarks

Monitor Well No. MW-33B
Project No. 92KW030
Date 7-8-92
Time 1510



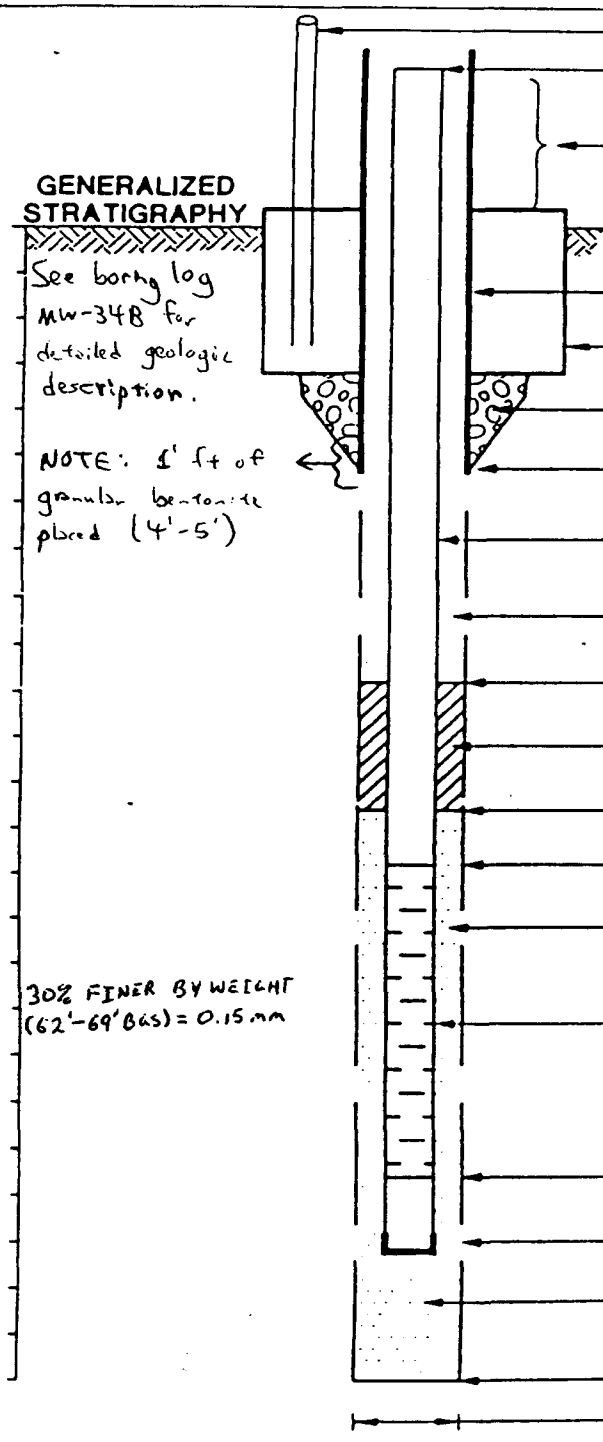
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1159.97'
Height of riser above ground: ~~2.0'~~ 1.84'
Ground Elevation: 1158.13'
I.D./Type of surface casing: 4"x4"x7' square steel
Dimen. / Type of Surface Pad: 3'x3'x4"/w-mix concrete
Type of surface seal: concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" Schedule 40 PVC flush-jointed
Type of backfill: cement/bentonite grout
Depth of top of seal: ~~10.0~~ RBP 14.0
Type of seal: tremied "Pure Gold" grout
Cal vol. (149 gal) Placed vol. (200 gal)
Depth of top of filter pack: 69.5
Depth of top of screen at joint: 73.5'
Type of filter pack: 10-20 Silica Sand
Cal vol. (481.5 lbs) Placed vol. (>00 lbs)
I.D./Type of screen: 2" Schedule 40 PVC factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen at joint: 83.5'
Depth of bottom of plugged bank section: 84.0'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 84.5'
Diameter of boring: 8"

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by J. Ritterling (WCC)
Method of Installation 7 7/8" O.D. and 4 1/4" I.D. ~~HSA~~ hollow stem augers; filter pack and volclay
Remarks grout tremied through 1" pipe. Used 40 gal of water in placement of filter pack. Used 300 lbs of 20-40 silica sand ~~as~~ filter pack.

Monitor Well No. MW-34B
Project No. 92KW030
Date 6-30-92
Time 1542

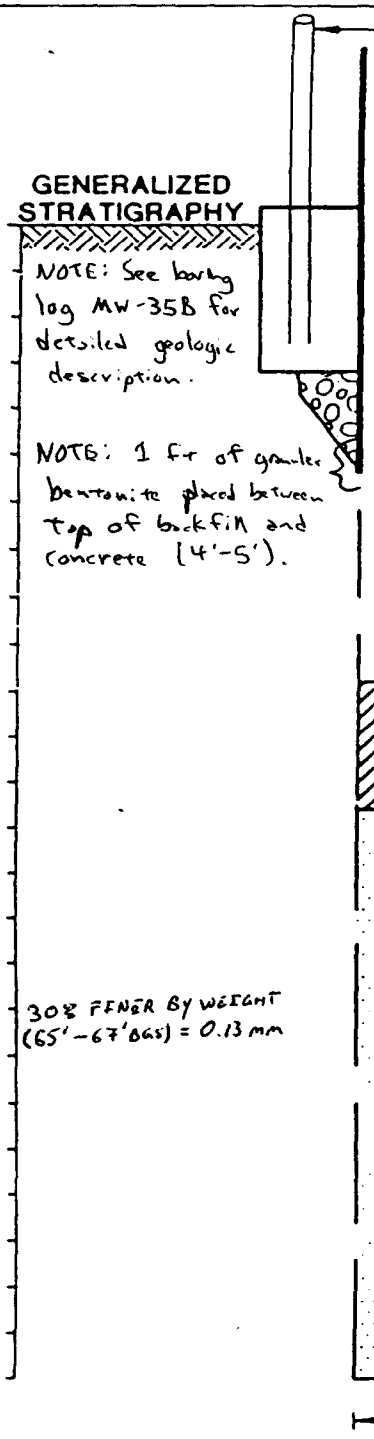


Number / Type of Protective Post	12
Elevation of top of riser pipe	1156.61
Height of riser above ground	2.0'
Ground Elevation	1154.61
I.D./Type of surface casing	4"x4"x7' square steel
Dimen. / Type of Surface Pad	3'x3'x4"/u-mix concrete
Type of surface seal	concrete
Depth of surface seal	5.0'
I.D./Type of riser pipe	2" Schedule 40 PVC flush-jointed
Type of backfill	cement/bentonite grout
Depth of top of seal	10.0'
Type of seal	Pure Gold ~~volclay~~ grout
Depth of top of filter pack	61.0'
Depth of top of screen at joint	65.0'
Type of filter pack	20-40 Silica Sand
I.D./Type of screen	2" Schedule 40 PVC factory-slotted
Screen slot size	0.010"
Depth of bottom of screen at joint	75.0'
Depth of bottom of plugged bank section	75.5'
Type of backfill below monitoring well	20-40 Silica Sand
Depth of bottom of boring	76.0'
Diameter of boring	8"

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by Jon Ritterling (WCC)
Method of Installation Hollow stem augers; filter pack and grout placed with 1" tremie pipe
Remarks Completion time is time grout placed to 10' bgs. 120 gallons used during placement of filter pack.

Monitor Well No. MW-35B
Project No. 92KW030
Date 6-25-92
Time 1725



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1139.27
Height of riser above ground: 1.89' ~~2.0'~~
Ground Elevation: 1137.38
I.D./Type of surface casing: 4"x4"x7' square steel
Dimen. / Type of Surface Pad: 3'x3'x4" / u-mix concrete
Type of surface seal: concrete
Depth of surface seal: 4'
I.D./Type of riser pipe: 2" Schedule 40 PVC, flush-joint
Type of backfill: cement / bentonite grout
Depth of top of seal: 10'
Type of seal: Pure Gold Volclay grout
Depth of top of filter pack: 53'
Depth of top of screen at joint: 57'
Type of filter pack: ~~#~~ 20-40 Silica Sand
I.D./Type of screen: 2" Schedule 40 PVC, factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen at joint: 67'
Depth of bottom of plugged bank section: 67.5'
Type of backfill below monitoring well: 20-40 Silica Sand
Depth of bottom of boring: 68'
Diameter of boring: 8"

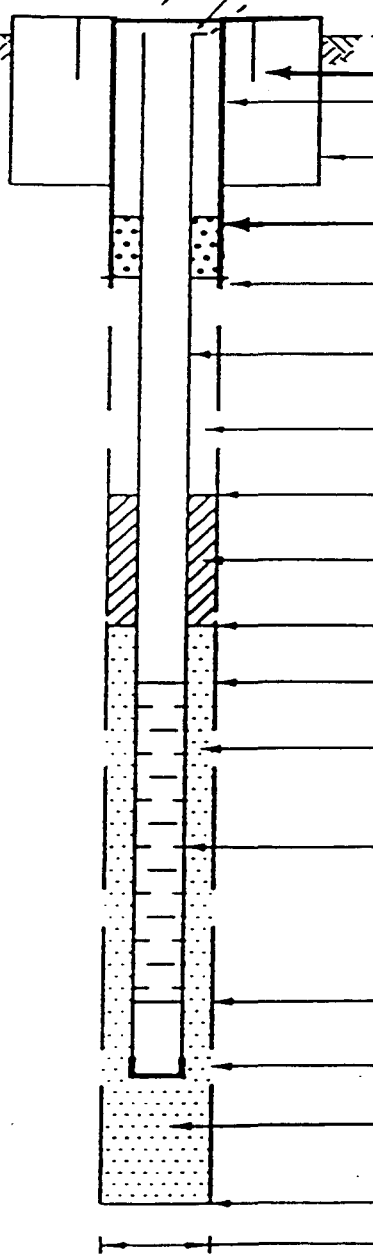
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward Clyde Consultants (Omaha)
Inspected by: Robert Mallissee WCC (Omaha)
Method of Installation: 5 7/8" tricone rollerbit - rotary/washboring. Placed filter pack and grout through 1" tremie pipe. On centralizer placed above screen at ~16' below ground.
Remarks: Estimated water loss in screen interval includes ~10 gal drilling fluid, ~30 gal water to flush fluid and 20 gal water to place filter pack. Total water loss ≈ 60 gallons.

Monitor Well No. MW-36B
Project No. 92KW030
Date 8-8-92
Time 1200

GENERALIZED STRATIGRAPHY

See boring log for mw36B for detailed geologic description.

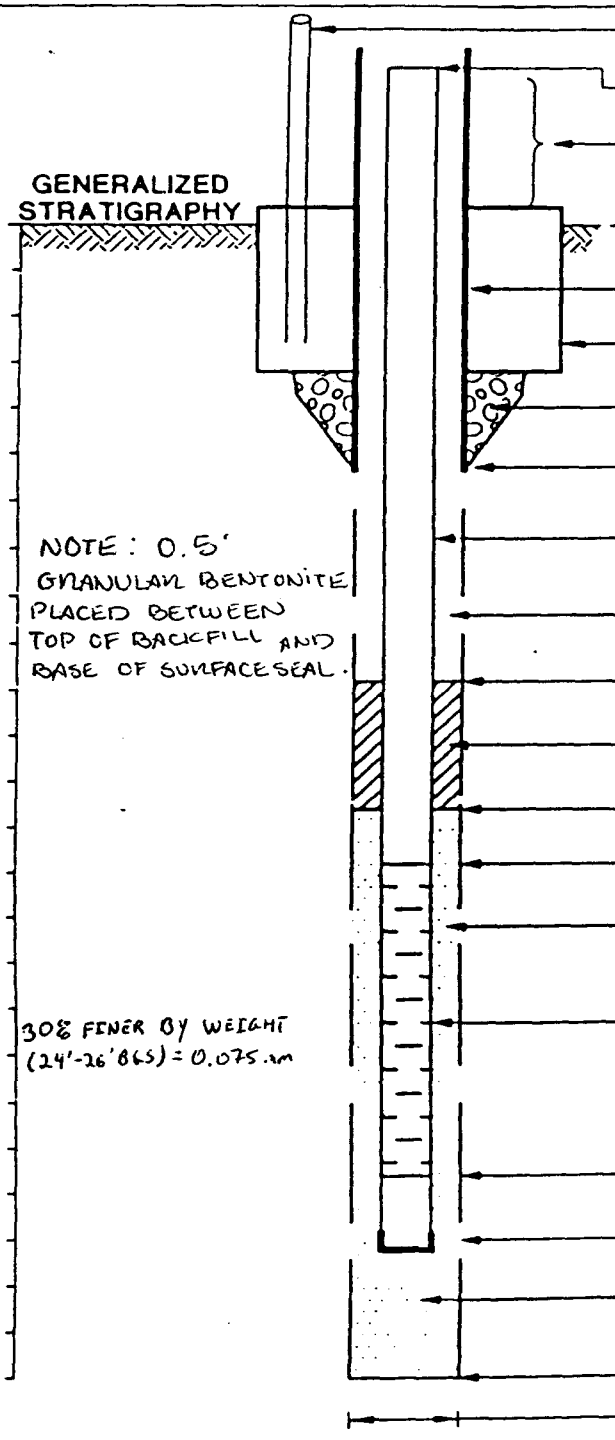


- Leak Resistant Manhole: 9 5/8"
- Elevation of top of riser pipe: 1076.27'
- Height of riser below ground: -0.15'
- Ground Elevation: 1076.42'
- 12" skirt
- I.D./Type of surface casing: 6" OD PVC
- Dimen. / Type of Surface Pad: 12"X12"X4.0'
- Type of filler: SAND 4.0'/Concrete to surface
- Depth of surface seal: 4.5'
- I.D./Type of riser pipe: 2" Sch 40 PVC flush Threaded
- Type of seal: Cement/Bentonite Grout
- Calculated volume ____ Placed volume ____
- Depth of top of seal: 6.5'
- Type of seal: Pregelled Grout
- Depth of top of filter pack: 14.0'
- Depth of top of screen: 12.0'
- Sieve Test (D_{30} = %)
- Type of filter pack: 20-40 Silica Sand
- Calculated volume 270 lbs Placed volume 270 lbs
- I.D./Type of screen: 2" ID/Sch 40 PVC mill slotted
- Screen slot size: 0.010"
- Depth of bottom of screen: 27.0'
- Depth of bottom of plugged blank section: 27.5'
- Type of backfill below monitoring well: 20-40 Silica Sand
- Depth of bottom of boring: 28.5'
- Diameter of boring: 6" (0'-6') 5 7/8" (6'-28.5')

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD N.O.P
Location: MEAD, NEBRASKA
Installed by: WINNEK COMPANY
Inspected by: LISA TRAVAGLIN (WCC)
Method of Installation: FILTER PACKED AND PURE GOLD GROUT PLACED THROUGH TREMIE. ONE CENTRALIZER @ 19'.
Remarks:

Monitor Well No. MW-37B
Project No. 92KW030
Date 6-17-92
Time 1040



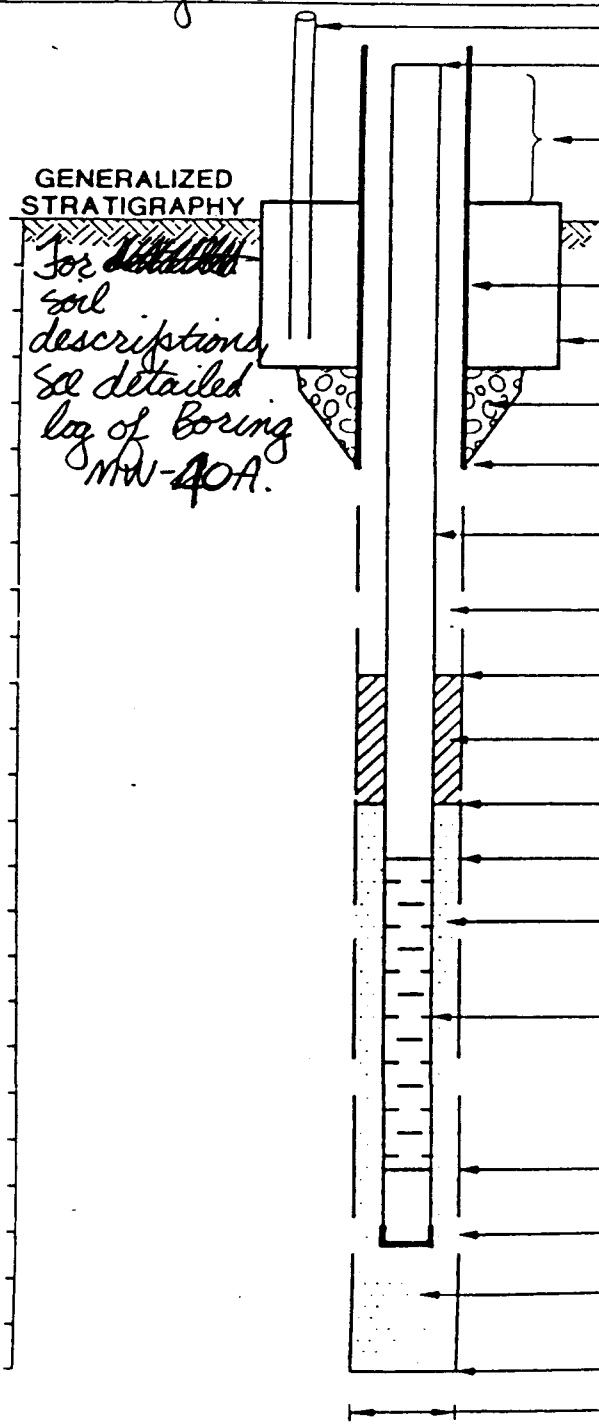
Number / Type of Protective Post per Cluster: 4
Elevation of top of riser pipe: 1089.82
Height of riser above ground: ~~2 FT~~ 2.12'
Ground Elevation: 1082.70
I.D./Type of surface casing: 4IN x 4IN x 7FT STEEL
Dimen. / Type of Surface Pad: 3FT x 3FT x 4IN / U-MIX
Type of surface seal: U-mix
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" SCH 40 PVC, FLUSH JOINT
DEPTH OF TOP OF BACKFILL: 6.0'
Type of backfill: CEM. / BENT. / PORTLAND TYPE I
Depth of top of seal: 11.0'
Type of seal: "PURE GOLD" GROUT
GROUT WT=10.0 LB/GAL.
Depth of top of filter pack: 21.7'
Depth of top of screen: 24.0'
Type of filter pack: 20-40 SILICA SAND
I.D./Type of screen: 2" SCH 40 MILL SLOTTED
Screen slot size: 0.010 IN.
Depth of bottom of screen: 29.0'
Depth of bottom of plugged bank section: 29.5'
Type of backfill below monitoring well: 20-40 SAND NATURAL MTL 30-29.5'
Depth of bottom of boring: 30.0'
Diameter of boring: 7 7/8 IN

FIGURE 6-3 cont 7/7/9-

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Woodward-Clyde Consultants
Inspected by: J. Nealon
Method of Installation: RWB. Tremied Pure Gold grout and 20/40 silica sand.
Remarks: Centralizer at 53'. Drilling fluid losses: 0-54', 140 gallons; 54'-65.5', 70 gallons; flushing, 20 gallons; filter pack placement, 10 gallons.

Monitor Well No.: MW-40B
Project No.: 92KW030
Date: 7-30-92
Time: 1405



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1171.92
Height of riser above ground: 1.96'
Ground Elevation: 1169.96
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" U-mix concrete
Type of surface seal: Granular Bentonite/U-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2 inch/Sch. 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: 10'
Type of seal: Pure Gold grout at 10.1 lb/gal. (50 gal est, 50 gal used)
Depth of top of filter pack: 51.0'
Depth of top of screen: 54.0'
Type of filter pack: 20/40 silica sand (230 lb est. 230 lb used)
Sieve test D_{30} = 0.14
I.D./Type of screen: 2 inch / Schedule 40 PVC factory slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 64.0'
Depth of bottom of plugged bank section: 64.5'
Type of backfill below monitoring well: 20/40 sand 64.5-65.2; natural sand slough 65.2-65.5
Depth of bottom of boring: 65.5'
Diameter of boring: ~~6 inch~~ 5 7/8 inch

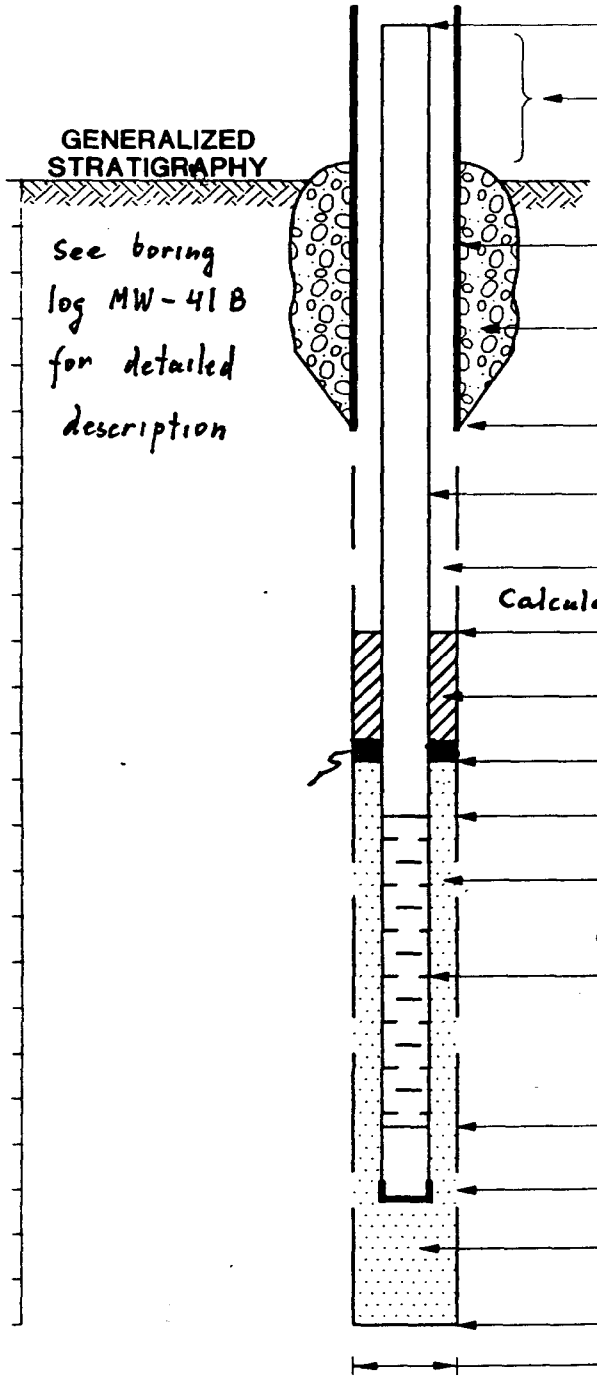
GROUND WATER OBSERVATION WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)

Piez./Well No. MW - 41 B
Project No. 92 KW 030
Date 8 - 9 - 92
Time 9:50

Method of Installation: Filter pack and "Pure Gold" grout placed through 1-inch-dia PVC tremie-pipe. Deflector used for grout placement

~~Remarks~~: One centralizer positioned @ the depth of 35 ft.



protective posts per cluster: 12

Elevation of top of riser pipe: 1168.26

Height of riser above ground: 2.41'

Ground Elevation: 1165.85

I.D./Type of surface casing: 4"x4"x7' Galvanized steel

Type of surface seal: ~~Granular Bentonite~~/ V-mix Concrete.

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia PVC, Sched. 40 threaded, flush-coupled

Type of backfill: Cement/Bentonite
Calculated vol. 31 gal Placed vol. 40 gals

Depth of top of seal: 10.0'

Type of seal: "Pure Gold" grout
~~Dep~~ 10.3 lbs/gal

Depth of top of filter pack: 33.0'

Depth of top of screen: 36.0'

Type of filter pack: 20-40 Silica Sand
Calculated vol. 17 gals Placed vol. 21 gals

I.D./Type of screen: 2-inch-dia PVC Sched. 40 mill-slotted, threaded, flush-coupled

Screen slot size: 0.01 inch

Depth of bottom of screen: 46.0'

Depth of bottom of plugged bank section: 46.5'

Type of backfill below observation well: Native material, 20-40 Silica Sand

Depth of bottom of boring: 47.0'

Diameter of boring: ~~6.0 inch~~ 5 7/8-inch

Woodward-Clyde Consultants

Fig. ~~19~~

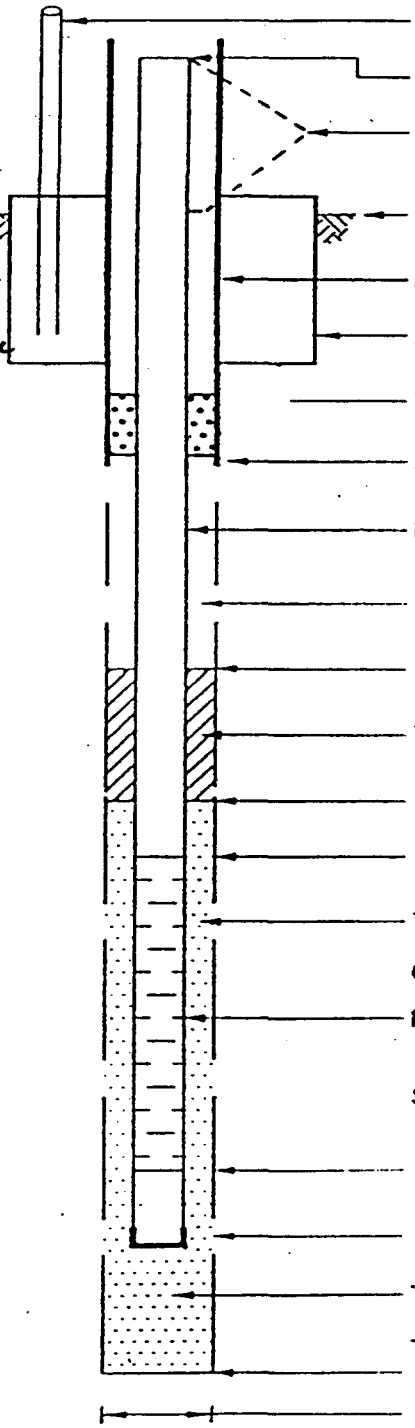
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants (Omaha)
Inspected by: Robert Mullisee WCC (Omaha)
Monitor Well No.: MW-42B
Project No.: 92KW030
Date: 8-6-92
Time: 1517

Method of Installation: 5 7/8" Tricone roller bit - rotary/wash boring. Placed filter sand and Valclay grout through 1" Tremie pipe. One centralizer placed above screen at ~
Remarks: Estimated water loss is screen interval includes: 20 gal. drilling fluid, 50 gal. water to flush drilling fluid, and 20 gal. of water used to place filterpack. Total water loss =

GENERALIZED STRATIGRAPHY

See boring log MW-42B for detailed geologic description.



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1146.25
Height of riser above ground: 2.13'
Ground Elevation: 1144.12
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix Concrete
Type of filler: Granular bentonite/u-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 53 gal. Placed volume: 60 gal.
Depth of top of seal: 9.0'
Type of seal: "Pure Gold" Valclay grout
Depth of top of filter pack: 50.0'
Depth of top of screen: 53.0'
Sieve Test (D_{20} = %)
Type of filter pack: 20-40 Silica Sand
Calculated volume: 240 lbs. Placed volume: 250 lbs.
I.D./Type of screen: 2" I.D. Schedule 40 PVC factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen: 63.0'
Depth of bottom of plugged blank section: 63.5'
Type of backfill below monitoring well: 20-40 Silica Sand.
Depth of bottom of boring: 64.5'
Diameter of boring: 6"

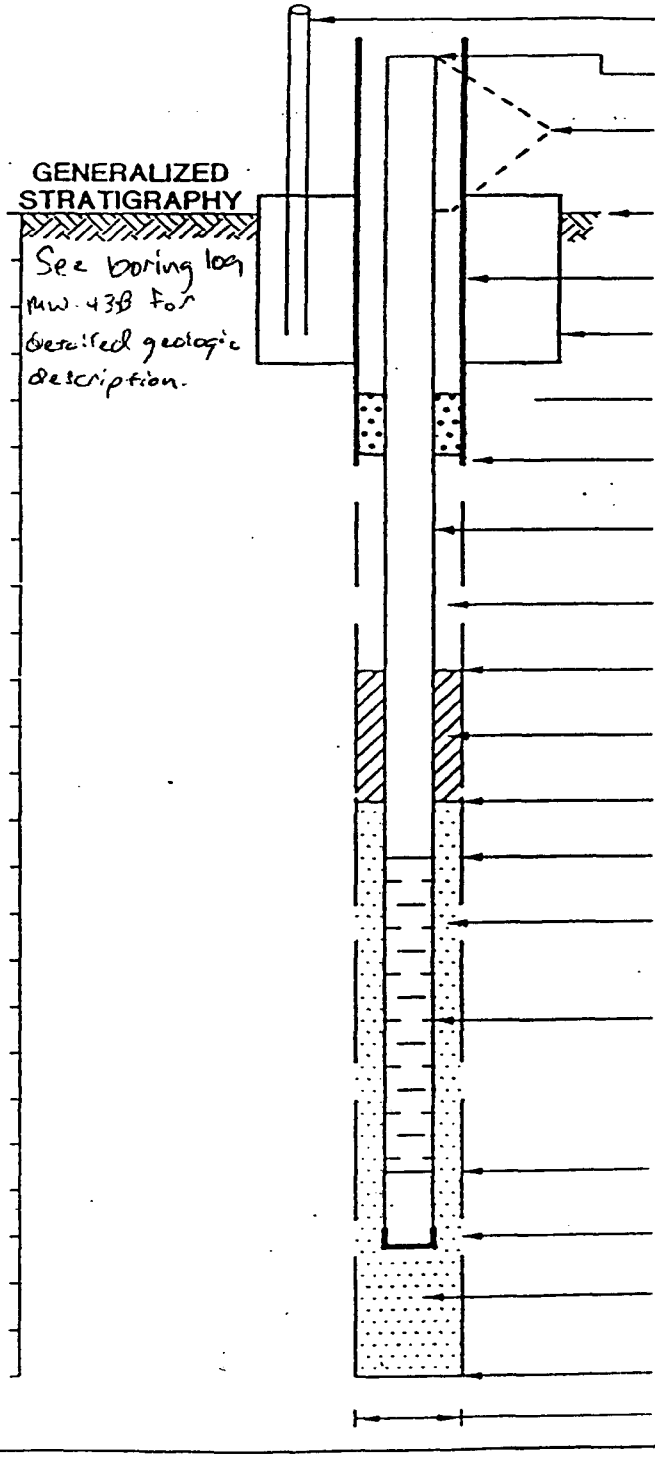
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants (Omaha)
Inspected by: Robert Mallisee WCC (Omaha)

Monitor Well No.: MW-43B
Project No.: 92KW030
Date: 8-5-92
Time: 1052

Method of Installation: 5 7/8" Tricone roller bit - rotary/wash boring. Placed filter pack and Volclay grout through 1" Tremie pipe. One centralizer placed above screen at ~38' bgs.

Remarks: Estimated water loss in screen interval includes: 20 gal. drilling fluid, 40 gal. water used to flush drilling fluid, and 10 gal. water to place filter pack. Total water loss = 70 gal.



Number / Type of Protective Post per Cluster: 6
Elevation of top of riser pipe: 1142.35
Height of riser above ground: 1.84'
Ground Elevation: 1140.51
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/v-mix concrete
Type of filler: Granular bentonite/v-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D./Schedule 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 36 gal. Placed volume: 40 gal.
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 37.0'
Depth of top of screen: 40.0'
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 240 lbs. Placed volume: 260 lbs.
I.D./Type of screen: 2" I.D./Schedule 40 PVC factory-slotted
Screen slot size: 0.010"
Depth of bottom of screen: 50.0'
Depth of bottom of plugged blank section: 50.5'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 52.0'
Diameter of boring: 6"

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: WCC - ~~Omaha~~
Inspected by: Robert Mallisee ~~[illegible]~~

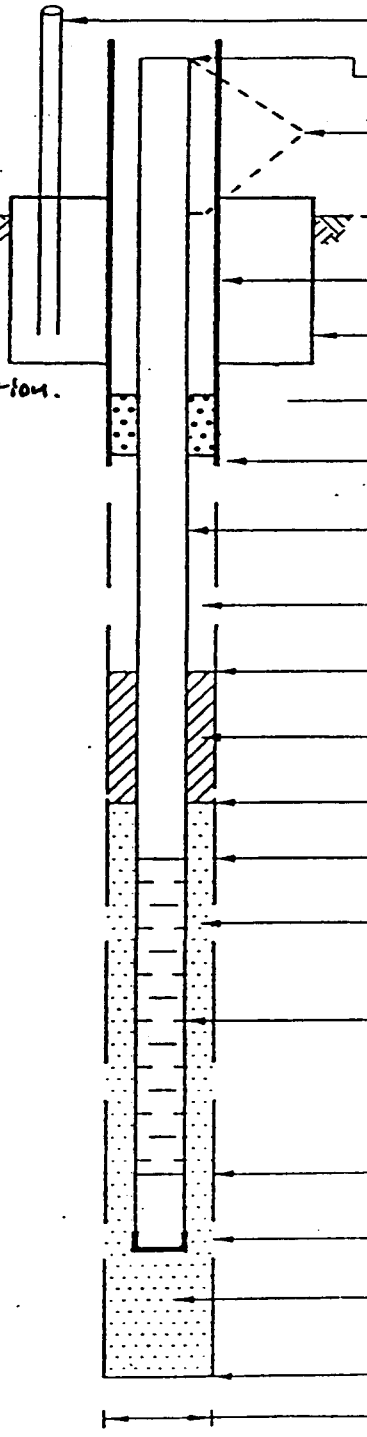
Monitor Well No. MW-44B
Project No. 92KW030
Date 7-30-92
Time 1020

Method of Installation: 6" drag bit - rotary/wash boring. Placed filter pack and Volclay grout through 1" tremie pipe. One centralizer placed above screen ~15 FT.

Remarks: Estimated water loss in screen interval includes: 20 gal. drilling fluid, 60 gal. water to flush drilling fluid, and 40 gal. water to place filter pack. Total water loss = 120 gal.

GENERALIZED STRATIGRAPHY

See boring log MW-44B for detailed geologic description.



Number / Type of Protective Post per cluster: 12

Elevation of top of riser pipe: 1092.08

Height of riser above ground: 1.84'

Ground Elevation: 1090.24

I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel

Dimen. / Type of Surface Pad: 3'x3'x4" / v-mix Concrete

Type of filler: Granular bentonite / v-mix Concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2" Schedule 40 PVC

Type of seal: Cement / Bentonite

Calculated volume: 4 gal. Placed volume: 5 gal.

Depth of top of seal: 10.0'

Type of seal: "Pure Gold" ~~Volclay~~ grout

Depth of top of filter pack: 13.0'

Depth of top of screen: 16.0'

Sieve Test (D_{30} = <0.075 mm)

Type of filter pack: 20-40 Silica Sand

Calculated volume: 28 lbs. Placed volume: 30 lbs.

I.D./Type of screen: 2" Schedule 40 PVC factory-slotted

Screen slot size: 0.010"

Depth of bottom of screen: 26.0'

Depth of bottom of plugged blank section: 26.5'

Type of backfill below monitoring well: 20-40 Silica Sand

Depth of bottom of boring: 30.0'

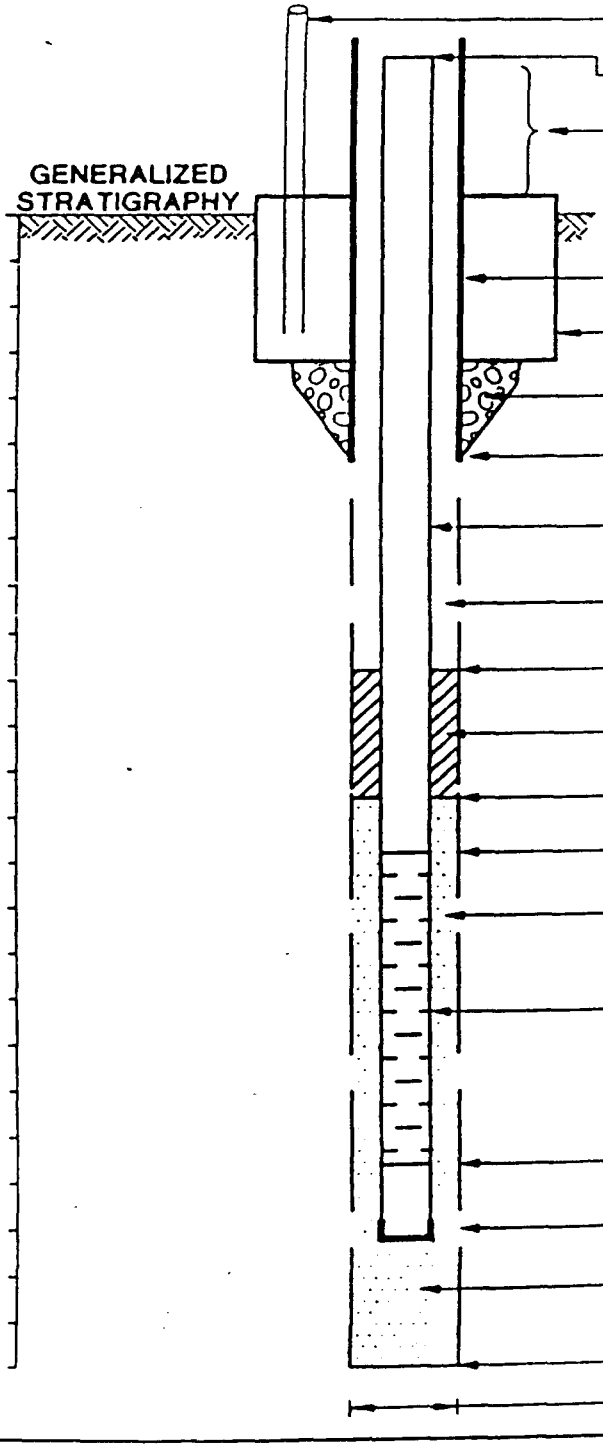
Diameter of boring: ~~4 5/8"~~ 6 inch.

FIGURE 6-3 CAH 7/29/92

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: SW SW SW Sec 26 T14N R9E
Installed by: The Winnek Companies
Inspected by: R.G. Pacheco
Method of Installation: Filter pack and Puregold grout trimmed in.
Remarks: 1 Stainless Steel Centralizer @ 14' bgs.

Monitor Well No. MW-45B
Project No. 92KW030
Date 07/23/92
Time 14:18



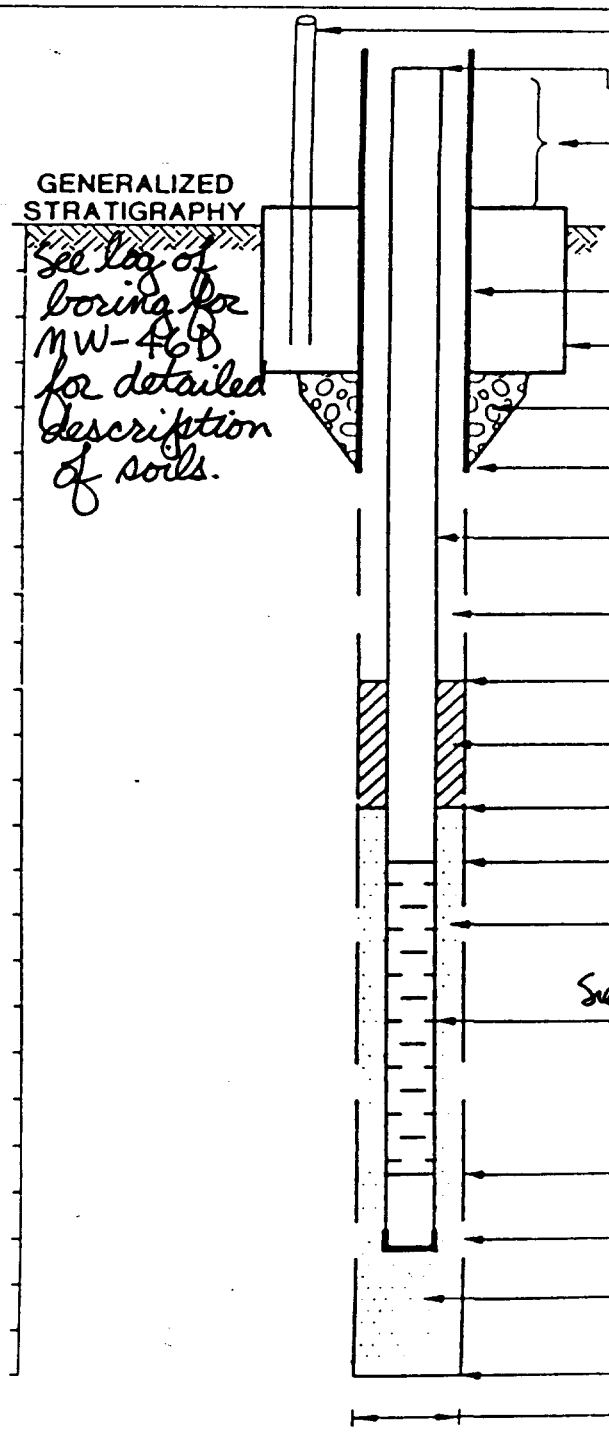
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1081.16 ~~3 ft~~.
Height of riser above ground: 2.00'
Ground Elevation: 1079.16
I.D./Type of surface casing: ~~2-inch/Sch 40 PVC~~ 2 RBP / Sch 4" x 4" x 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3' x 3' x 4" / U-mix Concrete
Type of surface seal: Granular Bentonite / Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch / Sch. 40 PVC
Type of backfill: Cement / Bentonite Grout
Depth of top of seal: ~10
Type of seal: Puregold grout (10.1 #/gal)
Depth of top of filter pack: 15.0
Depth of top of screen: 17.0
Type of filter pack: 20/40 Silica Sand (4.0 Bags used, 2.6 Bags estimated)
I.D./Type of screen: 2-inch / Sch. 40 PVC
Screen slot size: 0.01 inch
Depth of bottom of screen: 27.0
Depth of bottom of plugged bank section: 27.5
Type of backfill below monitoring well: 20/40 Silica Sand
Depth of bottom of boring: 28.5
Diameter of boring: 5 7/8" – 6.0'

FIGURE 6-3 CM 7/24/92

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants
Inspected by: J. Mealon
Method of Installation: RWB. Tremied 20/40 sand and Pure Gold grout. Centralizer at 20'
Remarks: Water losses: 0-19', 9 gal; 19-34', 25 gal; flushing, 50 gal; 25 gals, placing filter pack

Monitor Well No.: MW-46B
Project No.: 92KW030
Date: 7-24-92
Time: 1130 hrs.



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1082.43
Height of riser above ground: 2.04'
Ground Elevation: 1080.39
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
Type of surface seal: Granular Bentonite/u-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2in/Schedule 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: ~~10~~ 14.0' RAP
Type of seal: Pure Gold grout @ 10.4 lb/gal. (10 gal est; 10 gal used)
Depth of top of filter pack: 18.0'
Depth of top of screen: 21.0'
Type of filter pack: 20/40 silica sand. (2-100# bags est; 3.2-100# bags used)
Sieve est D_{30} = 0.22
I.D./Type of screen: 2 inch/Schedule 40 PVC factory-slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 31.0'
Depth of bottom of plugged bank section: 31.5'
Type of backfill below monitoring well: 20/40 sand 31.5-32.5; natural sand slough 32.5-34
Depth of bottom of boring: 34.0
Diameter of boring: 6" (0-34.6') 5 7/8" (6 - 34.0')

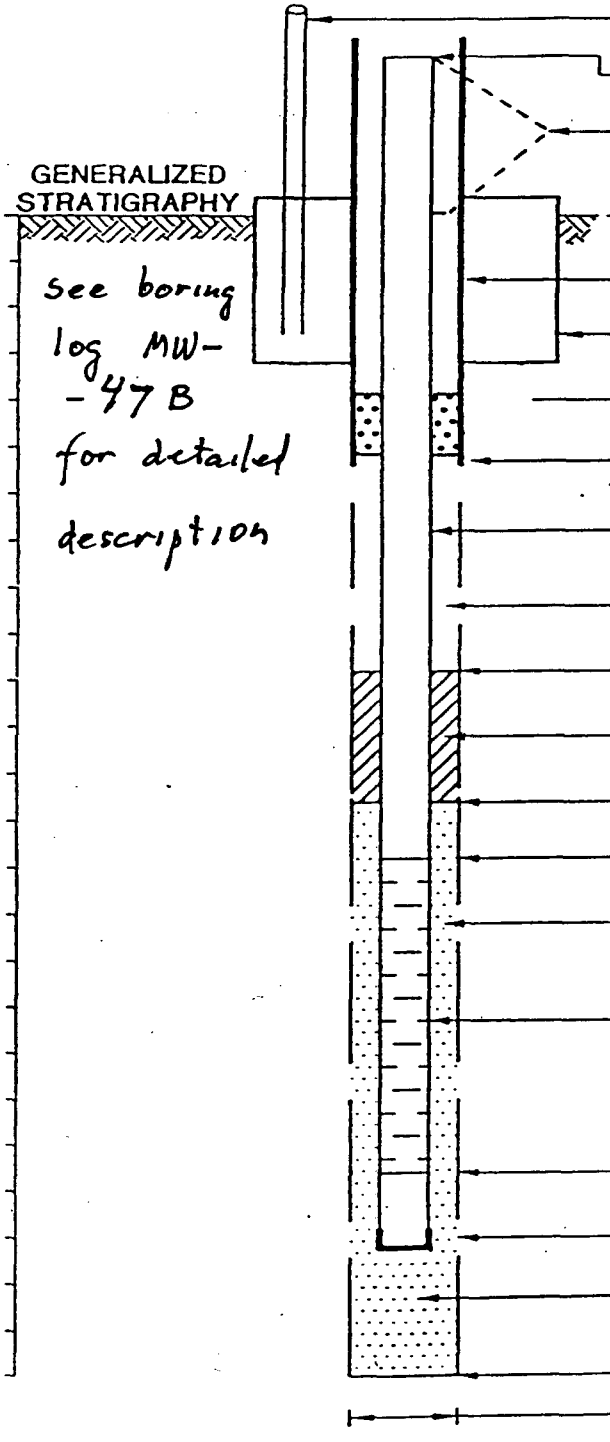
Woodward-Clyde Consultants

B07NE003702-05834

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: THE WINNER COMPANIES (Bill Vick)
Inspected by: WOODWARD CLYDE (THERESA Hecht)
Method of Installation: Direct Rotary
Remarks: Filter pack & Grout placed by tremie pipe, grout w/ side deflector, 1 centralizer placed 4' above Top of screen

Monitor Well No. MW-47B
Project No. 92KW030
Date 8/10/92
Time 1500



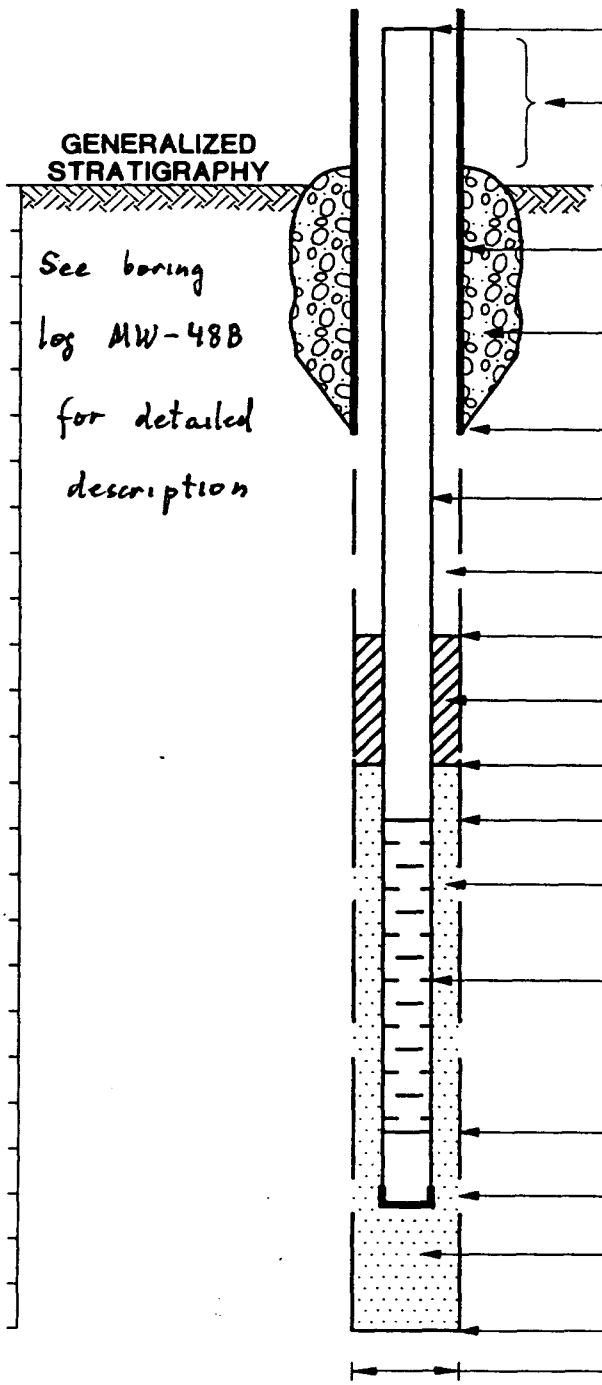
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1201.21'
Height of riser above ground: 1.90
Ground Elevation: 1199.31
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix Concrete
Type of filler: Granular bentonite
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" threaded, flush coupled sch 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 10.8 ft³ Placed volume: 9.0 ft³
Depth of top of seal: ~~2'~~ RBP 6.5'
Type of seal: Pure gold bentonite grout
Depth of top of filter pack: 71.9'
Depth of top of screen: 74.8'
Sieve Test (D_{30} = NA %)
Type of filter pack: 20-40 Silica Sand
Calculated volume: 2.3 ft³ Placed volume: 2.0 ft³
I.D./Type of screen: 2" threaded, flush coupled PVC sch 40
Screen slot size: 0.010"
Depth of bottom of screen: 84.0'
Depth of bottom of plugged blank section: 85.3'
Type of backfill below monitoring well: 20-40 Sand
Depth of bottom of boring: 86.6'
Diameter of boring: ~~6"~~ 5 7/8"

CEH 8/11/92

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)
Method of Installation:
~~Remarks~~ Filter pack, "Pure Gold" grout placed through 0.9-inch-ID PVC tremie-pipe. Deflector used for grout placement. One centralizer positioned @ ~ 72 ft depth

Monitor Well No. MW-48 B
Project No. 92 KW 030
Date 8-11-92
Time 10:50



Protective posts per cluster: 8

Elevation of top of riser pipe: 1192.90

Height of riser above ground: 2.00'

Ground Elevation: 1190.90

I.D./Type of surface casing: 4"x4"x7' Galvanized steel

Type of surface seal: Granular Bentonite/ V-mix concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia Sch. 40 threaded, flush-coupled, PVC

Type of backfill: Cement/Bentonite

Depth of top of seal: ~~~ 10 ft~~ RBP 14.0'

Type of seal: "Pure Gold" grout (10.3 lbs/gal)
Calculated volume 77.4 Placed volume 60.0 gals

Depth of top of filter pack: 70.5'

Depth of top of screen: 73.0'

Type of filter pack: 20-40 Silica Sand
Calculated volume ~~77.4~~ 17 gals Placed Volume ~~60.0~~ 18 gals

I.D./Type of screen: 2-inch-dia Sch. 40 mill-slotted, threaded, flush-coupled

Screen slot size: 0.01 inch

Depth of bottom of screen: 83.0'

Depth of bottom of plugged blank section: 83.5'

Type of backfill below monitoring well: Native materials, 20-40 Sand

Depth of bottom of boring: 83.5'

Diameter of boring: ~~6.0~~ inch 5 7/8"

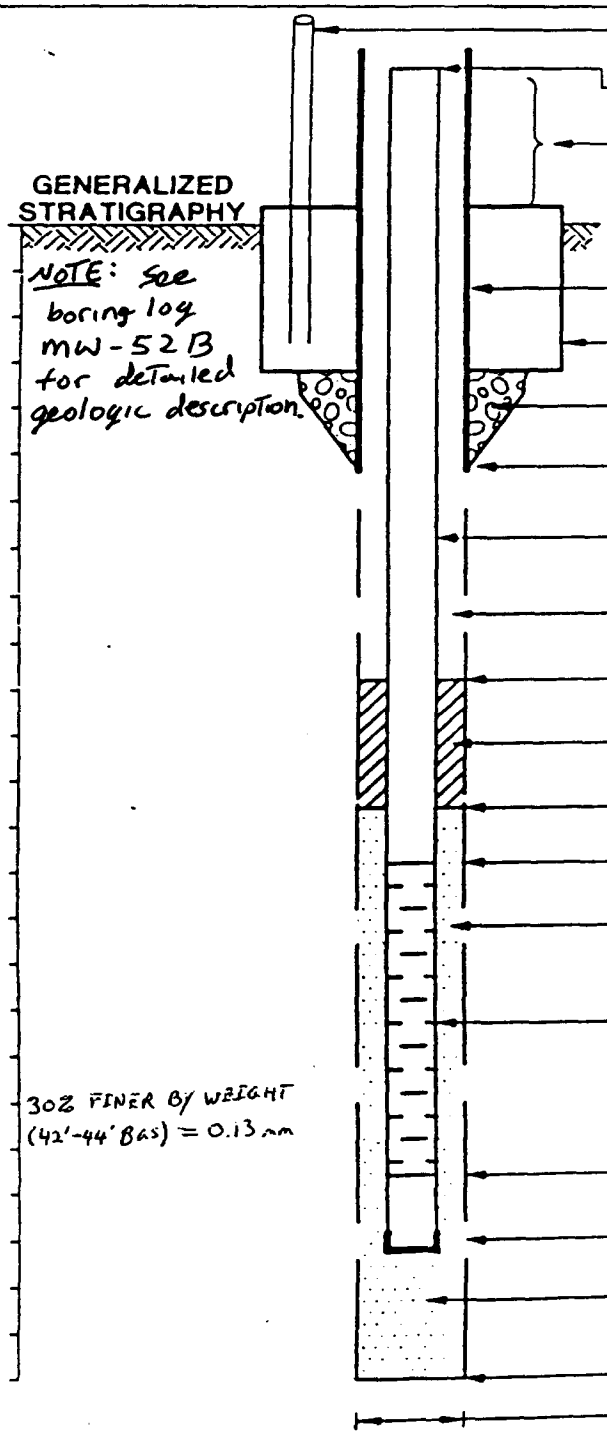
Woodward-Clyde Consultants

B07NE003702-05836

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew (CME 55)
Inspected by: R. Mallisee
Method of Installation: Hollow-stem Augers. Filter pack sand and Volclay grout placed with 1" Tremie pipe. Used 60 gal. of water during drilling of boring and used 100 gallons of water for filter pack installation.
Remarks:

Monitor Well No. MW-52B
Project No. 92KW030
Date 6-29-92
Time 1255



Number / Type of Protective Post per cluster: RBP ~~6~~ 4
Elevation of top of riser pipe: 1155.24
Height of riser above ground: 1.74'
Ground Elevation: 1153.50
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" U-mix Concrete
Type of surface seal: Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D., schedule 40 PVC
Type of backfill: Cement/bentonite grout
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 39.0'
Depth of top of screen: 42.0'
Type of filter pack: 20-40 Silica Sand
I.D./Type of screen: 2" I.D., schedule 40 PVC factory-slotted
Screen slot size: .010"
Depth of bottom of screen: 52.0'
Depth of bottom of plugged bank section: 53.0'
Type of backfill below monitoring well: 20-40 Silica Sand
Depth of bottom of boring: 54.0'
Diameter of boring: 8"

Woodward-Clyde Consultants

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC-Omaha
Inspected by J. Ritterling (WCC)

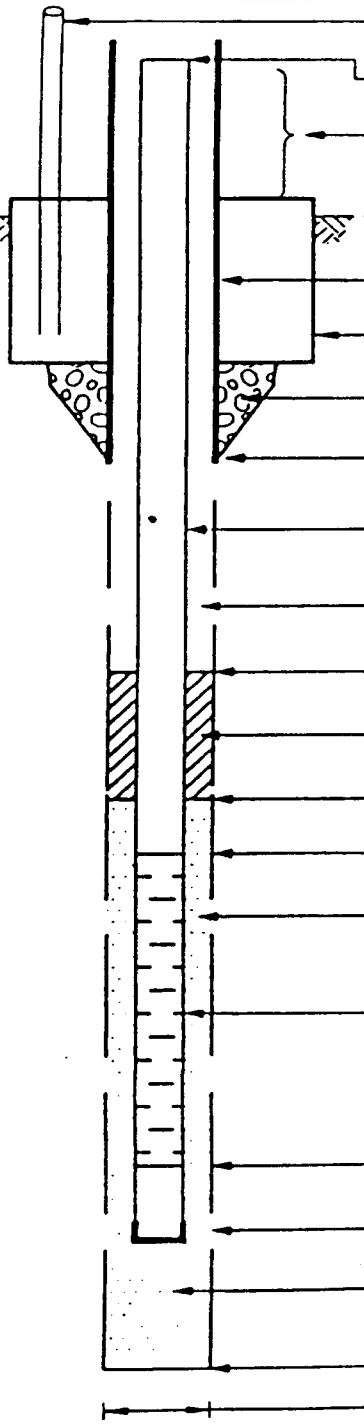
Monitor Well No. MW-53B
Project No. 92KW030
Date 7-16-92
Time 1610

Method of Installation 5 7/8" tricone roller bit - rotary wash bore. Placed filter pack and grout through 1" tremie pipe. One centralizer placed above screen at ~26' below ground.

Remarks Estimated water loss in screen interval includes: 20 gal drilling fluid, 130 gal water to flush fluid, and 40 gal water to place filter pack. Total = 190 gal.

GENERALIZED STRATIGRAPHY

See boring log MW-53B for detailed geologic description.



- Number / Type of Protective Post per cluster: 8
- Elevation of top of riser pipe: 1136.51'
- Height of riser above ground: 2.02'
- Ground Elevation: 1134.49'
- I.D./Type of surface casing: 4"x4"x7' Galvanized steel
- Dimen. / Type of Surface Pad: 3'x3'x4"
- Type of surface seal: Granular Bentonite/U-mix Concrete
- Depth of surface seal: 5.0'
- I.D./Type of riser pipe: 2" Schedule 40 PVC flush-jointed
- Type of backfill: Cement/Bentonite
- Depth of top of seal: 10.0'
- Type of seal: Tremied "Pure Gold" grout
- Depth of top of filter pack: 24.5'
- Depth of top of screen: 27.5'
- Type of filter pack: 20-40 Silica Sand (sl. Vol. (240 lb) Placed Vol. (300 lb).
- I.D./Type of screen: 2" Schedule 40 PVC factory-slotted
- Screen slot size: 0.010"
- Depth of bottom of screen: 37.5'
- Depth of bottom of plugged bank section: 38.0'
- Type of backfill below monitoring well: 20-40 Silica Sand
- Depth of bottom of boring: 39.0'
- Diameter of boring: 6"

FIGURE 6-3

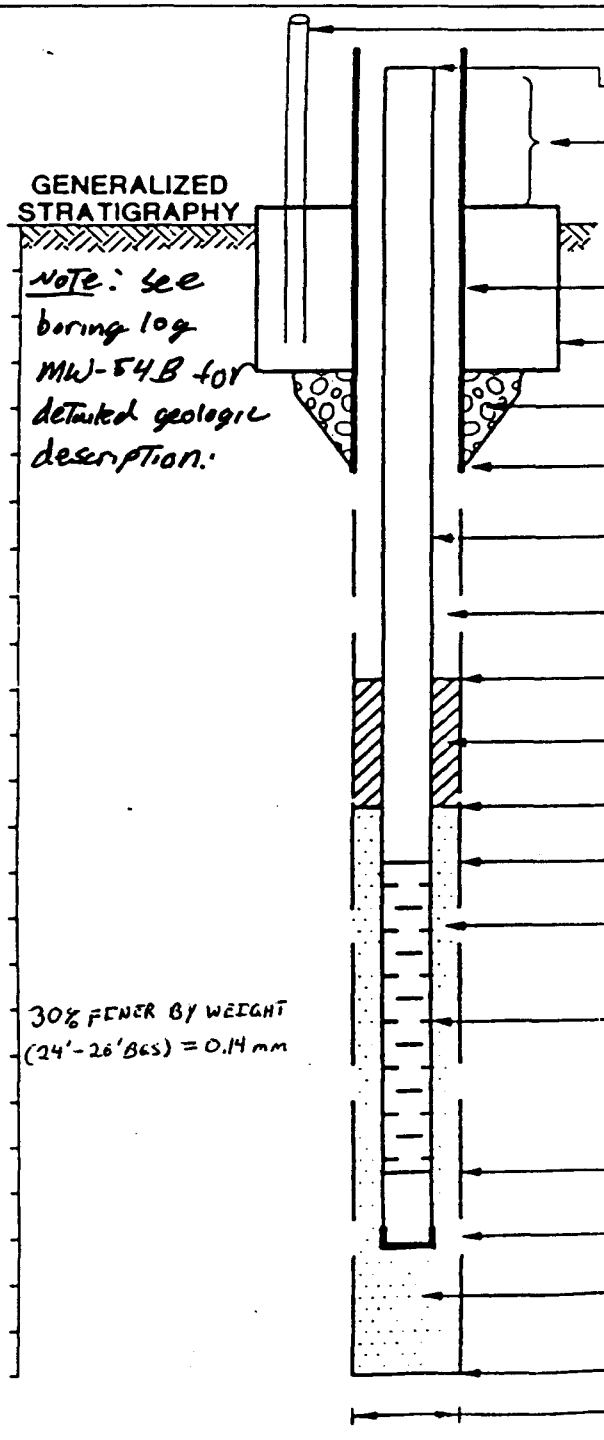
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, NE
Installed by: WCC Omaha Drill Crew CME 55
Inspected by: R. Mullisee

Monitor Well No. MW-54B
Project No. 92KW030
Date 6-29-92
Time 1125

Method of Installation: Hollow-stem Augers Filter pack sand and Volclay grout

Remarks: placed with 1" tremie pipe. Used 75 gallons of water for filter pack installation and used 100 gallons of water during drilling.



Number / Type of Protective Post per Cluster: 6

Elevation of top of riser pipe: 1121.18'

Height of riser above ground: 1.87'

Ground Elevation: 1119.31'

I.D./Type of surface casing: 4"x4"x7' Galvanized Steel

Dimen. / Type of Surface Pad: 3'x3'x4" / u-mix Concrete

Type of surface seal: Concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC

Type of backfill: Cement/Bentonite grout

Depth of top of seal: 10'

Type of seal: "Pure Gold" ~~[illegible]~~ grout

Depth of top of filter pack: 21

Depth of top of screen: 24'

Type of filter pack: 20-40 Silica Sand

I.D./Type of screen: 2" I.D., ~~Schedule~~ factory-slotted

Screen slot size: 0.010"

Depth of bottom of screen: 29'

Depth of bottom of plugged bank section: 30'

Type of backfill below monitoring well: 20-40 Silica Sand

Depth of bottom of boring: 31'

Diameter of boring: ~~8"~~ 7 7/8"

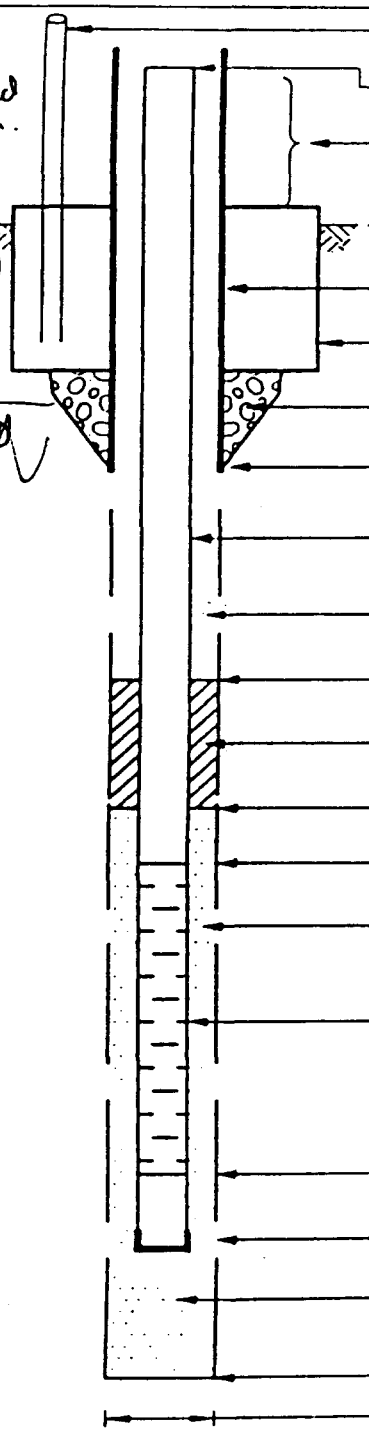
GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants
Inspected by: J. Mealon
Method of Installation: tremied filter pack and volclay grout
Remarks: one centralizer at 55'. Lost 10 gal in screened interval, 100 gal during flushing, and 25 gal placing filter pack

Monitor Well No.: MW-55B
Project No.: 92KW030
Date: 7-21-92
Time: 1625

See boring log MW-55B for detailed geologic description.

GENERALIZED STRATIGRAPHY
LEAN CLAY (CL)
POORLY GRADED SAND (SP)



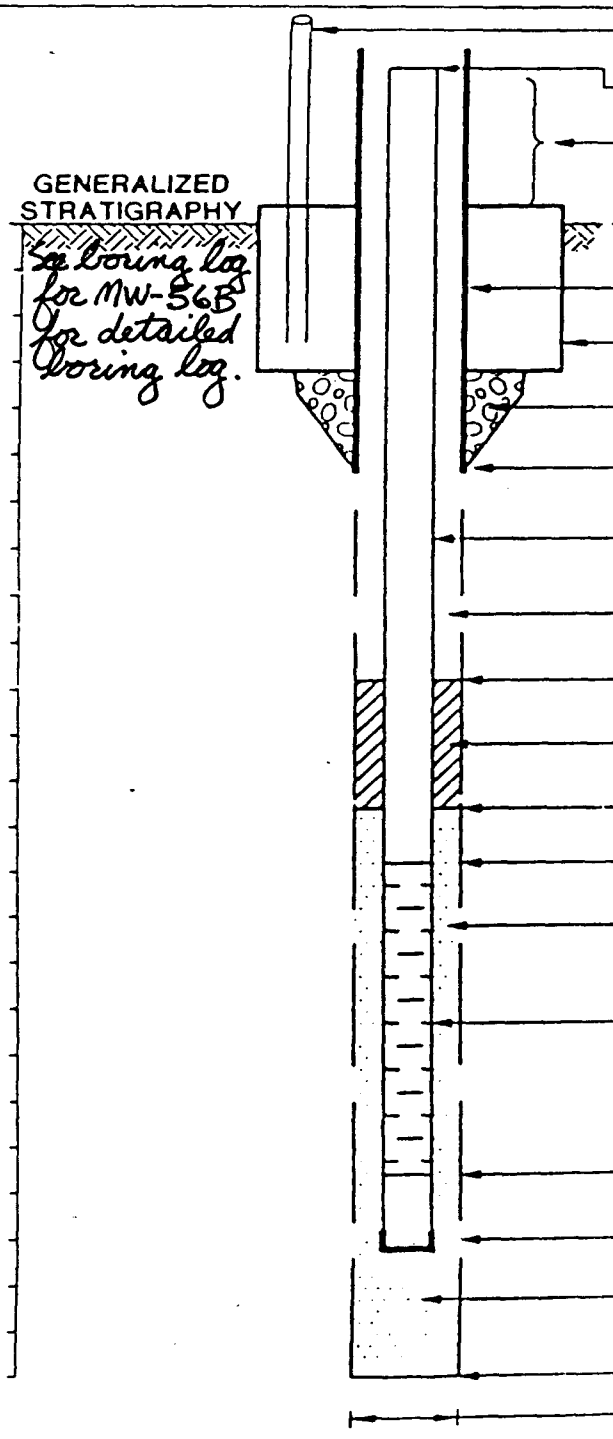
Number / Type of Protective Post per Cluster: 8
Elevation of top of riser pipe: 1126.87'
Height of riser above ground: 2.19'
Ground Elevation: 1124.68'
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" / v-mix concrete
Type of surface seal: Granular Bentonite / v-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2 inch / Sch 40 PVC
Type of backfill: Cement / Bentonite
Depth of top of seal: 10'
Type of seal: Volclay grout (80 gal used, 61 gal est.) @ 10.5 lb/gal
Depth of top of filter pack: 52.5'
Depth of top of screen: 56.0'
Type of filter pack: 10/20 sand (2.5 - 100# bags est. / 2.5 - 100# bags used)
Sieve test D_{30} = 0.16'
I.D./Type of screen: 2 in / Sch 40 PVC Factory-Slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 66.0'
Depth of bottom of plugged bank section: 66.5'
Type of backfill below monitoring well: 10/20 sand 66.5-67.0, Slough 67.0-68.0
Depth of bottom of boring: 68.0'
Diameter of boring: 6" 0-6' / 5 1/8" 6-68'

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Woodward-Clyde Consultants
Inspected by: J. Nealon
Monitor Well No.: MW-56B
Project No.: 92KW030
Date: 7-22-92
Time: 1410

Method of Installation: Rotary wash boring. Tremied filter pack and Pure Gold grout.
Remarks: 1 centralizer at 20 feet. Water losses: 0-19, 7 gal; 19-32, 13 gal; flushing, 60 gal; filter pack placement, 50 gal.



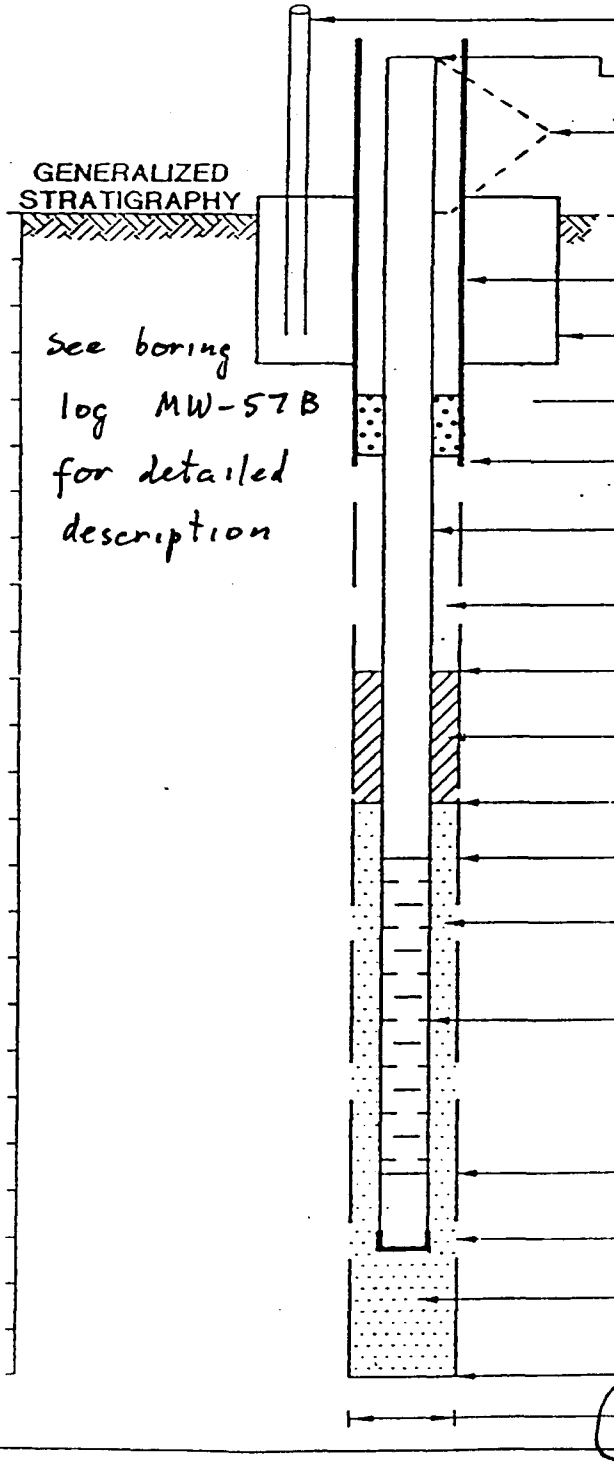
Number / Type of Protective Post per chater: 8
Elevation of top of riser pipe: 1125.84'
Height of riser above ground: 1.80'
Ground Elevation: 1124.04'
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
Type of surface seal: Granular Bentonite/u-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2in/Schedule 40 PVC
Type of backfill: NA
Depth of top of seal: 10'
Type of seal: Pure Gold grout @ 10.7 lb/gal. (10 gal est. 10 gal used)
Depth of top of filter pack: 18.0
Sieve test D_{30} = NA
Depth of top of screen: 21.0
Type of filter pack: 20/40 sand (3.2 - 100# bags used; 2.5 - 100# bags est)
I.D./Type of screen: 2in/Schedule 40 PVC - factory slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 31.0'
Depth of bottom of plugged bank section: 31.5'
Type of backfill below monitoring well: 20/40 sand
Depth of bottom of boring: 32.7'
Diameter of boring: 6 inches (0-~~32.7~~ 4') 5 7/8" (4 - 32.7')

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: The Winnek Companies
Inspected by: R. G. Pacheco
Method of Installation: Filter pack and Puregold tremied in.
Remarks: 2 Stainless-Steel Centralizer @ 54' and 34'

Monitor Well No. MW-57B
Project No. 92KW030
Date 07.30.92
Time 11:59



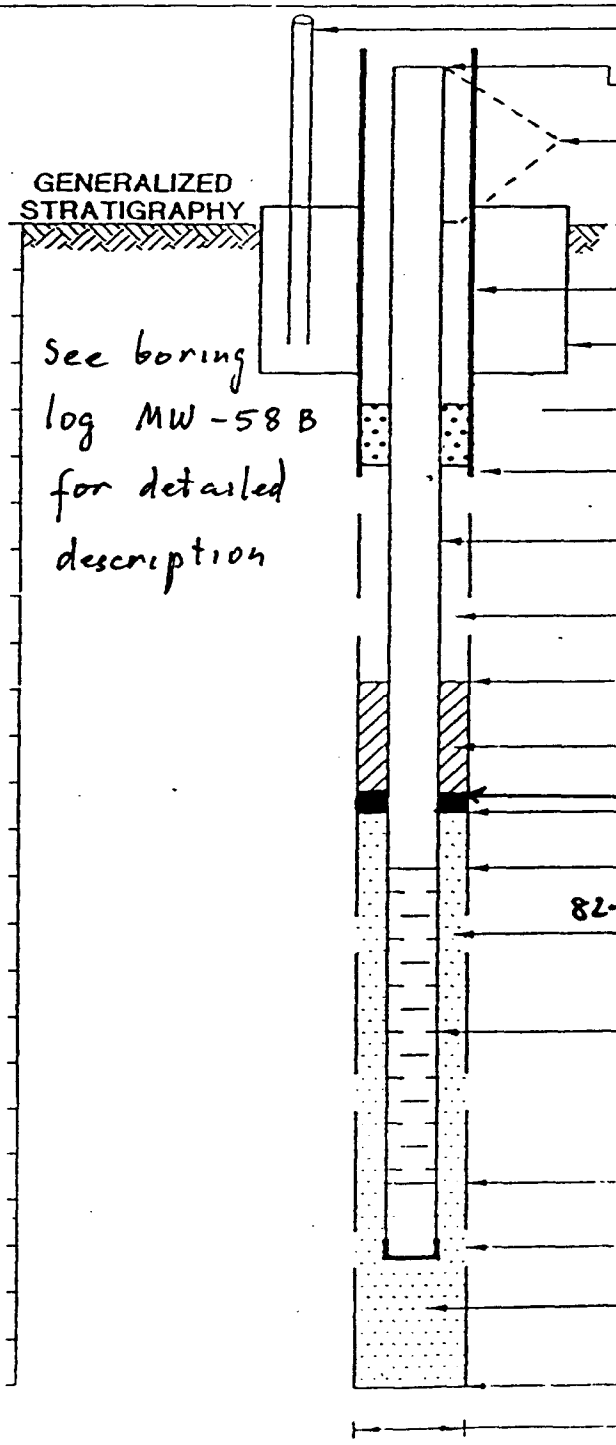
Number / Type of Protective Post: 3
Elevation of top of riser pipe: 1195.83
Height of riser above ground: 1.95 ~~2.67'~~
Ground Elevation: 1193.88
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix Concrete
Type of filler: Granular bentonite/u-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" Schedule 40, Threaded Flush Coupled PVC
Type of seal: Cement/Bentonite
Calculated volume: 54.8 Gal. Placed volume: 56.2 Gal.
Depth of top of seal: 9.0'
Type of seal: Puregold grout (10.1 #/Gall)
Depth of top of filter pack: 53'
Depth of top of screen: 55'
Sieve Test (D_{30} = %)
Type of filter pack: 20/40 Silica Sand
Calculated volume: 20.98 Gal. Placed volume: 22.44 Gal.
I.D./Type of screen: 2" Sch 40 PVC
Screen slot size: 0.010 in
Depth of bottom of screen: 65'
Depth of bottom of plugged blank section: 65.5'
Type of backfill below monitoring well: 20/40 Silica Sand (65.5-67')
Depth of bottom of boring: 74.0 ~~67.0'~~
Diameter of boring: 5 1/8" ~~7.6"~~

67'-69' Pellets (Bentonite)
69'-74' Backfilled w/ Sand 4/8.

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: THE Winnek Companies, Bill Vick
Inspected by: ~~Woodward Clyde Consultants~~, Terri Hecht
Method of Installation: Direct Rotary
Remarks: Sand and Grout placed w/ 1" tremie, side deflector for grout
1 centralizer placed 4' above screen

Monitor Well No. MW-58B
Project No. 92KW030
Date 7/30/92
Time 11:30



Number / Type of Protective Post: 12 per cluster
Elevation of top of riser pipe: 1174.96'
Height of riser above ground: 2.01.99'
Ground Elevation: 1172.97'
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix concrete
Type of filler: Granular bentonite/u-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" schedule 40, Threaded Flush-Coupled PVC
Type of seal: Cement/Bentonite
Calculated volume: 11.6 ft³ Placed volume: 17.7 ft³
Depth of top of seal: ~~30~~ RBP
Type of seal: "Pure Gold" bentonite chips, wt = 10.2 lb/gal
Depth of top of buffer sand (10-20): 66.6'
Depth of top of filter pack: 68.45'
Depth of top of screen: 70.7'
82-84A Sieve Test (D_{30} = 0.14mm)
Type of filter pack: 20-40 SILICA SAND
Calculated volume: 2.5 ft³ Placed volume: 2.2 ft³
I.D./Type of screen: 2" schedule 40, Threaded, Flush-Coupled PVC
Screen slot size: 0.010"
Depth of bottom of screen: 80.7'
Depth of bottom of plugged blank section: 81.2'
Type of backfill below monitoring well: 135.0 - 130.8 natural material, 130.8 - 89.7 10-20 sand, 89.7 - 85.8 bentonite pellets
Depth of bottom of boring: 135.0'
Diameter of boring: ~~6"~~ 5 5/8" to 109'; 5 1/2" to 135'.

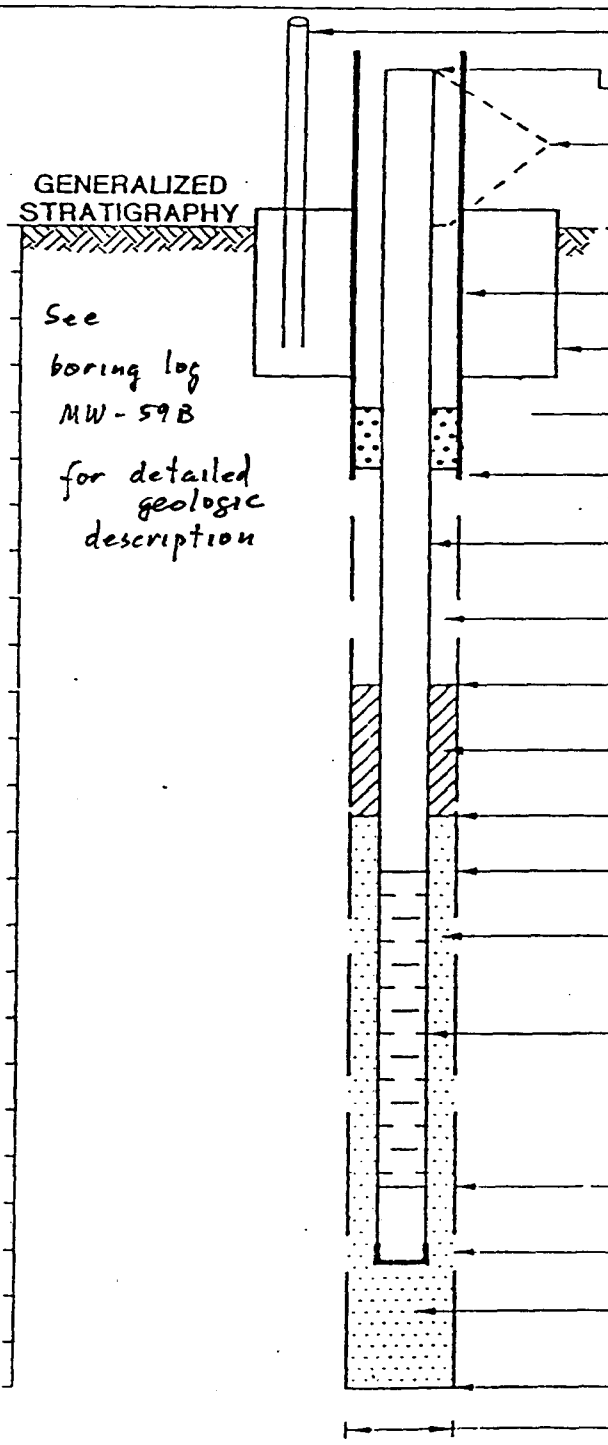
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Winnek Companies
Inspected by: Gene Papinako ~~(WCC)~~

Monitor Well No.: MW-59 B
Project No.: 92KW030
Date: 7-27-92
Time: 10:10

Method of Installation: Filter pack, buffer sand and "Pure Gold" grout placed through the tremie pipe (0.9-inch-ID, PVC). Side discharge used for grout placement. One centralizer positioned @ 36 ft dept.

Remarks:



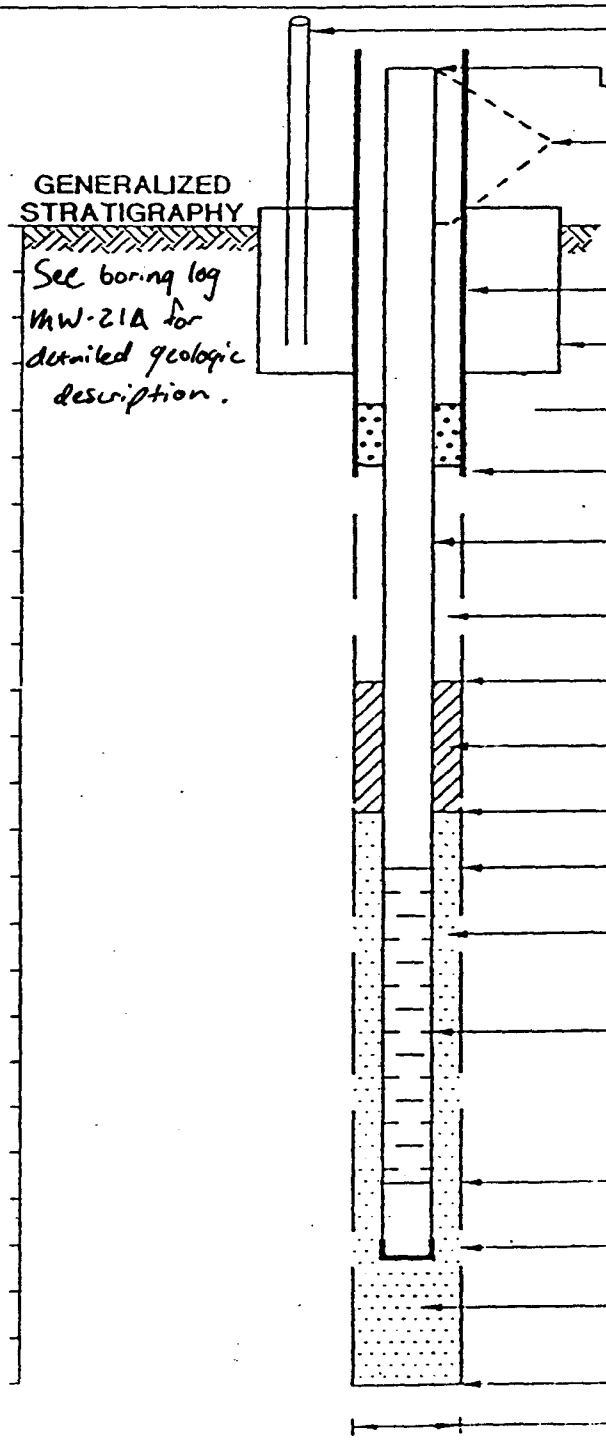
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1162.61'
Height of riser above ground: ~~2.0~~ 1.75'
Ground Elevation: 1160.86'
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4"/u-mix Concrete
Type of filler: Granular bentonite
Depth of surface seal: 5.5'
I.D./Type of riser pipe: 2-inch-dia. PVC Sch. 40 threaded, flush-coupled
Type of seal: Cement/Bentonite Grout
Calculated volume: 35 gals Placed volume: 60 gals
Depth of top of seal: ~~5-6~~ 6-7 ft
Type of seal: "Pure Gold" Bentonite
Depth of top of buffer sand (20-40): 35.5'
Depth of top of filter pack: 36.8'
Depth of top of screen: 38.0'
Sieve Test (D_{50} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: ~13 gals Placed volume: 25 gals
I.D./Type of screen: 2-inch-dia PVC Sch. 40 mill-slotted, threaded, flush-coupled
Screen slot size: 0.02 inch
Depth of bottom of screen: 48.0'
Depth of bottom of plugged blank section: 48.5'
Type of backfill below monitoring well: Native material, 10-20
Depth of bottom of boring: 49.0'
Diameter of boring: 5 1/4 inch

FIGURE 6-3 CEH

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants
Inspected by: J. Nealon
Method of Installation: RWB. Tremied 10/20 sand and Pure Gold grout. Centralizers at 75', 95', and 115'.
Remarks: Water losses: 10 gal in screened interval, 20 gal during flushing, and 15 gal during filter pack placement.

Monitor Well No. MW-21A
Project No. 92KW030
Date 7-26-92
Time 1510

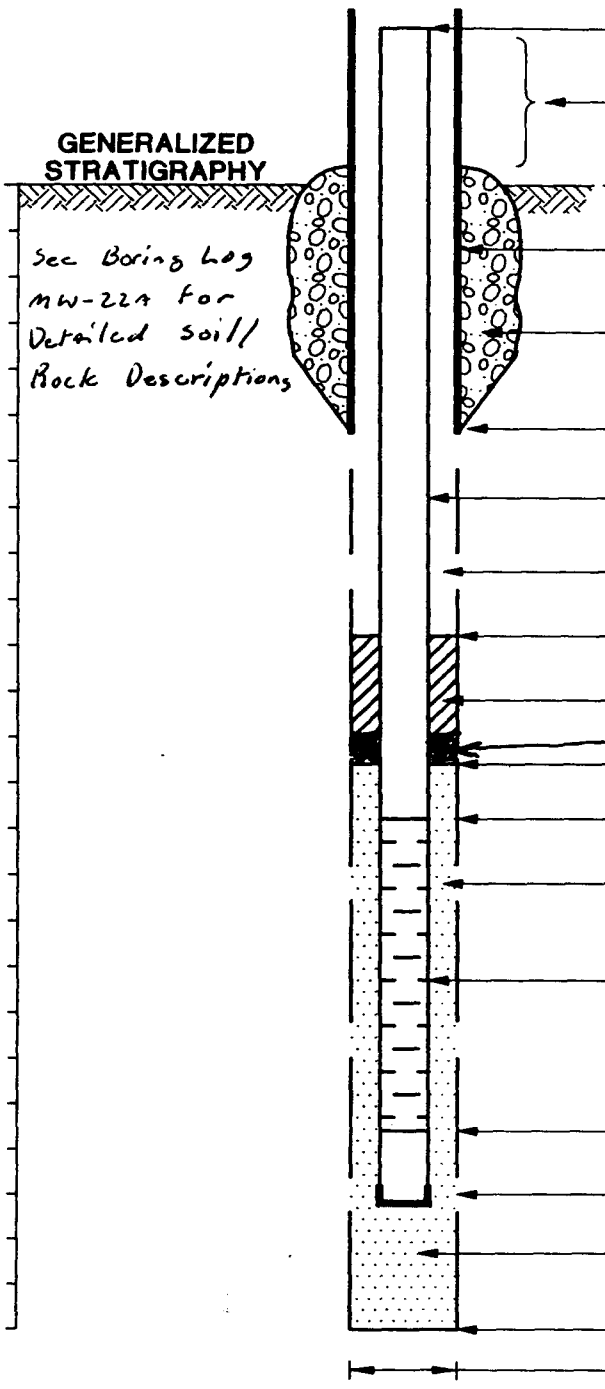


Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1165.22
Height of riser above ground: 1.91'
Ground Elevation: 1163.31
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'X3'X4" concrete
Type of filler: Granular bentonite / 6-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" / Schedule 40 PVC
Type of seal: Cement & bentonite grout
Calculated volume: 130 gal Placed volume: 190 gal
Depth of top of seal: 10'
Type of seal: Pure Gold grout @ 10.2 lb/gal.
Depth of top of filter pack: 113.0'
Depth of top of screen: 116.0'
Sieve Test (D_{10} = 0.48 mm)
Type of filter pack: 10/20 silica sand
Calculated volume: 250 lb Placed volume: 250 lb
I.D./Type of screen: 2 in / Schedule 40 PVC, factory slotted
Screen slot size: 0.020 inch
Depth of bottom of screen: 126.0'
Depth of bottom of plugged blank section: 126.5'
Type of backfill below monitoring well: 10/20 silica sand
Depth of bottom of boring: 128.5
Diameter of boring: 6 inch 0-128.5'

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: MEAD, Nebraska
Installed by: Winecock Companies
Inspected by: T.R. Hecht
Method of Installation: Direct Rotary
Remarks: Gravel pack and Pure Gold grout placed through 2" dia Tremie pipe (deflector used w/ grout) 1 Centralizer placed above screen.

Monitor Well No.: MW-22A
Project No.: 92KW030
Date: 6/23/92
Time: 17:00

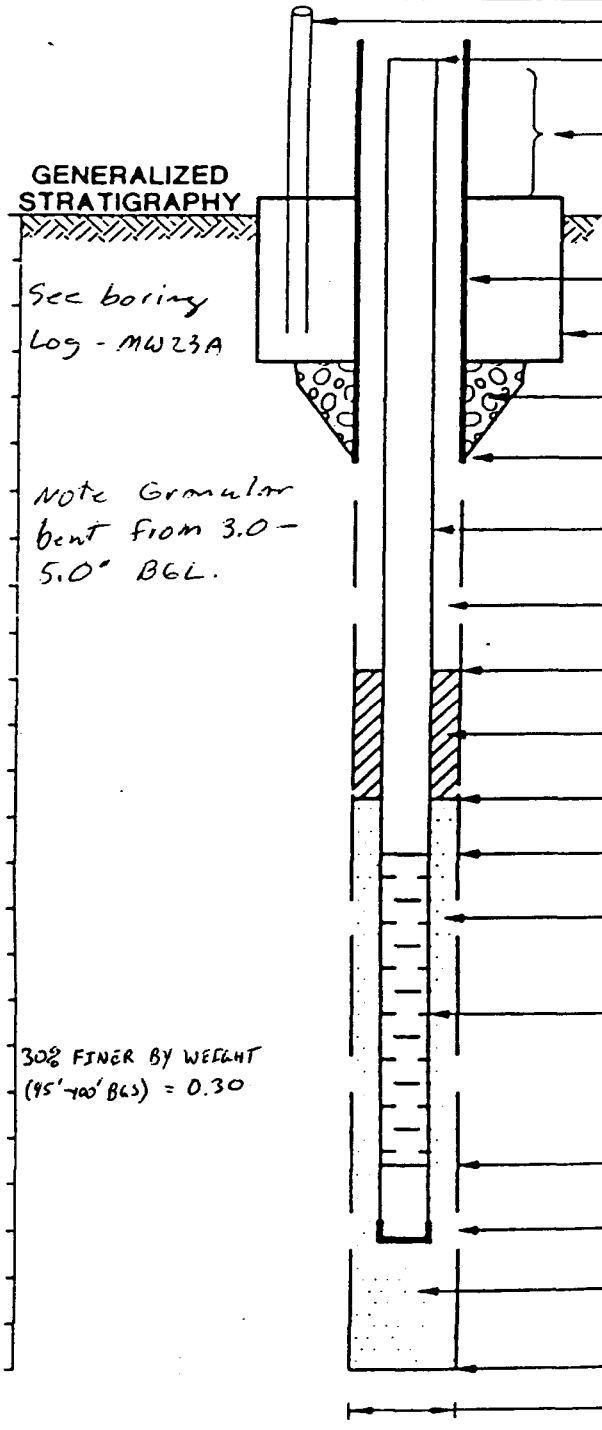


- protective posts per cluster: 6
- Elevation of top of riser pipe: 1176.35'
- Height of riser above ground: 1.85'
- Ground Elevation: 1174.50'
- I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
- Type of surface seal: Sakrete concrete granular bentonite 4.0' 6/30/92
- Depth of surface seal: 5.0' 6/30/92
- I.D./Type of riser pipe: 2" PVC Schedule 40, flush threads
- Type of backfill: Cement/bentonite grout 6/28/92
- Depth of top of seal: 12'
- Type of seal: Pure gold bentonite grout (10.2) Buffer sand to 83.9
- Depth of top of filter pack: 85.0
- Depth of top of screen: 87.8
- Type of filter pack: 4-8 silica Sand
- I.D./Type of screen: 2" mill slotted PVC, schedule 40, flush Thread
- Screen slot size: 0.020
- Depth of bottom of screen: ~~96.8~~ 97.8 MEW
- Depth of bottom of plugged blank section: ~~97.8~~ 98.3 MEW
- Type of backfill below monitoring well: 4-8 Silica Sand 97.3 to 97.8 plugged 100.1 to 106.1 6" w/ bentonite pellets; Native material 97.8 to 100.1
- Depth of bottom of boring: 102
- Diameter of boring: 8" to 102, 6 to 106

GROUND WATER MONITORING WELL REPORT

Project Name: Mead - NOP
Location: Mead Nebraska
Installed by: U.S. Army Corps of Engineers
Inspected by: Bob Exceen (WCC)
Method of Installation: Gravel pack and Pure Gold Grout placed with tremie pipe (2" dia) 5 centralizers placed 5' above screen then every 20'.
Remarks:

Monitor Well No. MW 23 A
Project No. 92KW030
Date 6-27-92
Time 1045



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1173.13
Height of riser above ground: 1.68' ~~1.9'~~ BTP ~~2.0'~~
Ground Elevation: 1171.45
I.D./Type of surface casing: 4"X4"X7' ~~Box~~ Galvanized steel
Dimen. / Type of Surface Pad: ~~4'X4'X~~ 3'X3'X4"
Type of surface seal: Sakrete cement
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia. schedule 40, flush joint, PVC
Type of backfill: Portland Type ~~II~~ I cement
Depth of top of seal: 28.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 84.0'
Depth of top of screen: 88.5'
Type of filter pack: 10-20 Silica sand
I.D./Type of screen: 2" dia schedule 40, flush joint PVC
Screen slot size: ~~0.20~~ BTP" 0.02"
Depth of bottom of screen: 98.5'
Depth of bottom of plugged bank section: 99.0'
Type of backfill below monitoring well: Bent. Pellets to 100.7'/10-20 sand above 100.7'
Depth of bottom of boring: 105.0'
Diameter of boring: 10" (0'-100') 5 5/8" (100'-105')

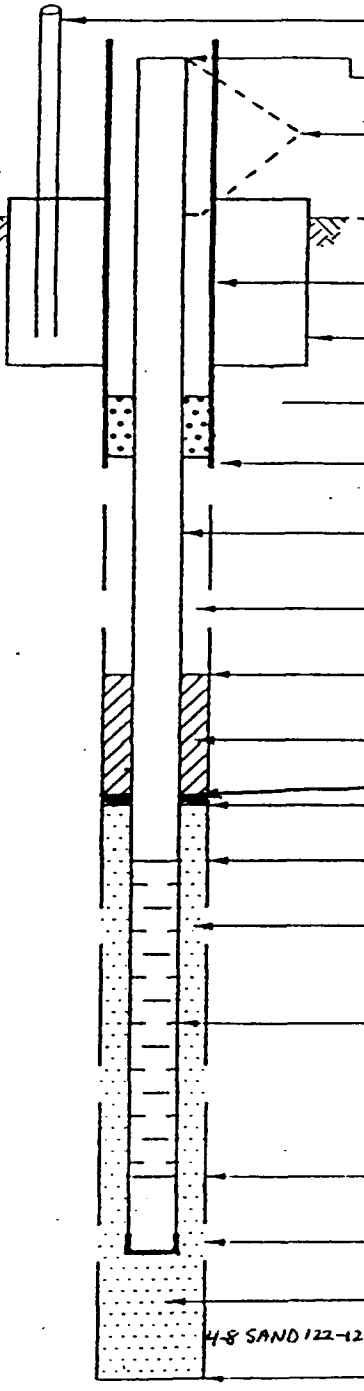
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: The Winnek Companies, Bill Vick
Inspected by: ~~Woodward Clyde Consultants~~, Theresa Hecht
Method of Installation: Direct Rotary
Remarks: Filter pack & Grout placed w/1" tremie pipe, deflector used during grouting. Five centralizers, first above screen, every 20'

Monitor Well No. MW-24A
Project No. 92KW030
Date 7/27-28/92
Time 0930

GENERALIZED STRATIGRAPHY

See Boring Log MW-24A for details



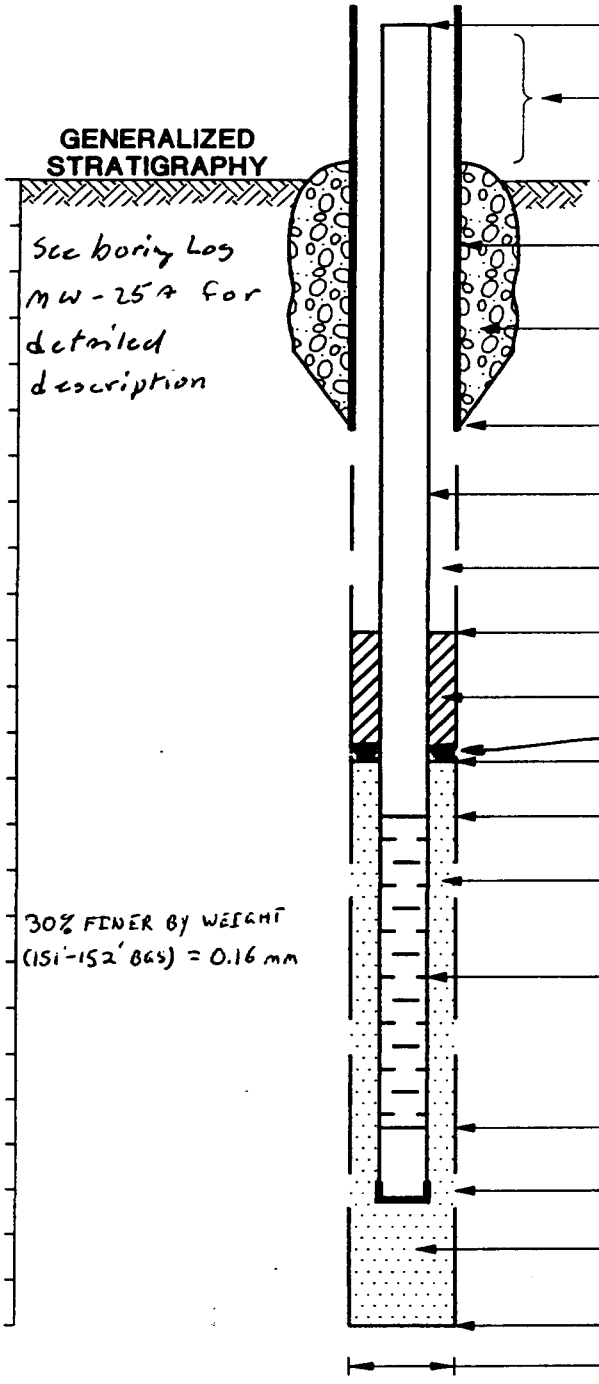
Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: ~~2.0~~ 1163.0
Height of riser above ground: 2.04
Ground Elevation: 1160.90
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'X3'X4"/u-mix concrete
Type of filler: Granular bentonite/Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2", Schedule 40, threaded Flush-Coupled PVC
Type of seal: Cement/Bentonite
Calculated volume: 34.5 ft³ Placed volume: 42.6 ft³
Depth of top of seal: ~~≈3'~~ 17.0'
Type of seal: Pure Gold bentonite, wt 10.2 lb/gal
Depth of top of Buffer sand: 108.5
Depth of top of filter pack: 109.4
Depth of top of screen: 111.5
Sieve Test (D_{50} = ~~0.48mm~~ 0.42 mm)
Type of filter pack: 4-8 silica Sand
Calculated volume: 1.9 ft³ Placed volume: 2.9 ft³
I.D./Type of screen: 2", schedule 40, threaded, Flush-coupled PVC
Screen slot size: 0.020"
Depth of bottom of screen: 121.5
Depth of bottom of plugged blank section: 123.54 ~~122.0~~
Type of backfill below monitoring well: 4-8 SAND 122-124, ~~10-20 SAND 124.0-140.8~~ 134.9, Bent. pellets 134.9-124.0, 10-20 SAND 134.9-140
Depth of bottom of boring: 140.8
Diameter of boring: 7 7/8" 8" 0-127.0, 5" 127-140.8

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD, NOP
Location: MEAD, Nebraska
Installed by: The Winnek Companies
Inspected by: T. Hecht, Woodward-Clyde
Method of Installation: Direct Rotary
Remarks: Gravel Pack & Grout (Pure Gold Bentonite) placed w/ 2" Tremie, (Deflector for Grout), 5 centralizers, 1 above screen, every 20'

Monitor Well No. MW-25A
Project No. 92KW030
Date 6-30-92
Time 17:45

protective Posts per cluster 12



Elevation of top of riser pipe 1174.83

Height of riser above ground 2.02

Ground Elevation 1172.81

I.D./Type of surface casing 4"x4"x7' Galvanized Steel

Type of surface seal Sakrete concrete/ Grimander Bentonite

Depth of surface seal 5.0'

I.D./Type of riser pipe 2" Sch 40 PVC Flush joint

Type of backfill Cement/Bentonite

Depth of top of seal ≈10'

Type of seal Pure Gold Bent. Grout (weight = 10.2 lbs/gal) Buffer Sand to 141.97'

Depth of top of filter pack 143.0'

Depth of top of screen 145.0'

Type of filter pack 10-20 Silica Sand

I.D./Type of screen 2" mill slotted Schedule 40 PVC

Screen slot size 0.020"

Depth of bottom of screen 155.0'

Depth of bottom of plugged blank section 155.5'

Type of backfill below monitoring well 10-20 Silica SAND

Depth of bottom of boring 156.6'

Diameter of boring 6"

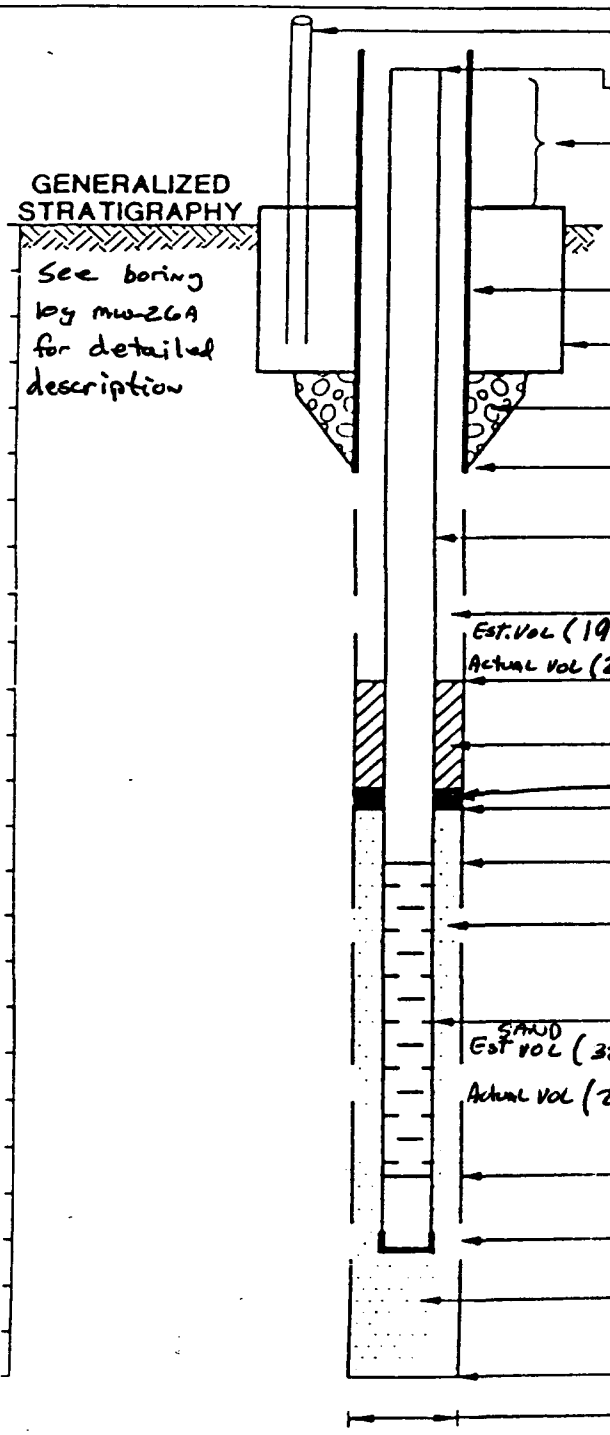
Woodward-Clyde Consultants

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: west of load line 2
Installed by: WINNEK Companies Bill Vick
Inspected by: WOODWARD-Clyde, Terri Hecht
Method of Installation: Direct rotary
Remarks: Sand & cement placed w/ 2" tremie pipe, 5 centralizers 2ft above screen, then every 20'

Monitor Well No. MW-26A
Project No. 92KW030
Date 7/21/92
Time 1500



Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1173.73
Height of riser above ground: ~~2.0~~ 1.71
Ground Elevation: 1172.02
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular bentonite
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" schedule 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: ~~10~~ RBP 12.5'
Type of seal: Pure gold Bentonite, placed w/ Deflected Tre
Depth of top of buffer sand: 89.0
Depth of top of filter pack: 89.8
Depth of top of screen: 92.5
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" mill slotted, Sch 40 PVC
Screen slot size: 20 slot
Depth of bottom of screen: 102.5
Depth of bottom of plugged bank section: 103.0 ~~102.5~~
Type of backfill below monitoring well: 10-20 Silica sand to 104.5 over bentonite pellets (104.5' to 120')
Depth of bottom of boring: 120.0
Diameter of boring: 8" to 106.0 5" to 120.0

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

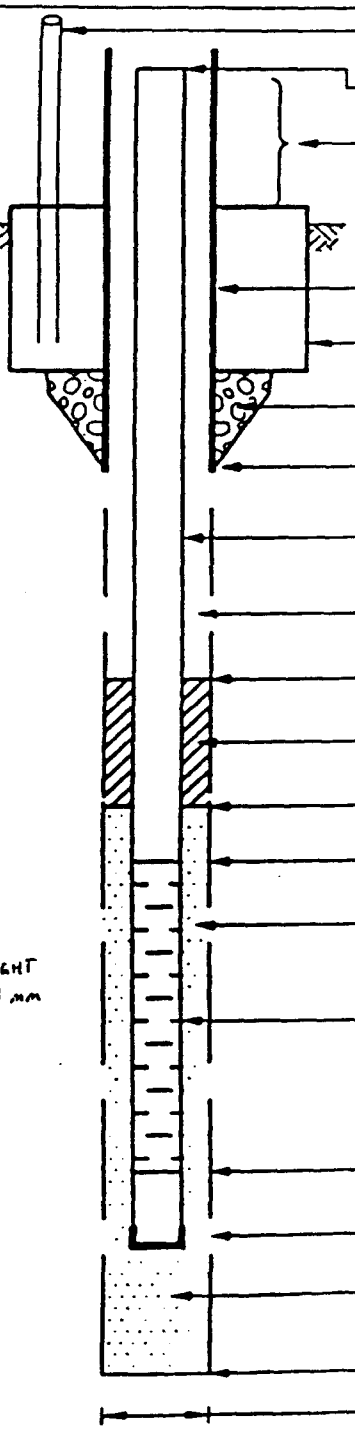
Project Name: Remedial Investigation, MEAD NOP
Location: MEAD NEBRASKA
Installed by: the WINNEK Companies
Inspected by: Terri Hecht (Woodward-Clyde) DAN GALBE (WCC 6-9-92)
Method of Installation: Sand Packed and Pure Gold grout placed through 2" tremie
Remarks: Centralizer placed above well screen

Monitor Well No. MW-27A
Project No. 92KW030
Date 6/1/92 / 6-9-92
Time

GENERALIZED STRATIGRAPHY

See Boring Log MW27A for detailed soil/Rock Description

30% FINER BY WEIGHT (102'-107' BGS) = 0.28 mm

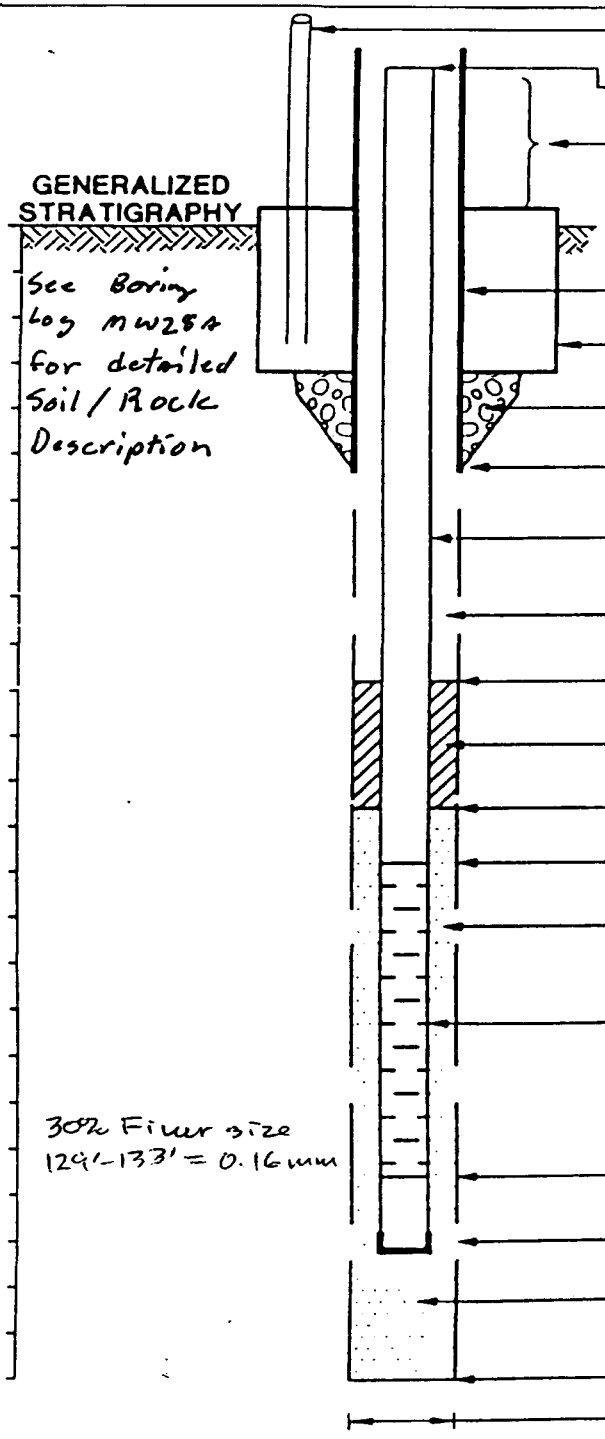


Number / Type of Protective Post per cluster	8
Elevation of top of riser pipe	1175.63
Height of riser above ground	~~2.90~~ 1.91
Ground Elevation	1173.72
I.D./Type of surface casing	4"x4"x1' STAINLESS STEEL DPG
Dimen. / Type of Surface Pad	3'x3'x4" DPG
Type of surface seal	SACKCRETE DPG
Depth of surface seal	~~SACKCRETE~~ 4' DPG
I.D./Type of riser pipe	2" dia. schedule 40 flush joint PVC
Type of backfill	~~Pure Gold Grout~~ BENTONITE PELLETS DPG
Depth of top of seal	6.2' ~~7.2'~~ DPG
Type of seal	~~Some~~ Pure GOLD GROUT DPG
Depth of top of filter pack	94
Depth of top of screen	96
Type of filter pack	4-8 Silica Sand
I.D./Type of screen	2" Sch 40 mill slotted
Screen slot size	0.20"
Depth of bottom of screen	106.0'
Depth of bottom of plugged bank section	107.0'
Type of backfill below monitoring well	4-8 Silica Sand
Depth of bottom of boring	121.9
Diameter of boring	8" to 110.1 4½" to 121.9

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: Gene Papinako (WEC)
Method of installation:
Remarks: Filter pack and "Pure Gold" grout were placed through 0.9-ID tremie-pipe with side discharge. Centralizers positioned @ 88, 108, 128 ft.

Monitor Well No. MW-28A
Project No. 92KW030
Date 7-7-92
Time 16:50

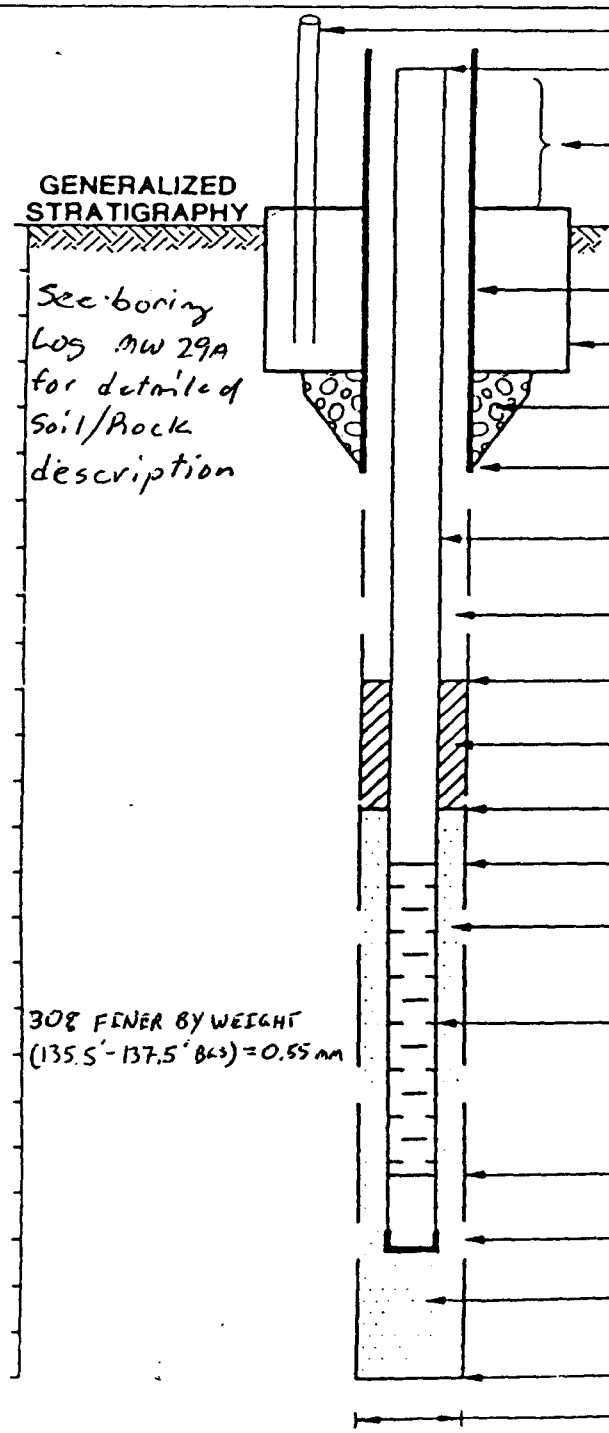


Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1171.81
Height of riser above ground: 1.93
Ground Elevation: 1169.88
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch-dia PVC Sch. 40 threaded, flush-coupled
Type of backfill: Cement/Bentonite
Depth of top of seal: 8.0'
Type of seal: "Pure Gold" bentonite grout (10.2)
Depth of top of filter pack: 124.8
Depth of top of screen: 127.6
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2-inch-dia mill-slotted PVC, Sch. 40, threaded, flush-coupled
Screen slot size: 0.020
Depth of bottom of screen: 137.6
Depth of bottom of plugged bank section: 138.2
Type of backfill below monitoring well: Native material, 10-20 silica sand
Depth of bottom of boring: 138.6
Diameter of boring: 8.0 inch

GROUND WATER MONITORING WELL REPORT

Project Name: Mead - NOP
Location: Mead Nebraska
Installed by: U.S. Army Corps of Engineers
Inspected by: Bob Exceen (WCC)
Method of Installation: Gravel pack and Pure Gold Grout placed w/ tremie
Remarks: (2" dia) 5 centralizers placed every 20'.

Monitor Well No. MW 29A
Project No. 92KW030
Date 6-17-92
Time 0845



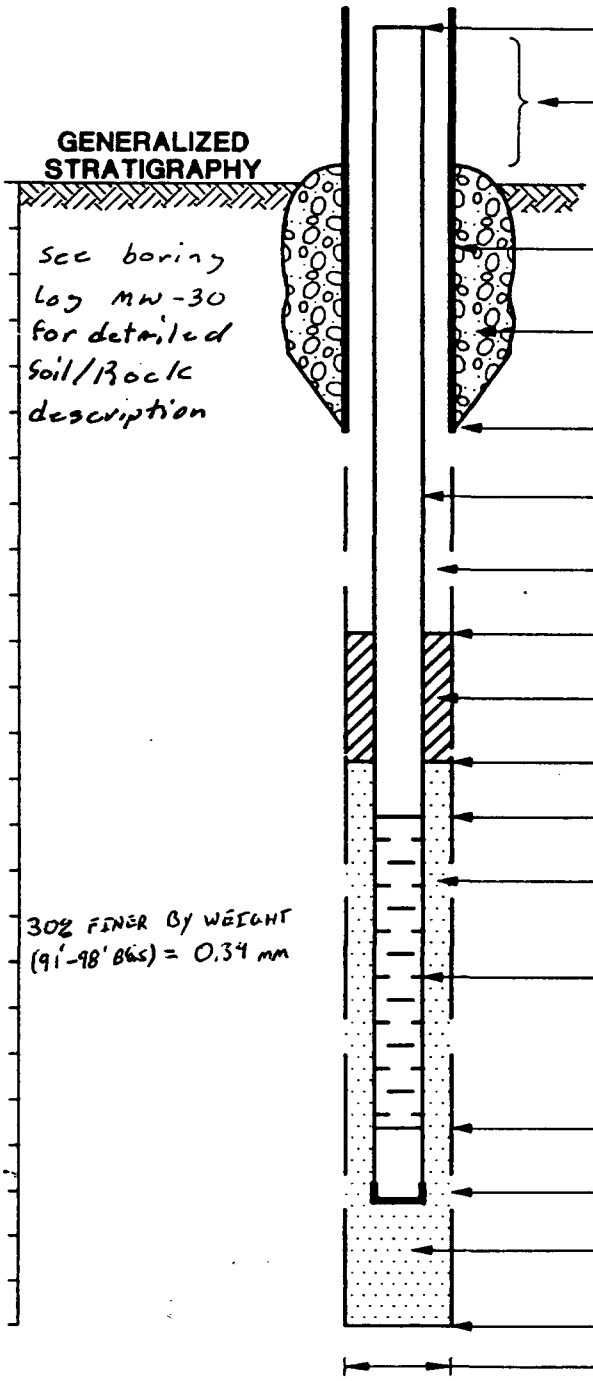
Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1159.66
Height of riser above ground: 1.56' ~~1.7 2.0' BGS~~
Ground Elevation: 1158.10
I.D./Type of surface casing: 4"x4"x7' Box steel
Dimen. / Type of Surface Pad: 3'x3'x4" u-mix
Type of surface seal: u-mix
Dry concrete @ 4.0-5.0' BGS 9-2-92
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia. Schedule 40, flush joint PVC
Type of backfill: Cement/bent. / Portland type II
Depth of top of seal: 10.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 118.5'
Depth of top of screen: 122.6'
Type of filter pack: 4-8 Silica sand to 120.0'
10-20 Silica sand to 118.5'
I.D./Type of screen: 2" dia. Schedule 40, Flush joint PVC
Screen slot size: 0.020"
Depth of bottom of screen: 122.6'
Depth of bottom of plugged bank section: 133.1'
Type of backfill below monitoring well: Bent. Pellets to 138.0, Native material 134.0 to 138.0
Depth of bottom of boring: 143.0'
Diameter of boring: 10"

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, Nebraska
Installed by: U.S. Army Corps of Engineers
Inspected by: B. Exceen (WCC) / DAN GALDE (WCC) 6-9-92
Method of Installation: Gravel pack and Volclay placed through 2" dia. Tremi.
Remarks: Centralizers placed ~~—~~ just above well screen then at 20' increments - 5 centralizers used

Monitor Well No. MW-30A
Project No. 92KW030
Date 5-27-92 / 6-9-92 DPL
Time 1140



protective posts - per cluster: 8

Elevation of top of riser pipe: 1168.13

Height of riser above ground: 2.0'

Ground Elevation: 1166.19

I.D./Type of surface casing: 4"x4"x7' ~~STAINLESS STEEL~~ Galvanized Steel

Type of surface seal: concrete.

Depth of surface seal: 4'

I.D./Type of riser pipe: 2" dia. Schedule 40, flush joint, PVC

Type of backfill: ~~Volclay~~ DPL Bentonite Pellets DPL

Depth of top of seal: 3.2' DPL

Type of seal: VOLCLAY DPL

Depth of top of filter pack: 91.0'

Depth of top of screen: 94.0'

Type of filter pack: 10-20 silica Sand.

I.D./Type of screen: 2" dia. Schedule 40, flush joint, PVC

Screen slot size: 0.20

Depth of bottom of screen: 99.0'

Depth of bottom of plugged blank section: 99.5'

Type of backfill below monitoring well: Bent. Pellets to 104.0' then Sand ~~to 109.~~ and natural materials to 99.5'

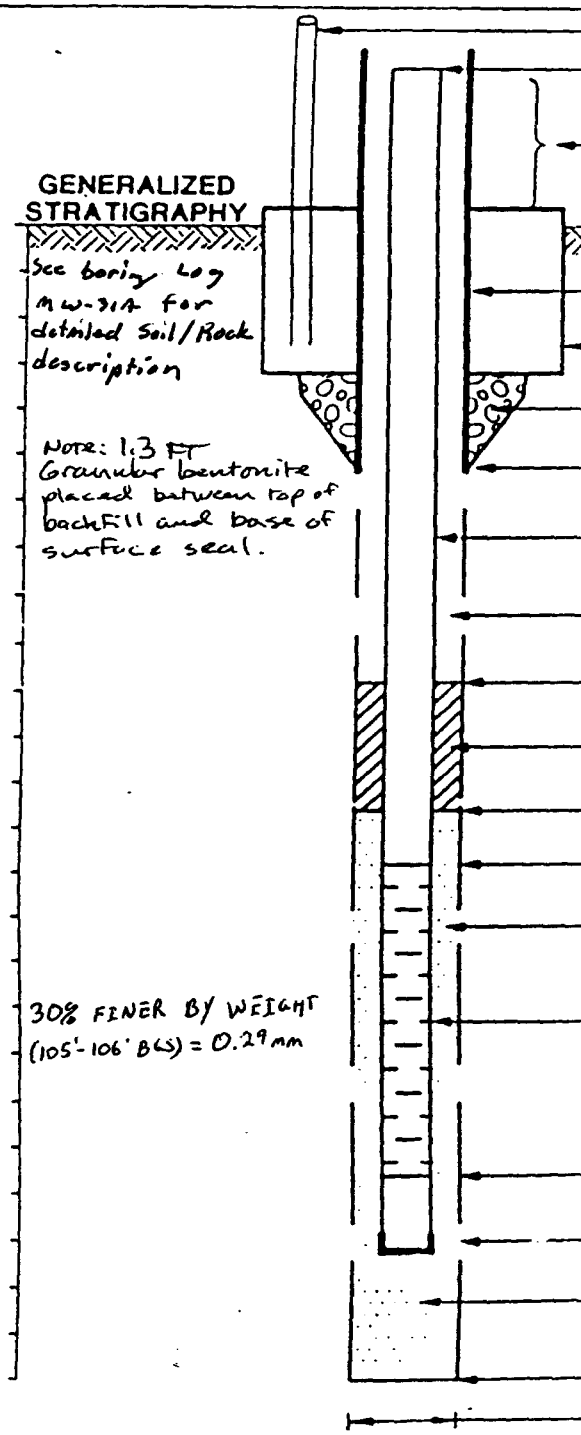
Depth of bottom of boring: 110.0'

Diameter of boring: 8"

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD N.O.P.
Location: MEAD, NE.
Installed by: THE WINNER CO.
Inspected by: LISA TRAVAGLIN
Monitor Well No.: MW-31A
Project No.: 92KW030
Date: 6/12/92
Time:
Method of Installation: FILTER PACKED AND PURE GOLD GROUT PLACED THROUGH 1" AND 2" TREMIE. 5 CENTRALIZERS PLACED @ 94', 74', 54', 34', 14'
Remarks:



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1166.97
Height of riser above ground: ~~2 FT~~ 2.03'
Ground Elevation: 1164.94
I.D./Type of surface casing: 4IN x 4IN STEEL
Dimen. / Type of Surface Pad: 3FT x 3FT x 4IN/SAKRETE
Type of surface seal: Sakrete
Depth of surface seal: 4.2'
I.D./Type of riser pipe: 2" SCH 40 PVC
Depth to top of backfill: 5.5'
Type of backfill: CEM. / BENT. GROUT
Depth of top of seal: 16.0'
Type of seal: "PURE GOLD" GROUT
Depth of top of filter pack: 91.2'
Depth of top of screen: 94.5'
Type of filter pack: 10/20 SILICA SAND
I.D./Type of screen: 2" SCH 40 ~~DRILL~~ SLOTTED
Screen slot size: 0.020
Depth of bottom of screen: 104.5'
Depth of bottom of plugged bank section: 105.0'
Type of backfill below monitoring well: 10-20 SAND 105.5' TO 105.0' / NATIVE MTLS. 107 to 105.5'
BENTONITE PELLETS 107 TO 109 / NATIVE MTL. 109 to 112'
Depth of bottom of boring:
Diameter of boring: 9 7/8 IN. 0-106.5' / 4 3/4 106.5 - 112

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, Nebraska
Installed by: Woodward Clyde - Consultants (Omaha)
Inspected by: JONATHAN C JOHNSON
Method of Installation: Gravel Pack and Puregold Grout installed through 1" dia Tremie Pipe
Remarks: 60 gallons of water used during installation of Filter Pack and Buffer Sand.

Monitor Well No. MW-32A
Project No. 92 KW 030
Date 6-27-92
Time 1400 hrs

7¾" Hollow-Stem Auger

GENERALIZED STRATIGRAPHY

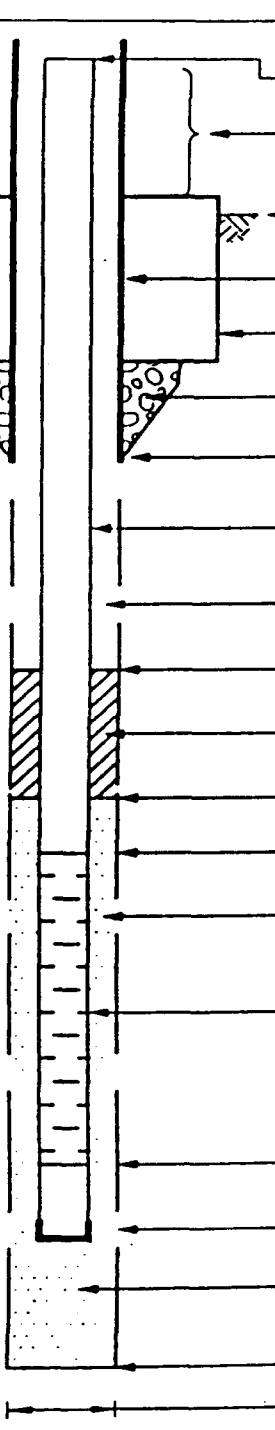
Note: See boring log MW-32A for detailed geologic description.

Note: 1.5' of 20-40 buffer sand installed above filter pack.

Note: Used 60 gallons of water during installation of filter sand material.

Note: 175 Lb of 4-8 Silica Sand used in Filter pack.

30% FINER BY WEIGHT (90'-95' BGS) = 0.77 mm



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1153.77
Height of riser above ground: 1.82'
Ground Elevation: 1151.95
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel ~~2" dia Sch 40 Flush Joint~~
Dimen. / Type of Surface Pad: 3'x3'x4" U-mix concrete
Type of surface seal: ~~Granular Bentonite~~/U-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia Schedule 40 Flush joint PVC
Type of backfill: Cement/Bentonite grout ~~Puregold Grout~~
Depth of top of seal: ~~10'~~ 9.0'
Type of seal: "Pure Gold" Grout
Depth of top of filter pack: 82.0'
Depth of top of screen: 88.5'
Type of filter pack: 4-8 Silica Sand w/ 1.5' of 20-40 Buffer Sand
I.D./Type of screen: 2" dia Sch 40 Flush joint PVC Factory-slotted.
Screen slot size: 0.020"
Depth of bottom of screen: 98.5'
Depth of bottom of plugged bank section: 99.0'
Type of backfill below monitoring well: 4-8 Silica Sand
Depth of bottom of boring: 99.5'
Diameter of boring: 7¾"

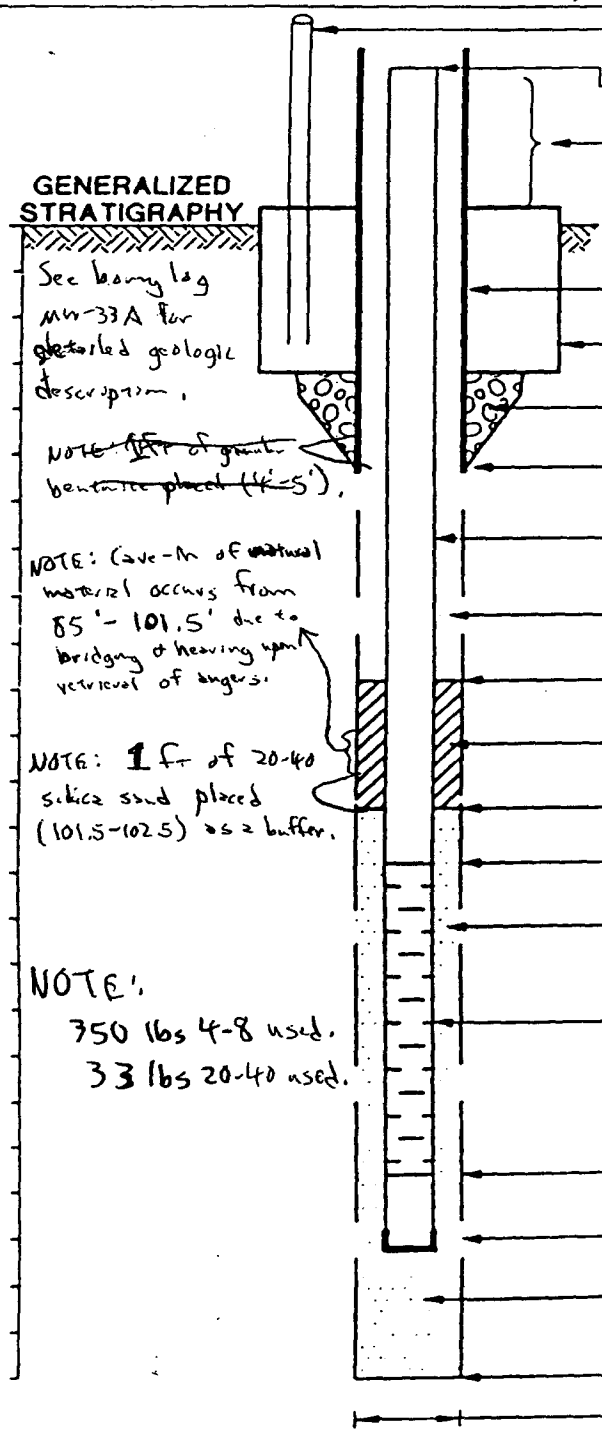
FIGURE 3-3

GROUND WATER MONITORING WELL REPORT

Rev 7/10/92

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by J. Ritterling (WCC)
Method of Installation 7 7/8" O.D. and 4 1/4" I.D. hollow stem augers, filter pack and volclay grout placed through 1" tremie pipe. Approximately 100 gal drilling water loss to Screen interval and 70 gal used during placement of filter pack. (THIS WELL WAS ABANDONED ON 7-9-92)
Remarks

Monitor Well No. MW-33A
Project No. 92KW030
Date 7-7-92
Time 1755



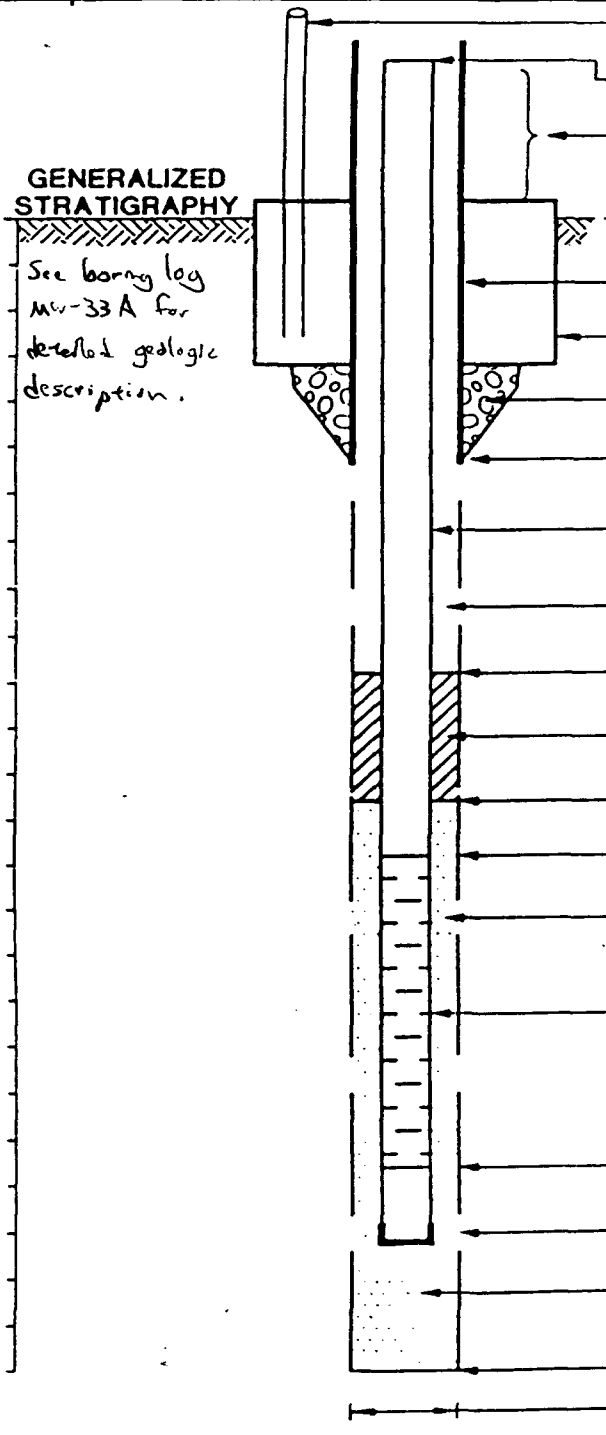
Number / Type of Protective Post	
Elevation of top of riser pipe	
Height of riser above ground	2.0'
Ground Elevation	
I.D./Type of surface casing	4"x4"x7' square steel
Dimen. / Type of Surface Pad	
Type of surface seal	Concrete
Depth of surface seal	
I.D./Type of riser pipe	2" Schedule 40 PVC Flush-jointed
Type of backfill	Cement/bentonite grout
Depth of top of seal	10.0'
Type of seal	Tremied "Pure Gold" ~~volclay~~ grout
Depth of top of filter pack	102.5
Depth of top of screen at joint	105.5
Type of filter pack	4-8 Silica Sand Cal Vol. (449.5 lbs) Placed Vol (350 lbs)
I.D./Type of screen	2" Schedule 40 PVC Factory-slotted
Screen slot size	0.020"
Depth of bottom of screen at joint	115.5
Depth of bottom of plugged bank section	116.0
Type of backfill below monitoring well	4-8 Silica Sand
Depth of bottom of boring	116.5
Diameter of boring	8"

GROUND WATER MONITORING WELL REPORT

Replacement

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by J. Rittling (WCC)
Method of Installation 5 7/8" tricone bit - rotary wash bore.
Remarks Filter pack and "Pure Gold" grout placed through 1" tremie pipe. Centralizers at 100', 80', 60', 40', and 20' bgs. Approximately 150 gal drilling fluid loss in screened interval. 30 gal water added during placement of filter pack.

Monitor Well No. MW-33A
Project No. 92KW030
Date 7-12-92
Time 1300



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1159.92
Height of riser above ground: 1.89
Ground Elevation: 1158.03
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite/U-mix concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" Schedule 40 PVC flush-jointed
Type of backfill: Cement/Bentonite
Depth of top of seal: 9.0'
Type of seal: tremied "Pure Gold" grout
Cal. Vol. (108.5 lb) Placed Vol. (100 lb)
Depth of top of filter pack: 96.5
Depth of top of screen at: 100.5
Type of filter pack: 10-20 Silica Sand
Cal vol. (247 #) Placed vol. (200 #)
I.D./Type of screen: 2" Schedule 40 PVC factory-slotted
Screen slot size: 0.020"
Depth of bottom of screen at joint: 110.5
Depth of bottom of plugged bank section: 111.0
Type of backfill below monitoring well: Coarse gravel slough
Depth of bottom of boring: 112.0
Diameter of boring: 6"

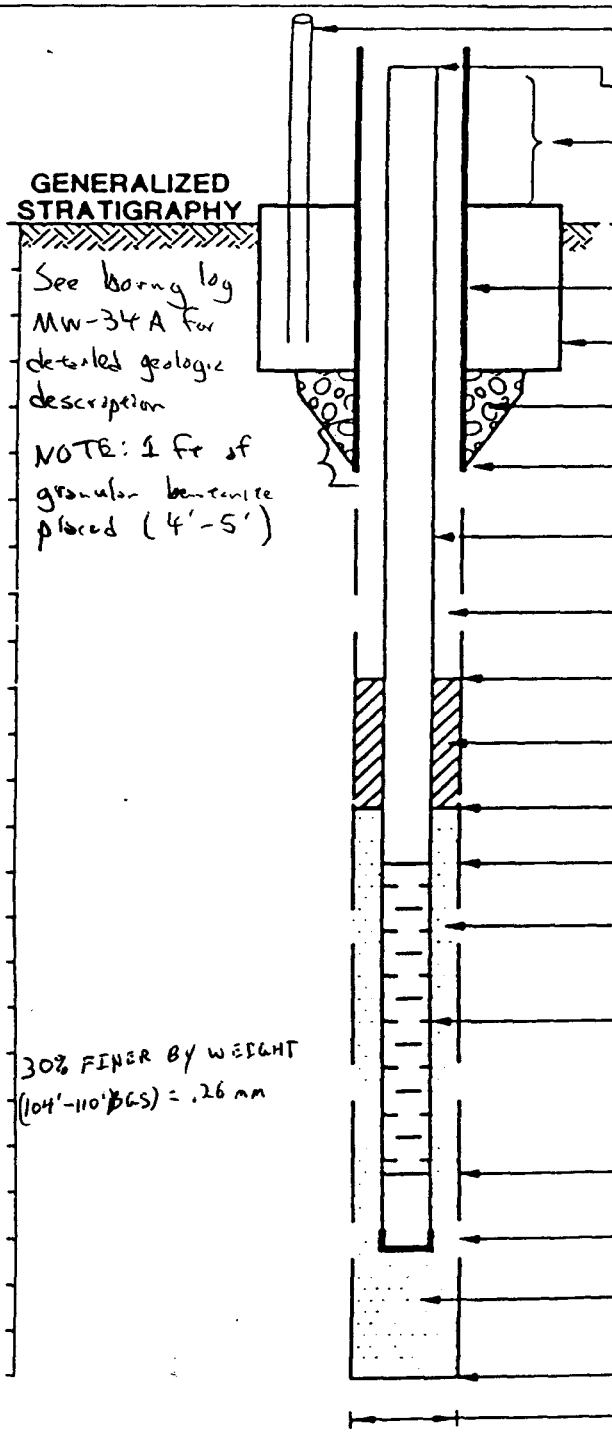
Woodward-Clyde Consultants

B07NE003702-05858

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: Mead, Nebraska
Installed by: WCC - Omaha
Inspected by: J. Ritterling (WCC)
Method of Installation: 7 7/8" OD, & 4 1/4" I.D. hollow stem augers; Filter Pack and volclay
Remarks: grout tremied through 1" pipe. Used 65 gal during placement of filter pack. Used 375 lbs of 10-20 silica sand as filter pack.

Monitor Well No.: MW-34A
Project No.: 92KW030
Date: 6-29-92
Time: 1645



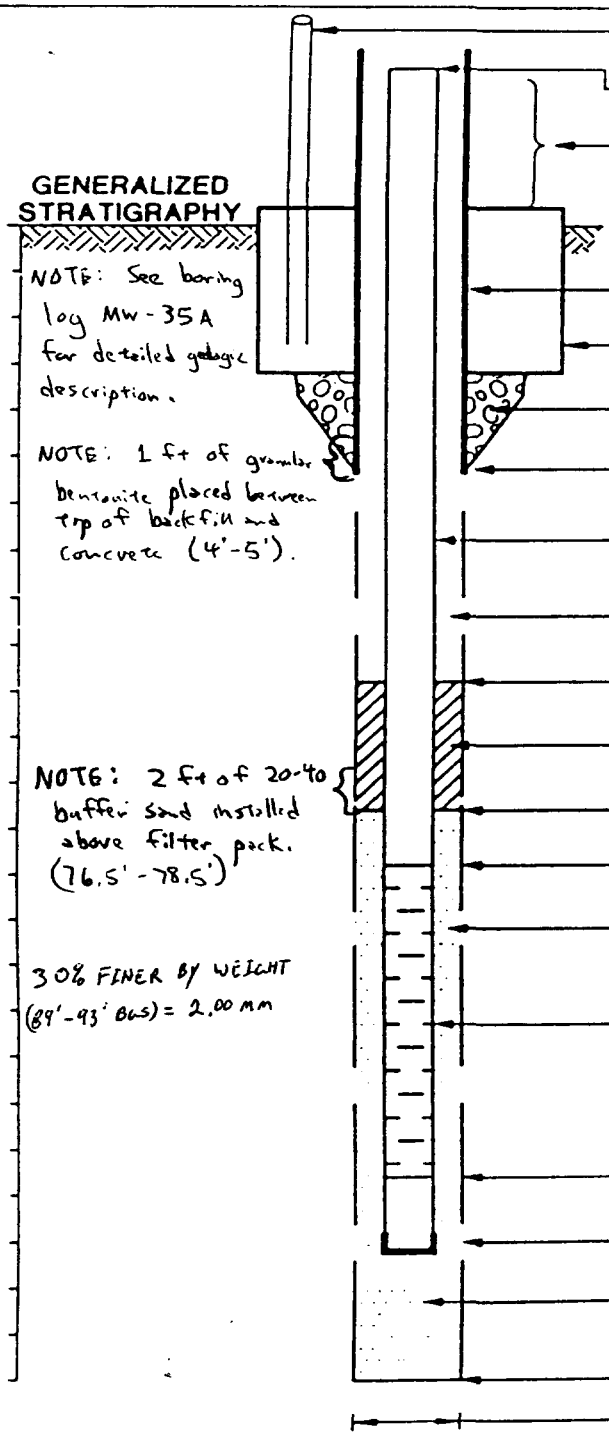
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1156.40
Height of riser above ground: 1.74' ~~2.0'~~
Ground Elevation: 1154.66
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel ~~Square steel~~
Dimen. / Type of Surface Pad: 3'x3'x4" U-mix concrete
Type of surface seal: Concrete
Depth of surface seal: _____
I.D./Type of riser pipe: 2" Schedule 40 PVC Flush-jointed
Type of backfill: Cement bentonite grout
Depth of top of seal: 10.0'
Type of seal: Pure Gold ~~volclay~~ grout
Depth of top of filter pack: 98.0'
Depth of top of screen: 102.0'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" Schedule 40 PVC Factory-slotted
Screen slot size: 0.020"
Depth of bottom of screen at joint: 112.0'
Depth of bottom of plugged bank section: 112.5'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 113.0'
Diameter of boring: 8"

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by WCC - Omaha
Inspected by Jon Ritterling (WCC)
Method of Installation Hollowstem augers; filter pack and grout placed with 1" tremie pipe
Remarks Completion time noted → grout to 10' bgs. Used 190 gallons of water to install filter pack.

Monitor Well No. MW-35A
Project No. 92KW030
Date 6-25-92
Time 1738



Number / Type of Protective Post per cluster	12
Elevation of top of riser pipe	1139.41
Height of riser above ground	1.99' ~~2.0'~~
Ground Elevation	1137.42
I.D./Type of surface casing	4"x4" x 7' square steel
Dimen. / Type of Surface Pad	3'x3'x4" concrete
Type of surface seal	concrete / Granular Bentonite
Depth of surface seal	~~4'~~ 5.0'
I.D./Type of riser pipe	2" Schedule 40 PVC, flush-joint
Type of backfill	cement/bentonite grout
Depth of top of seal	10'
Type of seal	Pure Gold volclay grout
Depth of top of filter pack	78.5'
Depth of top of screen at joint	81.5'
Type of filter pack	4-8 Silica Sand
I.D./Type of screen	2" I.D. Schedule 40 PVC, Factory-slotted
Screen slot size	0.020"
Depth of bottom of screen at joint	91.5'
Depth of bottom of plugged bank section	92.0'
Type of backfill below monitoring well	4-8 Silica Sand
Depth of bottom of boring	92.5'
Diameter of boring	~~8"~~ 8" JMR

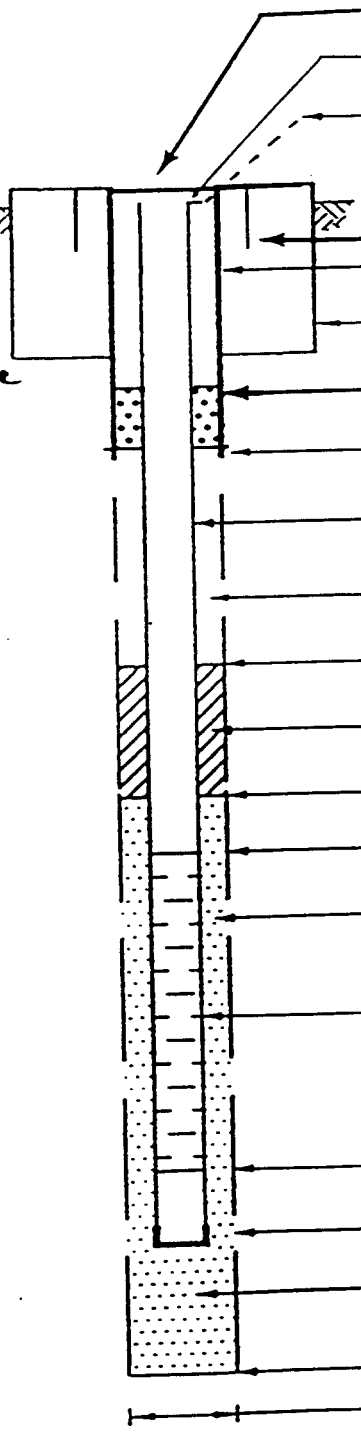
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward Clyde Consultants (Omaha)
Inspected by: Robert Mallissen - WCC Omaha
Method of Installation: 5 7/8" tricone roller bit, rotary washboard. Placed filter pack and Volclay Grout through 1" Tremie pipe. Two Centralizers placed above screen and at 7' below ground. Estimated water loss in screen interval including: 10 gal. drilling fluid, 40 gal. water to flush fluid, and 20 gal water to place filter pack. Total water loss = 70 gal.

Monitor Well No. MW-36A
Project No. 92KW030
Date 8-7-92
Time 1610

GENERALIZED STRATIGRAPHY

See boring log MW36A for detailed geologic description.



Leak Resistant Manhole: 9 5/8"
Elevation of top of riser pipe: 1076.24
Height of riser below ground: -0.22'
Ground Elevation: 1076.46
12" skirt
I.D./Type of surface casing: 6" OD PVC
Dimen. / Type of Surface Pad: 12"x12"x2.2'
Type of filler: Sand 2.2'/Concrete to surface
Depth of surface seal: 2.5'
I.D./Type of riser pipe: 2" PVC sch40 Flush threaded
Type of seal: Cement/Bentonite
Calculated volume: Placed volume:
Depth of top of seal: 7.0'
Type of seal: Angell Grout
Depth of top of filter pack: 25.0'
Depth of top of screen: 28.0'
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 240 lbs Placed volume: 250 lbs
I.D./Type of screen: 2" ID/Sch 40 PVC - factory slotted
Screen slot size: 0.020"
Depth of bottom of screen: 38.0'
Depth of bottom of plugged blank section: 38.5'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 39.0'
Diameter of boring: 6"

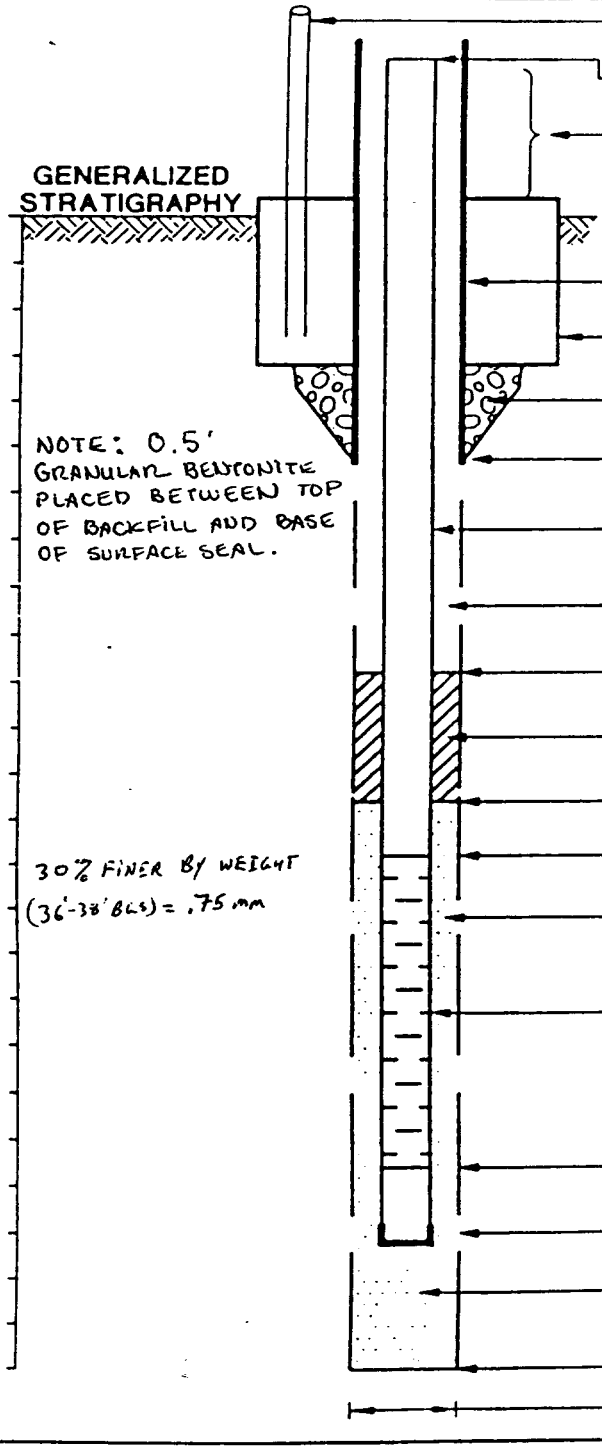
GROUND WATER MONITORING WELL REPORT

Project Name: MEAD, NOP
Location: MEAD, NEBRASKA
Installed by: THE WINNEK COMPANY
Inspected by: LISA MAVAGLIN (WCC)

Monitor Well No. MW-37A
Project No. 92KW030
Date 6-16-92
Time 0940

Method of Installation: FILTER PACKED AND PURE GOLD GROUT PLACED THROUGH TREMIE. 2 CENTRALIZERS @ 10' AND 30'.

Remarks:



Number / Type of Protective Post per cluster: 4

Elevation of top of riser pipe: 1084.83

Height of riser above ground: ~~2 FT~~ 2.15'

Ground Elevation: 1082.68

I.D./Type of surface casing: 4 IN x 4 IN x 7 FT STEEL

Dimen. / Type of Surface Pad: 3 FT x 3 FT x 4 IN / U-mix

Type of surface seal: U-mix ~~Sakrete~~ Rap concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2" SCH 40 PVC, FLUSH JOINT

DEPTH OF TOP OF BACKFILL: 6.0'

Type of backfill: CEM/BENT/PORTLAND TYPE II

Depth of top of seal: 11.0'

Type of seal: "PURE GOLD" GROUT WT = 10.1 lb/GAL

Depth of top of filter pack: 4-8 SAND TO 28.3' 10/20 BUFFER SAND TO 27.8

Depth of top of screen: 30.5'

Type of filter pack: 4-8 SILICA SAND

I.D./Type of screen: 2" SCH 40 MILL SLOTTED

Screen slot size: 0.020 IN

Depth of bottom of screen: 40.5'

Depth of bottom of plugged bank section: 41.0'

Type of backfill below monitoring well: 4-8 SAND FROM 41.0' / NATIVE MTL. FROM 48' TO 45' BENTONITE PELLETS 45' TO 41.5' / 41.5 TO 40.0' NATIVE MTLS.

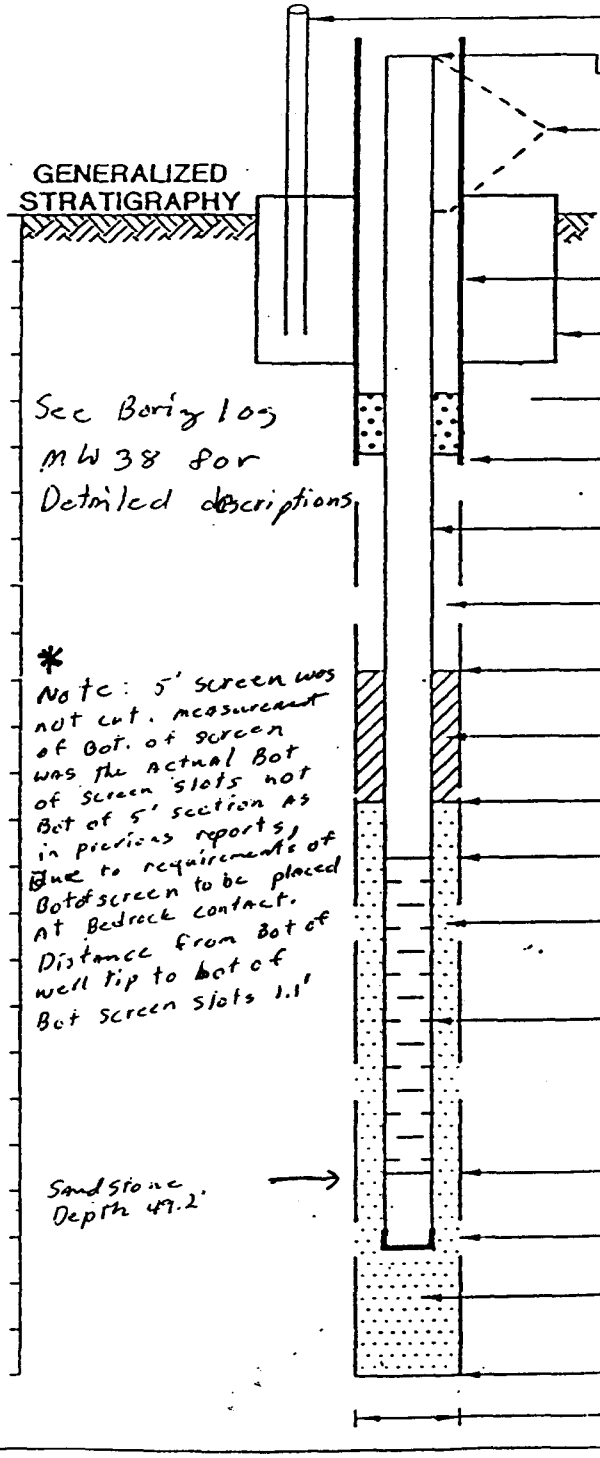
Depth of bottom of boring: 48.0'

Diameter of boring: 9 7/8 TO 43' / 5 7/8 TO 45'

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: U.S. Army Corps of Engineers
Inspected by: B. Exceen (WCC)
Method of Installation: Gravel pack and pure Gold Grout Placed Through Tremie
Remarks: Pipe Centralizer placed 39.7' BGL. DNAPL well.

Monitor Well No. MW-38 A
Project No. 92KW030
Date 8-5-92
Time 1415



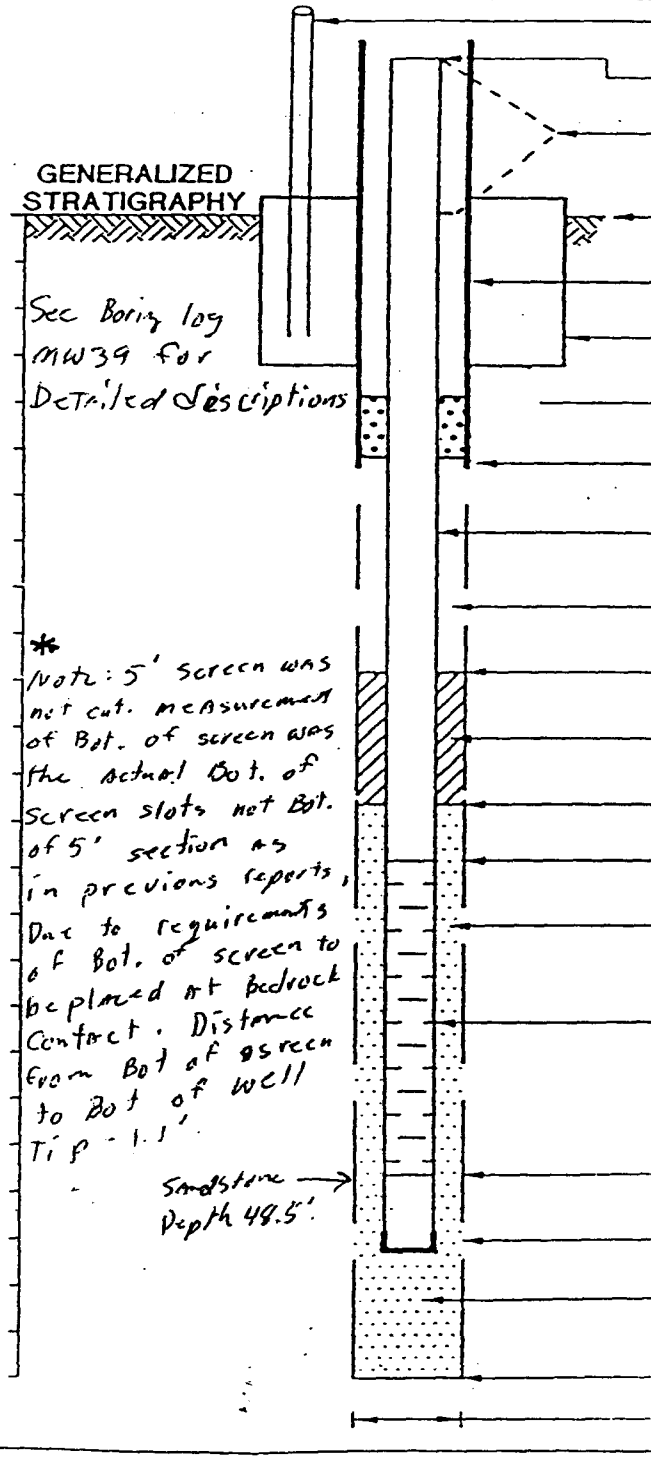
Number / Type of Protective Post: 4
Elevation of top of riser pipe: 1081.95'
Height of riser above ground: 2.34'
Ground Elevation: 1079.61'
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3X3'X4" ~~cement~~ concrete
Type of filler: Granular bentonite 4.0'/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia, flush joint, schedule 40 PVC
Type of seal: Portland Type II cement/Bentonite
Calculated volume: 78 gal Placed volume: 185 gal
Depth of top of seal: 10.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 41.7'
Depth of top of screen: 44.7'
Sieve Test (D_{30} = NA %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 23 gal Placed volume: 29.7 gal
I.D./Type of screen: 2" dia., flush joint, schedule 40 PVC *
Screen slot size: 0.02"
Depth of bottom of screen: 49.2'
Depth of bottom of plugged blank section: 50.3'
Type of backfill below monitoring well: 10-20 Silica sand
Depth of bottom of boring: 51.0'
Diameter of boring: 8"

GROUND WATER MONITORING WELL REPORT

8/11/92

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: US. Army Corps of Engineers
Inspected by: B. Exceen (WCC)
Monitor Well No.: MW-39A
Project No.: 92KW030
Date: 8-7-92
Time: 1505

Method of Installation: Gravel pack and Pure Gold Grout placed through 2" dia. tremie pipe. centralizer placed at 39' BGL.
Remarks: DNAPL Well



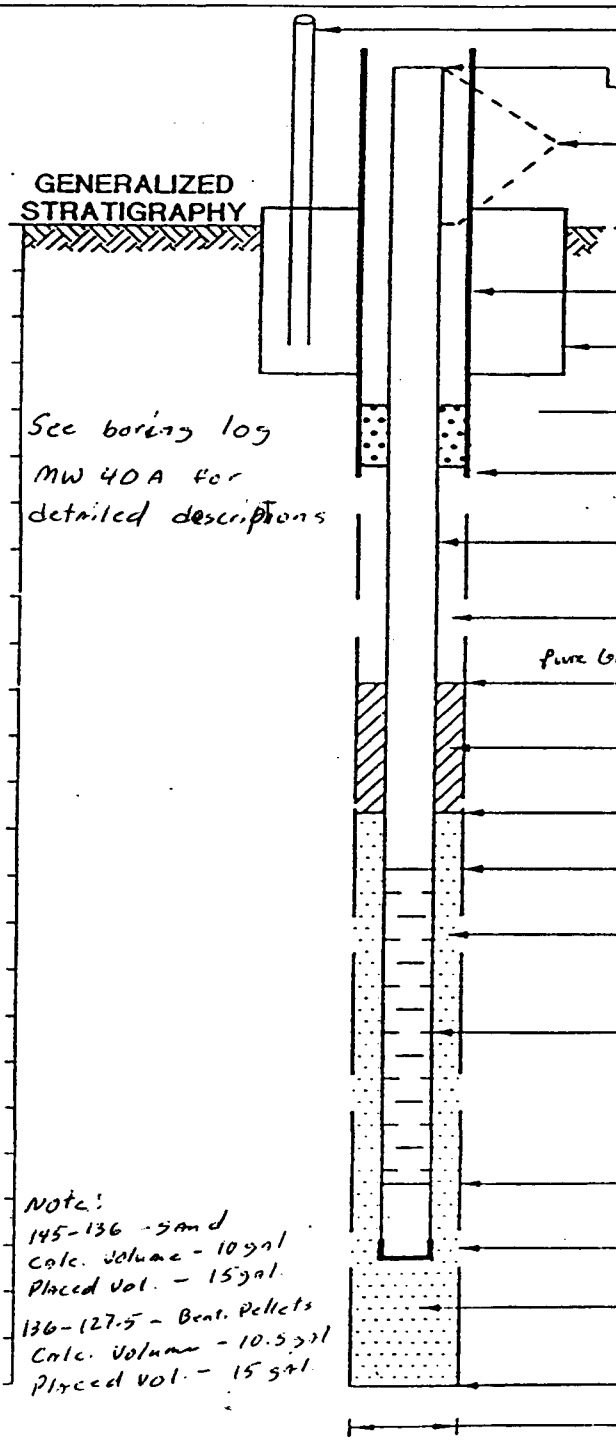
Number / Type of Protective Post: 4
Elevation of top of riser pipe: 1082.45'
Height of riser above ground: 1.82'
Ground Elevation: 1080.63
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of filler: Granular bentonite 4.0'/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia, flush joint, schedule 40, PVC
Type of seal: Portland Type II cement/Bentonite
Calculated volume: 91 gal Placed volume: 130 gal
Depth of top of seal: 10.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 40.0'
Depth of top of screen: 44.0'
Sieve Test (D_{30} = NA)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 27 gal Placed volume: 34 gal
I.D./Type of screen: 2" dia. Schedule 40, flush joint PVC *
Screen slot size: 0.02"
Depth of bottom of screen: 48.5'
Depth of bottom of plugged blank section: 49.6'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 51.0'
Diameter of boring: ~~8~~ 7 7/8"

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: U.S. Army Corps of Engineers
Inspected by: B. Exceen (BJE)
Method of Installation: Gravel pack and Pure Gold Grout placed through 2" dia tremie pipe. Centralizers place at 116', 96', 76', 56', 36' BGL
Remarks:

Monitor Well No. MW-40A
Project No. 92KW030
Date 7-28-92
Time 1440



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1171.67
Height of riser above ground: 2.00' ~~2.15'~~
Ground Elevation: 1169.67
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 5'x5'x4" sakrete cement
Type of filler: Granular bentonite 3.0'
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia, schedule 40, flush joint, PVC
Type of seal: Portland Type II cement
Pure Gold Calculated volume: 398 gal Placed volume: 600 gal
Depth of top of seal: 17.0'
Type of seal: Pure Gold Grout (10.0-10.2 16/gal.)
Calc. vol. - 398 gal Placed volume - 600 gal
Depth of top of filter pack: 118.6'
Depth of top of screen: 120.5'
Sieve Test (D_{30} = 0.50 mm)
Type of filter pack: (127.5-123.0 4-8 sand) (123-118.6 10-20 sand)
Calculated volume: 17.7 gal. Placed volume: 18.0 gal.
I.D./Type of screen: 2" dia, schedule 40, flush joint, PVC
Screen slot size: 0.02"
Depth of bottom of screen: 125.5'
Depth of bottom of plugged blank section: 126.0'
Type of backfill below monitoring well: 145.0-136.0' 10-20 sand 136.0-127.5 Bent. Pellets
Depth of bottom of boring: 145.0'
Diameter of boring: (0-118) 10" (118-128.7) 7.25" (128.7-145) 5.5"

Woodward-Clyde Consultants

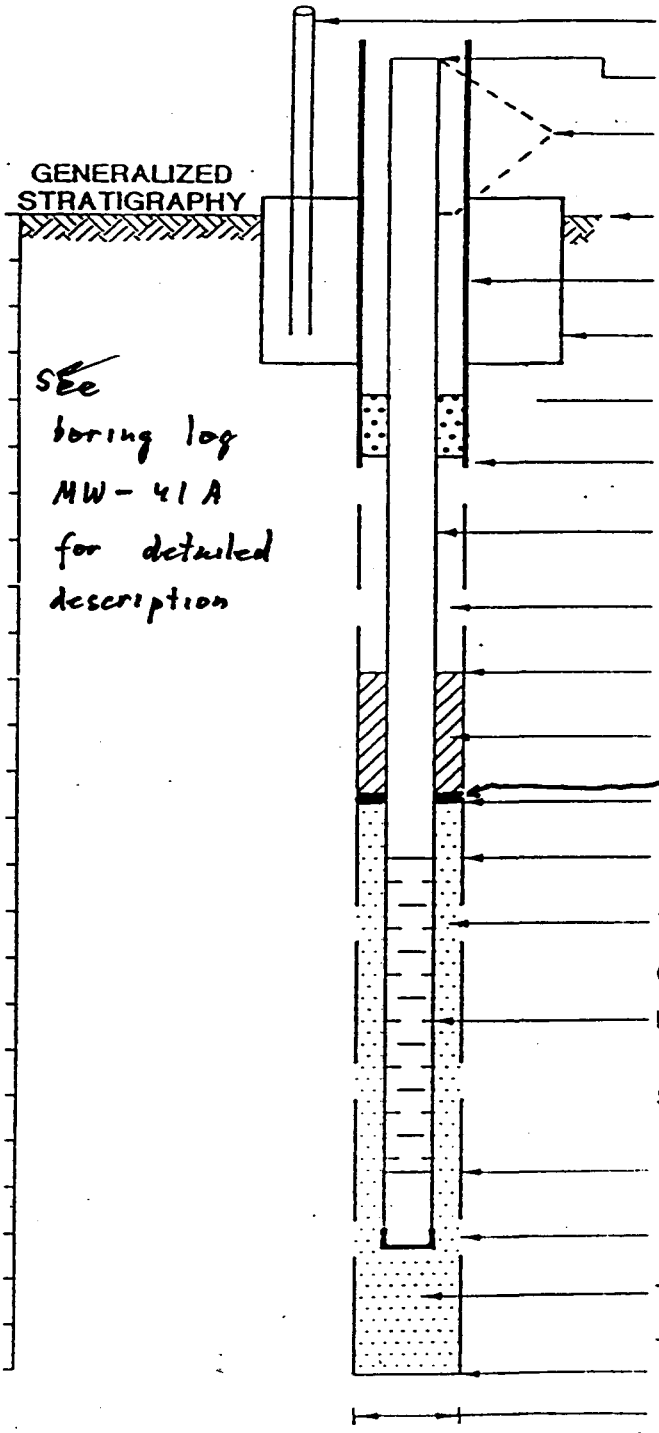
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)

Monitor Well No.: MW-41A
Project No.: 92KW030
Date: 8-8-92
Time: 14:10

Method of Installation: Bentonite pellets were placed by hand; filter pack, buffer and "Pure Gold" grout were placed through 1-inch-dia PVC tremie-pipe deflector used for grout placement. Centralizers positioned @ depths 7, 27, 47, 67 ft

~~Remarks~~



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1168.21'
Height of riser above ground: 2.31'
Ground Elevation: 1165.90'
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of filler: Granular bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch-dia. threaded flush-coupled Sched. 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 77 gals Placed volume: 80 gals
Depth of top of seal: ~10 ft
Type of seal: "Pure Gold" Bentonite Grout (10.3 lbs/gal)
Depth of top of buffer sand: 68.1
Depth of top of filter pack: 68.4
Depth of top of screen: 71.5
Sieve Test (D_{30} = NA %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 17 gals Placed volume: 22 gals
I.D./Type of screen: 2-inch-dia mill-slotted threaded flush-coupled Schedule 40 PVC
Screen slot size: 0.02 inch
Depth of bottom of screen: 81.5
Depth of bottom of plugged blank section: 82.0
Type of backfill below monitoring well: Bentonite pellets (82.3 to 83.0); native materials (83.0 to 83.3); 10-20 sand (82.0 to 82
Depth of bottom of boring: 83.3
Diameter of boring: 5 7/8 ~~6.0~~" to 83; 2" to 83.3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants (Omaha)
Inspected by: Robert Mallisee WCC (Omaha)

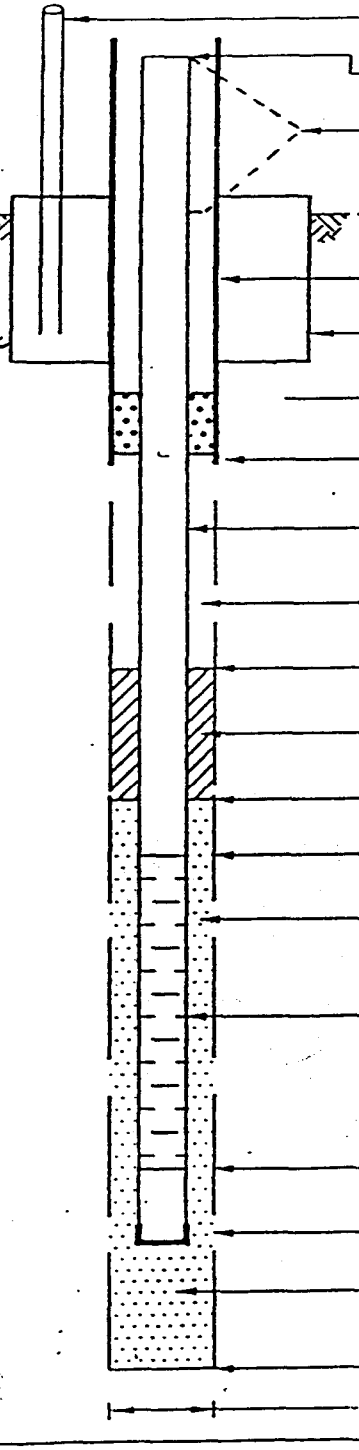
Monitor Well No. MW-42A
Project No. 92KW030
Date 8-6-92
Time 1000

Method of Installation: 5 7/8" Tricone roller bit - rotary/wash boring. Placed filter sand and grout through 1" Tremie pipe. Five centralizers placed above screen at ~ 85, 65, 45, 25 & 15'. Estimated water loss in screen interval includes: 80 gal. drilling fluid, 200 gal. water to flush drilling fluid, and 40 gal. water to place filter pack. Total water loss = 300 gal.

Remarks

GENERALIZED STRATIGRAPHY

See boring log MW-42A for detailed geologic description.

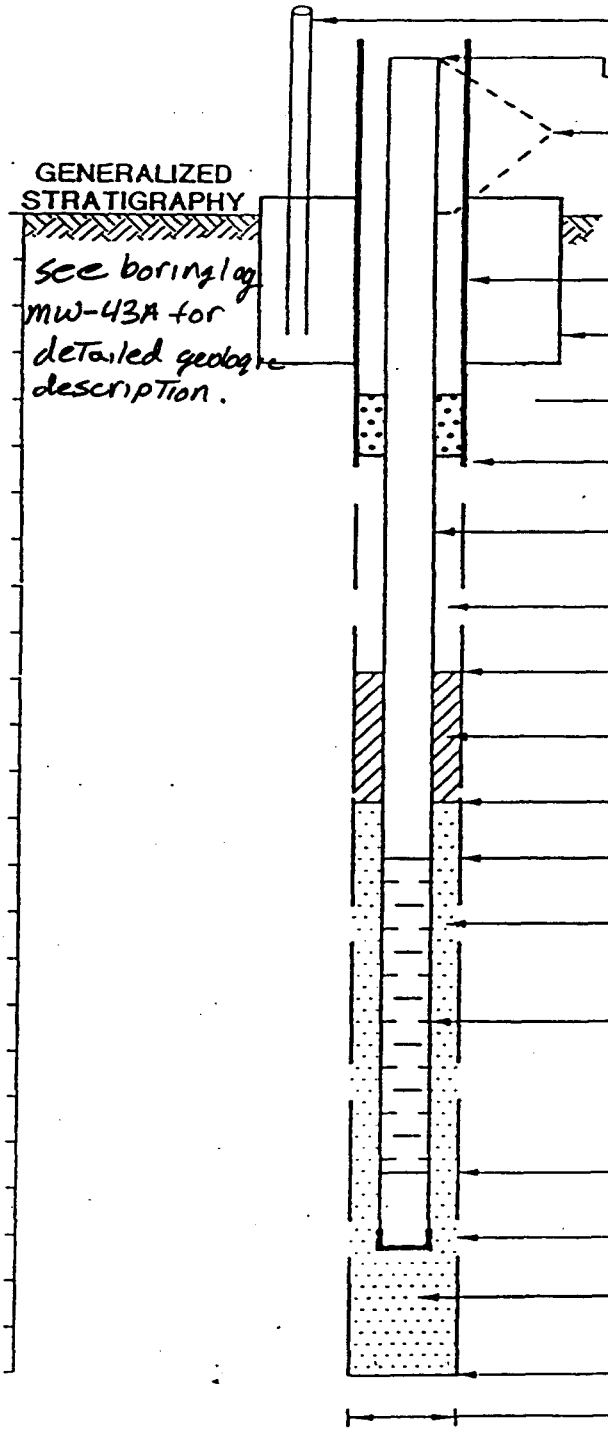


Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1146.14
Height of riser above ground: 1.99'
Ground Elevation: 1144.15
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3' X 3' X 4" Concrete
Type of filler: Granular bentonite / concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 9.7 gal. Placed volume: 100 gal.
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 83.0
Depth of top of screen: 86.0
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 240 lbs. Placed volume: 200 lbs.
I.D./Type of screen: 2" I.D. Schedule 40 PVC factory-slotted
Screen slot size: 0.020"
Depth of bottom of screen: 96.0
Depth of bottom of plugged blank section: 96.5
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 97.5
Diameter of boring: 6"

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants (Omaha)
Inspected by: Robert Mallisee WCC (Omaha)
Method of Installation: 5 7/8" Tricone roller bit - rotary/wash boring. Placed filter pack and Volclay
Remarks: grout through 1" tremie pipe. 5 centralizers placed above screen at 88', 68', 48', 28' & 11'. Estimated water loss in screen interval includes: 20 gal. drilling fluid, 30 gal. water used to flush drilling fluid, and 10 gal. water to place filter pack. Total water loss = 60 gal.

Monitor Well No.: MW-43A
Project No.: 92KW030
Date: 8-4-92
Time: 1432



Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1142.51'
Height of riser above ground: 1.88'
Ground Elevation: 1140.63'
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of filler: Granular bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" I.D. Schedule 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 103 gal. Placed volume: 110 gal.
Depth of top of seal: 10.0'
Type of seal: "Pure Gold" Volclay Grout
Depth of top of filter pack: 87.5'
Depth of top of screen: 90.5'
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 240 lbs. Placed volume: 250 lbs.
I.D./Type of screen: 2" I.D. Schedule factory-slotted
Screen slot size: 0.020"
Depth of bottom of screen: 100.5'
Depth of bottom of plugged blank section: 101.0'
Type of backfill below monitoring well: natural cave / 10-20 Silica Sand
Depth of bottom of boring: 102.0'
Diameter of boring: 6"

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: WCC - (Omaha)
Inspected by: Robert Mallisee (~~EIC~~)

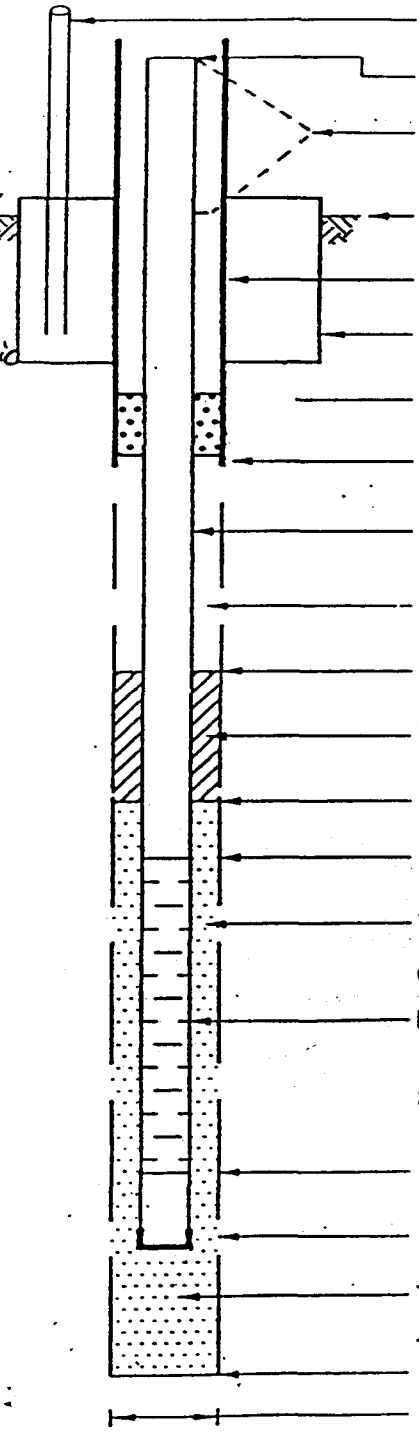
Monitor Well No. MW-44A
Project No. 92KW030
Date 7-29-92
Time 1458

Method of Installation: 6" drag bit - rotary/wash boring. Placed filter pack and Volclay grout through 1" tremie pipe. Two centralizers placed above screen at ~ 27 ft. and 10' bgs. Est. water loss in screen interval includes: 30 gal. drilling fluid, 90 gal. water to flush drilling fluid, and 40 gal. water to place filter pack. Total water loss = 160 gal.

Remarks:

GENERALIZED STRATIGRAPHY

See boring log MW-44A for detailed geologic description.



Number / Type of Protective Post per cluster: 12

Elevation of top of riser pipe: 1093.30'

Height of riser above ground: 1.77'

Ground Elevation: 1091.53'

I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel

Dimen. / Type of Surface Pad: 3'X3'X4" Concrete

Type of filler: Granular bentonite/concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2" schedule 40 PVC

Type of seal: Cement/Bentonite

Calculated volume: 22 gal. Placed volume: 25 gal.

Depth of top of seal: 10.5'

Type of seal: "Pure Gold" ~~Holeplug~~ grout

Depth of top of filter pack: 25.0

Depth of top of screen: 29.6

Sieve Test (D_{30} = 0.30 mm)

Type of filter pack: 10-20 silica sand

Calculated volume: 240 lbs. Placed volume: 260 lbs.

I.D./Type of screen: 2" schedule 40 PVC factory-slotted

Screen slot size: 0.020"

Depth of bottom of screen: 39.5

Depth of bottom of plugged blank section: 40.0'

Type of backfill below monitoring well: 10-20 silica sand and

Depth of bottom of boring: 42.5'

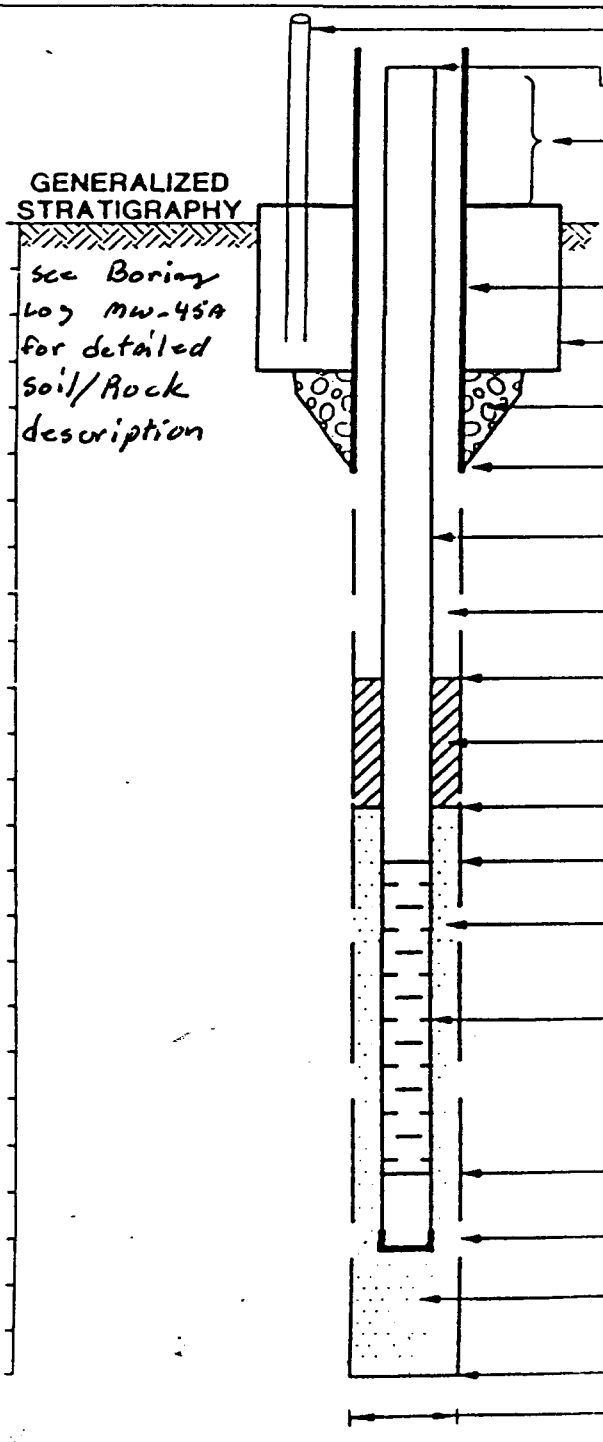
Diameter of boring: ~~6"~~ 5 7/8"

FIGURE 6-3 Cell 11411

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: SW SW SW Sec 26 T1N R9E
Installed by: The Winnek Companies
Inspected by: R. G. Pacheco
Method of Installation: Filter pack sand, buffer sand and Puregold grout trimmed in.
Remarks: 2 Stainless Steel Centralizers @ 27' and 17' bgs.

Monitor Well No. MW-45A
Project No. 92KW030
Date 7/23/92
Time 10:18



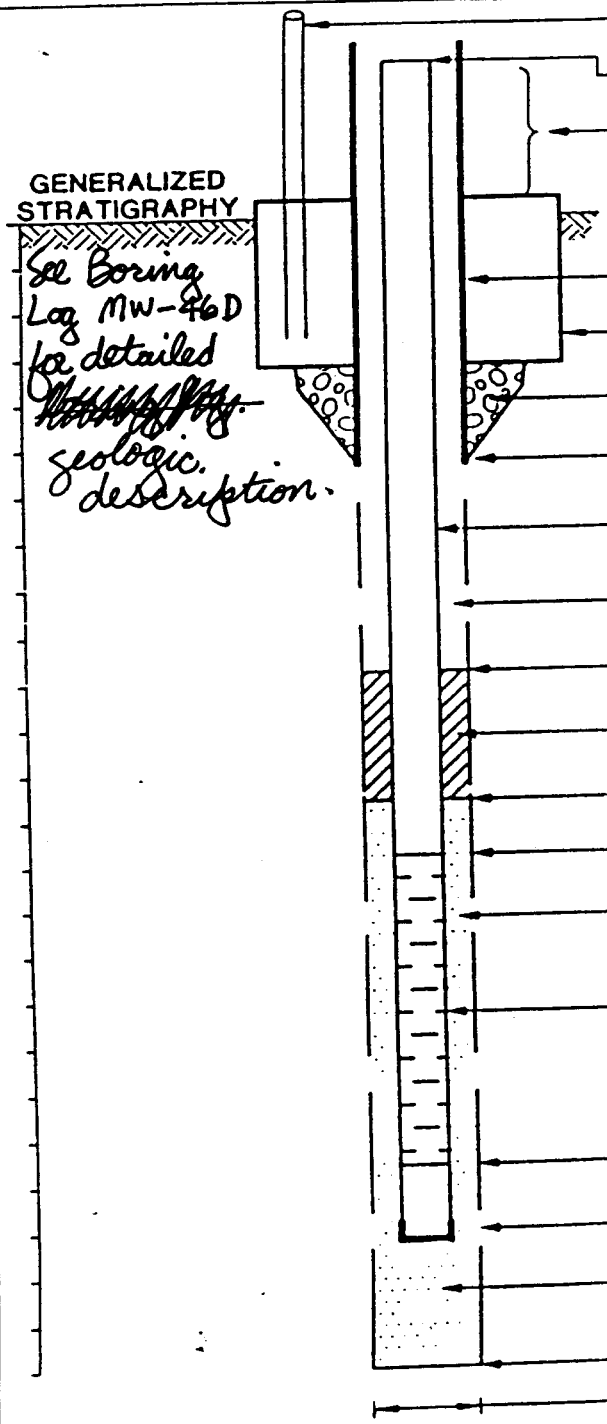
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1081.15 ~~1.96' 2 ft~~
Height of riser above ground: 1.96'
Ground Elevation: 1079.19
I.D./Type of surface casing: 4"x4"x7' Galanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite/u-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch/Sch. 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: ~10
Type of seal: Puregold grout (10.1 #/gal) (4.0 Bags used)
Depth of top of filter pack: 24.9 ft (10/20 Buffer Sand) 26.1 ft ~~(4/8 Filter Pack)~~
Depth of top of screen: 28.0
Type of filter pack: 4/8 Silica Sand (3.0 Bags used, 2.5 Bags estimated)
I.D./Type of screen: 2-inch/Sch 40 PVC
Screen slot size: 0.02 inch
Depth of bottom of screen: 38.0
Depth of bottom of plugged bank section: 38.5
Type of backfill below monitoring well: 4/8 Silica Sand
Depth of bottom of boring: 39.0
Diameter of boring: 5 7/8" - 6.0"

FIGURE 6-3 ~~WA~~ 7/24/92

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, NE
Installed by: Woodward-Clyde Consultants
Inspected by: J. Nealon
Method of Installation: RWB with 5 7/8" tricone roller bit. Tremied 20/40 sand filter pack and grout. Centralizers at 32' and 12'. Water losses: 0-34, 88 gal; 34-48, 101 gal; flushing, 100 gal; redrill, 52 gal; reflush, 100 gal; filter pack placement, 50 gal.
Remarks:

Monitor Well No. MW-46A
Project No. 92KW030
Date 7-23-92
Time 1810



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1082.32
Height of riser above ground: 1.99'
Ground Elevation: 1080.33
I.D./Type of surface casing: 4"x 4"x 7' GAL. Steel
Dimen. / Type of Surface Pad: 3'x3'x4" concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2 in / Schedule 40 PVC
Type of backfill: Cement/Bentonite
Depth of top of seal: 10'
Type of seal: Pure Gold grout @ 10.0 #/gal (est. 24 gal. Used 40 gal).
Depth of top of filter pack: 30.2
Depth of top of screen: 33.2
Type of filter pack: 20/40 silica sand (2.3 - 100 # bags est. 5.5 - 100 # bags used)
I.D./Type of screen: 2 inch / Schedule 40 PVC factory slotted
Screen slot size: 0.010 inch
Depth of bottom of screen: 43.2
Depth of bottom of plugged bank section: 43.7
Type of backfill below monitoring well: natural sand and gravel slough
Depth of bottom of boring: 48'
Diameter of boring: 6", 0-48

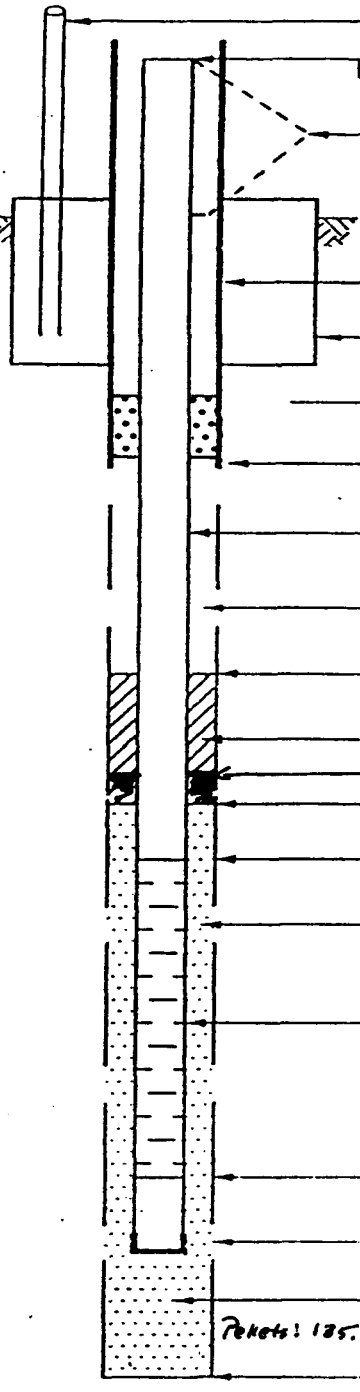
Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: The Winnek Companies (Bill Vick)
Inspected by: ~~Woodward Clyde~~ (Theresa Hecht)
Method of Installation: Direct Rotary
Remarks: Filter pack & Grout placed w/ 1" tremie, grout w/ side deflector
5 centralizers, first 4' above screen, rest every 20'

Monitor Well No. MW- 47A
Project No. 92KW030
Date 8/9/92
Time 1330

GENERALIZED STRATIGRAPHY
See Boring log MW-47A for details



Number / Type of Protective Post per Cluster: 12
Elevation of top of riser pipe: 1201.27
Height of riser above ground: 1.97'
Ground Elevation: 1199.30
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of filler: Granular bentonite/Concrete
Depth of surface seal: ~~23~~ 5.0'
I.D./Type of riser pipe: 2" threaded, flush coupled PVC
Type of seal: Cement/Bentonite
Calculated volume: 26.8 ft³ Placed volume: 33.5 ft³
Depth of top of seal: 23'
Type of seal: Pure Gold Bentonite Grout
Depth of top of buffer sand (20-90): 104.8'
Depth of top of filter pack: 105.1'
Depth of top of screen: 112.8'
Sieve Test (D_{30} = NA %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 5.5 Placed volume: 5.5 gals
I.D./Type of screen: 2" flush thread mill slotted PVC
Screen slot size: 0.020
Depth of bottom of screen: 122.8'
Depth of bottom of plugged blank section: 123.3'
Type of backfill below monitoring well
Pellets: 125.25-126.0 / 10-20 Sand 126-124.2 / Fill in 124.2 - 123.3
Depth of bottom of boring: 135.25'
Diameter of boring: 7 7/8" 0-130.0; ~~5"~~ 130.0 - 135.25; 4 5/8"

CWA 01227

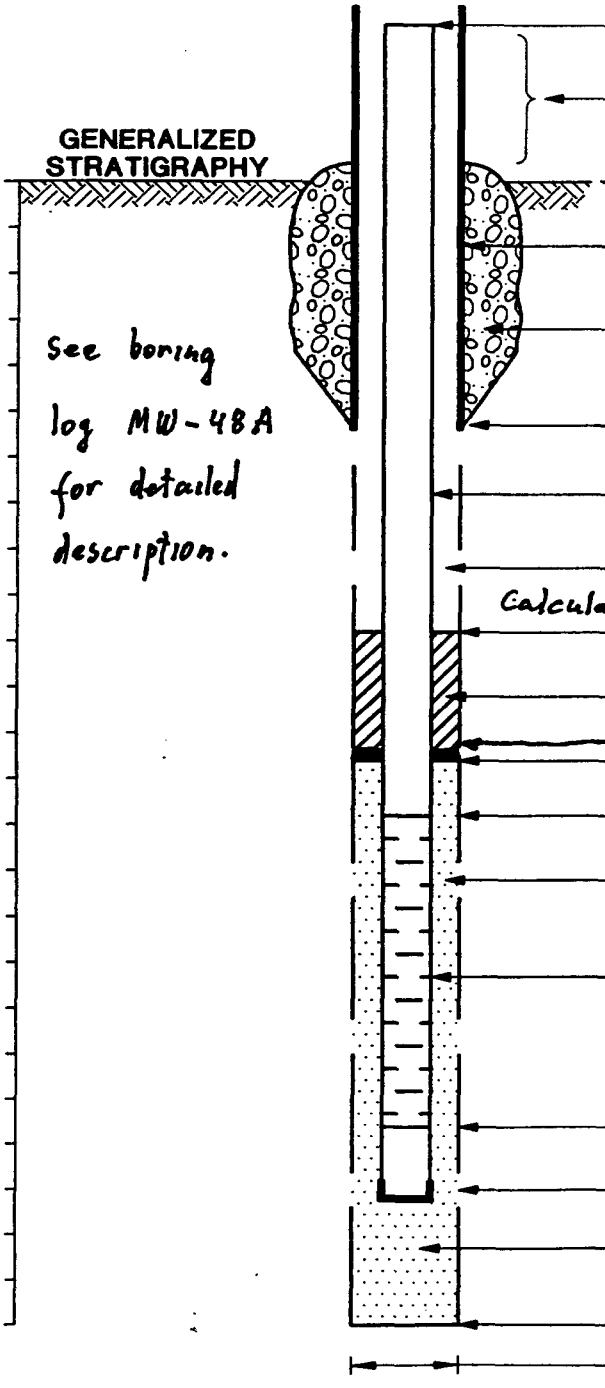
GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)

Monitor Well No. MW-48A
Project No. 92 KW 030
Date 8-7-92
Time 15:40

Method of Installation: Bentonite pellets, filter pack, "Pure Gold" grout placed through
Remarks: 0.9-inch-ID PVC tremie pipe. Deflector was used for grout placement
Centralizers were positioned @ the depths 8, 28, 48, 68, 88 and 108 ft

protective post per cluster: 8



Elevation of top of riser pipe: 1192.99

Height of riser above ground: 2.0

Ground Elevation: 1190.91

I.D./Type of surface casing: 4"x4"x7' Galvanized Steel

Type of surface seal: Granular Bentonite/Concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia Sch. 40, threaded flush-coupled PVC

Type of backfill: Cement/Bentonite
Calculated vol. 260 gals Placed vol. 330 gals

Depth of top of seal: ~~5 ft~~ RBP 17.0'

Type of seal: "Pure Gold" Bentonite Grout (10.1-10.2)

~~Depth of top of buffer sand~~ (20-40) 107.0

Depth of top of filter pack: 108.1

Depth of top of screen: 110.7

Type of filter pack: 10-20 Silica Sand
Calculated Volume 37 gals Placed vol. 31 gal

I.D./Type of screen: 2-inch-dia. mill-slotted Sch. 40, threaded, flush-coupled PVC

Screen slot size: 0.02

Depth of bottom of screen: 120.7

Depth of bottom of plugged blank section: 121.2

Type of backfill below monitoring well: Native materials, bentonite pellets, 10-20 sand

Depth of bottom of boring: ~~123.0~~ 124.0

Diameter of boring: 8.0" to 122.0; 5.5" to 124.0

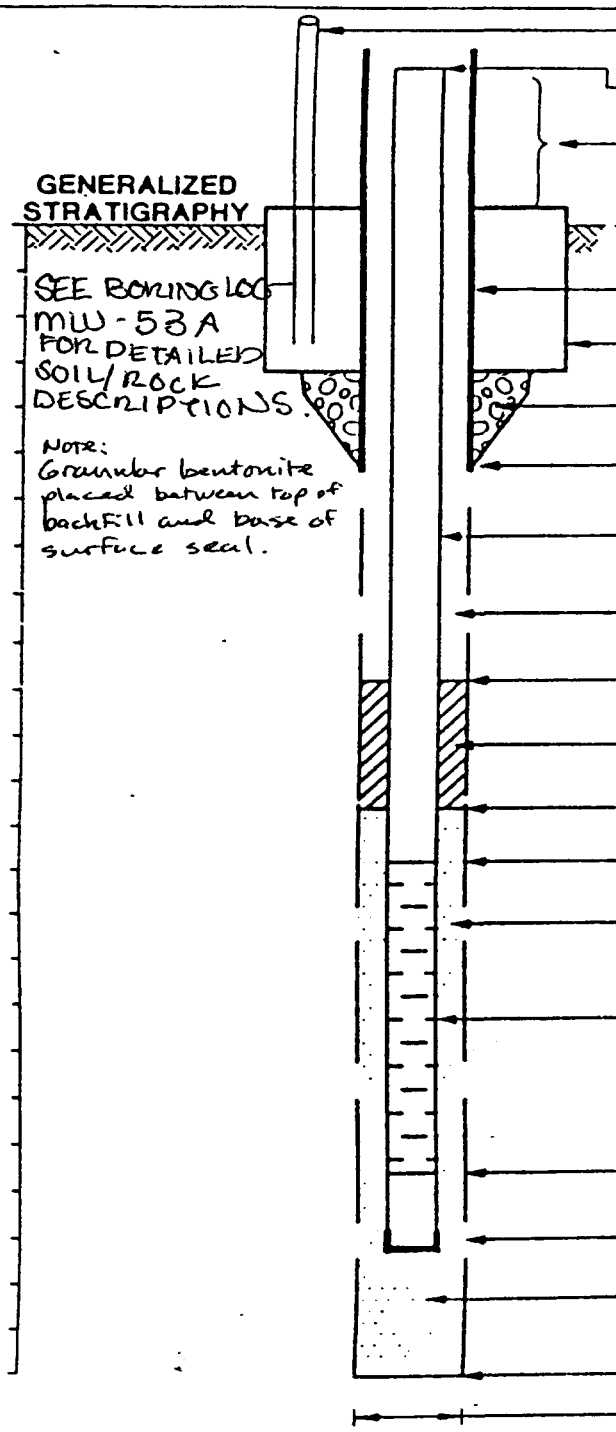
Woodward-Clyde Consultants

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD N.O.P.
Location: MEAD, NEBRASKA
Installed by: WINNEK COMPANY
Inspected by: LISA TRAVAGLIN (WCC)
Method of Installation: FILTER PACKED AND PURE GOLD GROUT PLACED
Remarks: THROUGH 1" TREMIE. 4 CENTRALIZERS @ 86' 66' 46' 36'

Monitor Well No. MW-53A
Project No. 92KW030
Date 6-30-92
Time 1000



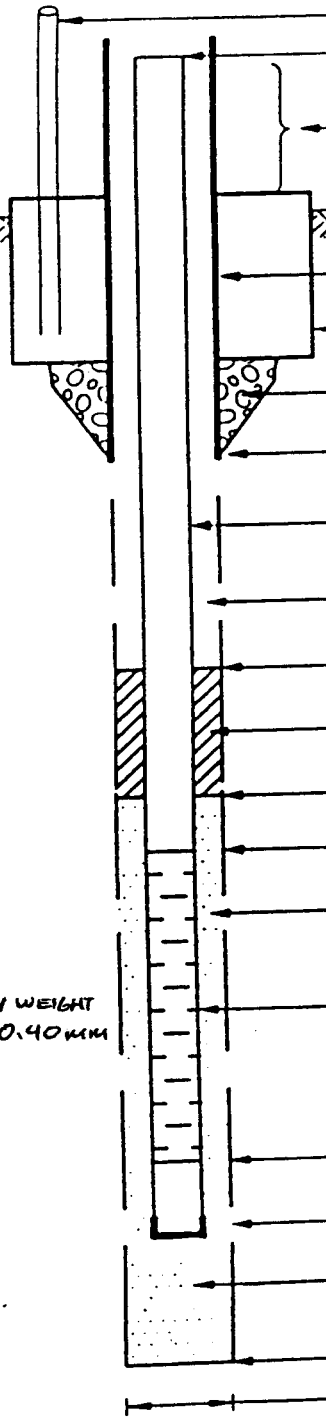
Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1135.96
Height of riser above ground: 1.94'
Ground Elevation: 1134.02
I.D./Type of surface casing: 4IN x 4IN x 7FT Galvanized STEEL
Dimen. / Type of Surface Pad: 3FT x 3FT x 4 IN Conc
Type of surface seal: Granular Bentonite / Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" DIM SCH 40, FLUSH JOINT
Depth to top of backfill: _____
Type of backfill: Cement / Bentonite
Depth of top of seal: ~16.0 FT
Type of seal: PURE GOLD GROUT
GROUT WT = 10.2 lb/GAL.
Depth of top of filter pack: 20-40 BUFFER SAND TO 83.1'
Depth of top of screen: 87.0 FT
Type of filter pack: 4-8 SILICA SAND FROM 98.5' TO 84.4'
20-40 BUFFER SAND FROM 84.4' TO 83.1'
I.D./Type of screen: 2" SCH 40 MILL SLOT
Screen slot size: 0.020 IN
Depth of bottom of screen: 97.0 FT
Depth of bottom of plugged bank section: 97.5 FT
Type of backfill below monitoring well: 101.0' TO 98.5' BENT. PELLETS / 4-8 SAND BEGINNING @ 98.5'
Depth of bottom of boring: 101.0'
Diameter of boring: 6"

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP.
Location: MEAD, NEBRASKA
Installed by: WINNER COMPANY
Inspected by: USA TRAVAGLIN (WCC)
Method of Installation: FILTER PACK AND PURE GOLD GROUT PLACED THROUGH 1 IN TREMIE. 5 CENTRALIZERS @ 65', 55', 45', 35' AND 25'
Remarks:

Monitor Well No. MW-54A
Project No. 92FW030
Date 6-27-92
Time 1550

GENERALIZED STRATIGRAPHY



Number / Type of Protective Post per cluster: 6
Elevation of top of riser pipe: 1121.17
Height of riser above ground: ~~2 FT.~~ 1.86'
Ground Elevation: 1119.31
I.D./Type of surface casing: 4IN X 4IN X 7FT ~~STEEL~~ Galvanized
Dimen. / Type of Surface Pad: 3FT X 3FT X 4IN Concrete
Type of surface seal: Granular Bentonite / concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" SCH 40 FLUSH JOINT PVC
Type of backfill: CEMENT / BENT / PORTLAND TYPE I
Depth of top of seal: ~~62.0'~~ 28.0' ~~(20-40 BUFFER SAND)~~
Type of seal: PURE GOLD GROUT
GROUT WT = 10.2 lb/GAL
Depth of top of filter pack: 62.0' (20-40) BUFFER SAND
Depth of top of screen: 66.0'
Type of filter pack: 4-8 SAND 81.0' TO 63.0' / 20/40 BUFFER SAND TO 62.0'
I.D./Type of screen: 2" SCH 40 MILL SLOTTED
Screen slot size: 0.020 IN
Depth of bottom of screen: 76.0'
Depth of bottom of plugged bank section: 76.5'
Type of backfill below monitoring well: ~~79.0 FILTER PACK~~ BENTONITE PELLETS
NATIVE MTL. 83.5' TO 81.0' / 81.0' TO 79.0 FILTER PACK
Depth of bottom of boring: 83.5'
Diameter of boring: 6"

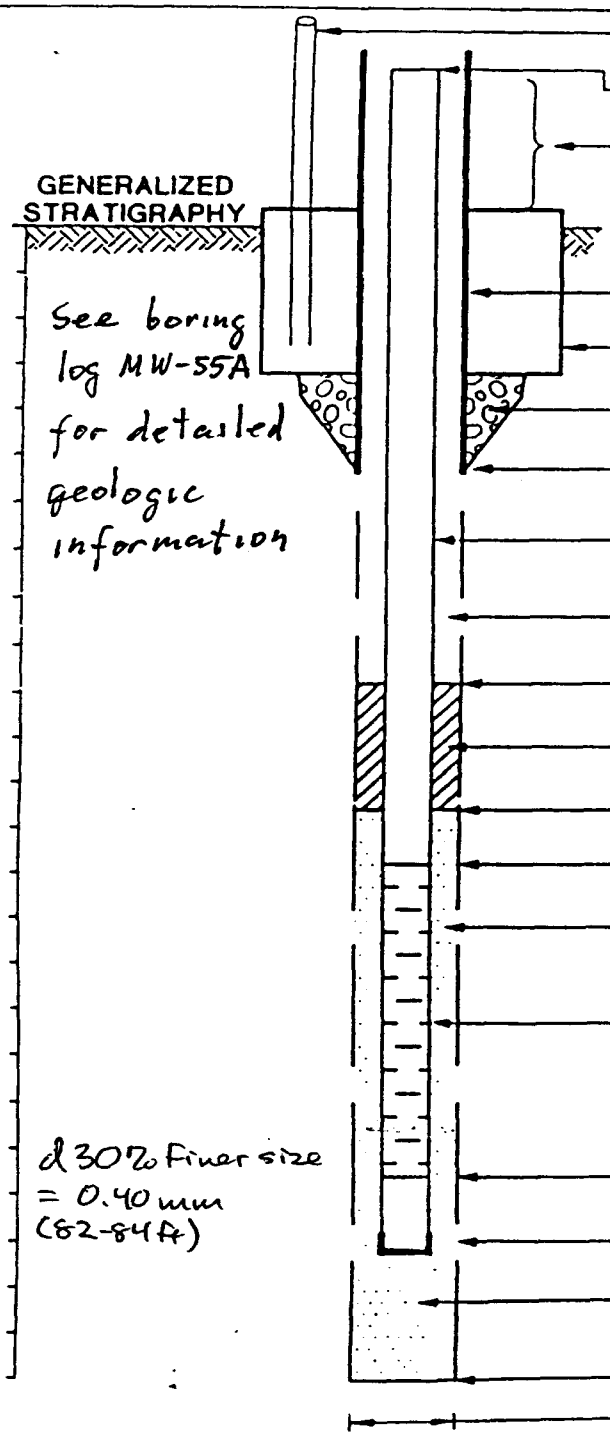
30% FINER BY WEIGHT (72'-74' BGS) = 0.40 MM

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead Ne
Installed by: Winnek
Inspected by: B. Hedenkamp
Method of Installation: tremied ~~materials~~ filter pack and pure gold grout
Remarks: 4 ~~3~~ centralizers 10', 30', 50', 70'

Monitor Well No. MW-55A
Project No. 92KW030
Date 7/7/92
Time 1520



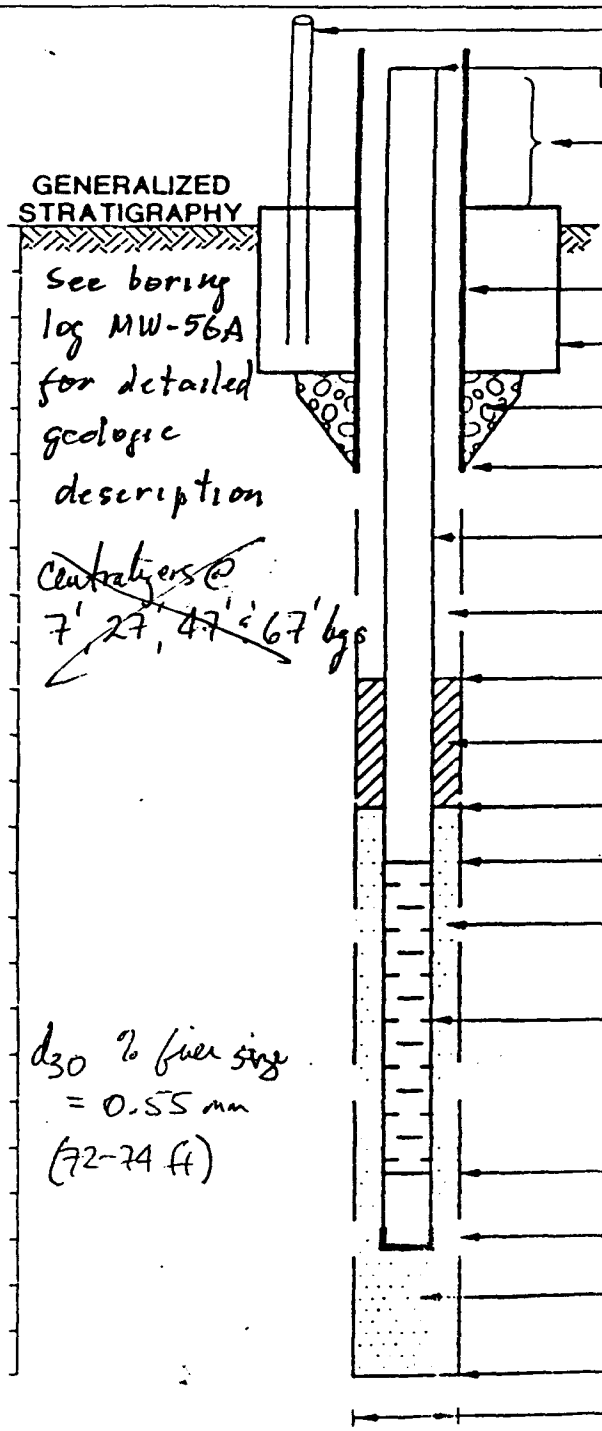
Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1126.09
Height of riser above ground: 1.97'
Ground Elevation: 1124.12
I.D./Type of surface casing: 4"x4"x7' galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" concrete
Type of surface seal: Granular Bentonite / concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2in / schedule 40 PVC
Type of backfill: ~~AA~~ PGP cement Bentonite
Depth of top of seal: 10
Type of seal: Pure gold ~~Volclay~~ grout, 10.2 lbs/gal (105 gal est / 132 gal used)
Depth of top of filter pack: 72
Depth of top of screen: 74
Type of filter pack: 10/20 sand (2.2·100# bags est. 2.5·100# bags used)
I.D./Type of screen: 2in / PVC schedule 40
Screen slot size: 0.020in
Depth of bottom of screen: 84 ft
Depth of bottom of plugged bank section: 84½ ft
Type of backfill below monitoring well: bentonite pellets
Depth of bottom of boring: 87 ft
Diameter of boring: 5⅞ in 38ft - 87ft
7⅞ in 0 - 38ft

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: MW-56A
Installed by: Winnek Company
Inspected by: B. Hedenkamp
Method of Installation: ~~Tremied~~ Filter pack and pure gold grout placed w/tremie pipe
Remarks: 4 centralizers @ 7', 27', 47', 67' bgs

Monitor Well No.: MW-56A
Project No.: 92KW030
Date: 7/10/92
Time: 1220



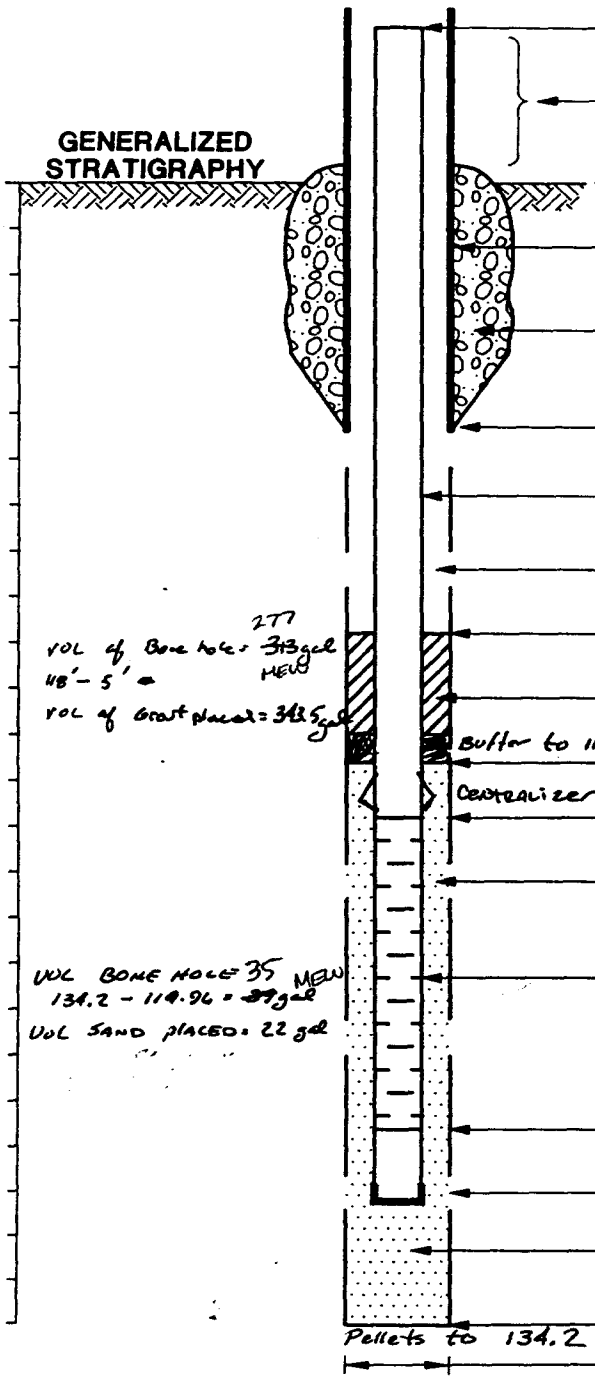
Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1125.56
Height of riser above ground: ~~2ft~~ 1.79'
Ground Elevation: 1123.77
I.D./Type of surface casing: ~~4in / [illegible]~~ 4"x4"x7' galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5 ft
I.D./Type of riser pipe: 2in / sch 40 PVC
Type of backfill: Cement grout
Depth of top of seal: 10 ft
Type of seal: Pure gold grout (10.2 lbs/gal) (7.2-50# bags est, 8.0 bags used) 101 gallons 112 used
Depth of top of filter pack: 66 ft
Depth of top of screen: 69 ft
Type of filter pack: 4/8 sand (2.2-100# bags est 2.4-100# bags used)
I.D./Type of screen: 2in / sch 40 PVC
Screen slot size: 0.02
Depth of bottom of screen: 79 ft
Depth of bottom of plugged bank section: 79½ ft
Type of backfill below monitoring well: bentonite pellets 80-82 / 4-8 sand 79½-80 ft
Depth of bottom of boring: 82 ft
Diameter of boring: 5 7/8 in (46.5 to 82 ft)
7 7/8 in (0 to 46.5 ft)

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: MEAD, NEBRASKA
Installed by: THE Winnek Companies, Bill Vick
Inspected by: WOODWARD Clyde Consultants, Terri Hecht
Method of Installation: Direct Rotary
Remarks: SAND & Grout placed w/ 2" tremie, 1 centralizer just above well screen

Monitor Well No. MW-58A
Project No. 92KW030
Date 7/12/92
Time 1400



protective post per cluster RB 12

Elevation of top of riser pipe 1174.94

Height of riser above ground ~~2.72~~ 1.89'

Ground Elevation 1173.05

I.D./Type of surface casing 4"x4"x7' Galvanized Steel

Type of surface seal Granular Bentonite/Concrete

Depth of surface seal 5.0'

I.D./Type of riser pipe 2" Schedule 40 PVC

Type of backfill Cement/Bentonite

Depth of top of seal ~~5~~ RB 19.0'

Grout wt 10.1, 10.0, 10.1

Type of seal PURE GOLD BENTONITE GROUT PLACED w/ 2" Deflected Tremie

Depth of top of filter pack 119.96

Depth of top of screen 122.55

Type of filter pack 10-20 SILICA SAND

I.D./Type of screen 2" mill slotted Schedule 40 PVC

Screen slot size 0.020"

Depth of bottom of screen 132.55

Depth of bottom of plugged blank section 133.03

Type of backfill below monitoring well 10-20 Silica Sand to 134.2', bentonite pellets 134.2 to 144

Depth of bottom of boring 144.5 plugged to 139

Diameter of boring 8" to 139.1, 4½ to 139.1 to 144.5

CW 7/27/94

GROUND WATER OBSERVATION WELL REPORT

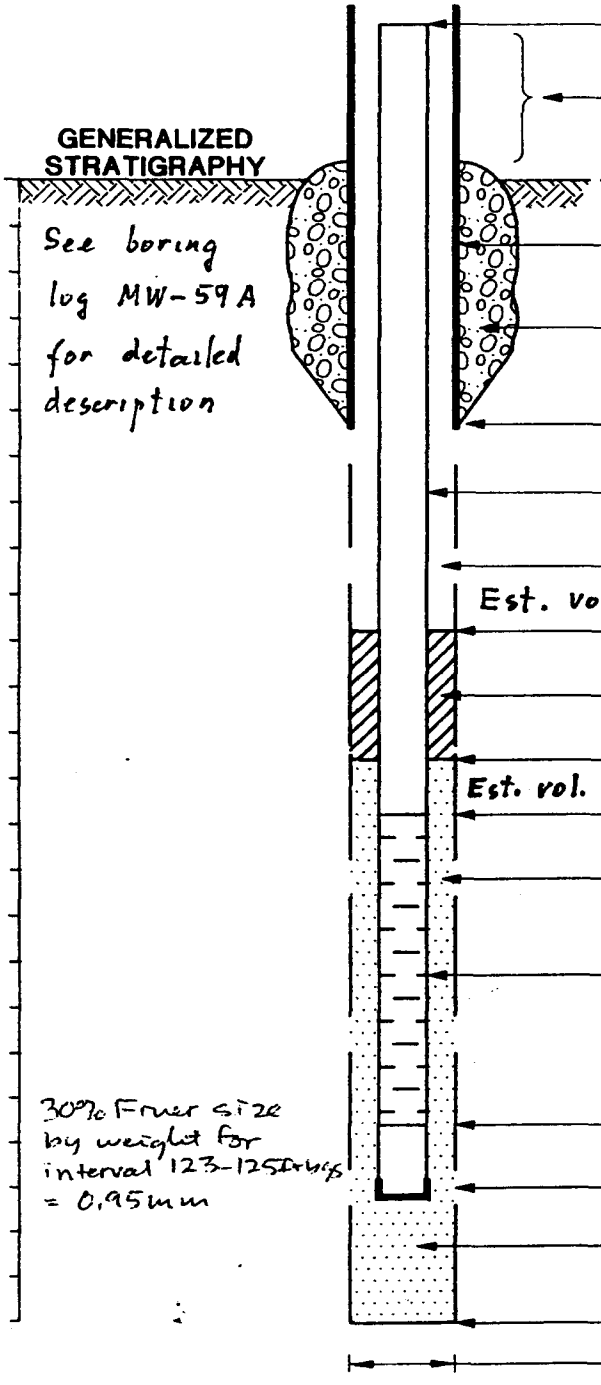
Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)

Piez./Well No. MW-59 A
Project No. 92 KW 030
Date 7-26-92
Time 15:20

Method of Installation: Filter pack, buffer sand and "Pure Gold" grout were placed through the tremie-pipe (0.9-inch-ID PVC) Side discharge (deflector) was used for grout placement. Six centralizers positioned @: 13, 33, 53, 73, 93 and 113 ft depths

~~Remarks~~

protective post per cluster 12



Elevation of top of riser pipe 1162.52

Height of riser above ground 1.89'

Ground Elevation 1160.63

I.D./Type of surface casing 4"x4"x7' Galvanized Steel

Type of surface seal ~~Granular~~ Bentonite/concrete

Depth of surface seal 5.0'

I.D./Type of riser pipe 2-inch-dia PVC Sch. 40 threaded, flush-coupled

Type of backfill Cement/Bentonite grout

Est. vol ~130 gals Actual vol. in 235 gals

Depth of top of seal ~~5-6 ft~~ RGP BGS 9.0

Type of seal "Pure Gold" Bentonite (10.0-10.2 lbs/gal)

Depth of buffer sand (20-40) 110.5

Depth of top of filter pack 111.5

Est. vol. 13 gals. Actual vol. in 22 gals

Depth of top of screen 113.1

Type of filter pack 4-8 Silica Sand

I.D./Type of screen 2-inch-dia PVC Sch. 40 mill-slotted, threaded, flush-coupled

Screen slot size 0.02 inch

Depth of bottom of screen 123.1

Depth of bottom of plugged bank section 123.6

Type of backfill below observation well 4-8 sand

Depth of bottom of boring 124.0

Diameter of boring 5 1/4-inch

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Fig. 69

GROUND WATER MONITORING WELL REPORT 9/12/92

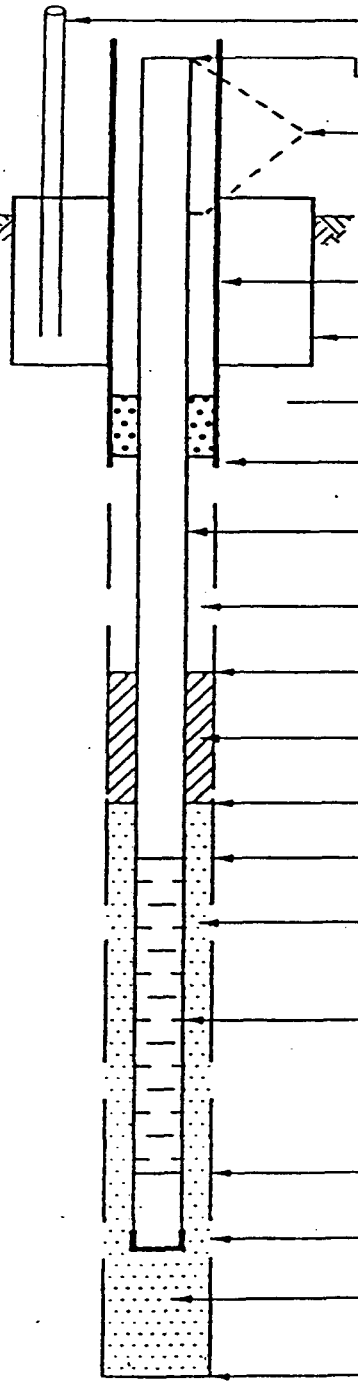
Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: U.S. Army Corps of Engineers
Inspected by: B. Exceen (WCC)
Monitor Well No.: MW-9D
Project No.: 92KW030
Date: 8-11-92
Time: 1800

Method of Installation: Gravel pack and Pure Gold Grout Placed Through 2" dia. Tremie pipe. Centralizer placed at 126.0'

Remarks:

GENERALIZED STRATIGRAPHY

See boring log MW9D for Detailed discriptions



Number / Type of Protective Post: 2

Elevation of top of riser pipe: 1170.87'

Height of riser above ground: ~~2.0'~~ 1.97'

Ground Elevation: 1168.90'

I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel

Dimen. / Type of Surface Pad: 3' X 3' X 4" Concrete

Type of filler: Granular bentonite 4.0'

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2" dia., Schedule 40, Flush joint, PVC

Type of seal: Portland Type II cement

Calculated volume: 307 gal Placed volume: 500 gal

Depth of top of seal: ~~10 ft~~ 16.5'

Type of seal: Pure Gold Grout

Depth of top of filter pack: 127.5'

Depth of top of screen: 131.0'

Sieve Test (D_{30} = NA %)

Type of filter pack: 10-20 Silica sand

Calculated volume: 10.8 gal Placed volume: 11.0 gal

I.D./Type of screen: 2" dia., Schedule 40, Flush joint PVC

Screen slot size: 0.02"

Depth of bottom of screen: 136.0'

Depth of bottom of plugged blank section: 136.5'

Type of backfill below monitoring well: ~~137.5-139~~ 137.5-139.0 Native materials 136.5-137.5 10-20 Sand

Depth of bottom of boring: 139.0'

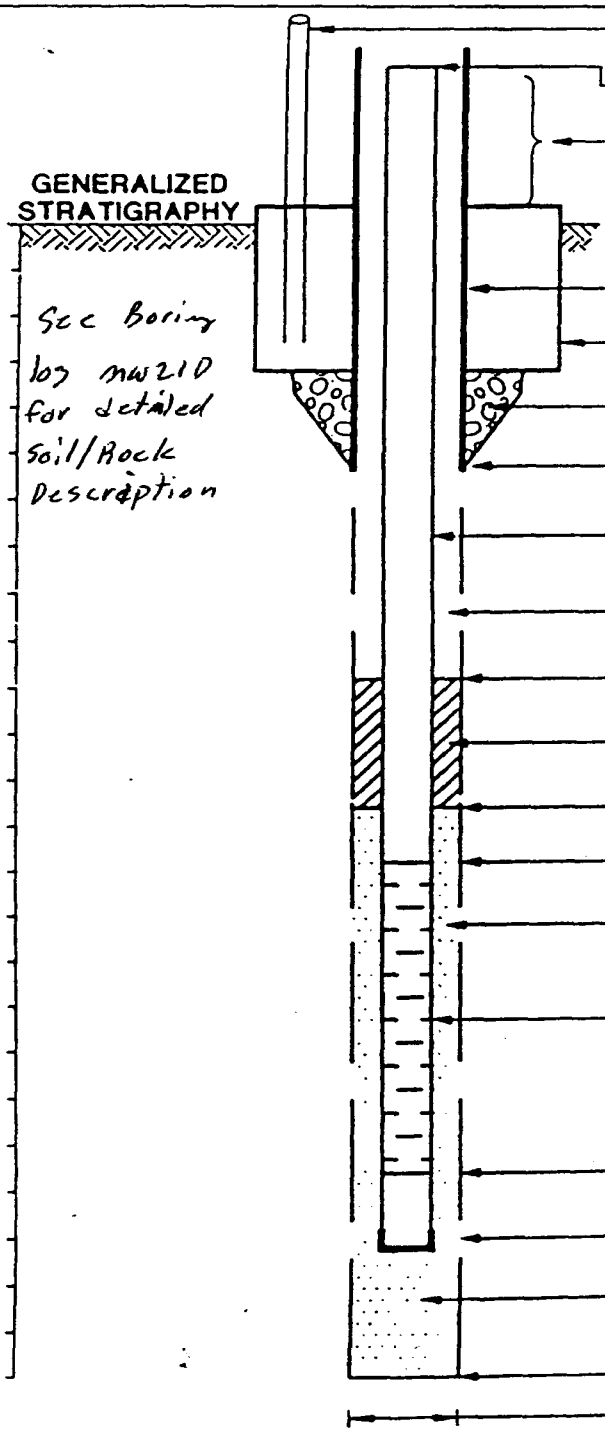
Diameter of boring: (0-125') 8" - (125'-139') 5.5"

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation Mead - NOP
Location: Mead, Nebraska
Installed by: U.S. Army Corps of Engineers
Inspected by: B. Exeen (BJE)
Method of Installation: Gravel pack and pure Gold Grout placed through 2" dia Tremie pipe. one centralizer placed at 130' BTOR
Remarks:

Monitor Well No. MW210
Project No. 92KW030
Date 7-16-92
Time 1545



Number / Type of Protective Post per cluster: 8
Elevation of top of riser pipe: 1165.16'
Height of riser above ground: ~~2.0'~~ RBP 1.90'
Ground Elevation: 1163.26'
I.D./Type of surface casing: 4"x4"x7' Steel
Dimen. / Type of Surface Pad: 3'x3'x4"
Type of surface seal: Sakrete cement BJE 7-21-92
Depth of surface seal: 7.0' BJE 7-21-92
Granular Bent. 7.0'-4.0'
I.D./Type of riser pipe: 2" dia. Schedule 40, Flush Joint, PVC
Type of backfill: ~~Bentonite~~ Portland Type II cement
Est Vol. (469 gal) Vol used (620 gal)
Depth of top of seal: 9.0' BJE 7-16-92 / 15.0' BJE 7-21-92
Type of seal: Pure Gold Grout
Depth of top of filter pack: 130.2'
Depth of top of screen: 133.0'
Type of filter pack: 10-20 silica sand
Est. Volume (10 gal) volume used (13.5 gal)
I.D./Type of screen: ~~[illegible]~~ 2" dia, Schedule 40, Flush Joint, PVC
Screen slot size: 0.02"
Depth of bottom of screen: 138.0'
Depth of bottom of plugged bank section: 138.5'
Type of backfill below monitoring well: 10-20 Silica sand
Depth of bottom of boring: 139.0'
Diameter of boring: 10"/0'-128.5' 5 5/8" 128.5'-139.0'

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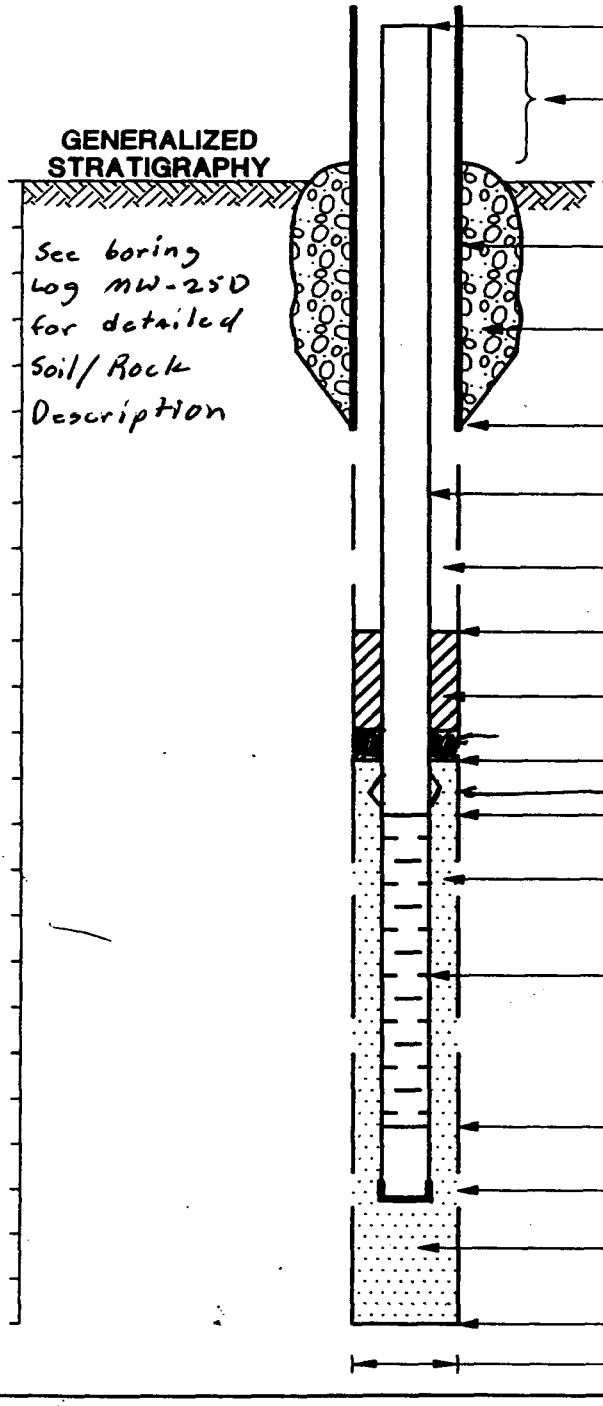
GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: MEAD, NEBRASKA
Installed by: THE WINNEK COMPANIES
Inspected by: T. Hecht, WOODWARD CLYDE
Method of Installation: Direct Rotary
Remarks: GRAVEL PACK & Pure Gold bentonite grout placed w/ 2" tremie (Deflated for Grout), 1 centralizer above SCREEN

Monitor Well No. MW-25D
Project No. 92KW030
Date 6/29/92
Time 08:25



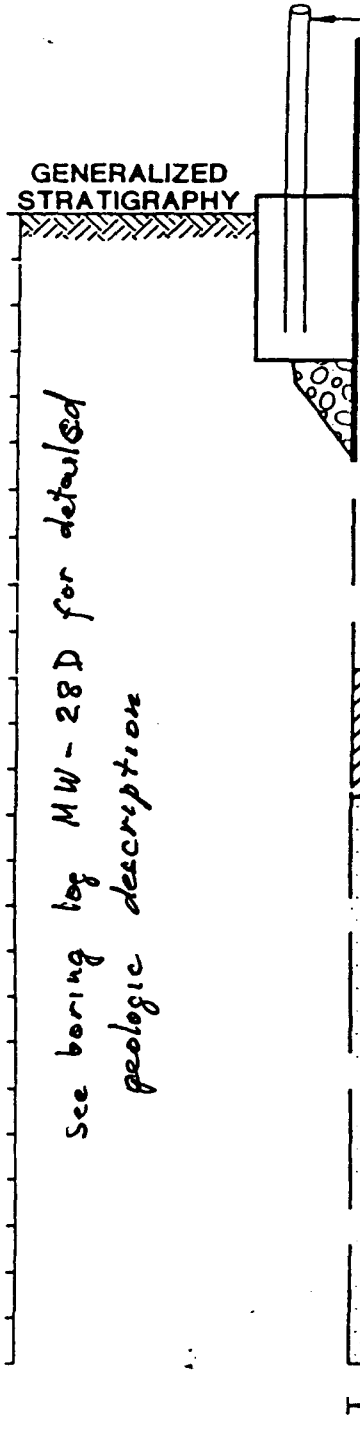
Elevation of top of riser pipe: 1175.04'
Height of riser above ground: ~~2.0~~ RDP 1.92'
Ground Elevation: 1173.12'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Type of surface seal: Granular Bentonite/ Ready Mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" PVC Sch 40 flush threaded
Type of backfill: Cement/Bentonite
Depth of top of seal: ≈ 18'
Type of seal: Pure Gold bentonite grout (10.2 lbs/gal) Buffer Sand to 159.54
Depth of top of filter pack: 161.0'
CENTRALIZER
Depth of top of screen: 163.15'
Type of filter pack: 10-20 Silica SAND
I.D./Type of screen: 2" schedule 40 mill slotted PVC
Screen slot size: 0.020"
Depth of bottom of screen: 168.15'
Depth of bottom of plugged blank section: 168.65'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 170.0
Diameter of boring: ~~170.0-6"~~ 162.5-170.0 8", 0-162.5

B07NE003702-05882

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: Gene Papinako (WCC)
Method of Installation:
Remarks: Filter pack, Pure Gold grout placed through 1-inch-dia. Tremie pipe, one centralizer installed at - 144 ft (above the screen)

Monitor Well No. MW-28D
Project No. 92KW030
Date 7-02-92
Time 10:15 AM



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1171.58'
Height of riser above ground: 2.15'
Ground Elevation: 1169.43
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch-dia. Sch. 40 PVC Flush Threaded
Type of backfill: Cement/Bentonite Grout
Depth of top of seal: 5 ft BGS ~~before settlement~~ 14.0'
Type of seal: "Pure Gold" bentonite grout (10.2#/g)
Depth of top of buffer sand (20-40): 141.4
Depth of top of filter pack: 142.0
Depth of top of screen: 144.0
Type of filter pack: 10-20 silica sand
I.D./Type of screen: 2-inch. dia Sch. 40 PVC Flush Threaded
Screen slot size: 0.020 mill-slotted
Depth of bottom of screen: 149.0'
Depth of bottom of plugged bank section: 149.5'
Type of backfill below monitoring well: Native material, 10-20 silica sand
Depth of bottom of boring: 149.5'
Diameter of boring: ~~5.75 in~~ 5 3/4 inch

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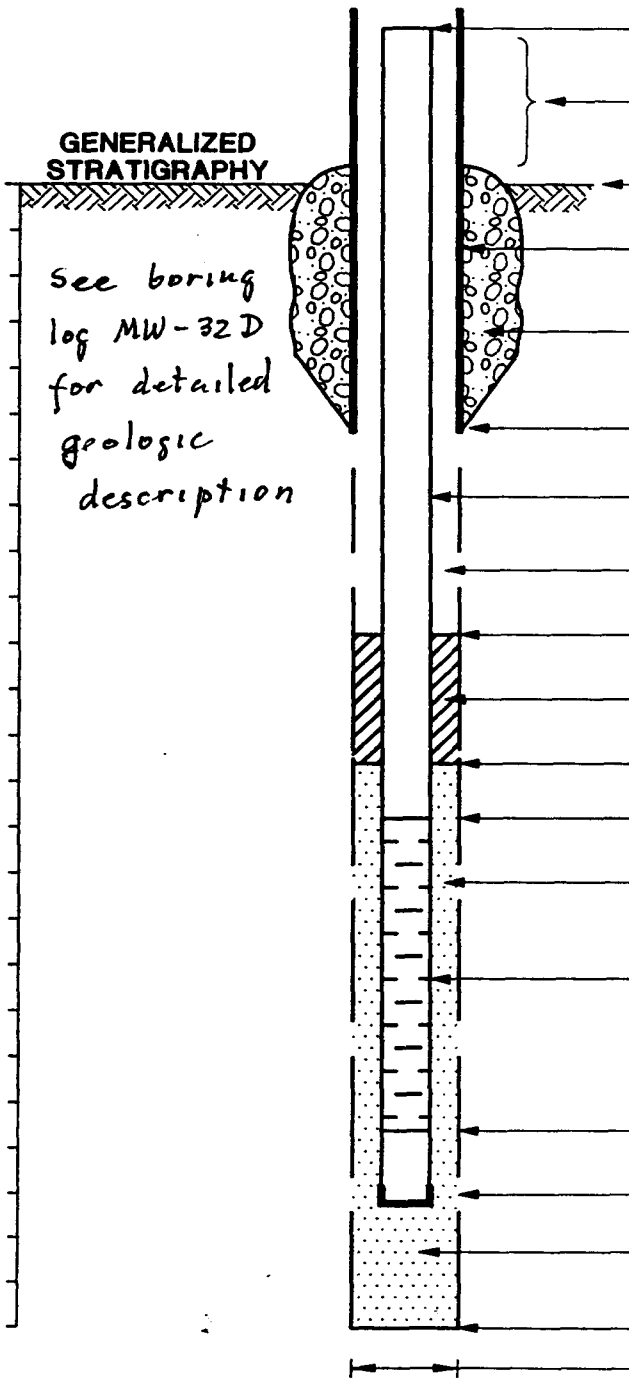
GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation, Mead NOP
Location Mead, Nebraska
Installed by U.S. Army Corps of Engineers
Inspected by B. Exceen (WCC)

Monitor Well No. MW-32 D
Project No. 92KW030
Date 5-30-92
Time

Method of Installation Gravel pack and ~~to~~ Pure Gold grout placed through 2" dia. Tremie pipe. Centralizers placed ~~at~~ Just above well screen then at 10' BGL - 2 centralizers used.

Remarks



Elevation of top of riser pipe 1153.62'

Height of riser above ground ~~2.0'~~ 1.95'

Ground Elevation 1151.67'

I.D./Type of surface casing 4"x4"x7' Galvanized Steel

Type of surface seal Granular Bentonite/concrete

Depth of surface seal 4.0'

I.D./Type of riser pipe 2" dia. Schedule 40, flush joint, PVC

Type of backfill ~~Pure Gold grout~~ Bentonite pellets DPG

Depth of top of seal 4.1'

Type of seal Pure Gold Grout

Depth of top of filter pack 103.5'

Depth of top of screen 106.5'

Type of filter pack 10-20 Silica Sand

I.D./Type of screen 2" dia. Schedule 40, flush joint, PVC

Screen slot size 0.20"

Depth of bottom of screen 111.5'

Depth of bottom of plugged blank section 112.0'

Type of backfill below monitoring well 10-20 Silica Sand

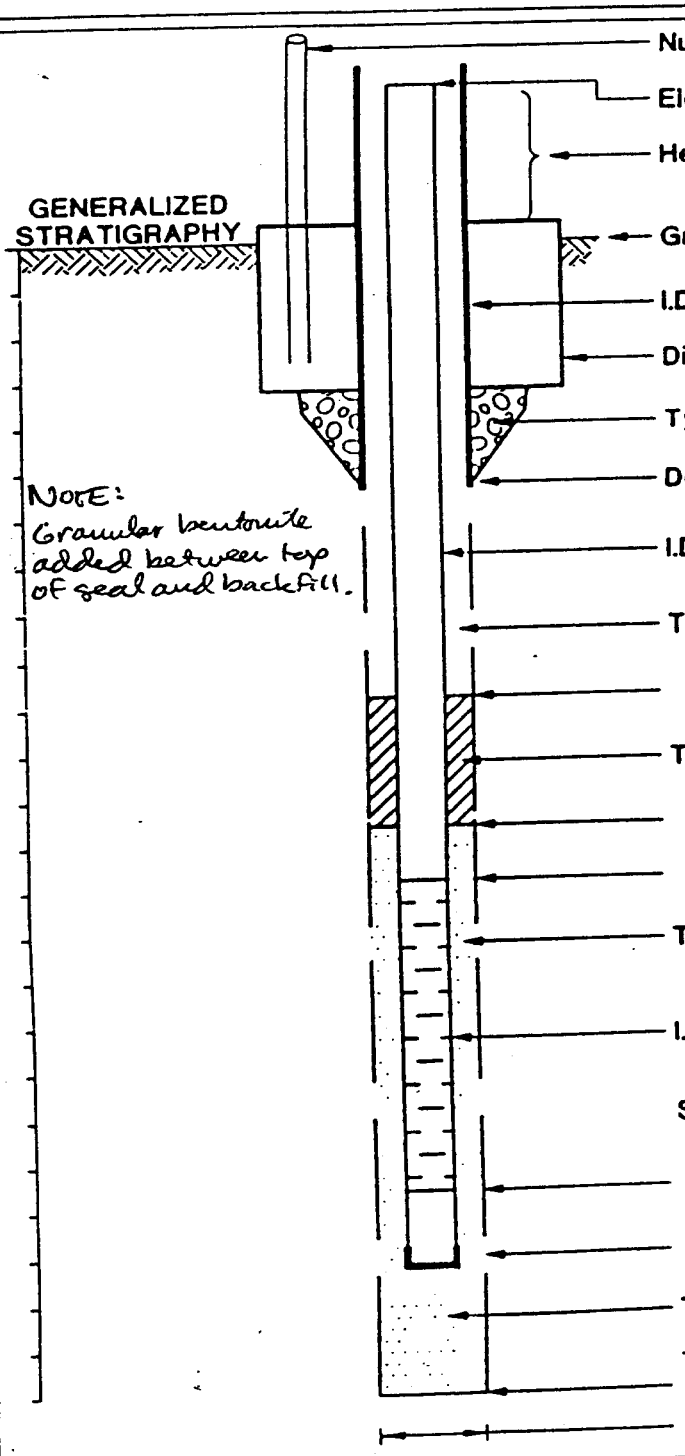
Depth of bottom of boring 113.0'

Diameter of boring ~~5 3/8"~~ 10" to 101.0 / 10" to surface

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation, Mead NOP
Location: NE 1/4 of Sec 29
Installed by: Winnek Environmental Drilling Rig 1
Inspected by: K. J. Bailey (WCCOPKS)
Method of Installation: Gravel pack and Pure Gold grout placed through 2" tremie
Remarks: Centralizer place above well screen

Monitor Well No. MW-33D
Project No. 92KW030
Date 6/14/92 start 1445
Time Completed 6/15/92 0920



Number / Type of Protective Post: 12 per cluster
Elevation of top of riser pipe: 1159.84'
Height of riser above ground: ~~2.0~~ RBP 1.95'
Ground Elevation: ~~1164.00~~ RBP 1157.89'
I.D./Type of surface casing: 4"x4"x7' Galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite/Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia, schedule 40 flush joint
Type of backfill: Cement/Bentonite Grout
Depth of top of seal: 9.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 118.0'
Depth of top of screen: 120.0'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2" Schedule 40 millslot
Screen slot size: 0.020"
Depth of bottom of screen: 125.0'
Depth of bottom of plugged bank section: 126.0'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 127.0'
Diameter of boring: 7 7/8" to 117', 5 7/8 to 127.0'

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GROUND WATER MONITORING WELL REPORT

Project Name Remedial Investigation Mead NOP
Location Mead, Nebraska
Installed by U.S. Army Corps of Engineers
Inspected by B. Exceen (WCC)

Monitor Well No. MW-34D
Project No. 92KW030
Date ~~6-9-92~~ 6-10-92
Time 0745

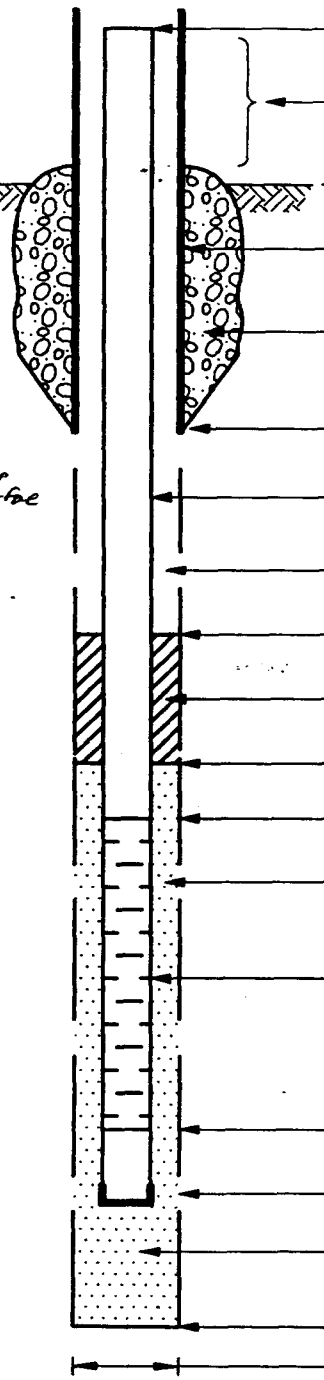
Method of Installation Gravel pack and pure Gold grout placed through 2" dia. Tremie pipe. Centralizers placed 2' above well screen then at 15' below ground level - 2 centralizers used

Remarks

GENERALIZED STRATIGRAPHY

See boring log MW34D

Note: Granular bentonite placed between top of backfill and surface seal



Elevation of top of riser pipe 1156.34'

Height of riser above ground 1.90'

Ground Elevation 1154.44'

I.D./Type of surface casing 4"x4"x7' Galvanized Steel

Type of surface seal U-mix Concrete / Granular Bentonite

Depth of surface seal 10.0'

I.D./Type of riser pipe 2" dia. Schedule 40, flush joint, PVC

Type of backfill ~~Pure Gold grout~~ Cement/Bentonite Grout

Depth of top of seal 10.0'

Type of seal Pure Gold grout

Depth of top of filter pack ~~112~~ 117.3'

Depth of top of screen 120.0'

Type of filter pack 10-20 Silica Sand.

I.D./Type of screen 2" dia. Schedule 40, flush joint PVC

Screen slot size 0.020"

Depth of bottom of screen 125.0'

Depth of bottom of plugged blank section 125.5'

Type of backfill below monitoring well 10-20 Silica sand to 126.8' / Native materials 126.8'-127.5'

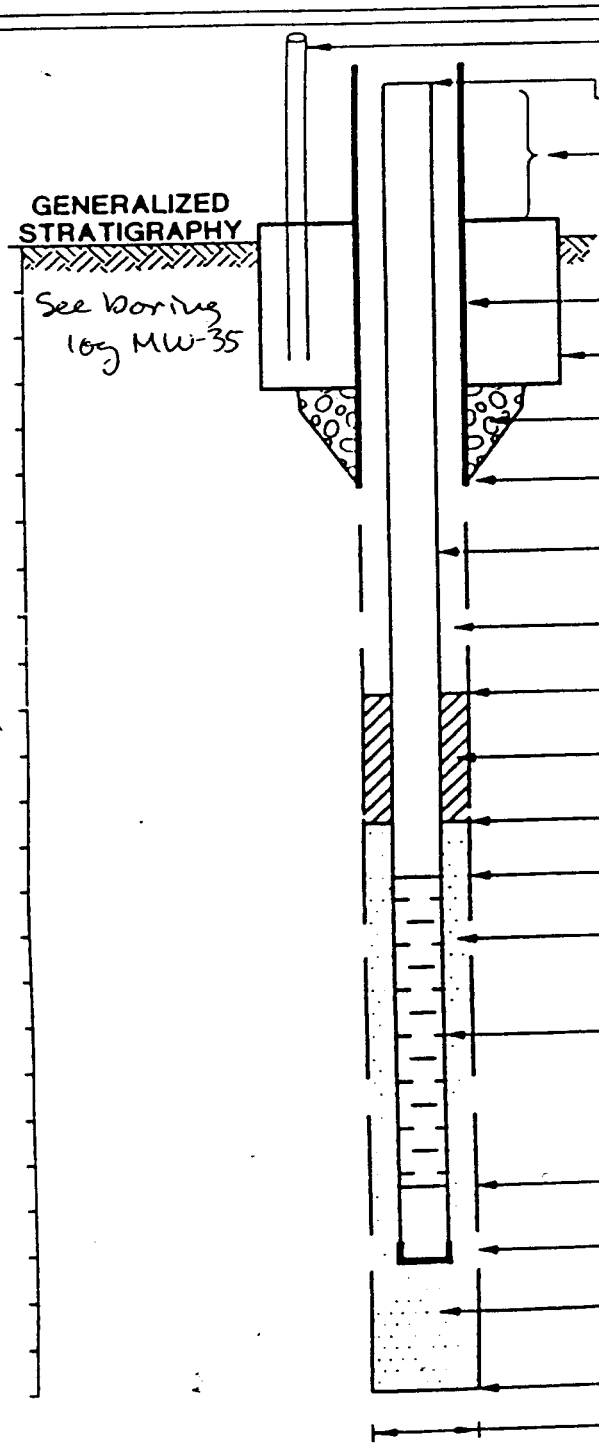
Depth of bottom of boring 127.5'

Diameter of boring 5 5/8" to 116.0' / 10" to surface

GROUND WATER MONITORING WELL REPORT

Project Name: REMEDIAL INVESTIGATION, MEAD N OP
Location: MEAD, NEBRASKA
Installed by: THE WINNEK COMPANY
Inspected by: LISA MAVAGLIN
Method of Installation: Gravel pack and pure gold grout placed through 2" dia. tremie pipe
Remarks: Centralizers placed 2' above well screen.

Monitor Well No. MW-35D
Project No. 92KW030
Date 6/10/92
Time



Number / Type of Protective Post per Cluster: 12
Elevation of top of riser pipe: 1139.60'
Height of riser above ground: 2.20'
Ground Elevation: 1137.40'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite / Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2 in dia Sch 40 Flush Joint PVC.
Type of backfill: Cement/Bentonite Grout
Depth of top of seal: 10.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 98.0'
Depth of top of screen: 100.5'
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2 in Sch 40 mill slotted
Screen slot size: 0.020 in
Depth of bottom of screen: 105.5'
Depth of bottom of plugged bank section: 106.5'
Type of backfill below monitoring well: 10-20 Silica Sand 106.5' to 107'; Bentonite Pellets 117' to 107'
Depth of bottom of boring: 117'
Diameter of boring: 7 7/8 in to 95' / 5 7/8 in to 117'

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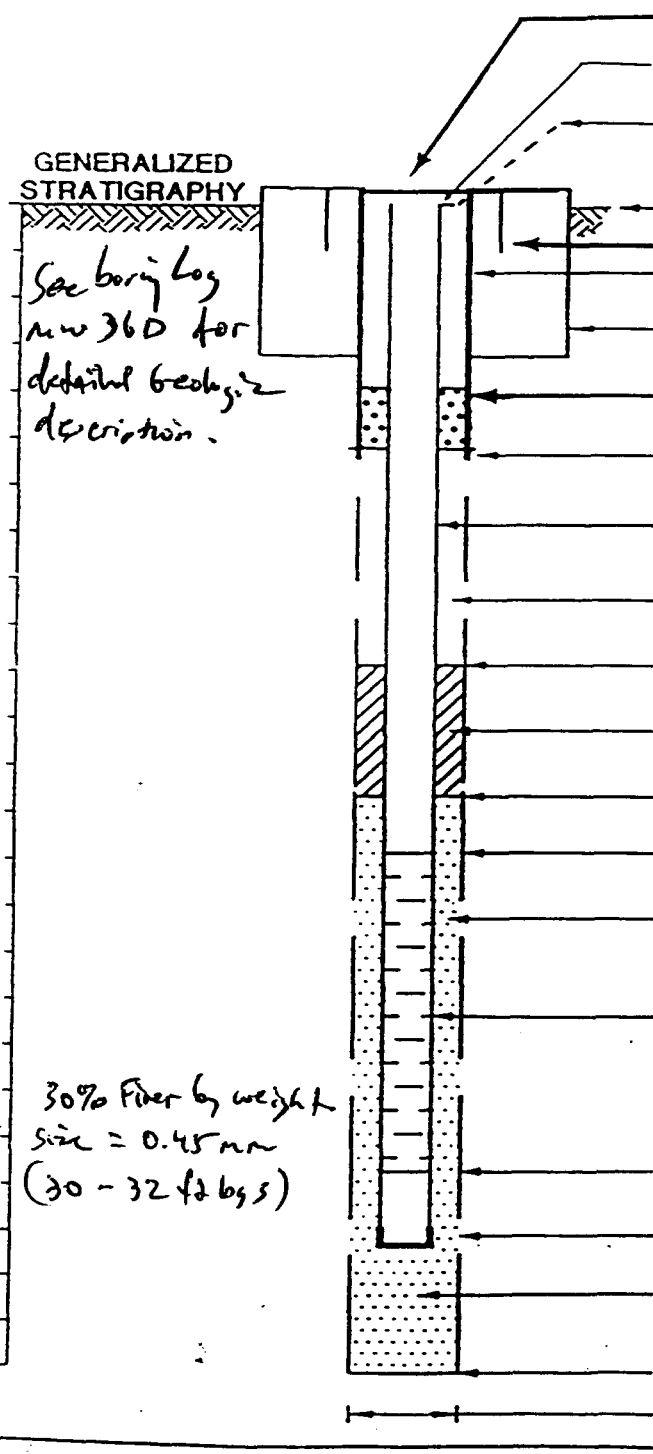
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Winnek Company
Inspected by: B. Hedgstrom (WCC)
Method of Installation: Frame filter pack & Aregold grout
Remarks: 1 Cedarform @ 42 ft.

Monitor Well No. MW-36D
Project No. 92KW030
Date 7-16-92
Time 1430



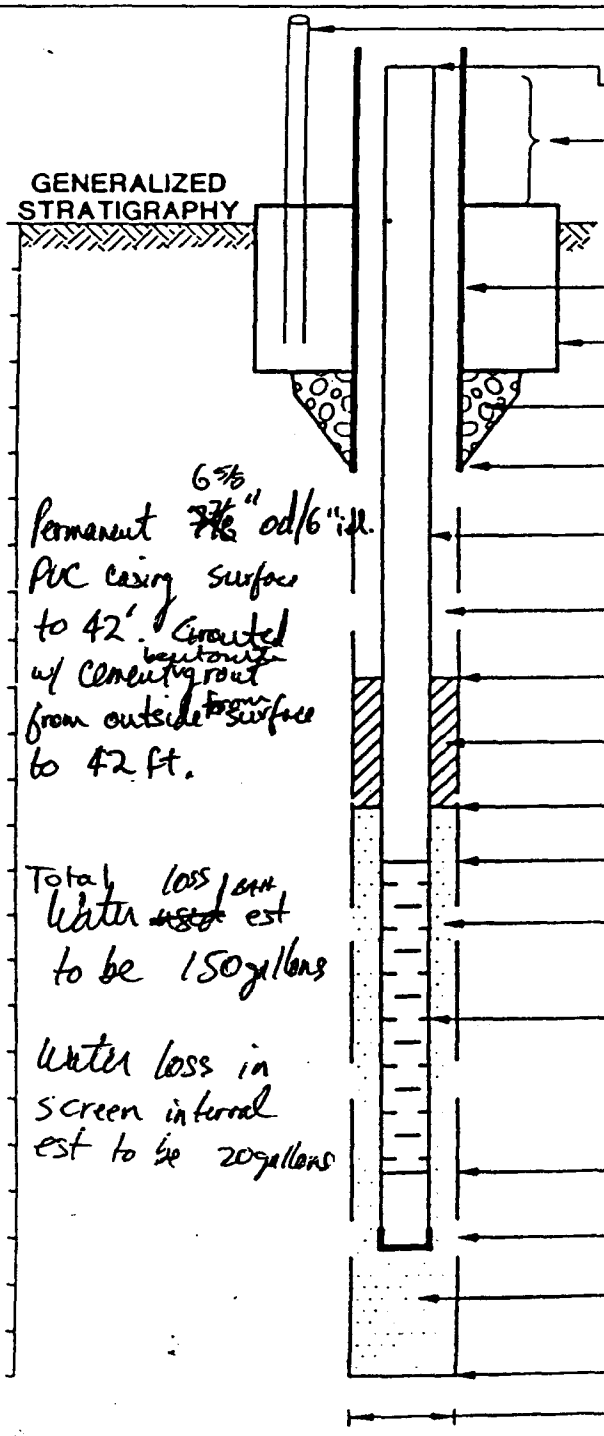
Leak Resistant Manhole: 9 5/8"
Elevation of top of riser pipe: 1076.41'
Height of riser below ground: -0.14
Ground Elevation: 1076.55'
12" skirt
I.D./Type of surface casing: 6" OD PVC
Dimen. / Type of Surface Pad: 12" X 12" X 2.5'
Type of filler: Sand 2.5' / cement to surface
Depth of surface seal: 2.7'
I.D./Type of riser pipe: 2" Pvc sch 40 flush threaded
Type of seal: Cement/Bentonite Grout
Calculated volume ____ Placed volume ____
Depth of top of seal: 20.0'
Type of seal: Aregold Grout 10.2 gal/gal (4.5 bags est / 5.0 bags used)
Depth of top of filter pack: 41'
Depth of top of screen: 43'
Sieve Test (D_{30} = %)
Type of filter pack: 10/20 Silica Sand (1.4 bags est / 1.6 bags used)
Calculated volume ____ Placed volume ____
I.D./Type of screen: 2 in / sch 40 PVC mill slotted, flush threaded
Screen slot size: 0.02 in
Depth of bottom of screen: 48'
Depth of bottom of plugged blank section: 48 1/2'
Type of backfill below monitoring well: 10/20 Silica Sand
Depth of bottom of boring: 49.0'
Diameter of boring: 0-40 ft 7 7/8"
40-49 ft 5 7/8"

FIGURE 6-3

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location:
Installed by: The Winnek Company
Inspected by: B. Hedenkamp (WCC)
Method of Installation: tremied filter pack and pure gold grout, 7 centralizer @ 43 ft
Remarks:

Monitor Well No.: MW-37D
Project No.: 92KW030
Date: 7/13/92
Time: 1330



Number / Type of Protective Post: 4 per Cluiter
Elevation of top of riser pipe: 1084.69'
Height of riser above ground: 2.08 ft
Ground Elevation: 1082.61'
I.D./Type of surface casing: 4"x4"x7' galvanized steel
Dimen. / Type of Surface Pad: 3'x3'x4" concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2 in / sch 40 PVC
Type of backfill: Cement bentonite grout
Depth of top of seal: 10 ft
Type of seal: Puregold seal 10.2 # gal (65 gallons est / 70 gallons used)
Depth of top of filter pack: 43.5 ~~43½ ft~~
Depth of top of screen: 45.5 ~~45½ ft~~
Type of filter pack: 10/20 silica sand 1.4 ft³ est / 4.0 ft³ used
I.D./Type of screen: 2 in / sch 40 PVC ~~(0.01 slot)~~
Screen slot size: 0.01
Depth of bottom of screen: 50.5 ft
Depth of bottom of plugged bank section: 51.0 ft
Type of backfill below monitoring well: 10/20 silica sand
Depth of bottom of boring: 51.8 ft
Diameter of boring: 0-42 ft @ 9⅞ in ~~42-51.8 ft @ 5⅞ in~~

Permanent 6⅝" od/6" id. PVC casing surface to 42'. Grouted w/ cement bentonite grout from outside from surface to 42 ft.

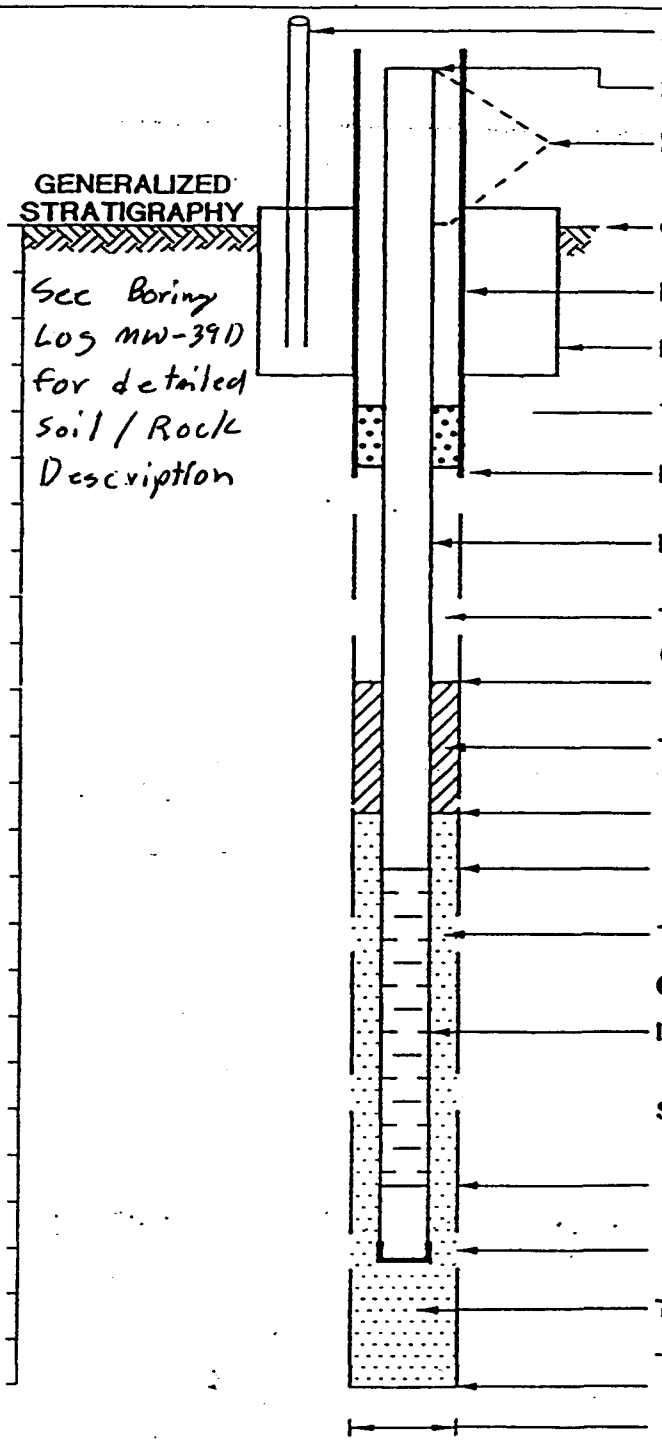
Total water loss/day est to be 150 gallons

Water loss in screen interval est to be 20 gallons

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Winnek #1
Inspected by: B. Exceen
Method of Installation: Gravel pack and P.G. Grout placed through 1" dia.
Remarks: Tremie pipe centralizer placed at 53.5'

Monitor Well No. MW-38D
Project No. 92KW030
Date 8-19-92
Time 1721



Number / Type of Protective Post: 4 - Steel
Elevation of top of riser pipe: _____
Height of riser above ground: 2.2'
Ground Elevation: _____
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3' X 3' X 4" Concrete
Type of filler: Granular bentonite 4.0'
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" dia. schedule 40, flush joint PVC
Type of seal: Portland Type II cement
Calculated volume: 130 gal Placed volume: 140 gal
Depth of top of seal: 10 ~~4~~.0' BJE
Type of seal: Pure Gold Grout
Depth of top of filter pack: 55.6'
Depth of top of screen: 58.5'
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica sand
Calculated volume: 12.4 gal. Placed volume: 17.0 gal.
I.D./Type of screen: 2" dia. schedule 40, flush joint PVC
Screen slot size: 0.02"
Depth of bottom of screen: 63.5'
Depth of bottom of plugged blank section: 64.0'
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 65.0'
Diameter of boring: (54'-65') 6" (0'-54') 8"

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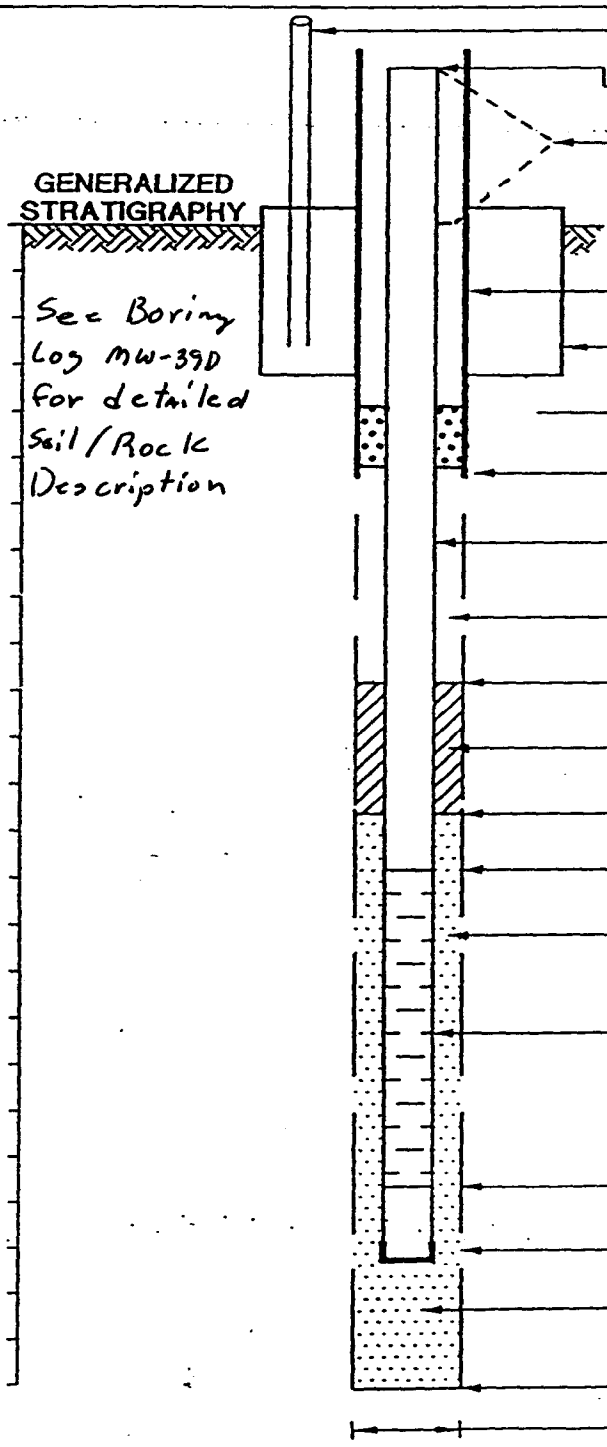
GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NE
Installed by: Winnek
Inspected by: B. Exceen
Method of Installation: Gravel pack and Grout placed through 1" dia. tremie pipe. Centralizer placed at 47.5'
Remarks:

Monitor Well No. MW- 39D
Project No. 92KW030
Date 8-22-92
Time 1055 h



Number / Type of Protective Post: 4 - Steel
Elevation of top of riser pipe:
Height of riser above ground: 1.95'
Ground Elevation:
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3' X 3' X 4" concrete
Type of filler: Granular bentonite 4.0'
Depth of surface seal: ~~12.0~~ BTE 6.0'
I.D./Type of riser pipe: 2" dia. Schedule 40, flush joint, PVC.
Type of seal: ~~Cement Bent~~ BTE Portland Type I Cement
Calculated volume 105 gal Placed volume 100 gal
Depth of top of seal: 12.0'
Type of seal: Pure Gold Grout
Depth of top of filter pack: 50.5'
Depth of top of screen: 52.5'
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 sand 51.0' 20-40 - 50.5'
Calculated volume 9.8 gal. Placed volume 14.0 gal
I.D./Type of screen: 2" dia. Schedule 40, flush joint PVC
Screen slot size: 0.02"
Depth of bottom of screen: 55.3'
Depth of bottom of plugged blank section: 55.5'
Type of backfill below monitoring well: 56.7-59.0' Bent Pellets 56.7-55.5 10-20 sand
Depth of bottom of boring: 59.0'
Diameter of boring: (0-52.5') 8" (52.5-59) - 6"

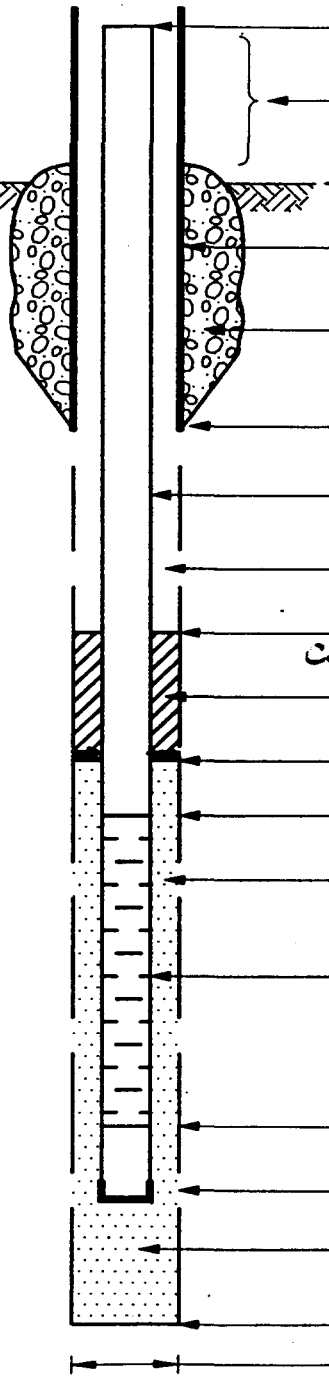
GROUND WATER MONITORING WELL REPORT

Project Name: Mead NDP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: G. Papinako (WCC)
Method of Installation: Filter pack, buffer sand and "Pure Gold" grout placed with 0.9-inch-ID PVC tremie-pipe. Deflector used for grout placement.
~~Remarks~~ One centralizer positioned at the depth of 86 ft.

Monitor Well No. MW-41D
Project No. 92KW030
Date 8-10-92
Time 13:15

GENERALIZED STRATIGRAPHY

See boring log MW-41D for detailed description



Elevation of top of riser pipe: 1168.19

Height of riser above ground: 2.20'

Ground Elevation: 1165.99

I.D./Type of surface casing: 4"X4"X 7' Galvanized Steel

Type of surface seal: ~~3'X3'X4'~~ Concrete/Granular Bentonite

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia threaded Sch. 40 flush-coupled, PVC

Type of backfill: Cement/Bentonite grout

Depth of top of seal: 10.0'
Calculated volume 180 Placed vol. 160 gals

Type of seal: Pure Gold grout (10.1-10.3)
Depth of top of buffer sand (20-40): 84.5'

Depth of top of filter pack: 85.0'

Depth of top of screen: 87.0'

Type of filter pack: 10-20 Silica sand
~~Calculated volume 8.5 Placed volume 10.0 gals~~

I.D./Type of screen: 2-inch-dia. mill-slotted threaded, flush-coupled PVC sch. 40

Screen slot size: 0.02 inch

Depth of bottom of screen: 92.0'

Depth of bottom of plugged blank section: 92.5'

Type of backfill below monitoring well: Native materials (92.5 to 93.0), 10-20 Silica Sand

Depth of bottom of boring: 93.0'

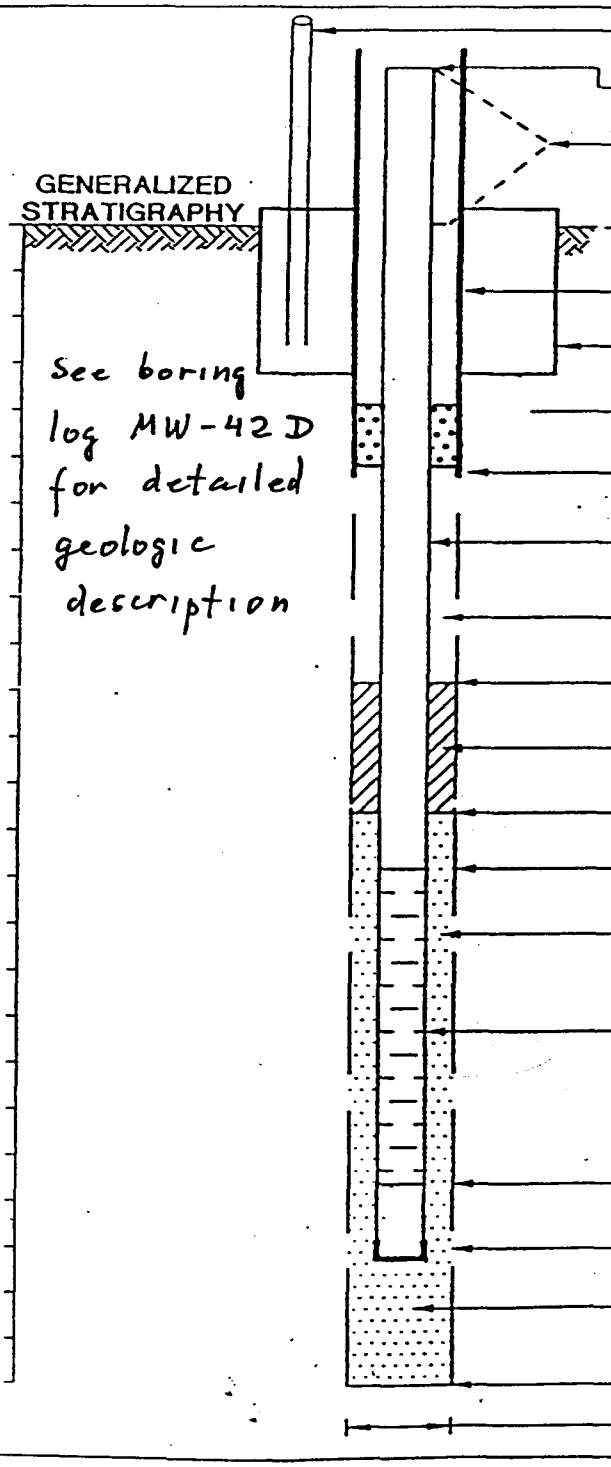
Diameter of boring: ~~5.5~~ (82.0 - 93.0) ~~8.0~~ (to 82.0) 7 7/8 inch

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NB
Installed by: The Winnek Companies
Inspected by: R. G. Pacheco
Method of Installation: Filter pack and pure gold grout tremied in.
Remarks: 1 Stainless Steel Centralizer @ 102.0' bgs.

Monitor Well No. MW- 42D
Project No. 92KW030
Date 07/28/92
Time 10:05



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1146.14
Height of riser above ground: 2.12'
Ground Elevation: 1144.02
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'X3'X4" Concrete
Type of filler: Granular bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" PVC Sch 40 flush thread
Type of seal: Cement/Bentonite Grout
Calculated volume ——— Placed volume ———
Depth of top of seal: 7.0'
Type of seal: Pure gold grout (10.22 #/gal, 10.2 #/gal, 10.2 #/gal) Top of 20/40 Buffer Sand 100.2'
Depth of top of filter pack: 101.2'
Depth of top of screen: 103.2'
Sieve Test (D_{50} = %)
Type of filter pack: 10/20 Silica Sand
Calculated volume: 9.25 Gallons Placed volume: 9.35 Gallons
I.D./Type of screen: 2-in / Sch 40 PVC
Screen slot size: 0.02 in
Depth of bottom of screen: 108.2'
Depth of bottom of plugged blank section: 108.7'
Type of backfill below monitoring well: 10/20 Silica Sand
Depth of bottom of boring: 109.2'
Diameter of boring: 5 7/8" (97.7 - 109.2') 7 7/8" (0 - 97.7')

Woodward-Clyde Consultants

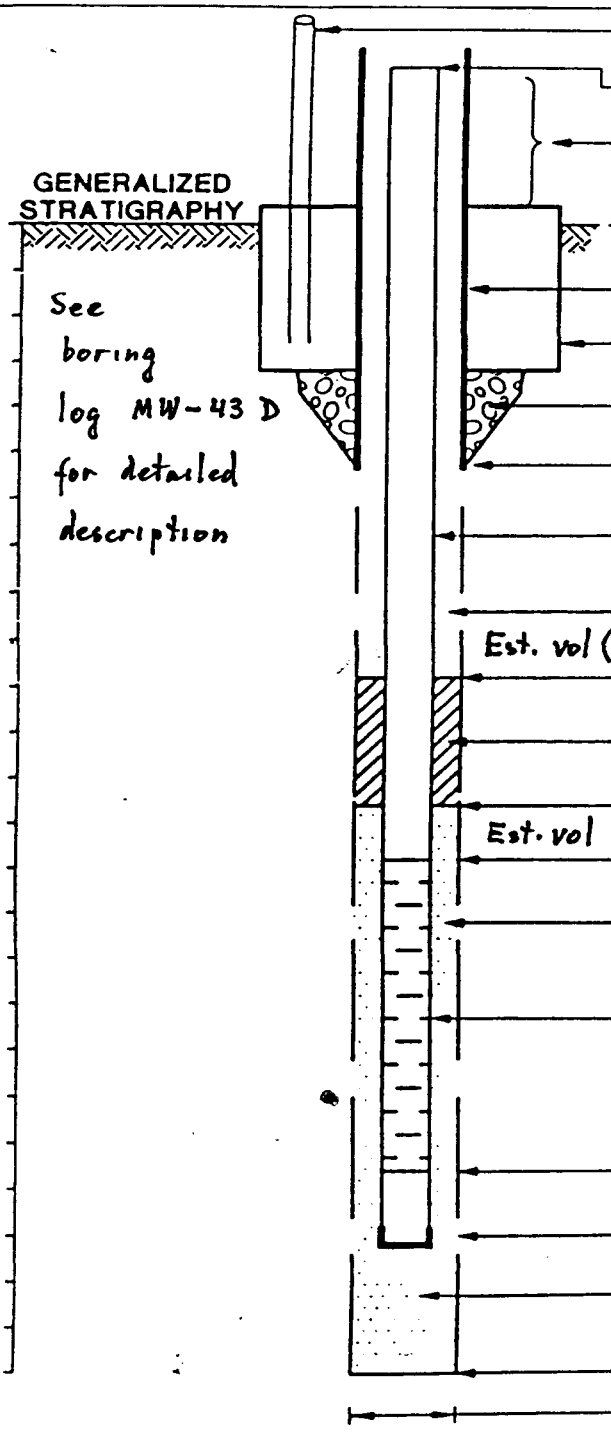
GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: Gene Papinako (WCC)

Monitor Well No. MW-43D
Project No. 92 KW 030
Date 7-13-92
Time 18:20

Method of Installation: Filter pack, buffer sand and "Pure Gold" grout were placed through the tremie-pipe (0.9-inch-ID PVC). Side discharge ~~was used~~ (deflector) was used for grout placement. One centralizer positioned @ 106 ft depth

~~Remarks~~



Number / Type of Protective Post per cluster: 6

Elevation of top of riser pipe: 1142.56'

Height of riser above ground: 2.00'

Ground Elevation: 1140.56'

I.D./Type of surface casing: 4"x4"x7' Galvanized Steel

Dimen. / Type of Surface Pad: 3'x3'x4" Concrete

Type of surface seal: Granular Bentonite/Concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia PVC Sch. 40 threaded, flush-coupled

Type of backfill: Cement/Bentonite

Est. vol (235) Actual. vol. in (295)

Depth of top of seal: 9.0'

Type of seal: "Pure Gold" bentonite grout (10.2 lbs/g

Depth of top of buffer sand (20-40) 103.4

Depth of top of filter pack: 104.0

Est. vol (9 gals) Actual. vol. in (10 gals)

Depth of top of screen: 106.4

Type of filter pack: 10-20 Silica Sand

I.D./Type of screen: 2-inch-dia PVC Sch 40 mill-slotted, threaded, flush-coupled

Screen slot size: 0.020 inch

Depth of bottom of screen: 111.4

Depth of bottom of plugged bank section: 111.9

Type of backfill below monitoring well: Native material, 10-20 silica sand

Depth of bottom of boring: 114.0

Diameter of boring: 7 7/8 inch (to 101.5); 5 1/4 inch (to 114.0)

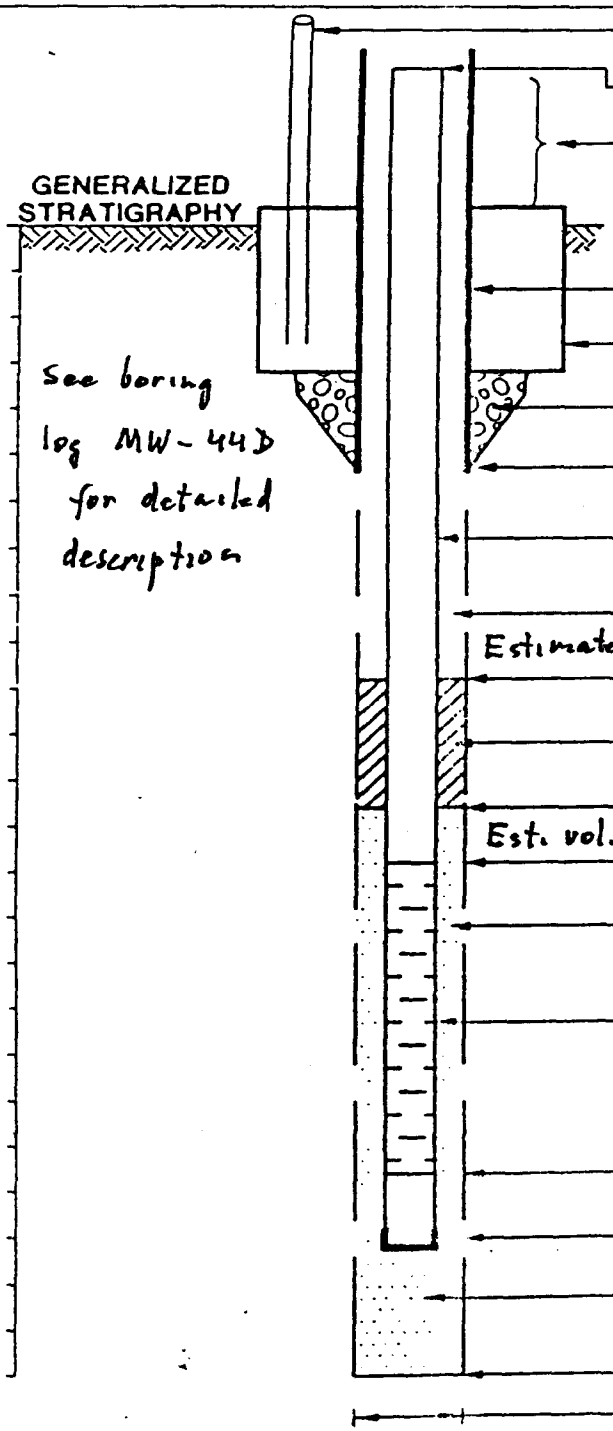
FIGURE C-3

GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: Gene Papinako (WCC)

Monitor Well No.: MW-44D
Project No.: 92 KW 030
Date: 7-16-92
Time: 12:30

Method of Installation: Filter pack, buffer sand and "Pure Gold" grout were placed through the treme-pipe (0.9-inc-ID PVC). Side discharge (deflector) was used for grout placement. One centralizer positioned @ 50.5 ft depth



Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1093.82
Height of riser above ground: ~~2.0~~ 1.89'
Ground Elevation: 1091.93
I.D./Type of surface casing: 4"X4"X7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'X3'X4" Concrete
Type of surface seal: Granular Bentonite/concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2-inch-dia PVC Sch. 40 threaded, flush-coupled.
Type of backfill: Cement/Bentonite
Estimated vol. (115 gal) Actual vol. in (160 gal)
Depth of top of seal: ~~7.4~~ 8.0'
Type of seal: "Pure Gold" bentonite grout (10.1-10.2 #/gal)
Depth of top of 20-40 buffer sand: 48.1
Depth of top of filter pack: 48.8
Est. vol. (10 gals) Actual vol. in (10 gals)
Depth of top of screen: 50.8
Type of filter pack: 10-20 Silica Sand
I.D./Type of screen: 2-inch-dia. PVC Sch. 40 mill-slotted, threaded, flush-coupled
Screen slot size: 0.020 inch
Depth of bottom of screen: ~~55.8~~ 55.8
Depth of bottom of plugged bank section: ~~56.3~~ 56.3
Type of backfill below monitoring well: Native materials, 10-20 Silica Sand
Depth of bottom of boring: 57.0
Diameter of boring: ~~57.0~~ 7 7/8 inch (to 44.0 ft), 5 1/4 inch (to 57.0 ft)

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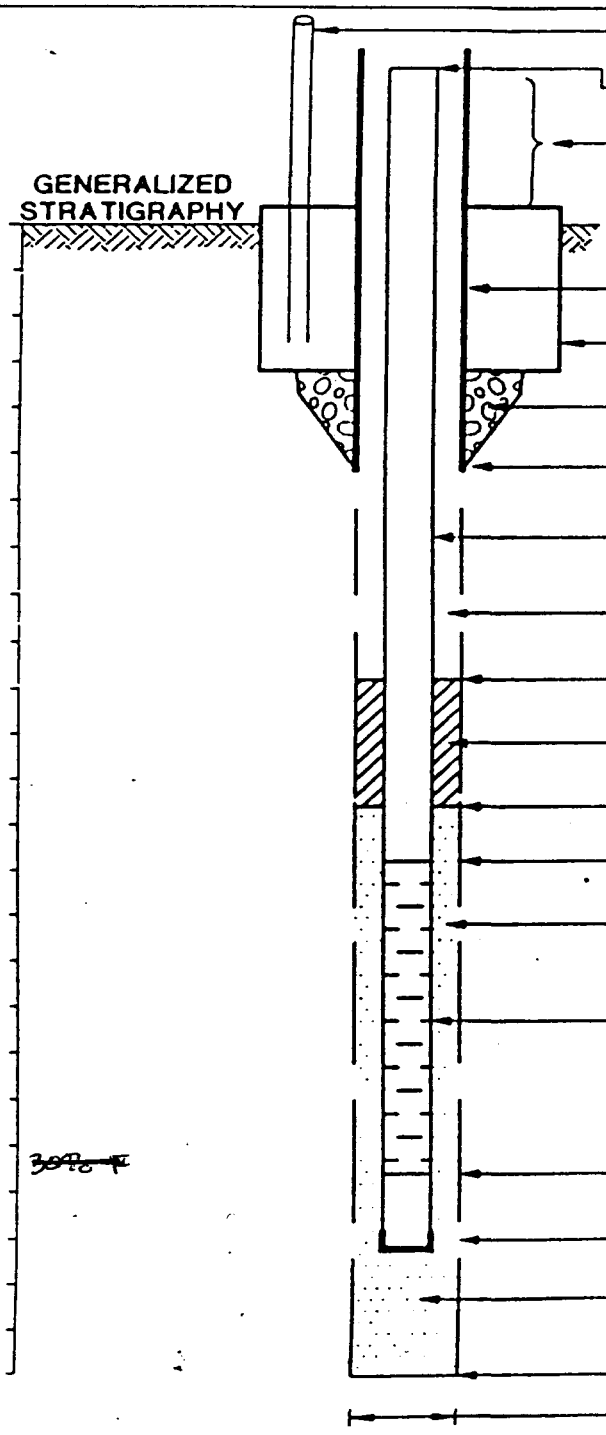
GROUND WATER MONITORING WELL REPORT

Project Name: MEAD NOP
Location: Mead, NE
Installed by: THE WINNEK COMPANIES
Inspected by: R.G. PACHECO
Method of Installation: Filter pack and Pure gold grout trimmed in.
Remarks: 1 Stainless Steel Centralizer @ 40 ft bgs.

Monitor Well No. MW-45D
Project No. 92KW030
Date 7/22/92
Time 13:10



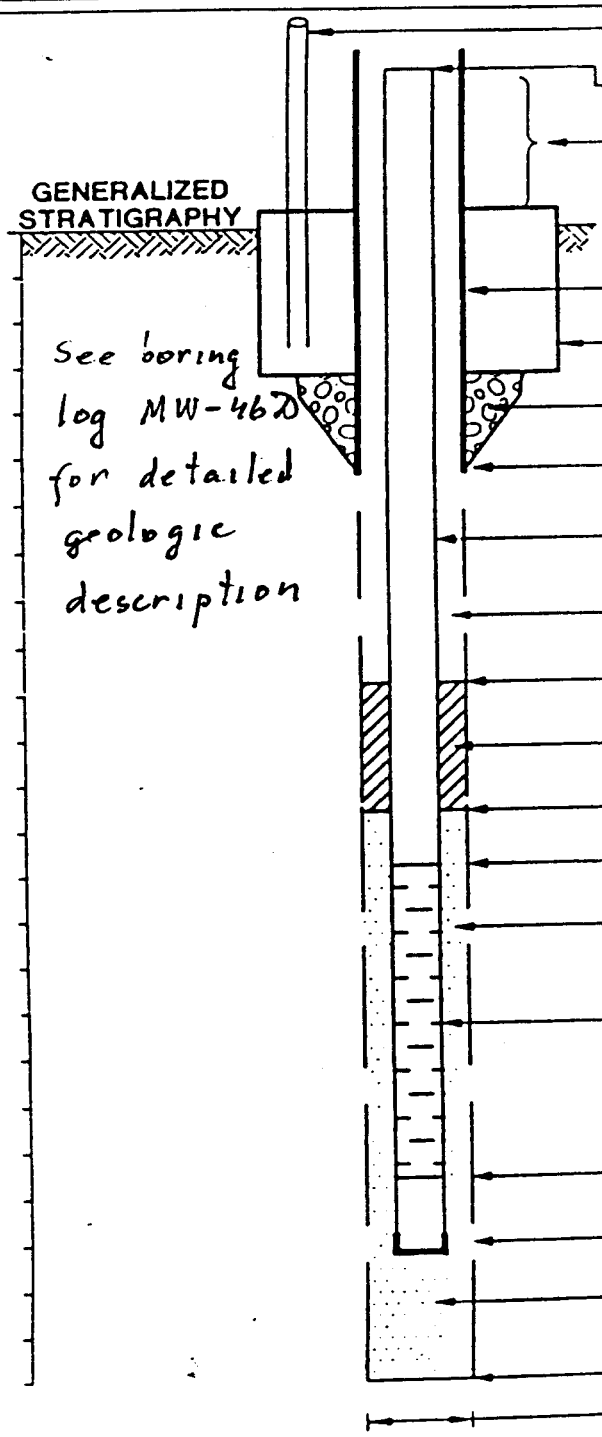
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1081.06 ~~2 ft~~
Height of riser above ground: 1.78
Ground Elevation: 1079.28
NOTE Cut 2' off protective casing
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Concrete
Depth of surface seal: 3'
I.D./Type of riser pipe: 2-inch / Sch. 40 PVC
Type of backfill: bentonite pellets 3'-4' RSP
Depth of top of seal: ~4
Type of seal: Pure gold grout (10.0 #/gal) (4.5 Bags used)
Depth of top of filter pack: 40.5
Depth of top of screen: 43.0
Type of filter pack: 10/20 Silica Sand (1.5 Bags used; 1.4 Bags estimated)
I.D./Type of screen: 2-inch / Sch 40 PVC
Screen slot size: 0.02 in.
~~30.0 ft~~
Depth of bottom of screen: 48.0
Depth of bottom of plugged bank section: 48.5
Type of backfill below monitoring well: 10/20 Silica Sand
Depth of bottom of boring: 49.7
Diameter of boring: 5 7/8" - 6.0"

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Mead NOP
Location: Mead, NB
Installed by: Winnek Company
Inspected by: B. Hedenkamp
Method of Installation: filter pack and puregold grout tremied in
Remarks: 1 stainless steel centralizer @ 51½ ft bgs

Monitor Well No. MW-46D
Project No. 92KW030
Date 7/15/92
Time 0915



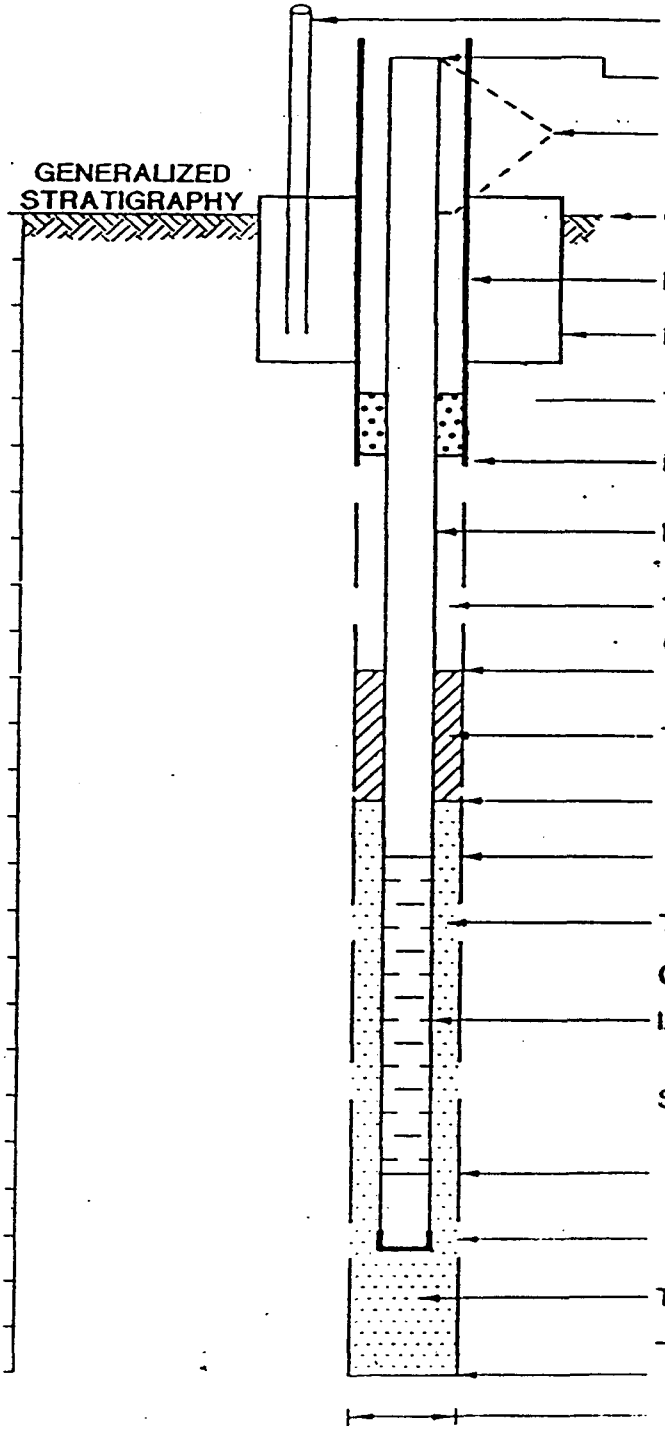
Number / Type of Protective Post per cluster: 12
Elevation of top of riser pipe: 1082.272 ft
Height of riser above ground: 1.94'
Ground Elevation: 1080.33'
I.D./Type of surface casing: 4"x4"x7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'x3'x4" Concrete
Type of surface seal: Granular Bentonite / Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2in / sch 40 PVC
Type of backfill: Cement bentonite grout
Depth of top of seal: 10.0 ft
Type of seal: Puregold grout (10.2#/gal) (3.1-50# bags est; 3.5 used)
Depth of top of filter pack: 50.5 ft
Depth of top of screen: 52.5 ft
Type of filter pack: 10/20 silica sand (1.3-100# bags est; 2.0 used)
I.D./Type of screen: 2in / sch 40 PVC
Screen slot size: 0.02 in
Depth of bottom of screen: 57.5 ft
Depth of bottom of plugged bank section: 58.0 ft
Type of backfill below monitoring well: 10/20 silica sand
Depth of bottom of boring: 58.5 ft
Diameter of boring: 0-50' @ 7⅞ in diam; ~~50-58½' @ 5⅞ in di~~

Woodward-Clyde Consultants

GROUND WATER MONITORING WELL REPORT

Project Name: Remedial Investigation; Mead NOP
Location: Mead, NB
Installed by: THE WINNEK COMPANIES (B. Vick)
Inspected by: WOODWARD Clyde Consultants (T. Hecht)
Method of Installation: Direct Rotary
Remarks: Grout + filter pack placed by Tremie pipe (1") grout w/ Side deflector, 1 centralizer 5' above top of screen

Monitor Well No. MW-48D
Project No. 92KW030
Date 8/13/92
Time 1600



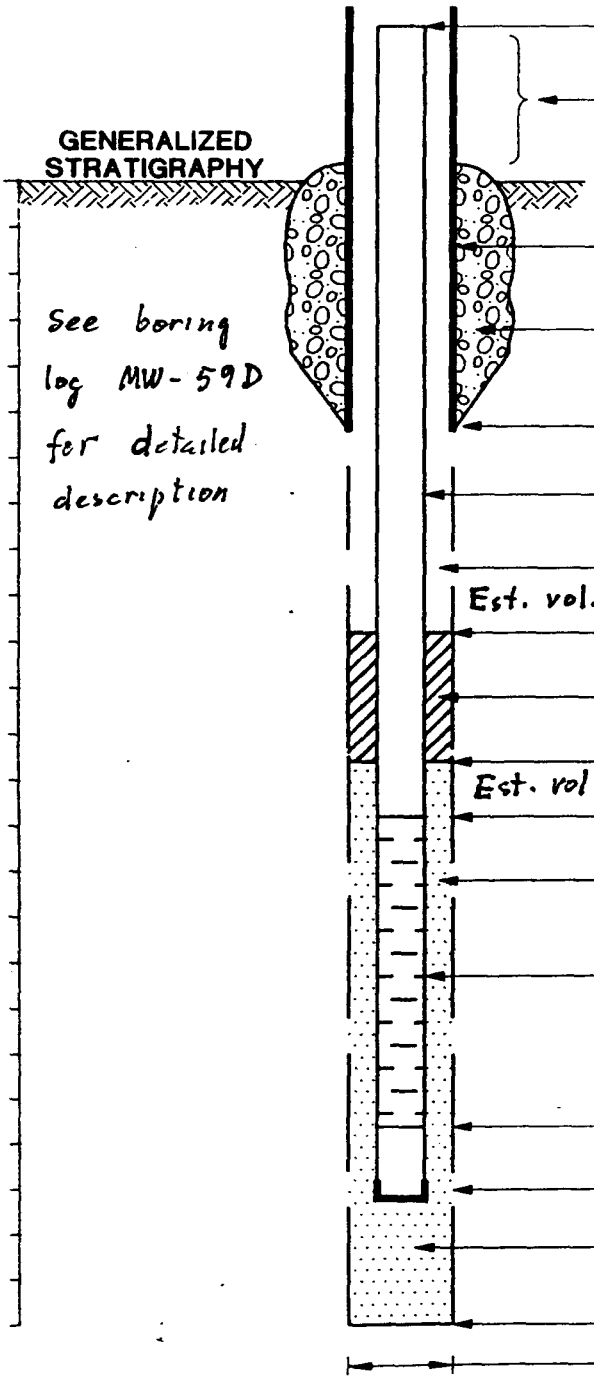
Number / Type of Protective Post for cluster: 8
Elevation of top of riser pipe: ~~2.01~~ 1193.20
Height of riser above ground: 2.01
Ground Elevation: 1191.19
I.D./Type of surface casing: 4" X 4" X 7' Galvanized Steel
Dimen. / Type of Surface Pad: 3'X3'X4" Concrete
Type of filler: Granular bentonite/w-mix Concrete
Depth of surface seal: 5.0'
I.D./Type of riser pipe: 2" Threaded, flush coupled Sch 40 PVC
Type of seal: Cement/Bentonite
Calculated volume: 36.3 ft³ Placed volume: 50.0
Depth of top of seal: ~~2.0'~~ 12.0'
10.2 in hole
10.2
Type of seal: Pure Gold bentonite Grout 10.2
Depth of top of filter pack: 120.8
Depth of top of screen: 125.5
Sieve Test (D_{30} = %)
Type of filter pack: 10-20 Silica Sand
Calculated volume: 2.1 Placed volume: 1.35 ft³
I.D./Type of screen: 2" Flush coupled threaded, mill slot Sch 40 PVC
Screen slot size: 0.020"
Depth of bottom of screen: 130.5
Depth of bottom of plugged blank section: 131.0
Type of backfill below monitoring well: 10-20 Silica Sand
Depth of bottom of boring: 133.0
Diameter of boring: Nominal 6"

GROUND WATER OBSERVATION WELL REPORT

Project Name: Mead NOP
Location: Mead, Nebraska
Installed by: Winnek Companies
Inspected by: Gene Papinako (WCC)
Piez./Well No.: MW-59D
Project No.: 92 KW 030
Date: 7-25-92
Time: 12:15

Method of Installation: Filter pack, buffer sand and "Pure Gold" grout were placed through the tremie pipe (0.9-inch-ID PVC). Side discharge (deflector) was used for grout placement. One centralizer positioned @ ~~18~~ 130 ft depth

Remarks:



Elevation of top of riser pipe: 1162.14'

Height of riser above ground: ~~2.0~~ RBP 1.72'

Ground Elevation: 1160.42'

I.D./Type of surface casing: 4"x4"x7' Galvanized steel

Type of surface seal: Granular Bentonite/Concrete

Depth of surface seal: 5.0'

I.D./Type of riser pipe: 2-inch-dia PVC Sch. 40 threaded, flush-coupled

Type of backfill: Cement/Bentonite Grout

Est. vol. 320 gals Actual vol. in 315 gals

Depth of top of seal: ~~5.0~~ RBP 13.0'

Type of seal: "Pure Gold" Bentonite 128.9

Depth of top of buffer sand (20-40)

Depth of top of filter pack: 130.2

Est. vol. 9.3 gals. Actual vol. in 11 gals

Depth of top of screen: 132.2

Type of filter pack: 10-20 Silica Sand

I.D./Type of screen: 2-inch-dia PVC Sch. 40 mill-slotted, threaded, flush-coupled

Screen slot size: 0.02 inch

Depth of bottom of screen: 137.2

Depth of bottom of plugged bank section: 137.7

Type of backfill below observation well: Native material, 10-20 Silica Sand

Depth of bottom of boring: 139.0

Diameter of boring: 5 1/4 (from 125.0 to 139.0 ft) / 7 7/8 (from 0 to 125.0)

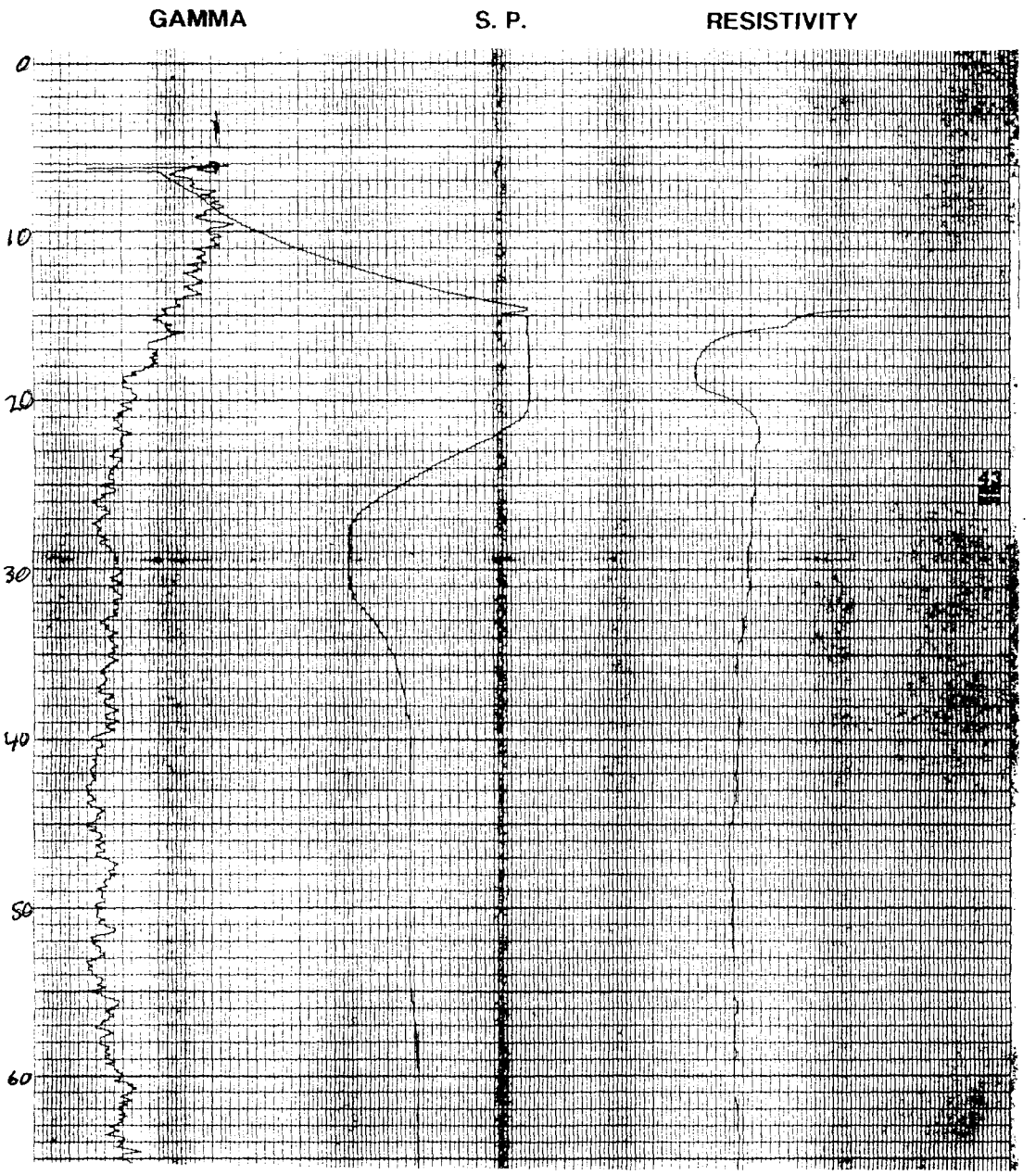
Woodward-Clyde Consultants

Fig. 89

APPENDIX C
GEOPHYSICAL LOGS

WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

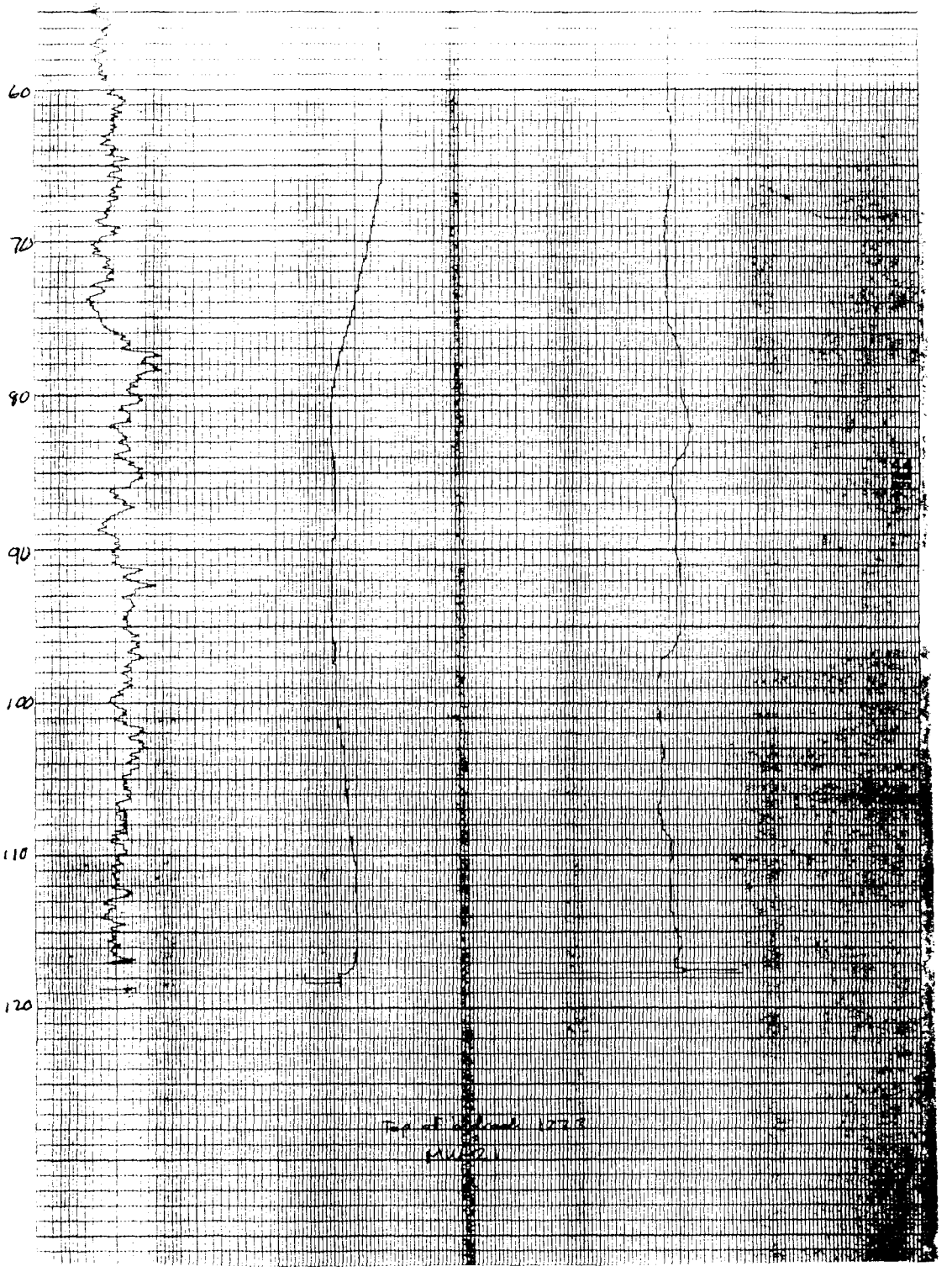
PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-21D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 7-15-92	DATE LOGGED: 7-15-92
BOTTOM OF HOLE: 117'	BOTTOM OF LOG: 117'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



1

WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

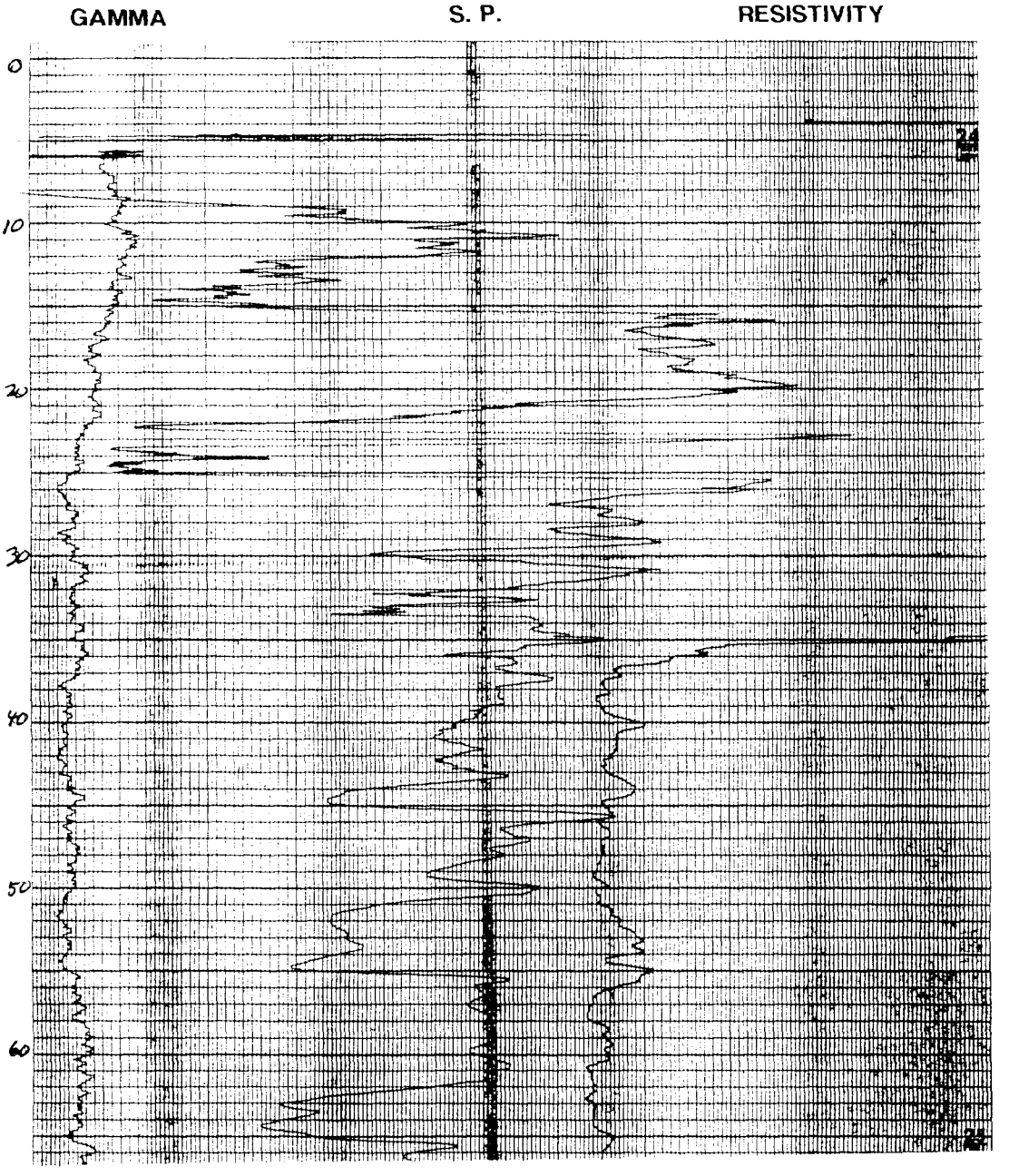
PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-21D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 7-15-92	DATE LOGGED: 7-15-92
BOTTOM OF HOLE: 117'	BOTTOM OF LOG: 117'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



2

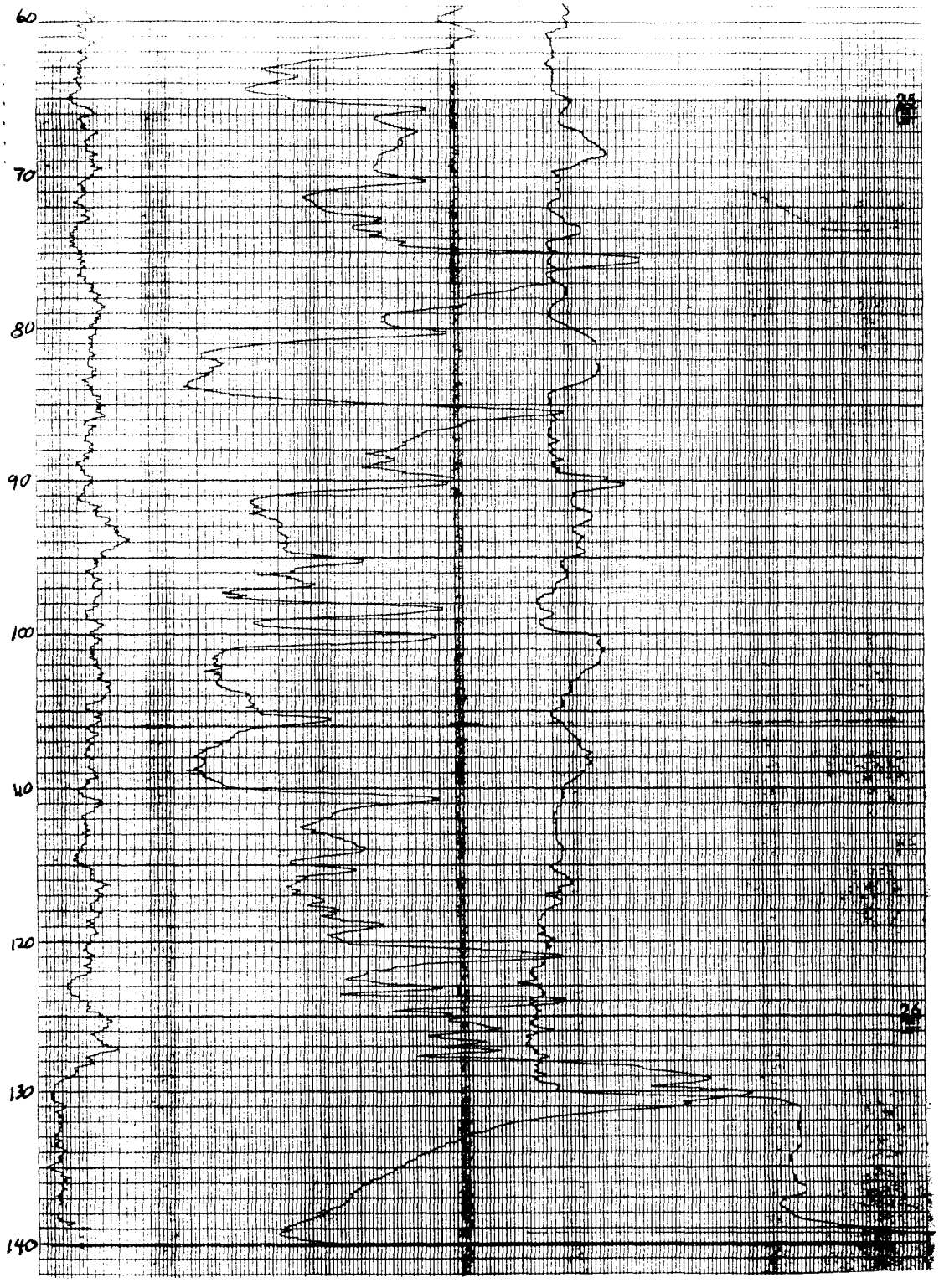
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-21D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 7-15-92	DATE LOGGED: 7-15-92
BOTTOM OF HOLE: 139'	BOTTOM OF LOG: 139'
TYPE OF TEMORPARY CASING: 6 IN. DIA	BOTTOM OF CASING: 129.5'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-21D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 7-15-92	DATE LOGGED: 7-15-92
BOTTOM OF HOLE: 139'	BOTTOM OF LOG: 139'
TYPE OF TEMORPARY CASING: 6 IN. DIA	BOTTOM OF CASING: 123.5
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS

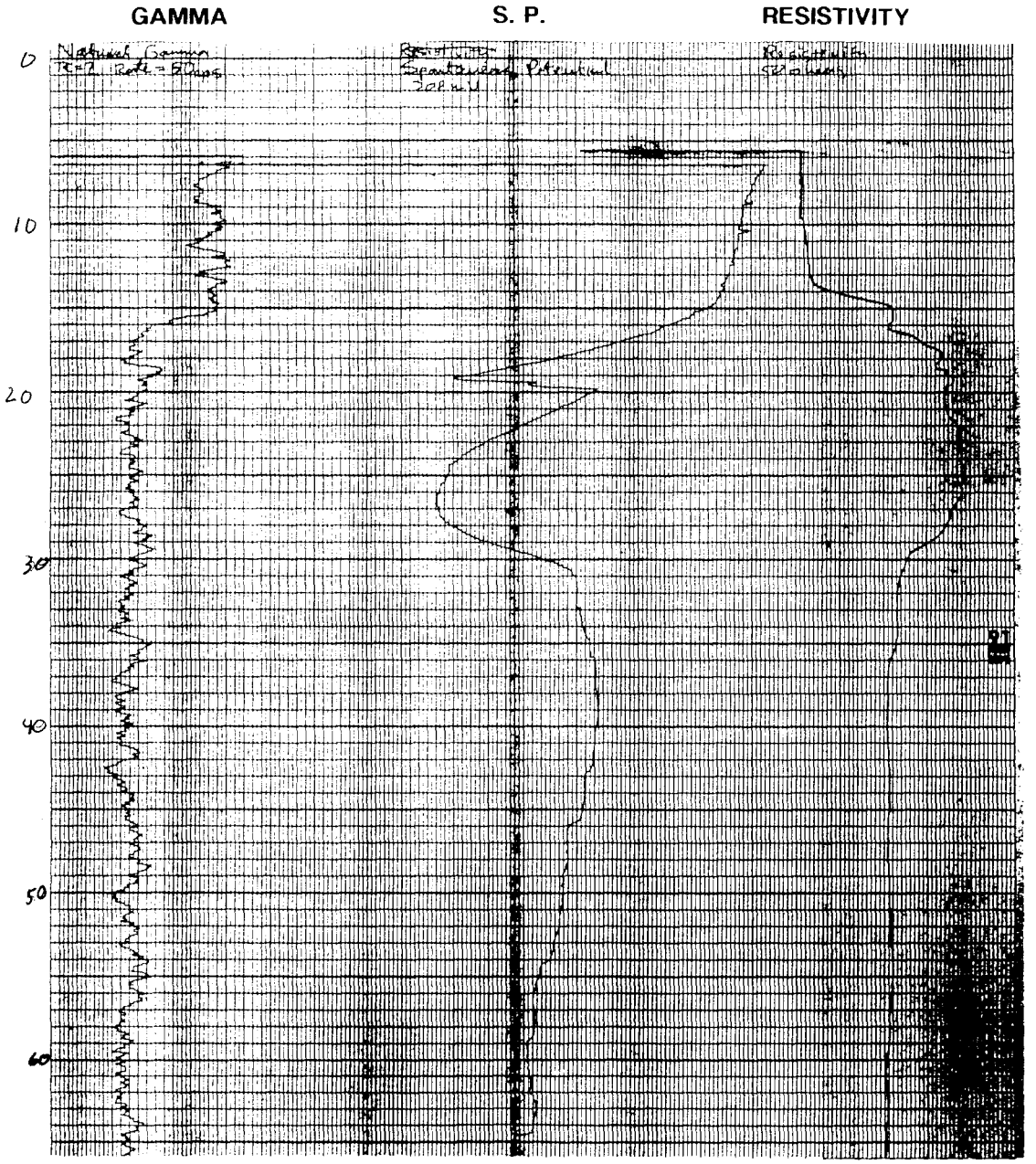


4

B07NE003702-05904

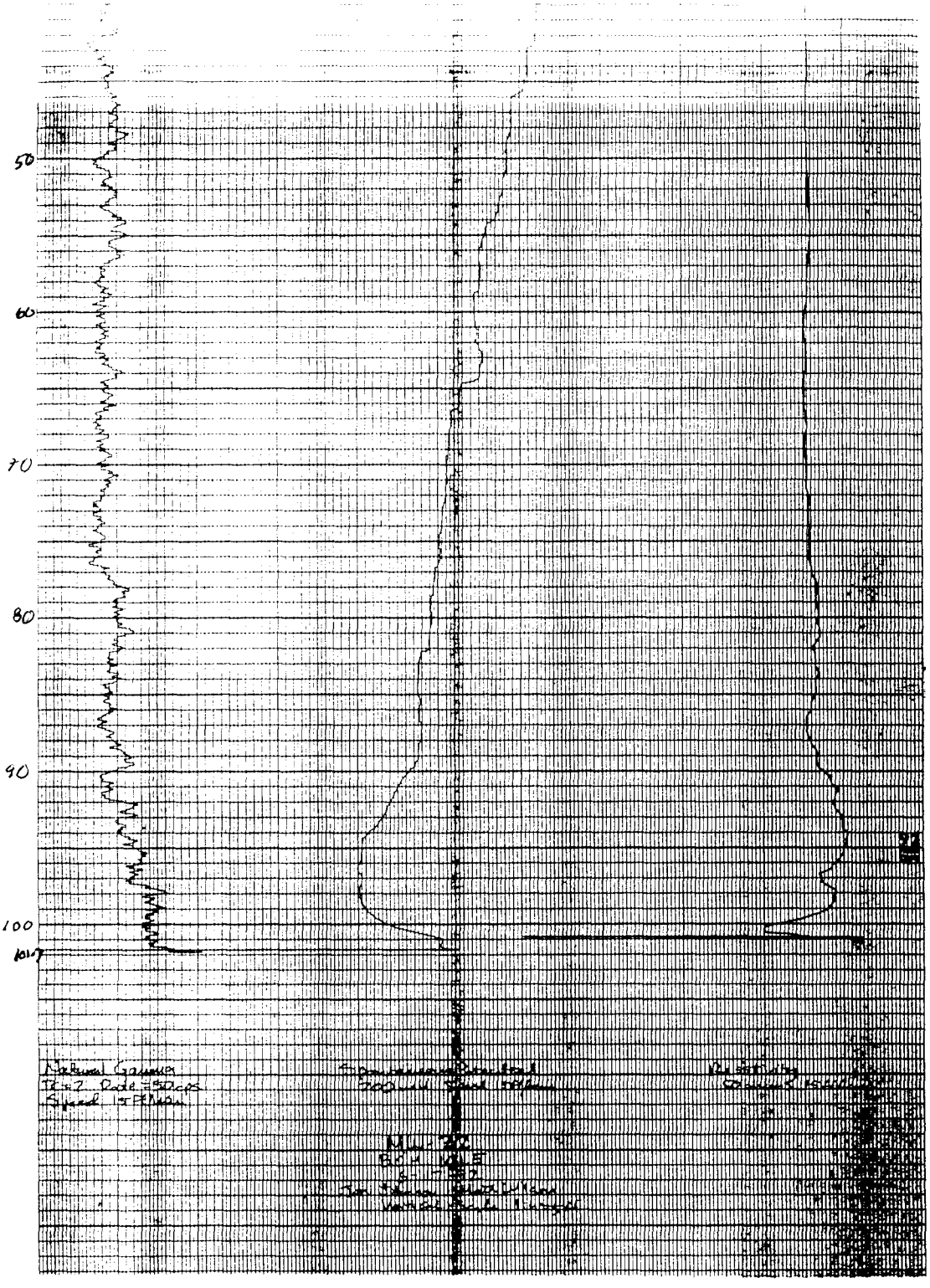
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-22A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-17-92	DATE LOGGED: 6-17-92
BOTTOM OF HOLE: 101.5'	BOTTOM OF LOG: 101.7'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



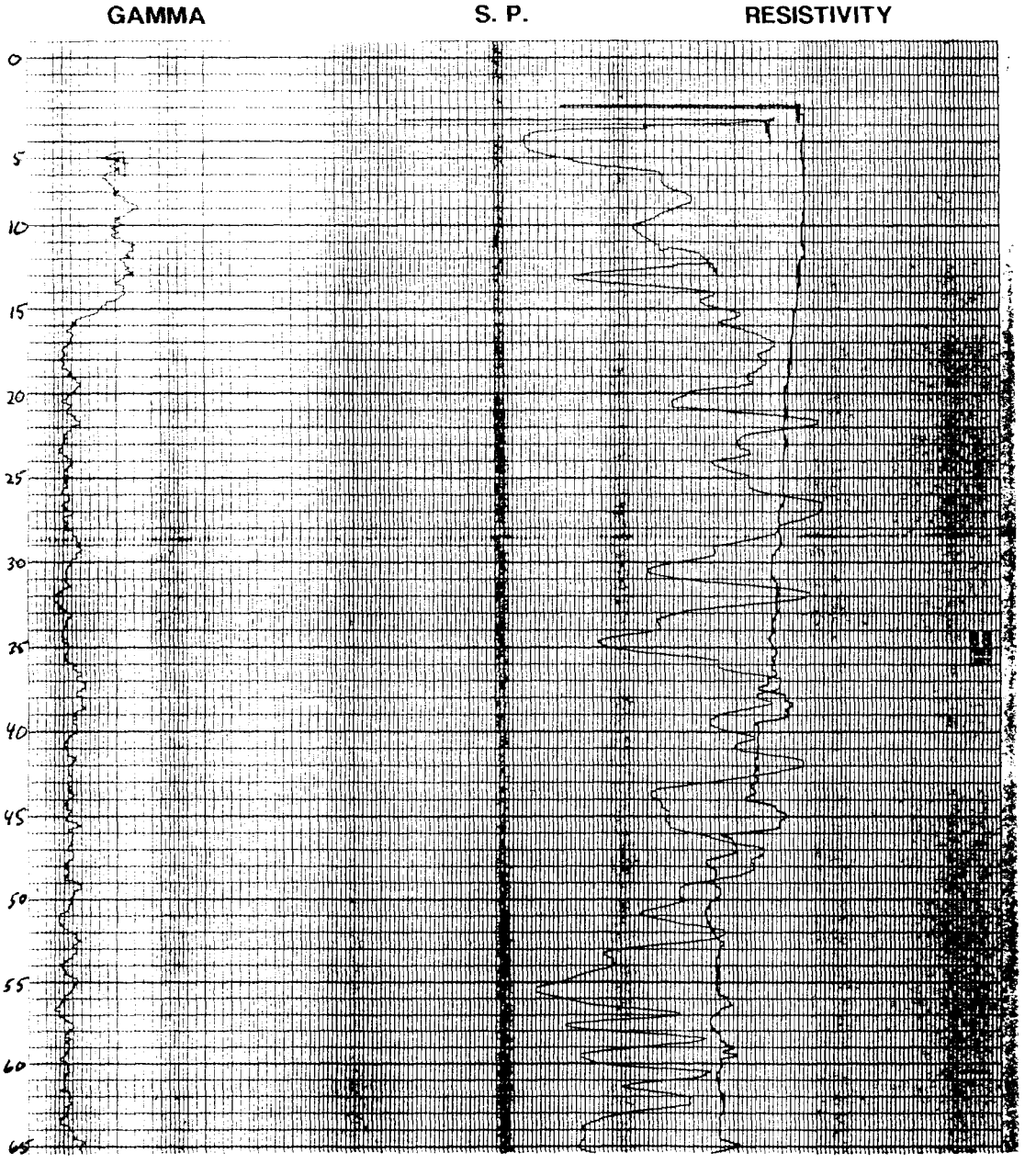
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING:MW-22A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-17-92	DATE LOGGED: 6-17-92
BOTTOM OF HOLE: 101.5'	BOTTOM OF LOG: 101.7'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



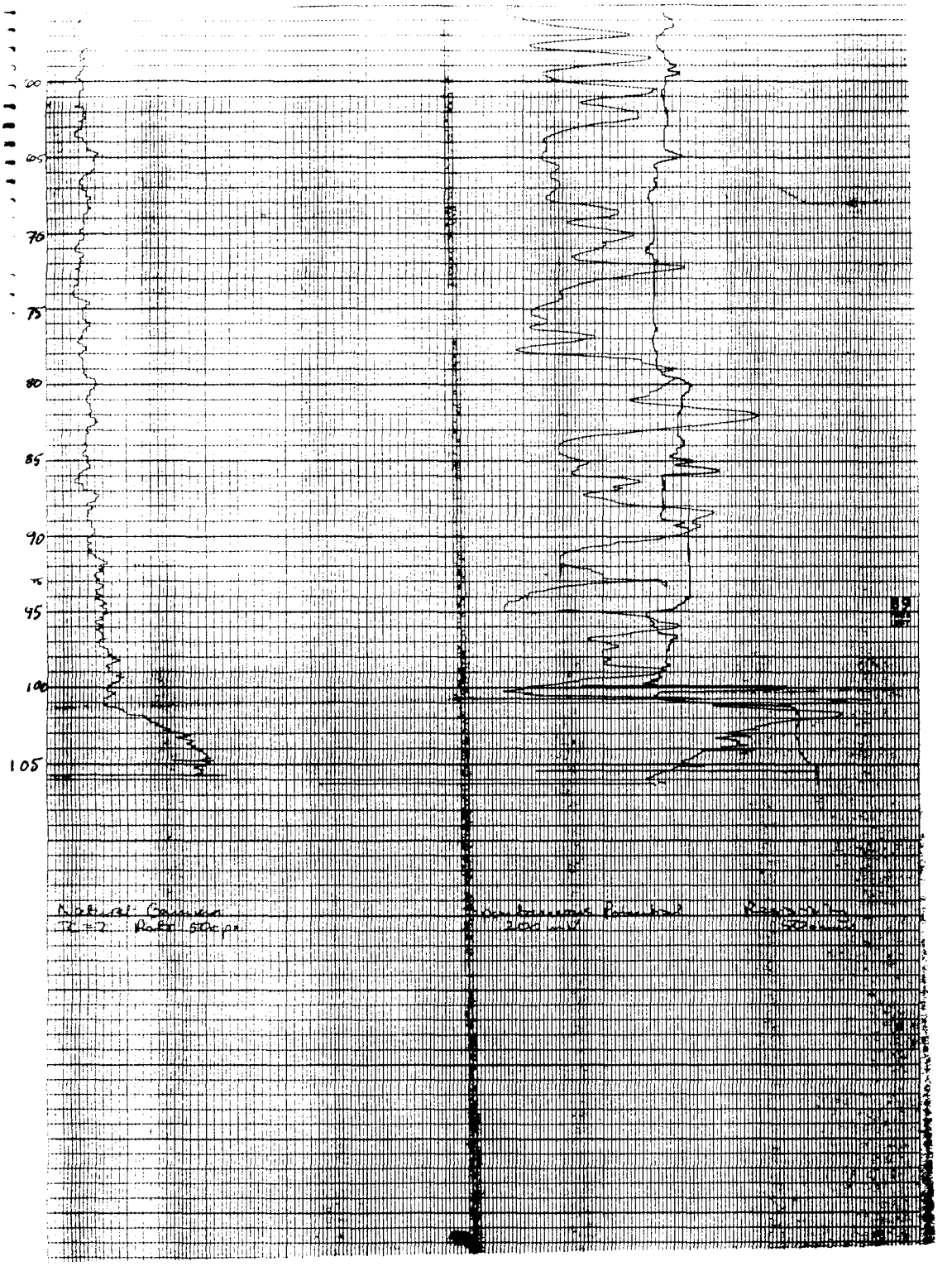
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-22A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	WINNEK
DATE DRILLED: 6-18-92	DATE LOGGED: 6-18-92
BOTTOM OF HOLE: 106'	BOTTOM OF LOG: 106'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 101'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-22A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	WINNEK
DATE DRILLED: 6-18-92	DATE LOGGED: 6-18-92
BOTTOM OF HOLE: 106'	BOTTOM OF LOG: 106'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 101'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



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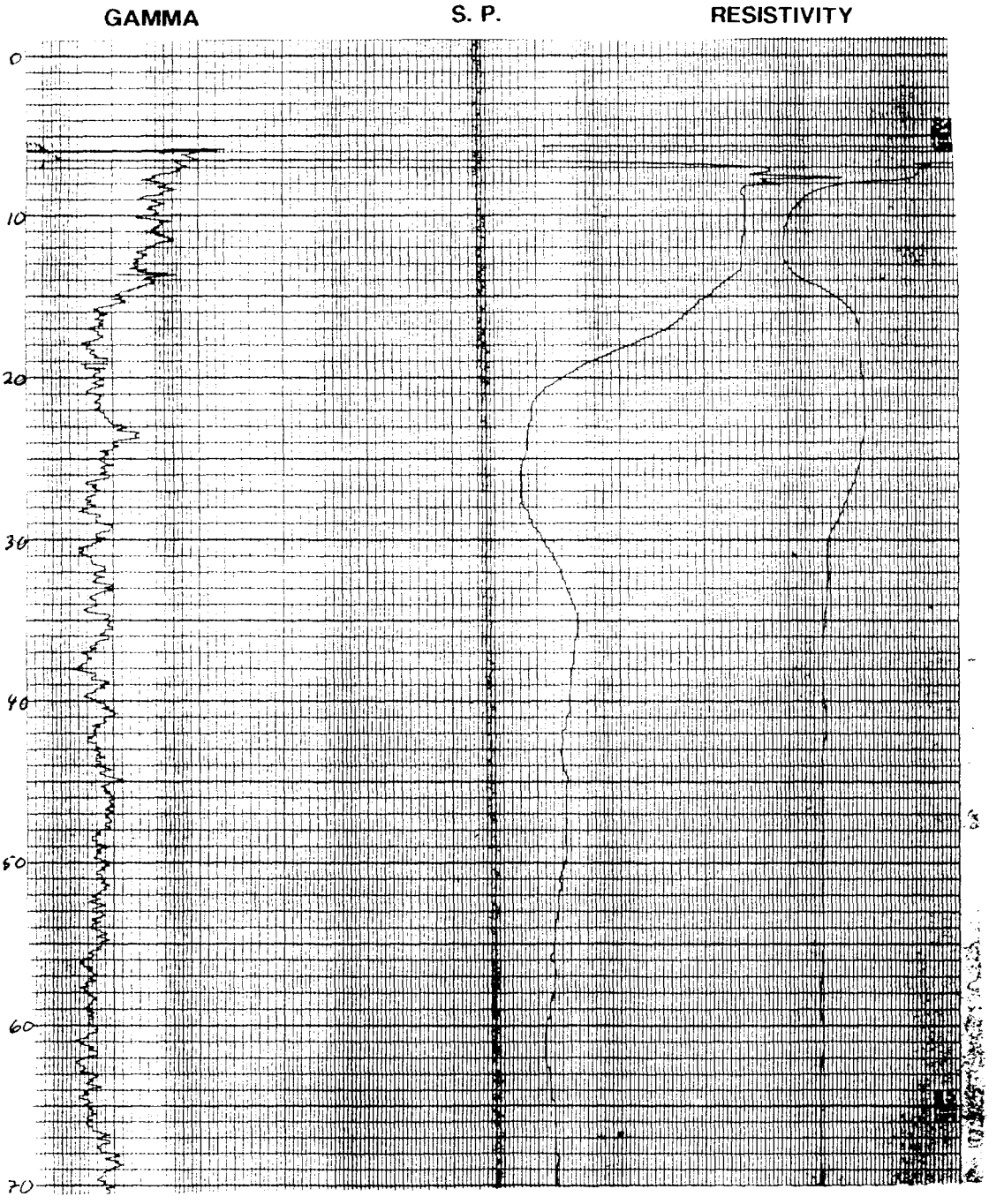
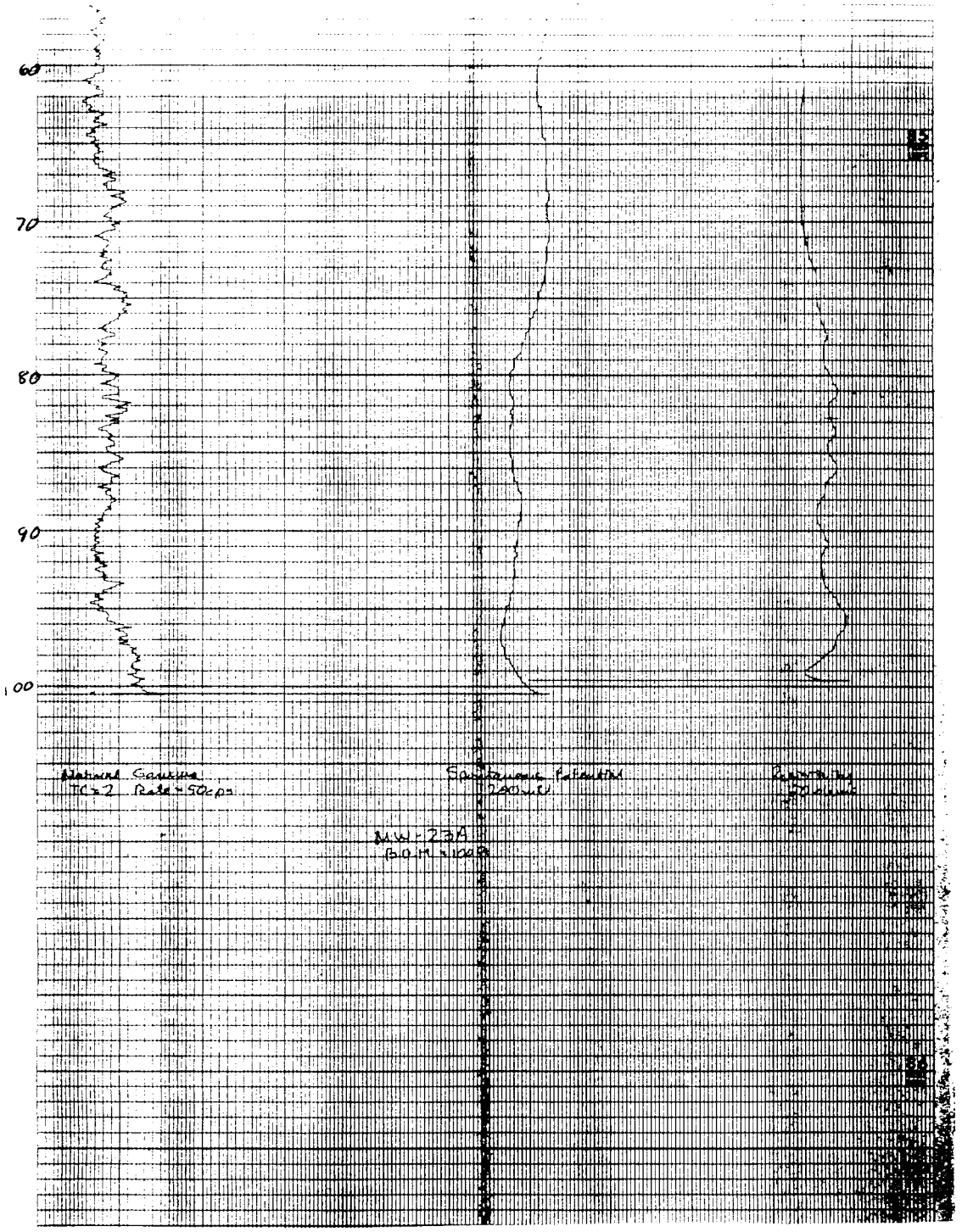
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-23A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-26-92	DATE LOGGED: 6-26-92
BOTTOM OF HOLE: 100'	BOTTOM OF LOG: 100'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



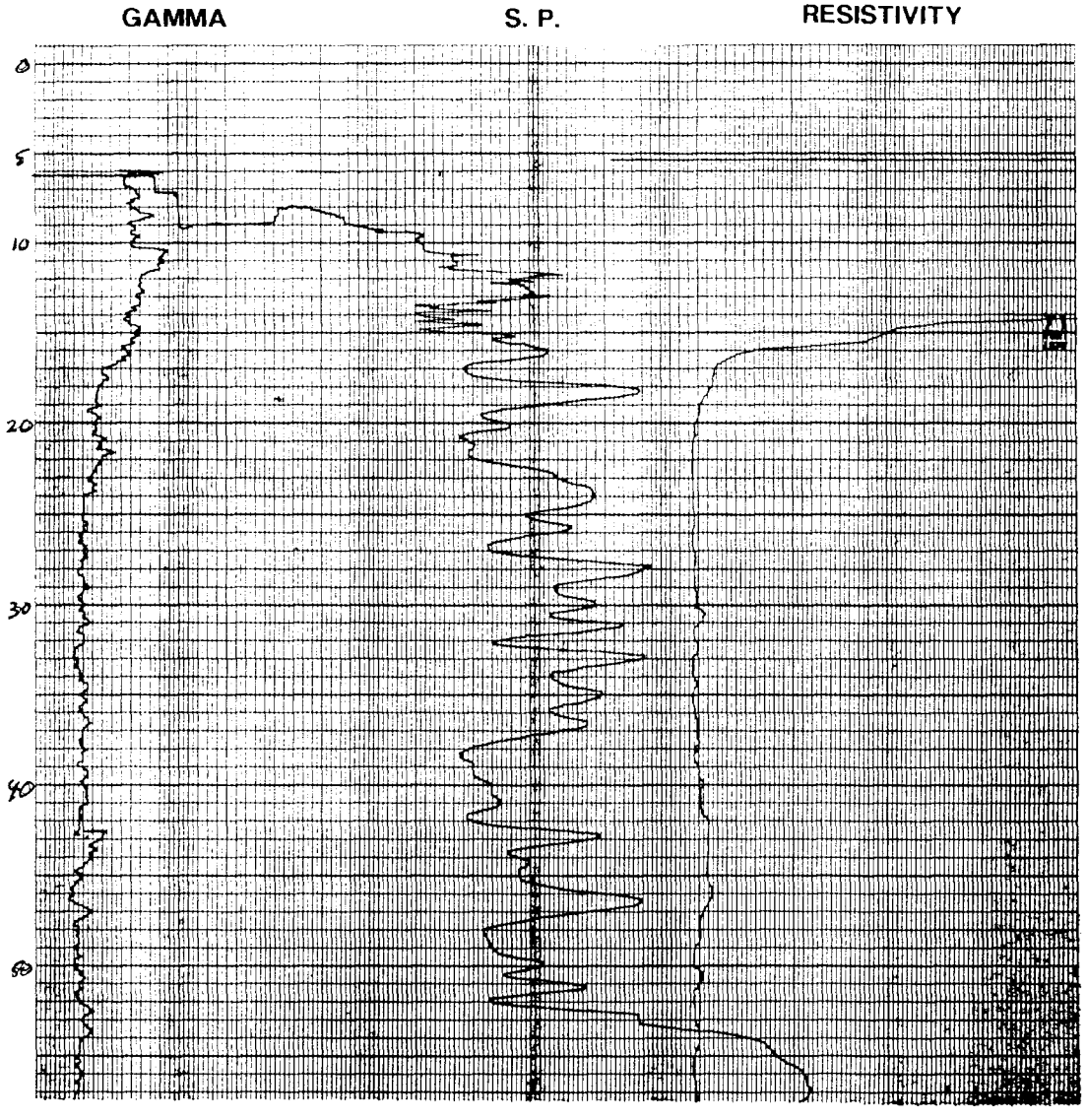
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-23A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-26-92	DATE LOGGED: 6-26-92
BOTTOM OF HOLE: 100'	BOTTOM OF LOG: 100'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



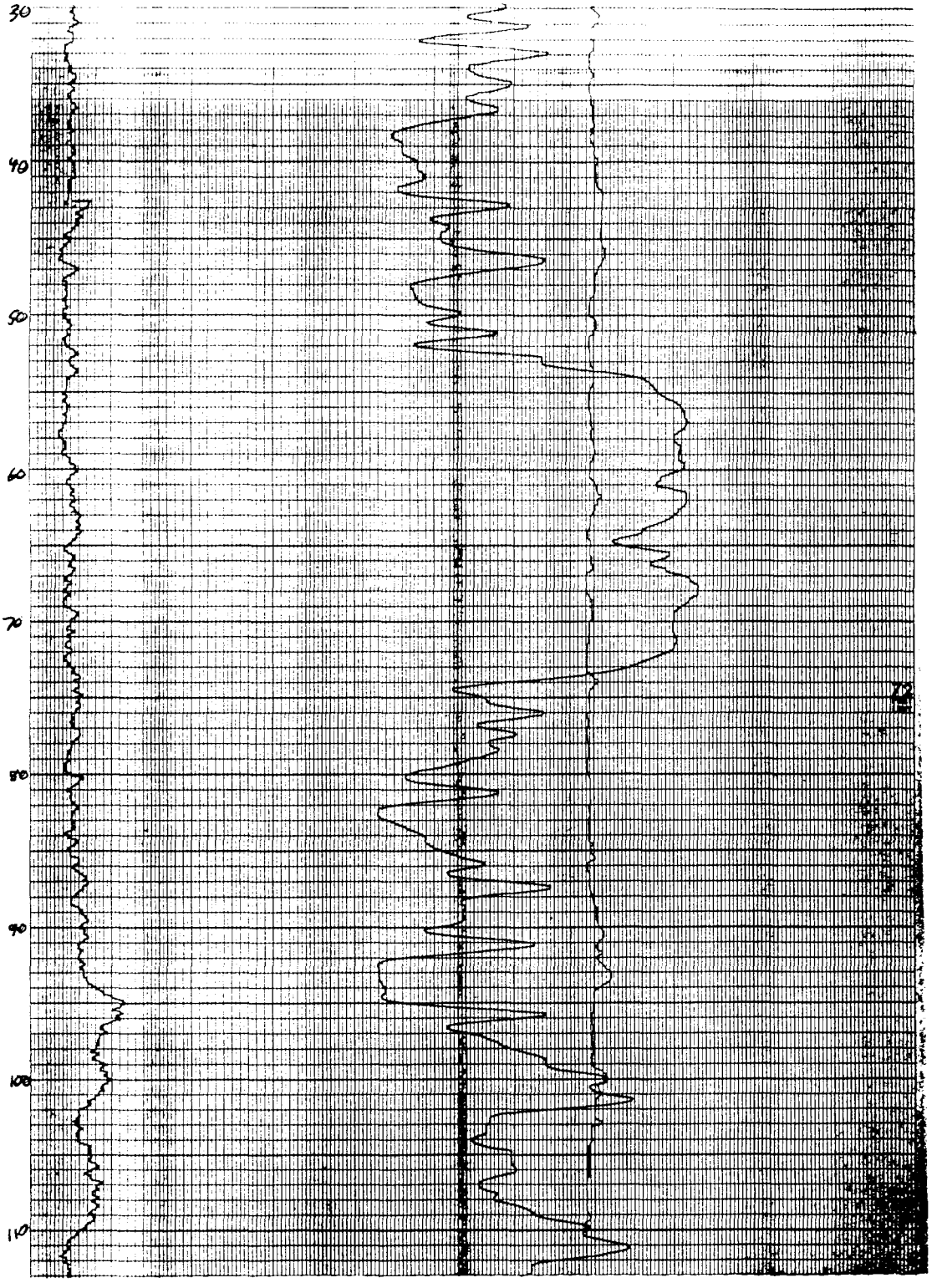
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-25D
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-27-92	DATE LOGGED: 6-28-92
BOTTOM OF HOLE: 170'	BOTTOM OF LOG: 170
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 160.5'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN.
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



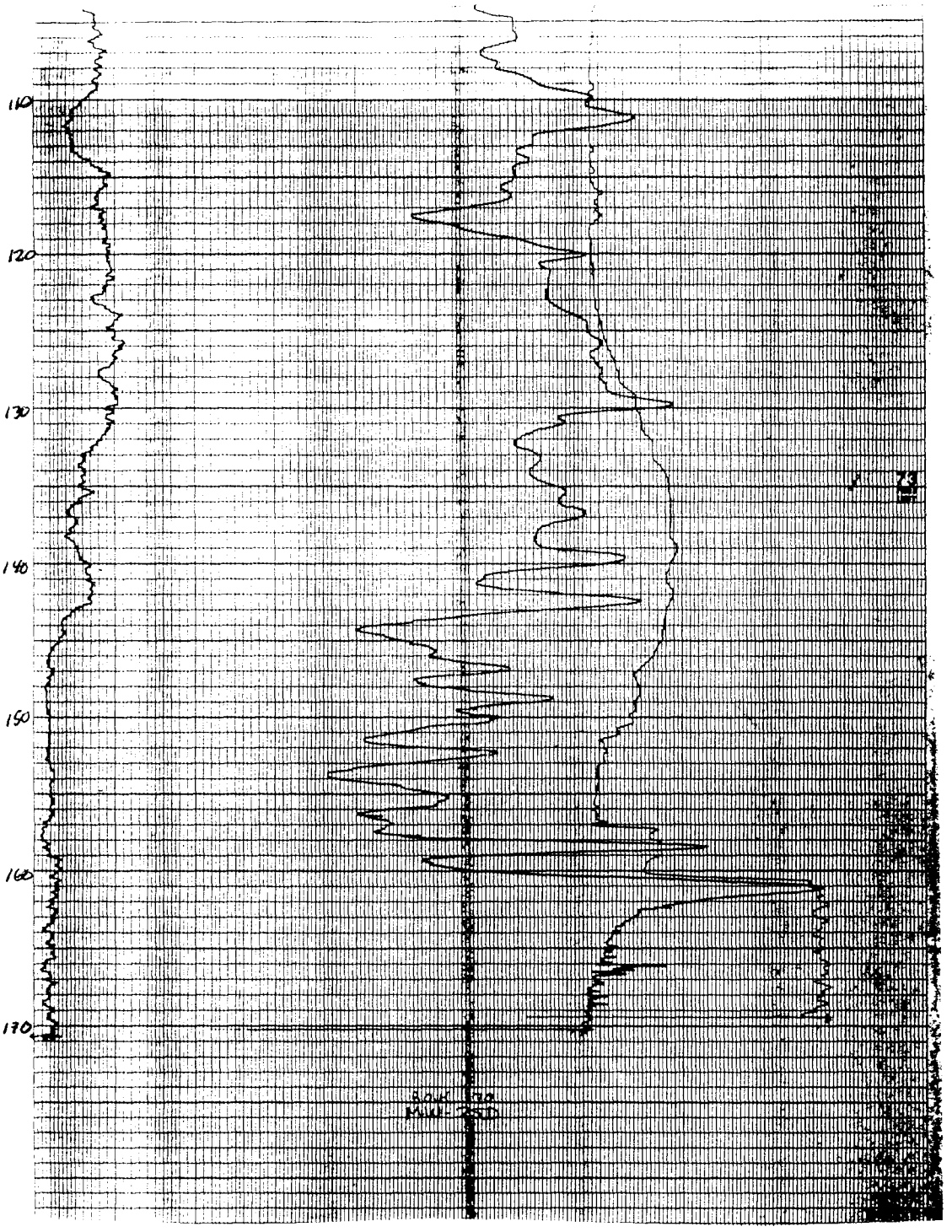
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-25D
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-27-92	DATE LOGGED: 6-28-92
BOTTOM OF HOLE: 170'	BOTTOM OF LOG: 170
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 160.5'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



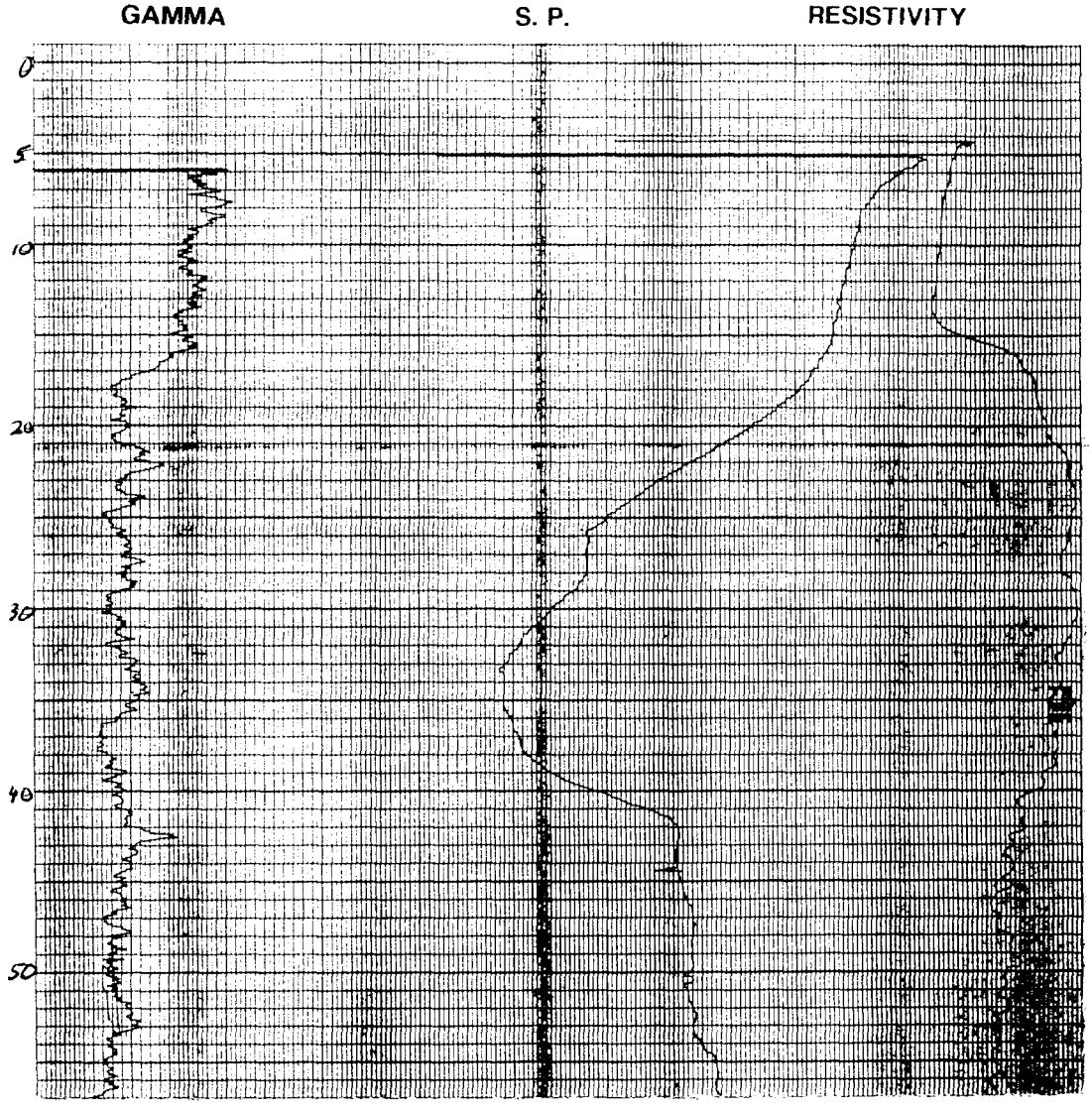
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-25D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-27-92	DATE LOGGED: 6-28-92
BOTTOM OF HOLE: 170'	BOTTOM OF LOG: 170'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 160.5'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



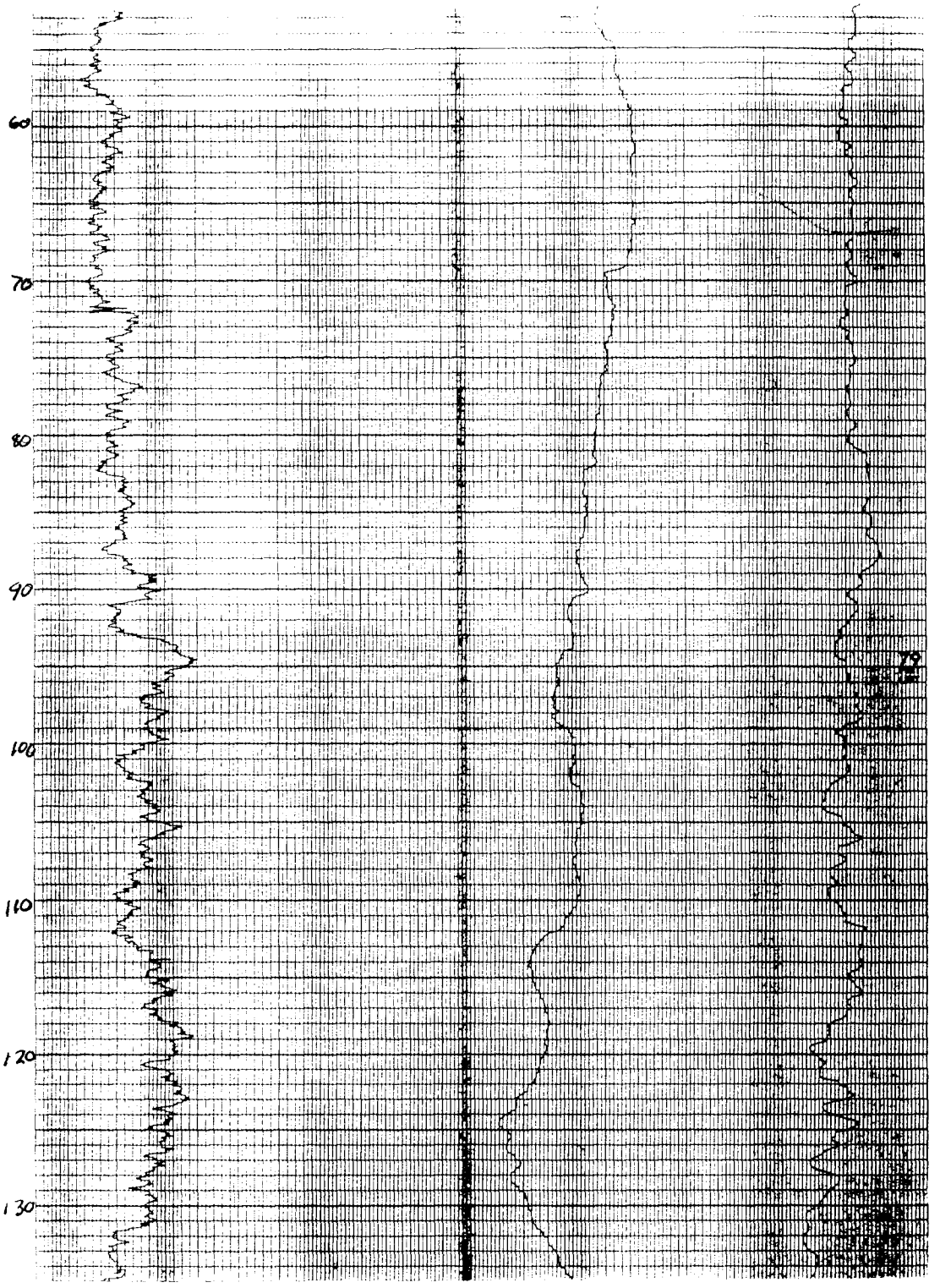
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-25D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-28-92	DATE LOGGED: 6-27-92
BOTTOM OF HOLE: 161.8'	BOTTOM OF LOG: 161.3
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



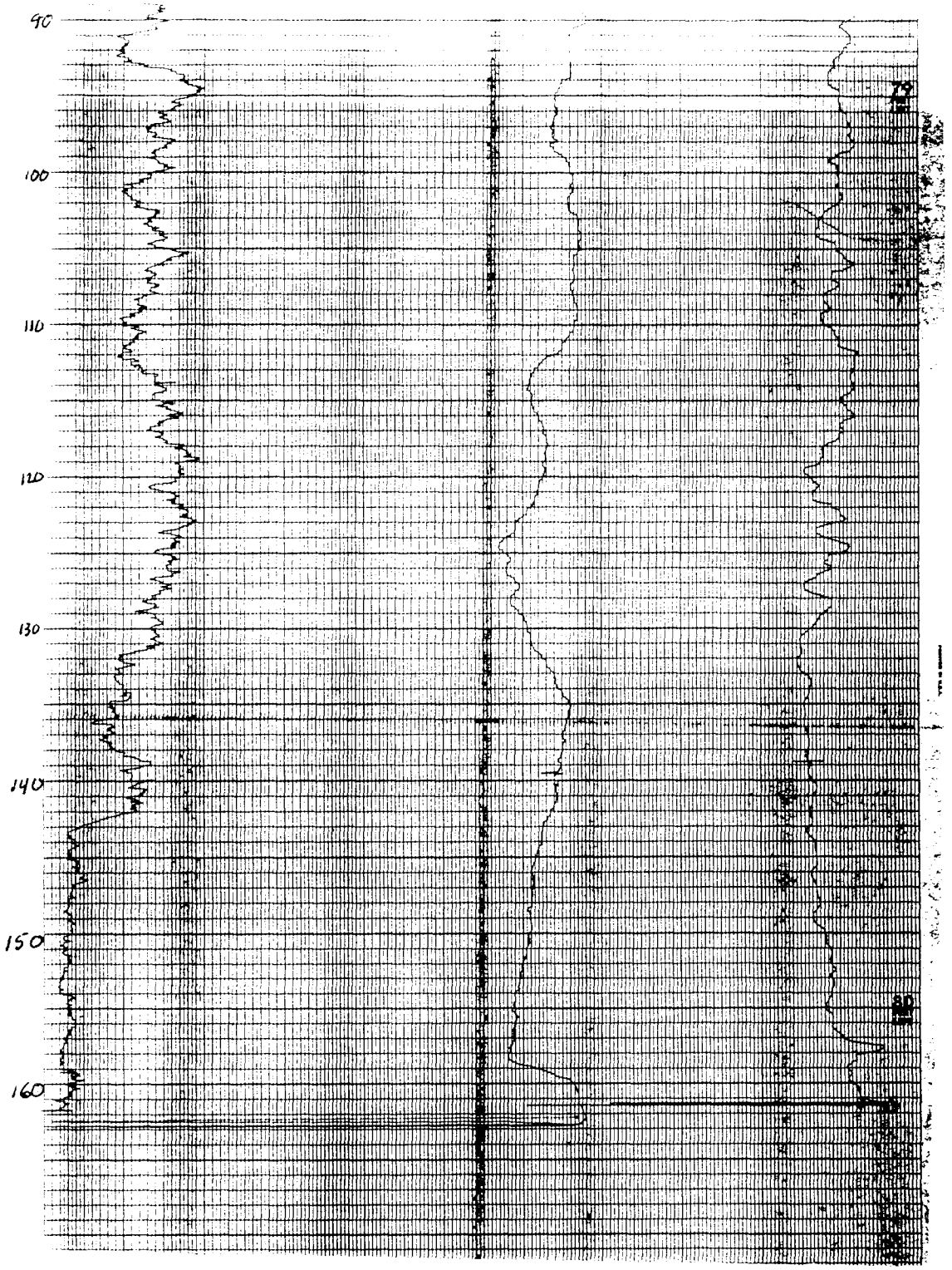
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-25D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-28-92	DATE LOGGED: 6-27-92
BOTTOM OF HOLE: 161.8'	BOTTOM OF LOG: 161.3'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



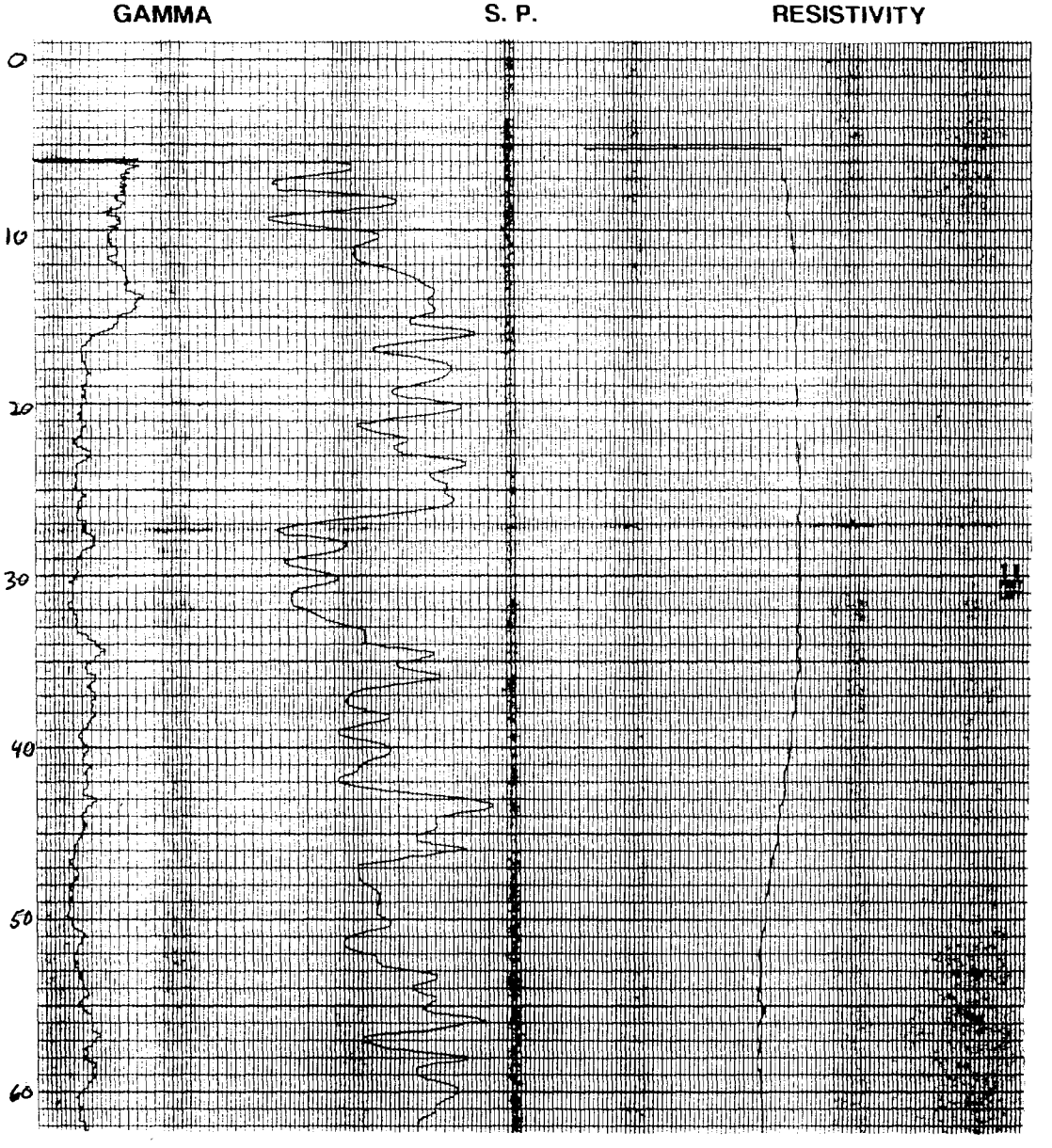
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-25D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-28-92	DATE LOGGED: 6-27-92
BOTTOM OF HOLE: 161.8'	BOTTOM OF LOG: 161.3'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



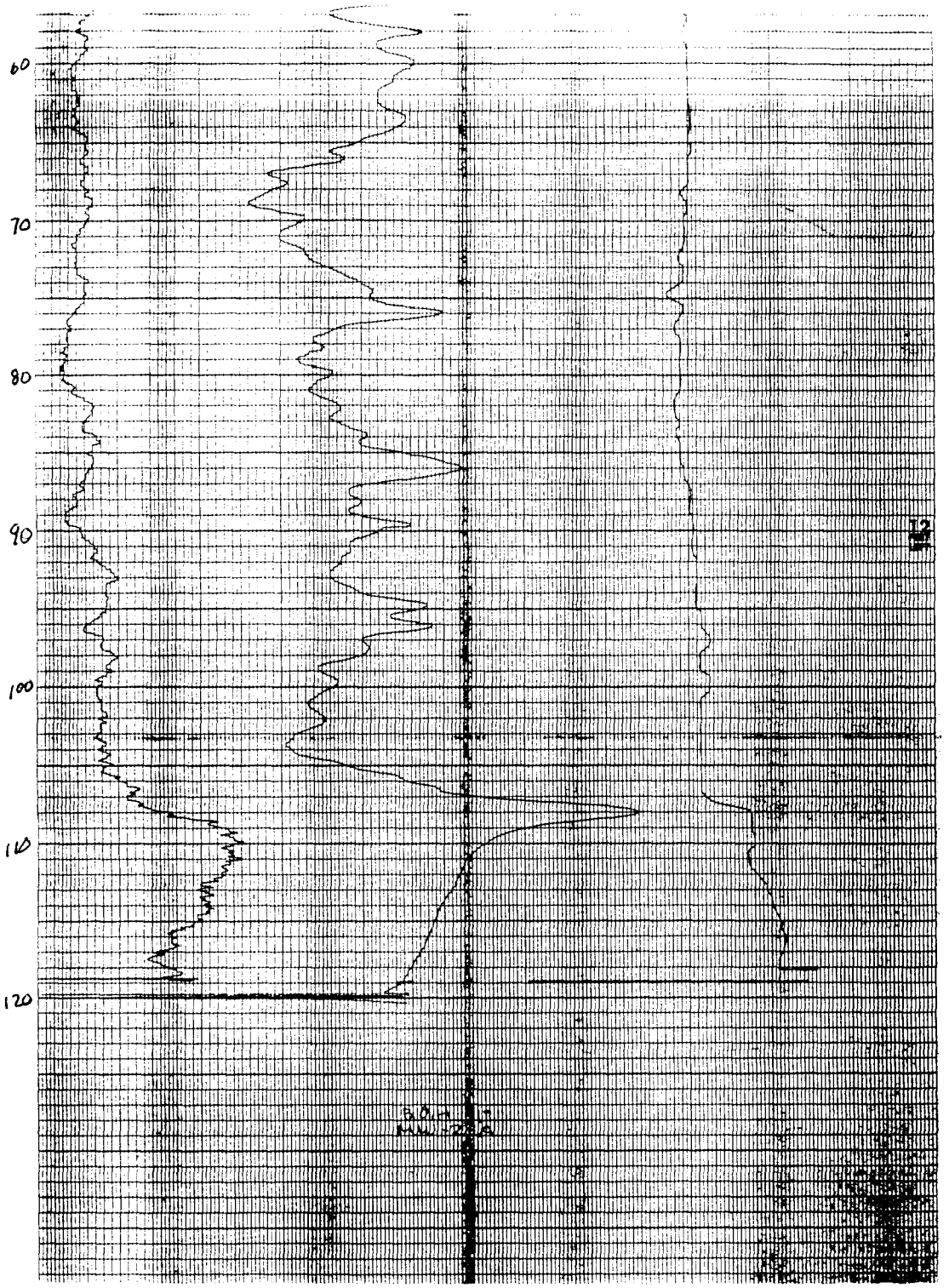
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-26A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-16-92	DATE LOGGED: 7-16-92
BOTTOM OF HOLE: 119'	BOTTOM OF LOG: 119'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 107'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



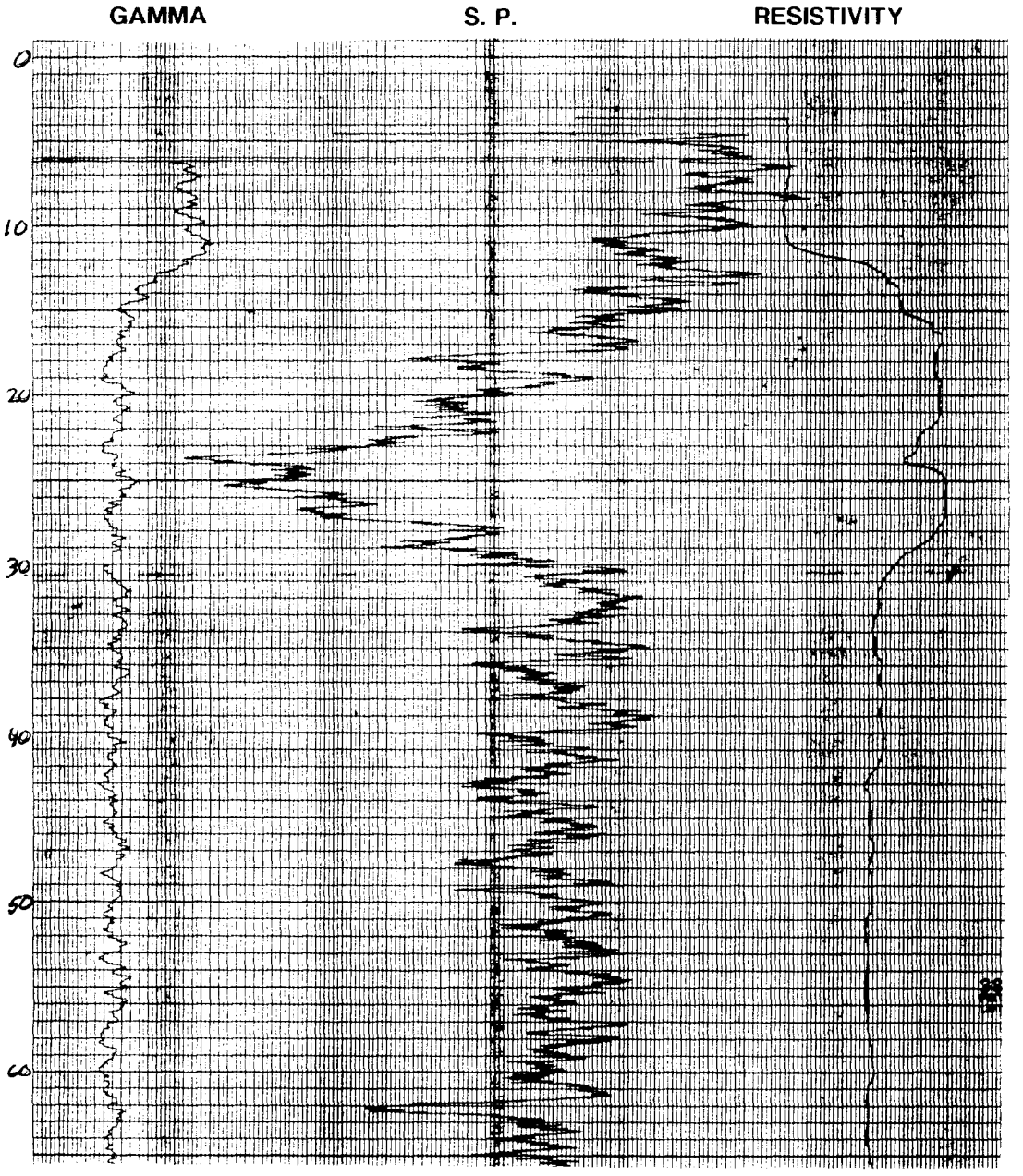
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-26A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-16-92	DATE LOGGED: 7-16-92
BOTTOM OF HOLE: 119'	BOTTOM OF LOG: 119'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 107'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



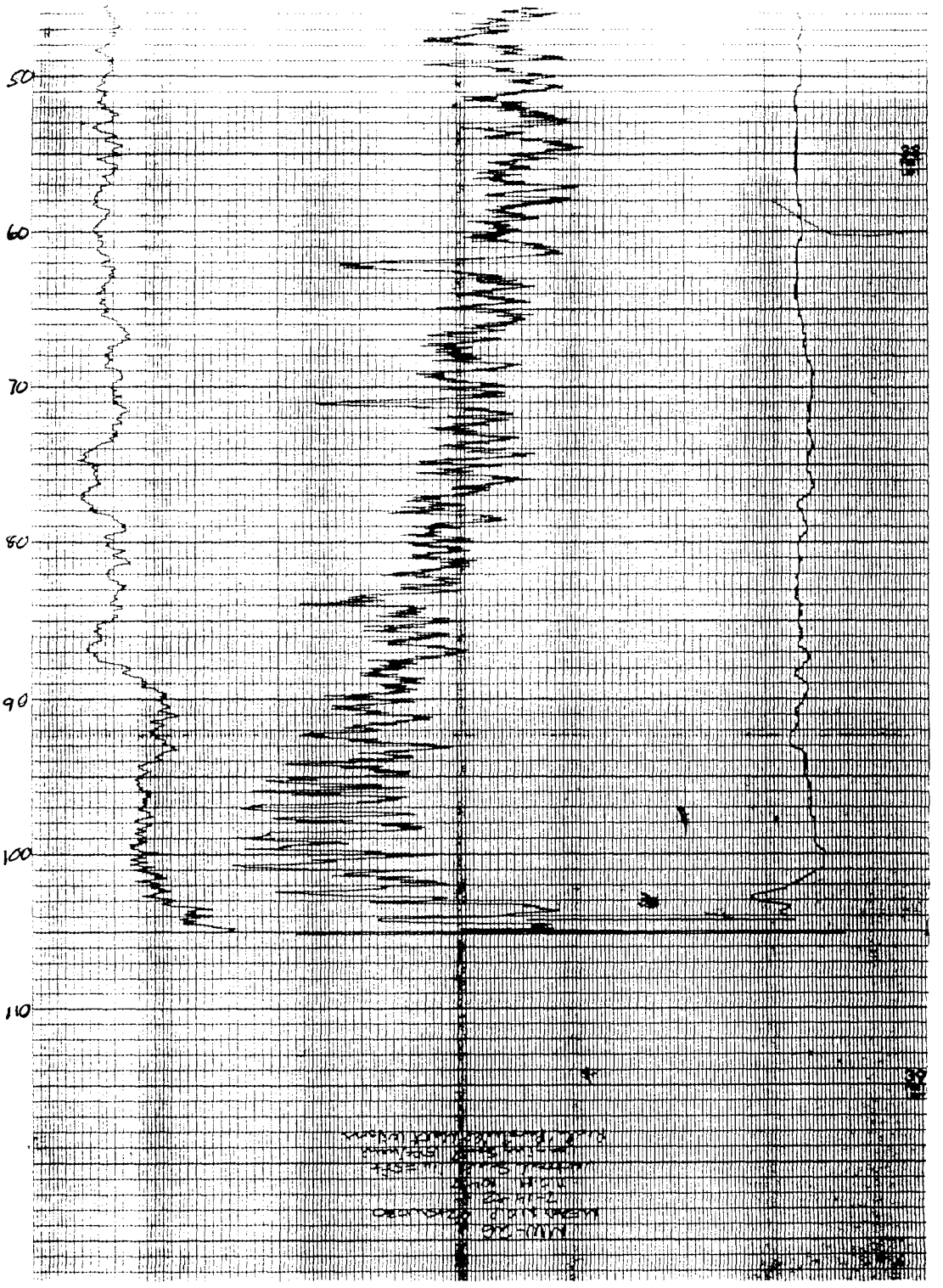
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-26A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-14-92
BOTTOM OF HOLE 104.7'	BOTTOM OF LOG: 105'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



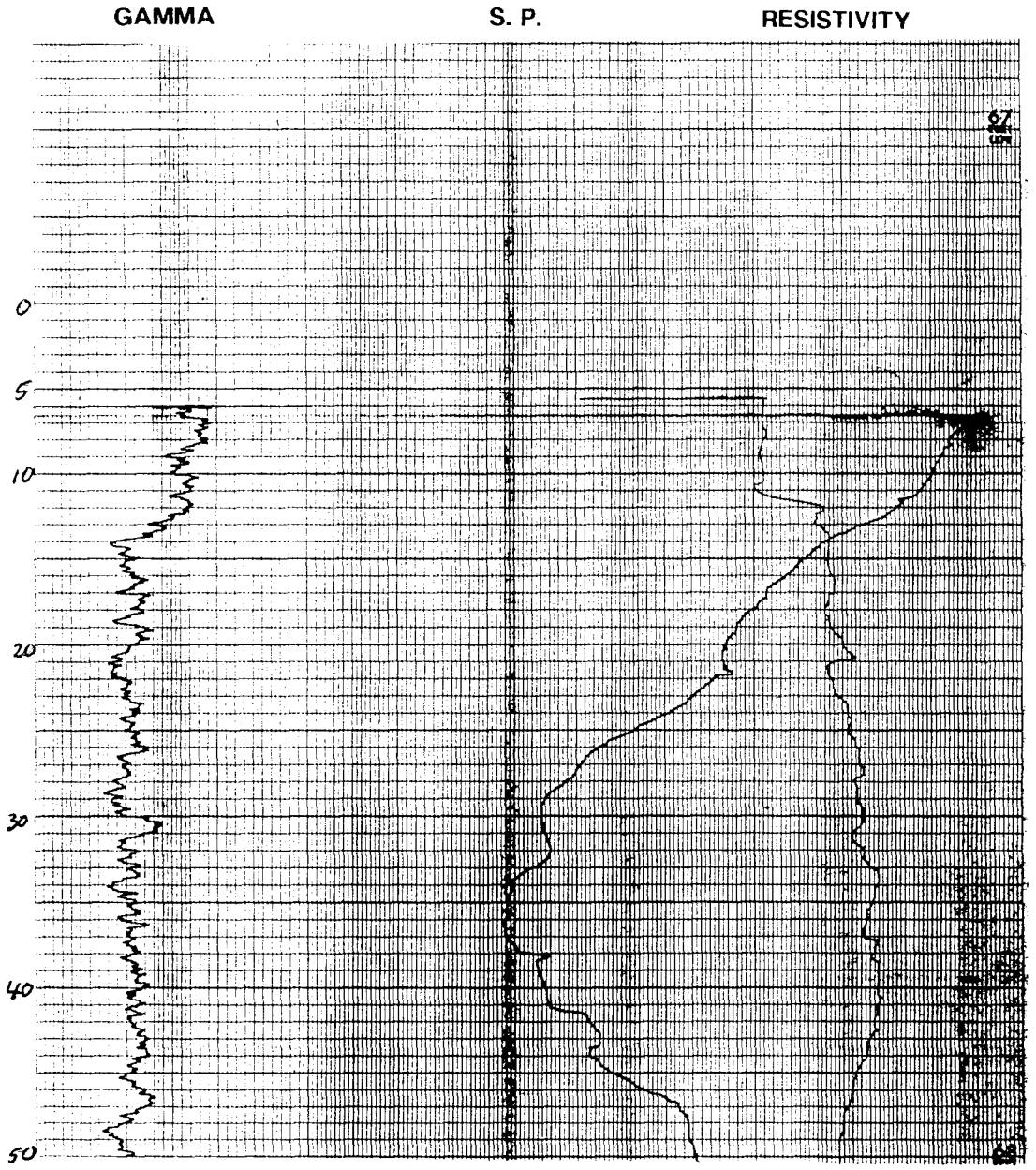
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-26A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-14-92
BOTTOM OF HOLE: 104.7'	BOTTOM OF LOG: 105'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



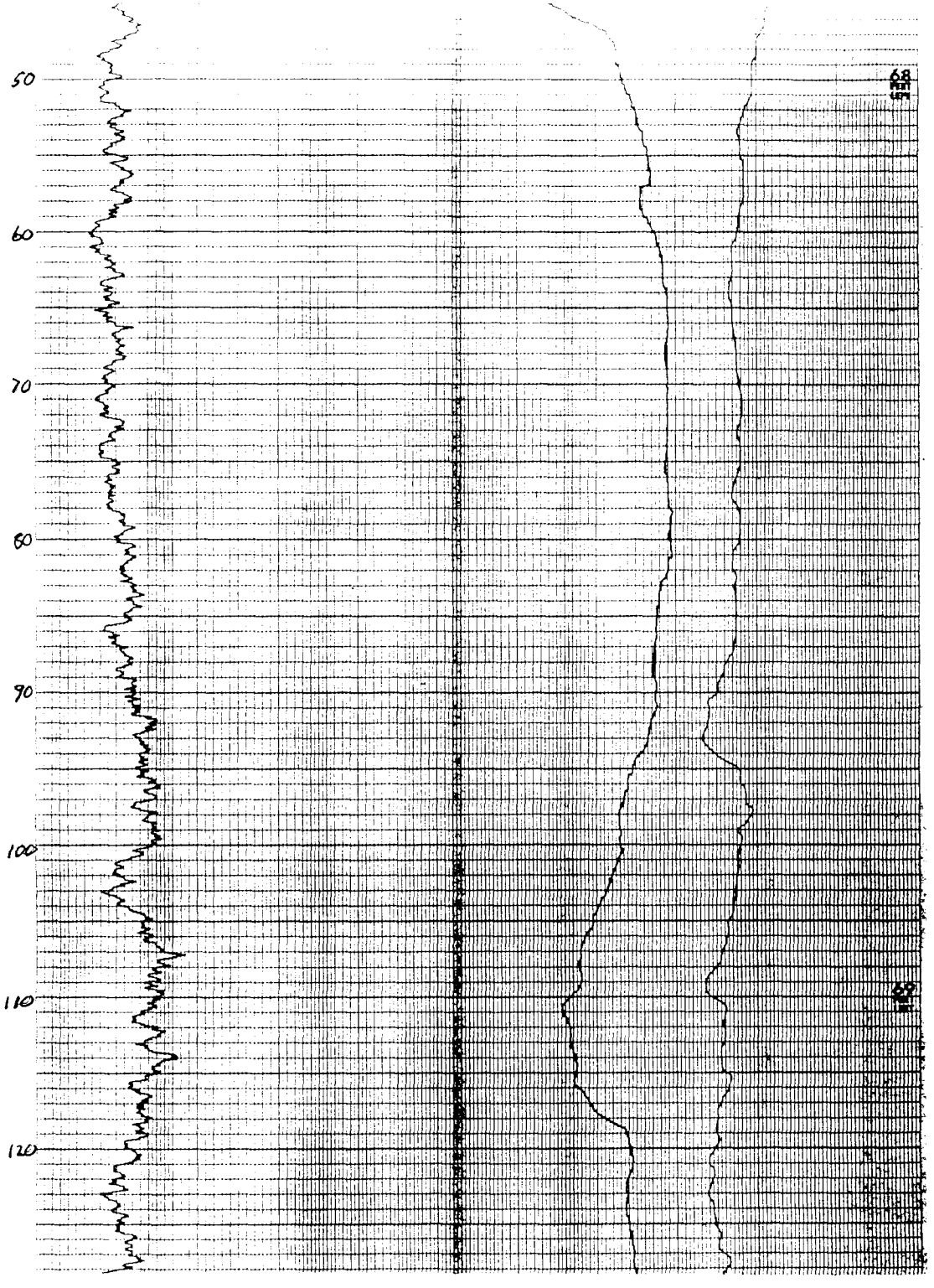
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-28D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-29-92	DATE LOGGED: 6-29-92
BOTTOM OF HOLE: 137.4'	BOTTOM OF LOG: 137.8
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

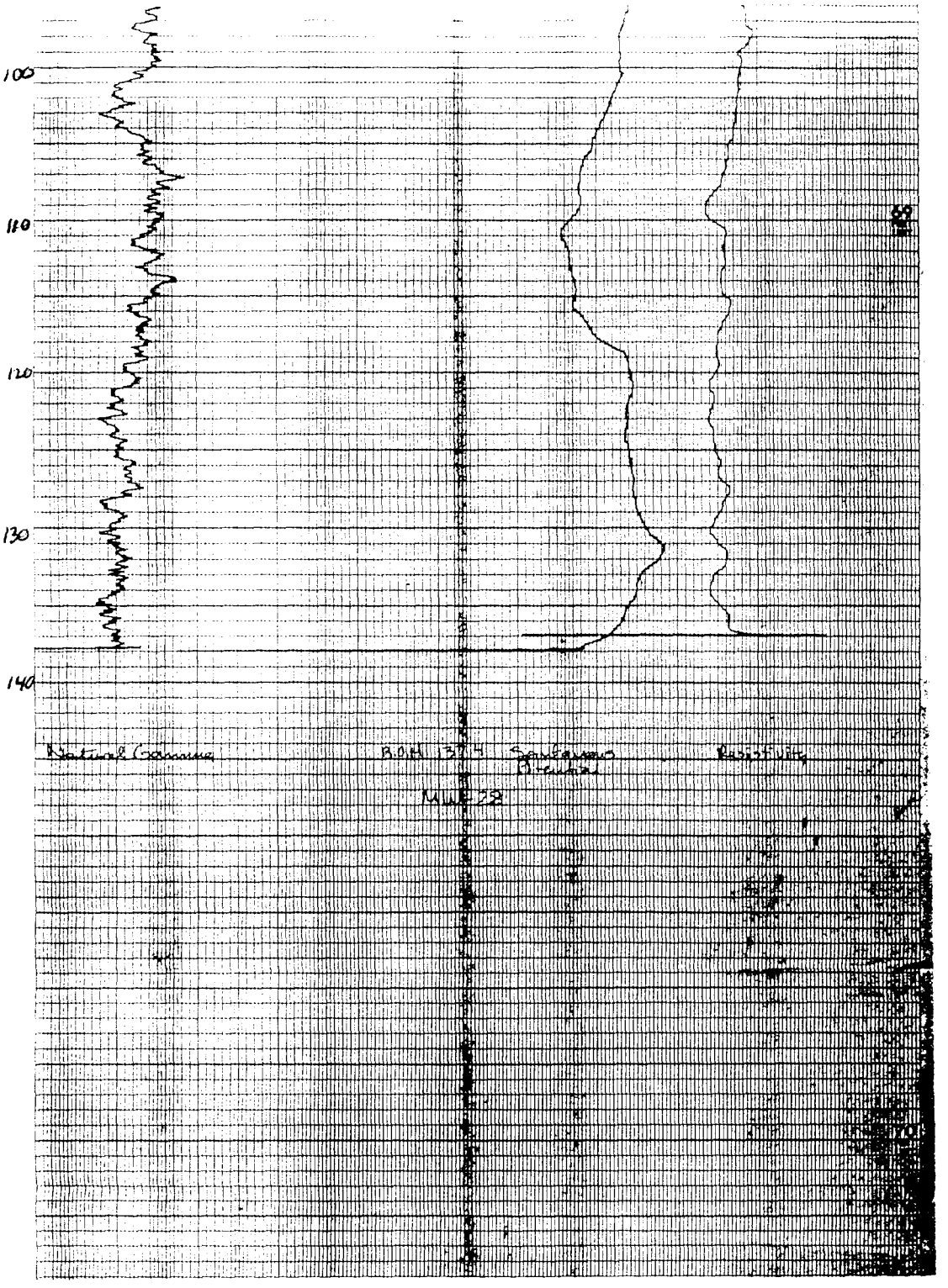
PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-28D
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-29-92	DATE LOGGED: 6-29-92
BOTTOM OF HOLE: 137.4'	BOTTOM OF LOG: 137.8
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

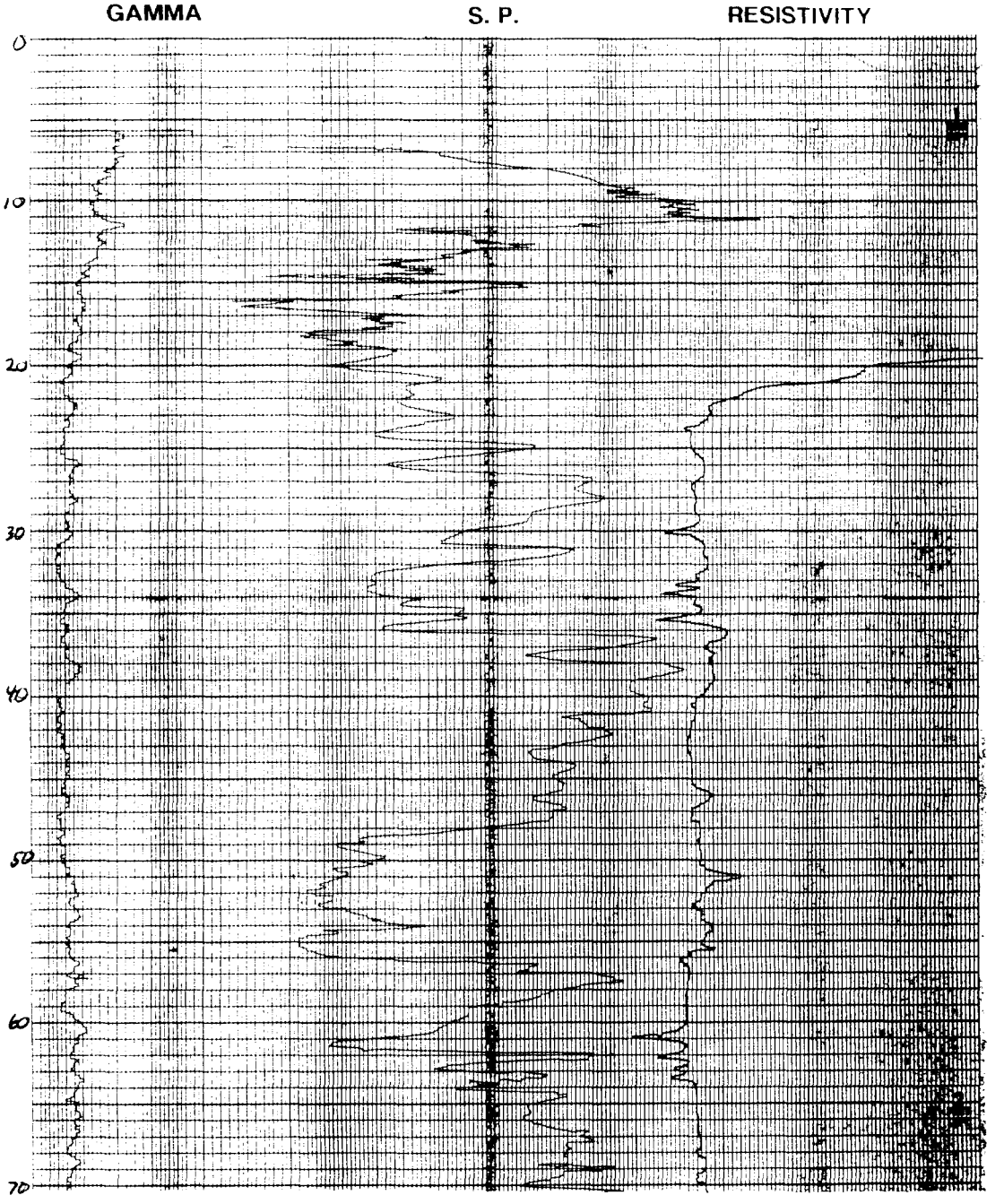
PROJECT NAME: NEBRASKA ORDNANCE PLANT
PROJECT LOCATION: MEAD, NEBRASKA
PROJECT NUMBER: 92KW030
LOGGED BY: MATT WILSON
DATE DRILLED: 6-29-92
BOTTOM OF HOLE: 137.4'
TYPE OF TEMPORARY CASING: NONE
VERTICAL SCALE: 1 IN. = 10 FT.
RESISTIVITY: 100 OHMS / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.

BORING: MW-28D
CLIENT: USACE
DRILLED BY: WINNEK
DATE LOGGED: 6-29-92
BOTTOM OF LOG: 137.8
BOTTOM OF CASING: NA
LOGGING SPEED: 15 FT. / MIN
SPONTANEOUS POTENTIAL: 400 MV / IN
TIME CONSTANT: 2 SECONDS



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

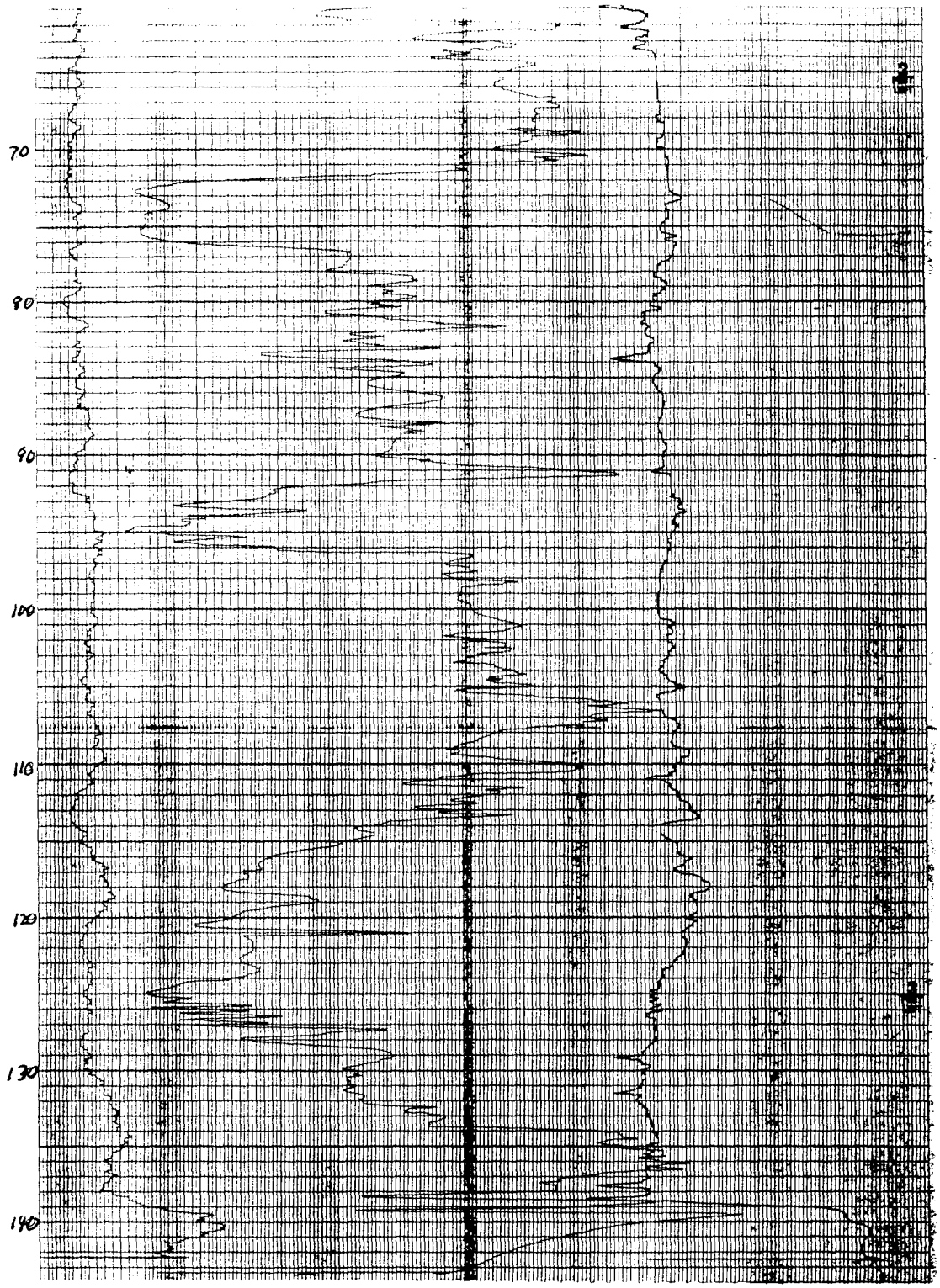
PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-29A
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-16-92	DATE LOGGED: 6-16-92
BOTTOM OF HOLE: 142.8'	BOTTOM OF LOG: 142'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 138
VERTICAL SCALE: 1 IN = 10 FT.	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: [illegible]
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

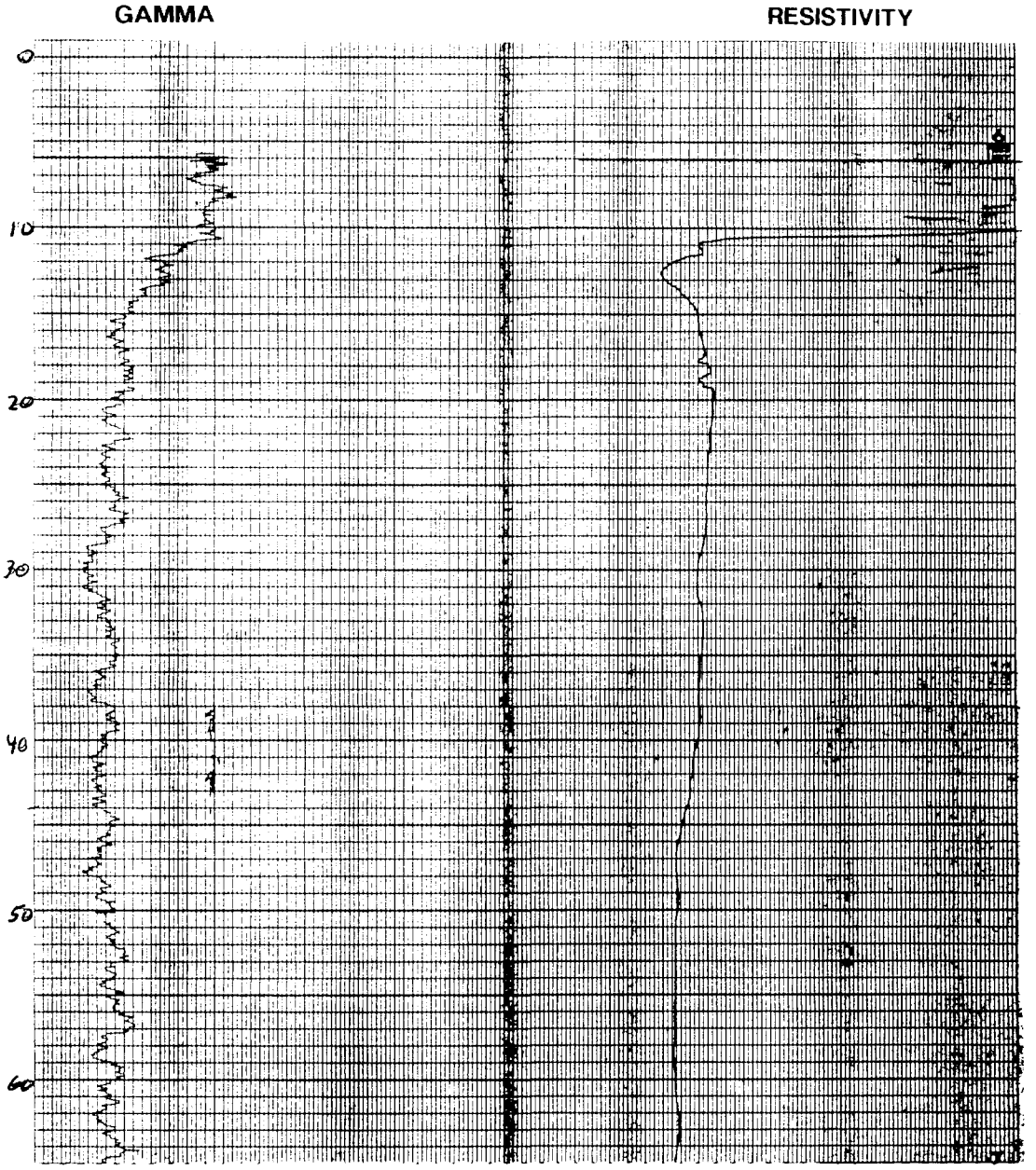
PROJECT NAME: NEBRASKA ORDNANCE PLANT
PROJECT LOCATION: MEAD, NEBRASKA
PROJECT NUMBER: 92KW030
LOGGED BY: MATT WILSON
DATE DRILLED: 6-16-92
BOTTOM OF HOLE: 142.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA
VERTICAL SCALE: 1 IN = 10 FT.
RESISTIVITY: 100 OHMS / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.

BORING: MW-29A
CLIENT: USACE
DRILLED BY: USACE
DATE LOGGED: 6-16-92
BOTTOM OF LOG: 142'
BOTTOM OF CASING: 138'
LOGGING SPEED: 15 FT. / MIN
SPONTANEOUS POTENTIAL: 400 MV / IN
TIME CONSTANT: 2 SECONDS



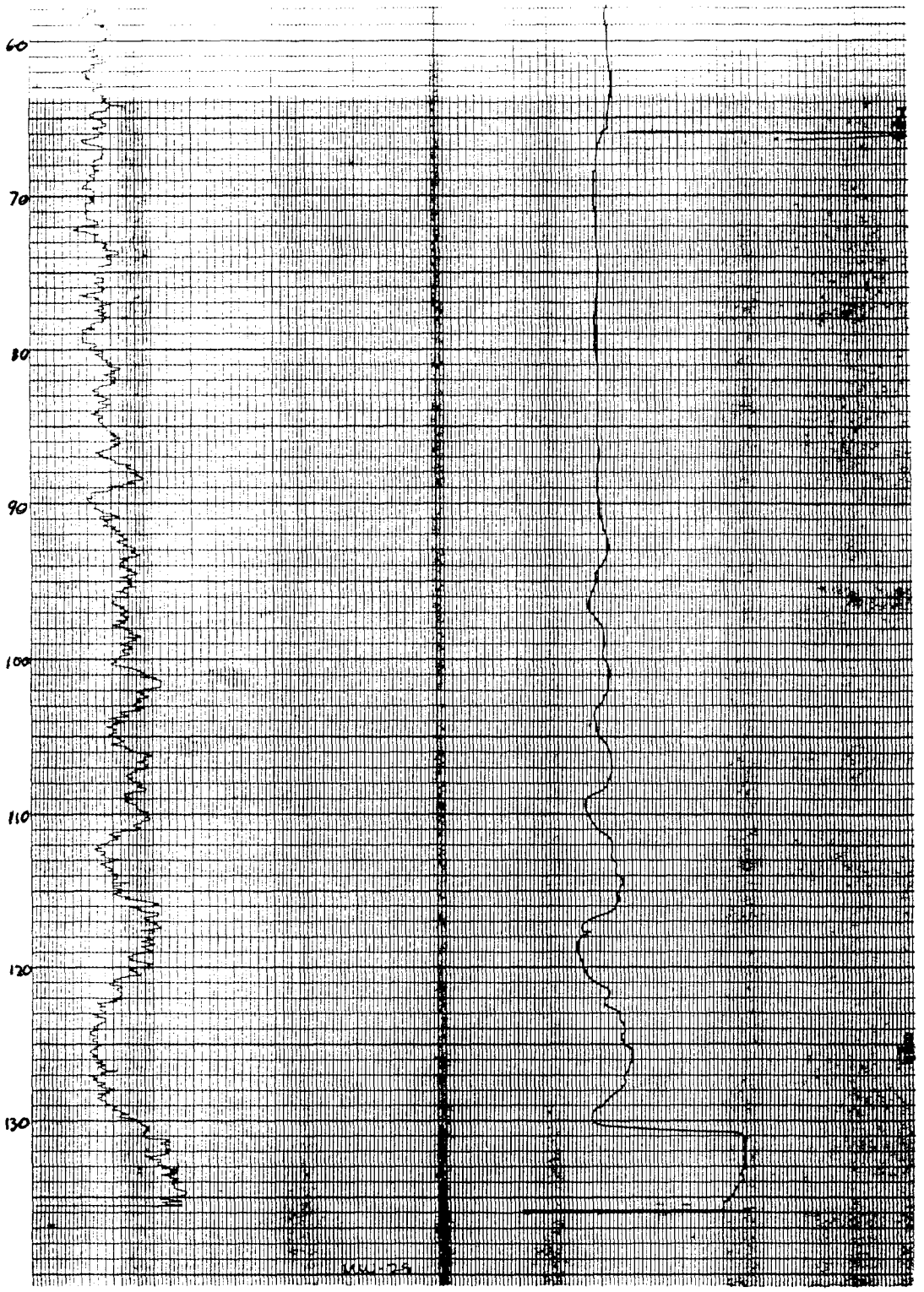
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-29A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-15-92	DATE LOGGED: 6-15-92
BOTTOM OF HOLE: 135'	BOTTOM OF LOG: 135.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT.	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



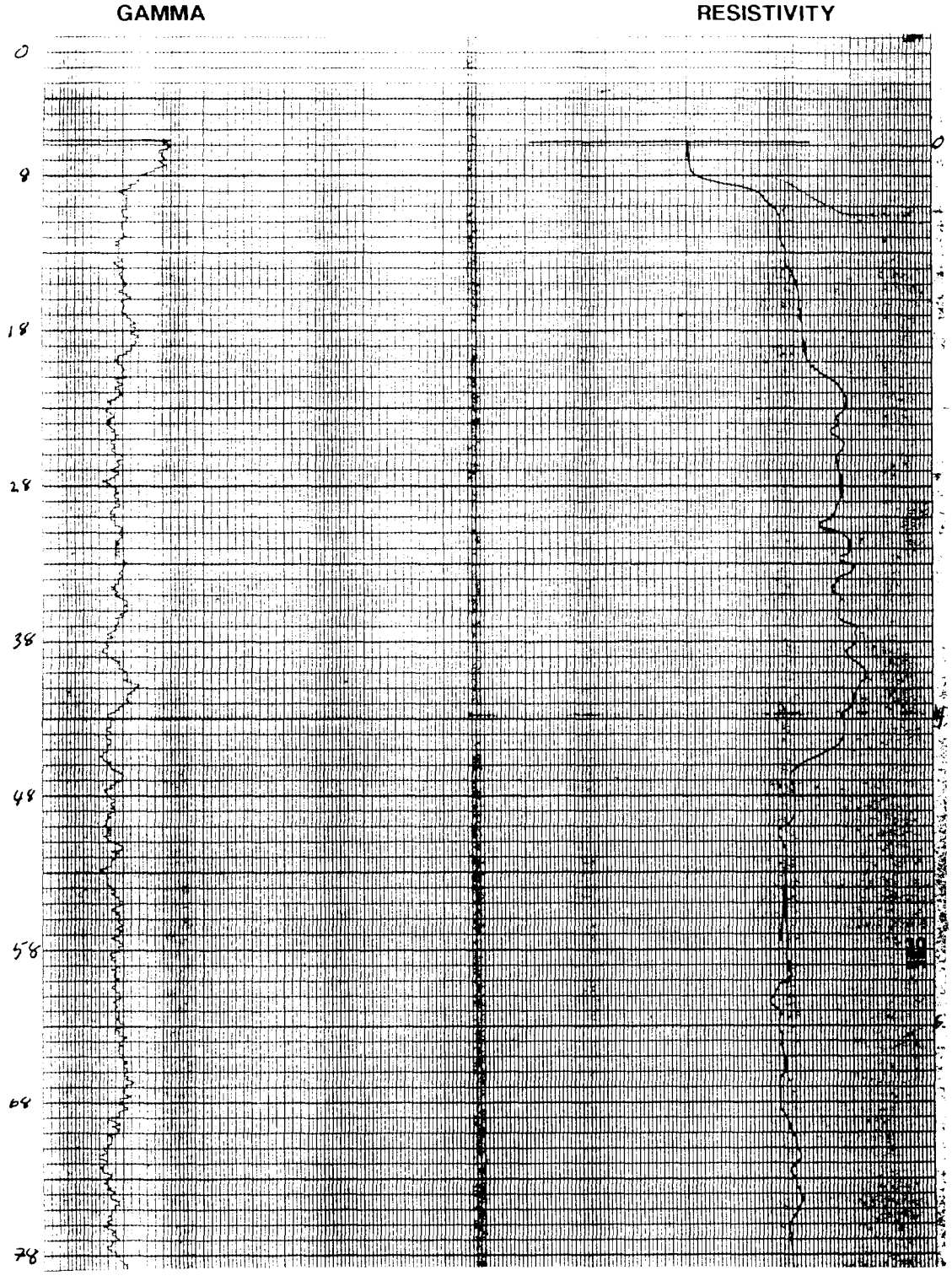
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-29A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-15-92	DATE LOGGED: 6-15-92
BOTTOM OF HOLE: 135'	BOTTOM OF LOG: 135.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



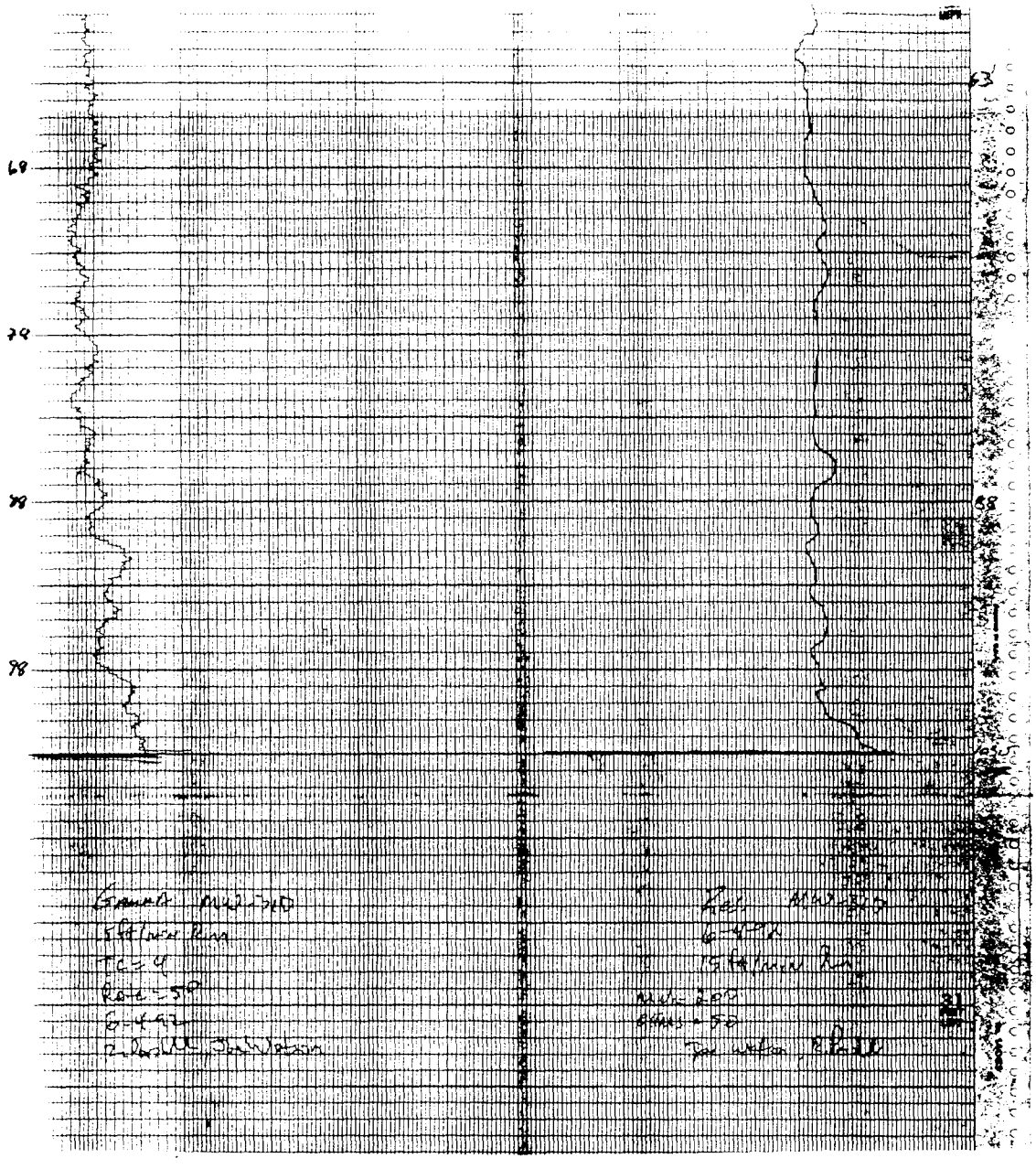
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-31A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: RICH PARSHALL	DRILLED BY: WINNEK
DATE DRILLED: 6-4-92	DATE LOGGED: 6-4-92
BOTTOM OF HOLE: 103.5'	BOTTOM OF LOG: 103.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

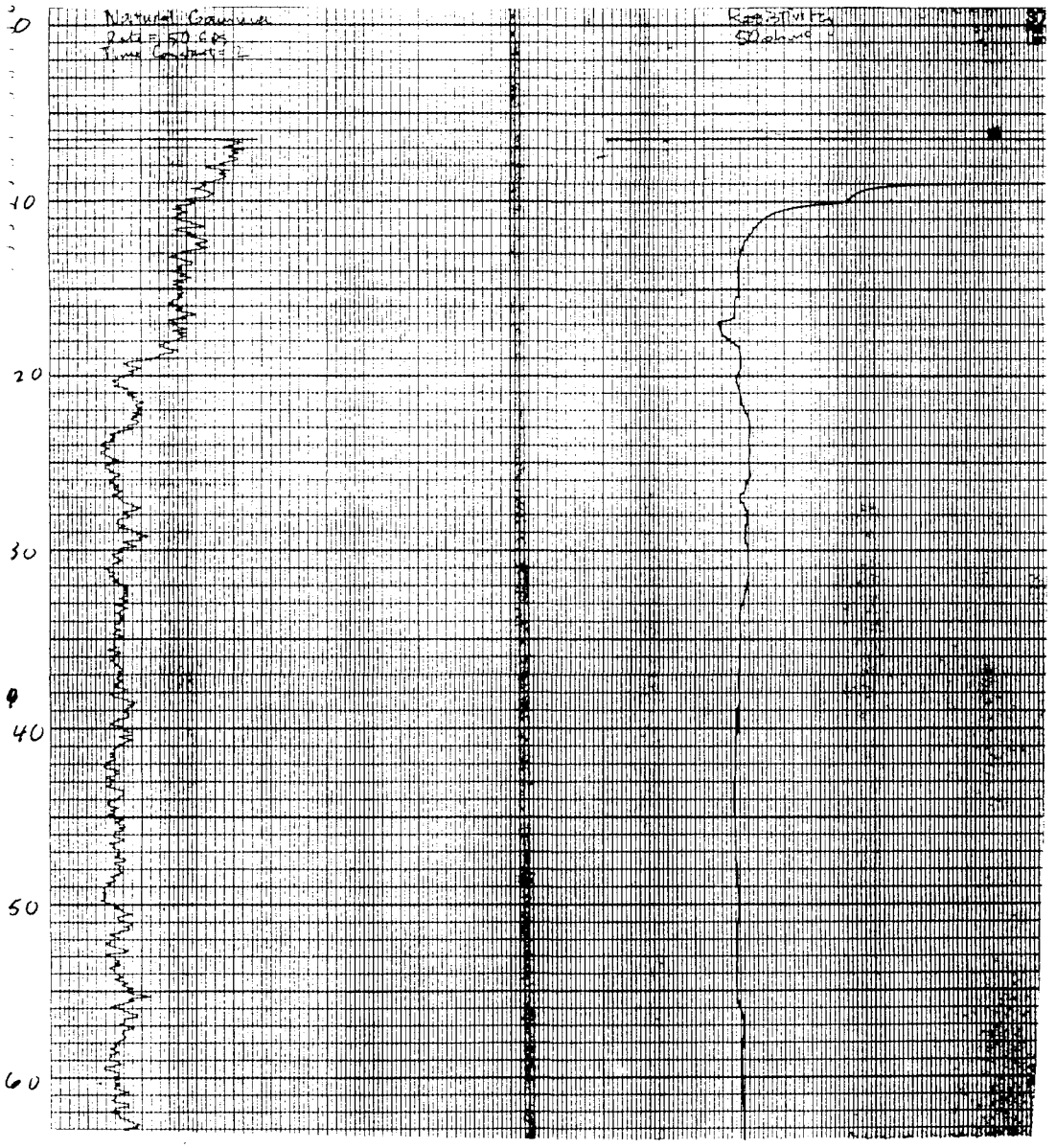
PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-31A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: RICH PARSHALL	DRILLED BY: WINNEK
DATE DRILLED: 6-4-92	DATE LOGGED: 6-4-92
BOTTOM OF HOLE: 103.5'	BOTTOM OF LOG: 103.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-34D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-3-92	DATE LOGGED: 6-3-92
BOTTOM OF HOLE:115.6'	BOTTOM OF LOG: 115.6'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS

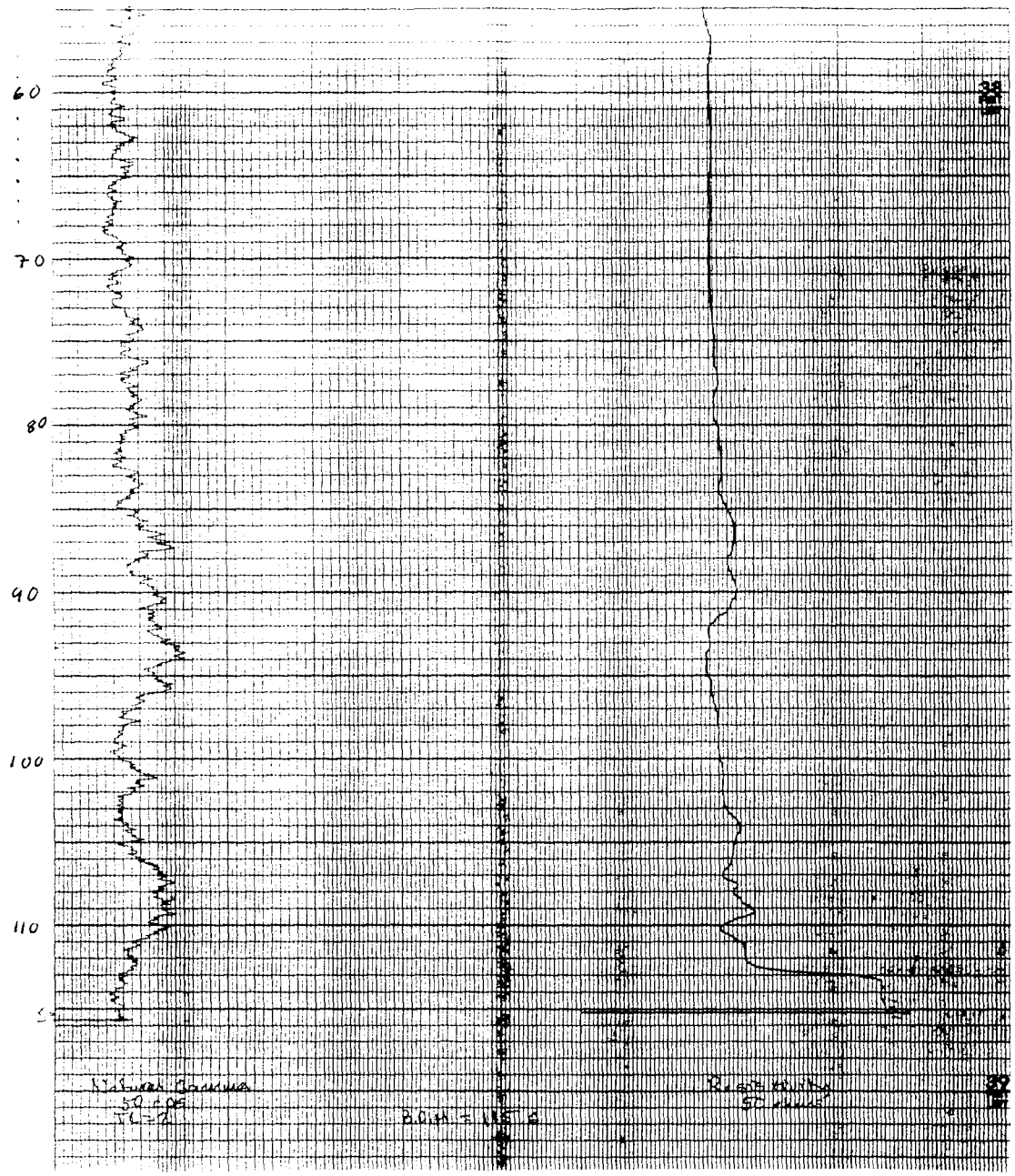
GAMMA **RESISTIVITY**



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

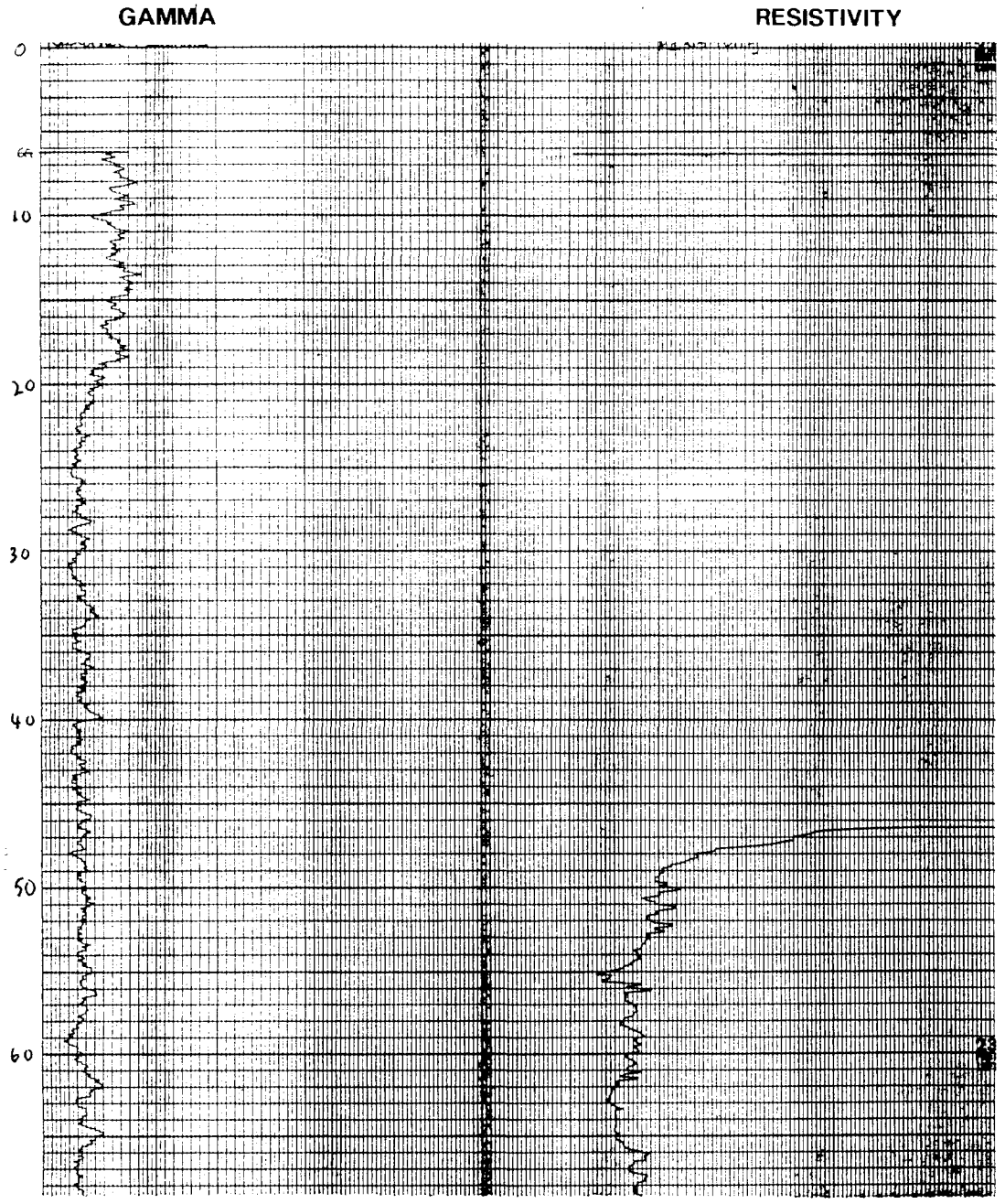
PROJECT NAME: NEBRASKA ORDNANCE PLANT
PROJECT LOCATION: MEAD, NEBRASKA
PROJECT NUMBER: 92KW030
LOGGED BY: MATT WILSON
DATE DRILLED: 6-3-92
BOTTOM OF HOLE: 115.6'
TYPE OF TEMPORARY CASING: NONE
VERTICAL SCALE: 1 IN. = 10 FT.
RESISTIVITY: 100 OHMS / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN

BORING: MW-34D
CLIENT: USACE
DRILLED BY: USACE
DATE LOGGED: 6-3-92
BOTTOM OF LOG: 115.6'
BOTTOM OF CASING: NA
LOGGING SPEED: 15 FT. / MIN.
SPONTANEOUS POTENTIAL: NA
TIME CONSTANT: 2 SECONDS



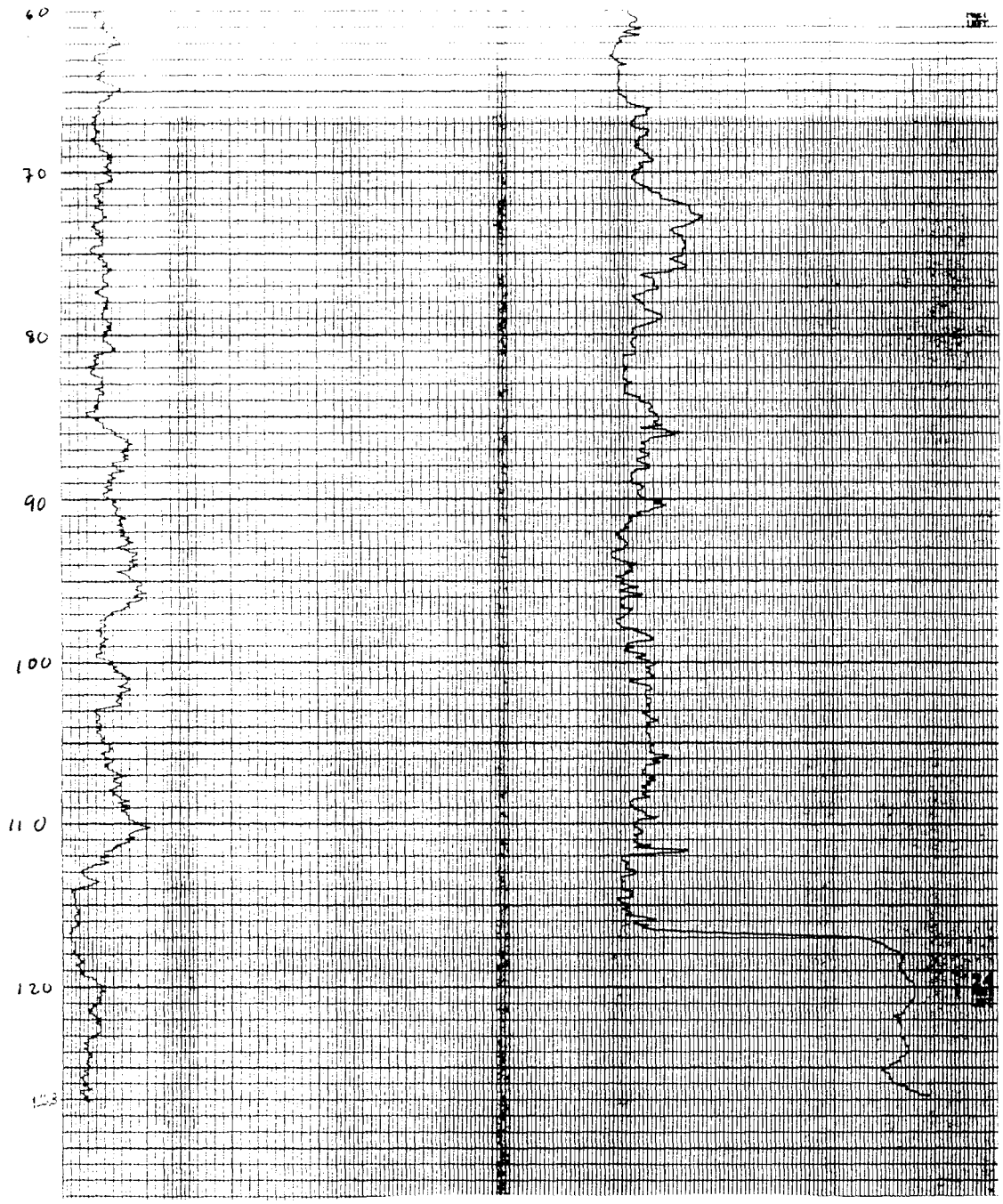
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-34D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-9-92	DATE LOGGED: 6-9-92
BOTTOM OF HOLE: 126.8'	BOTTOM OF LOG: 126.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 116'
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



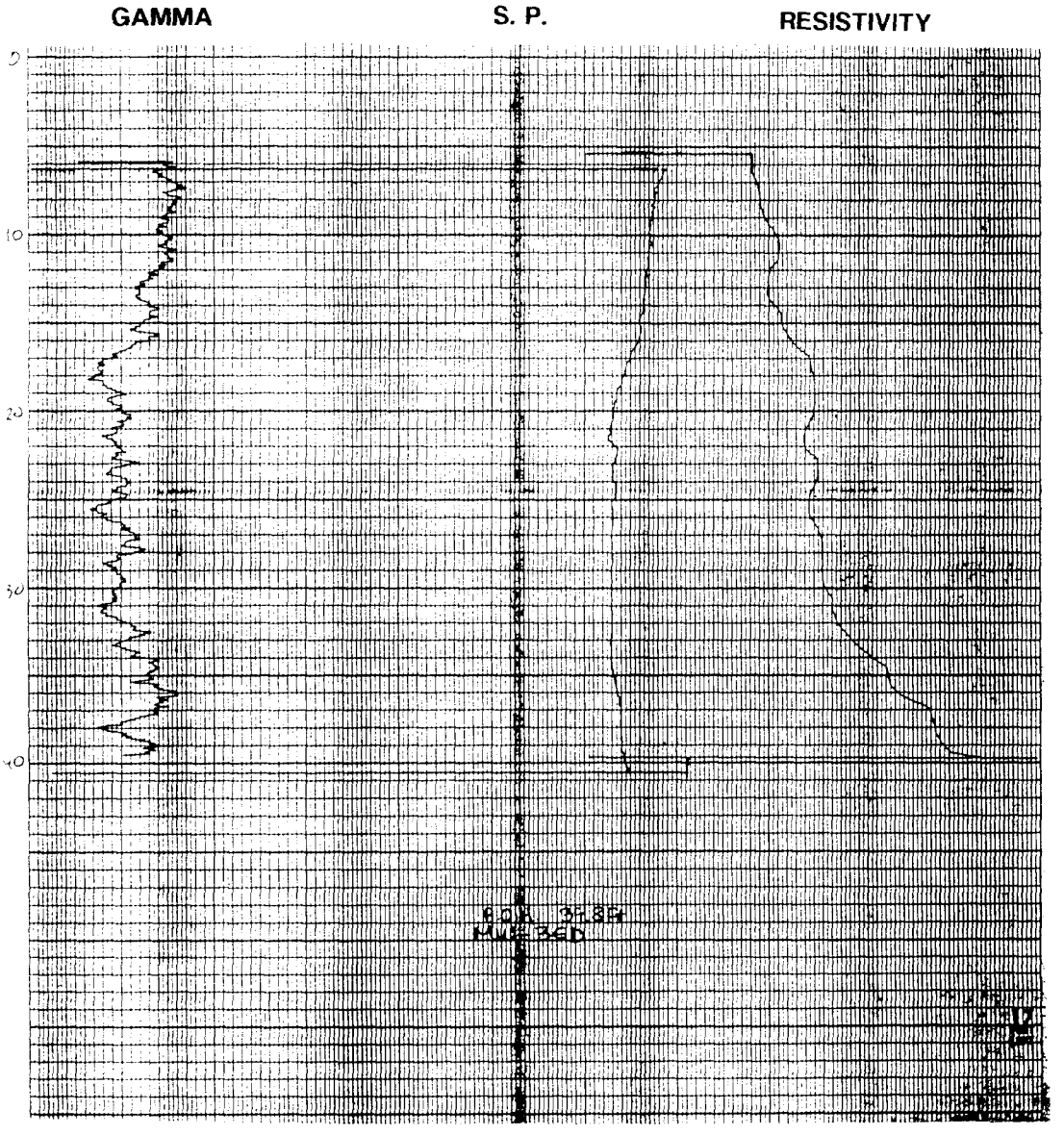
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-34D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: USACE
DATE DRILLED: 6-9-92	DATE LOGGED: 6-9-92
BOTTOM OF HOLE: 126.8'	BOTTOM OF LOG: 126.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 116'
VERTICAL SCALE: 1 IN. = 10 FT.	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



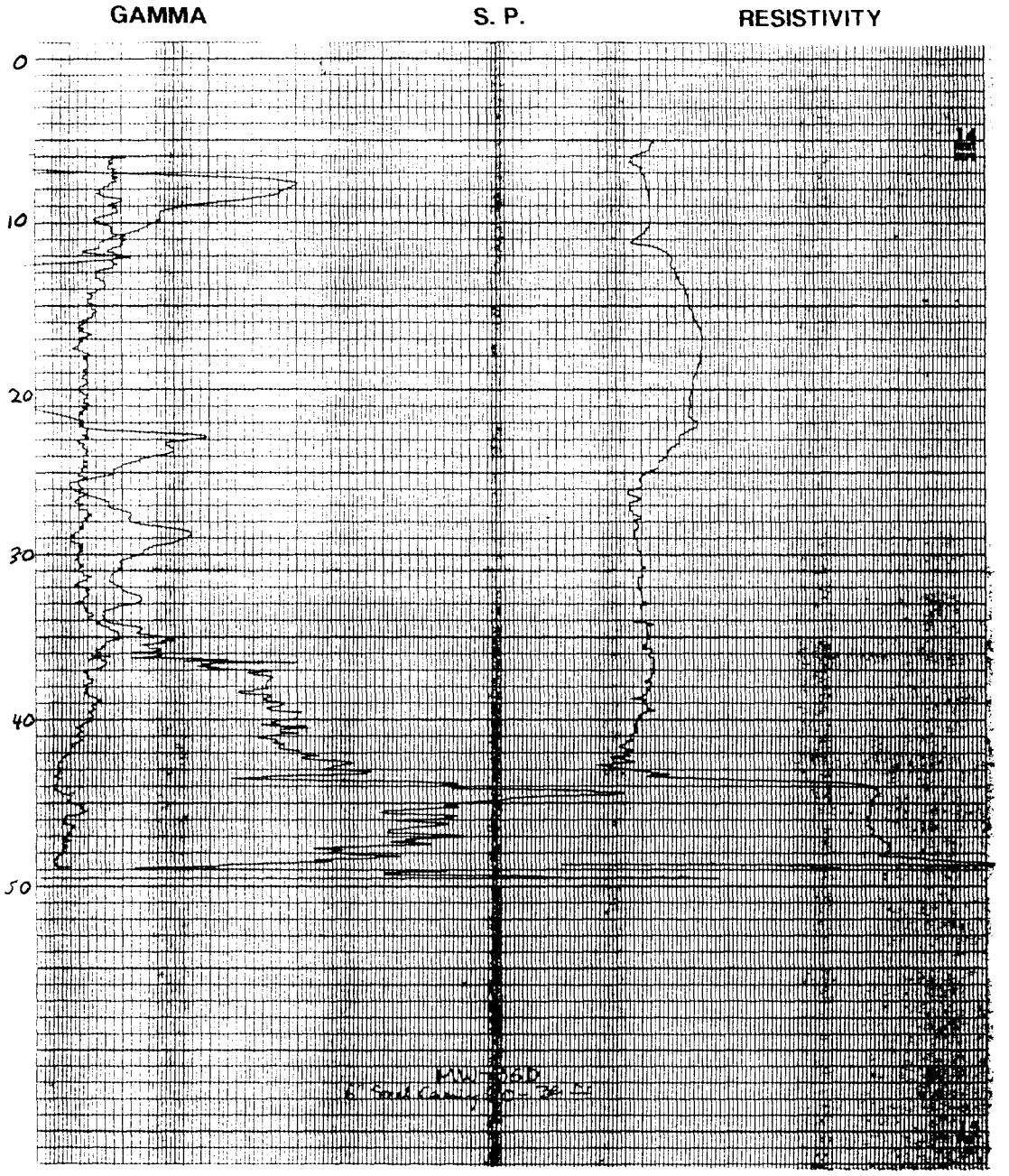
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-36D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-16-92	DATE LOGGED: 7-16-92
BOTTOM OF HOLE: 39.8'	BOTTOM OF LOG: 49'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



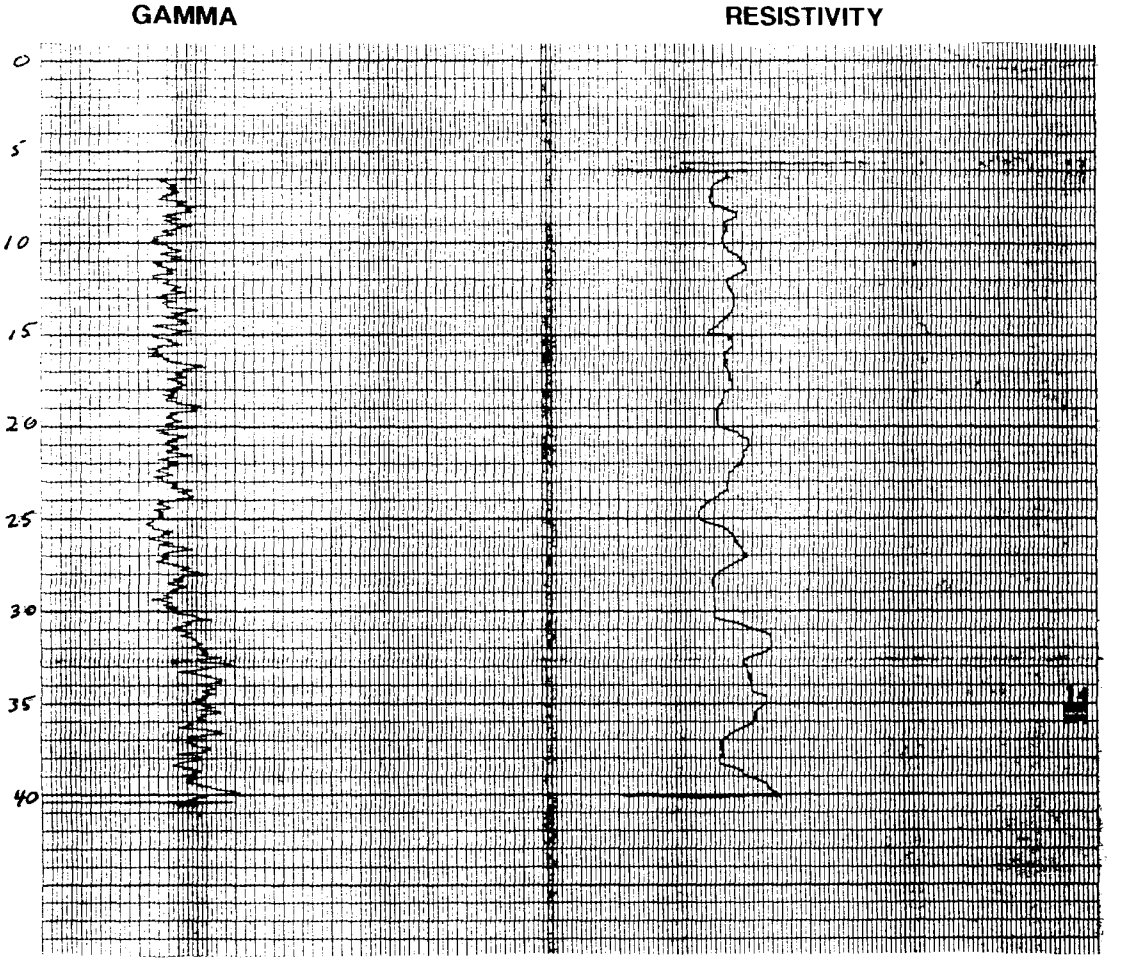
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-36D
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-16-92	DATE LOGGED: 7-16-92
BOTTOM OF HOLE:49'	BOTTOM OF LOG: 49'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 39'
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



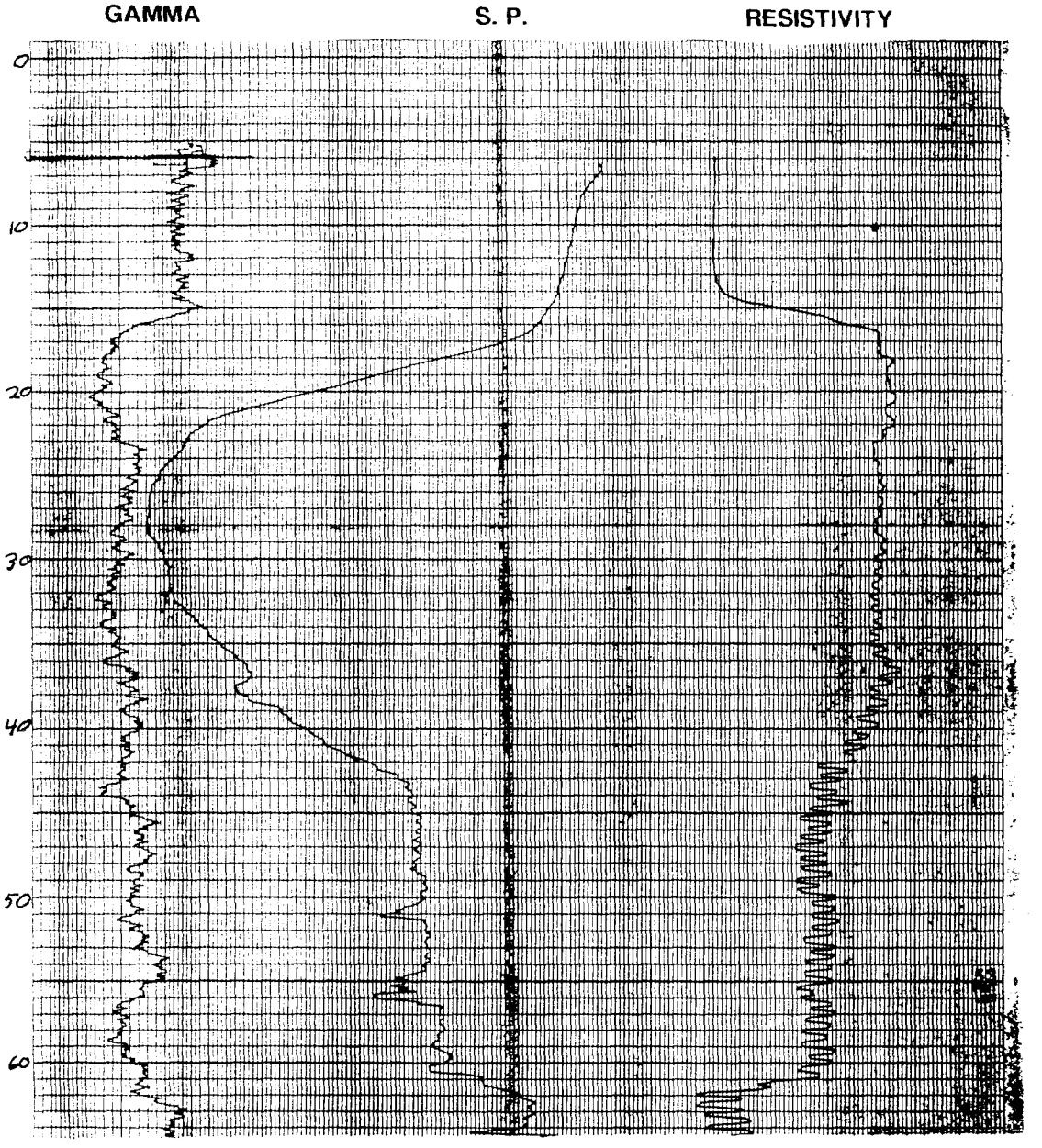
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-37D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-14-92
BOTTOM OF HOLE: 40.5'	BOTTOM OF LOG: 40.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: NA
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



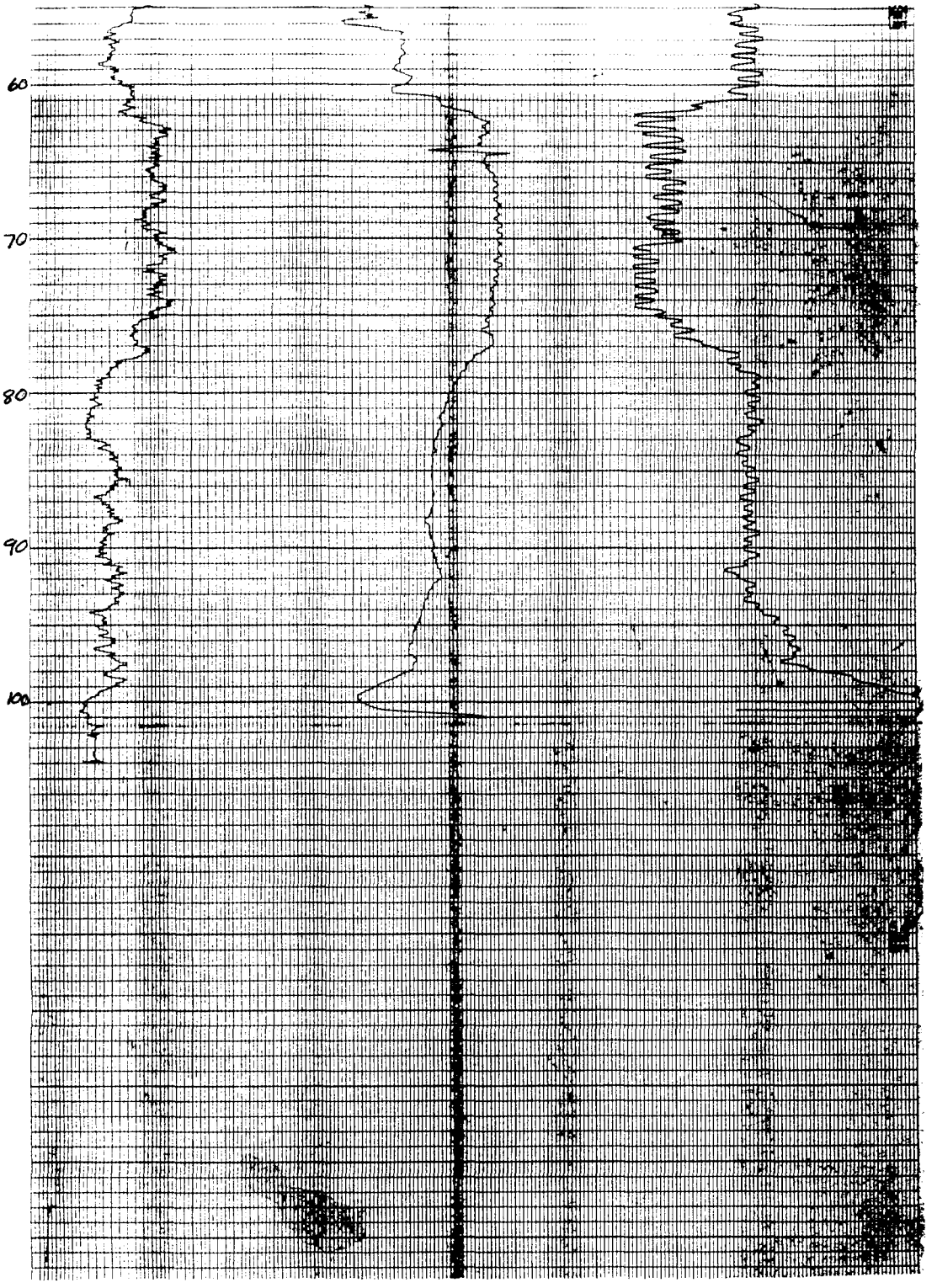
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 43D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-10-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 100.7'	BOTTOM OF LOG: 100.7
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



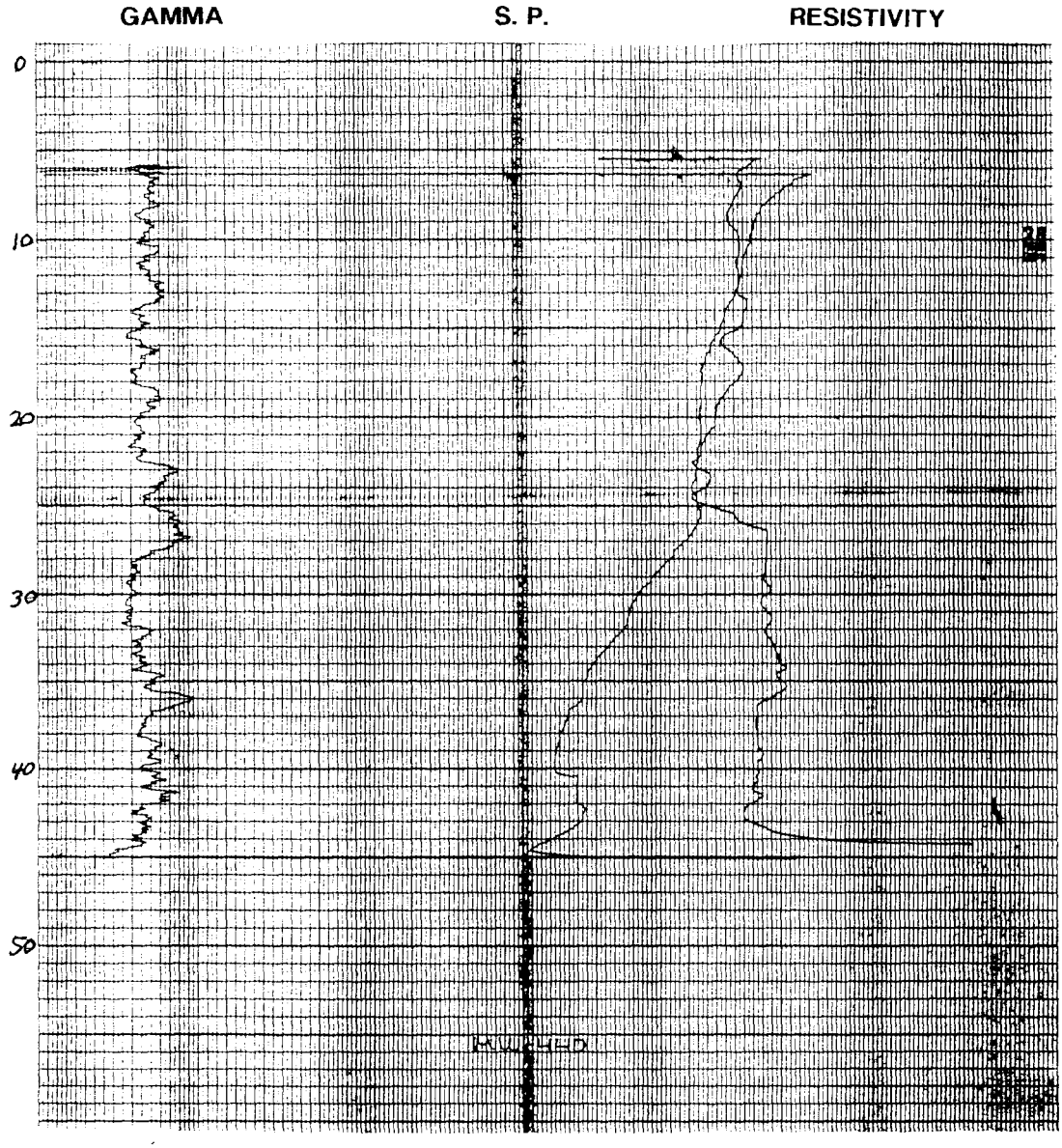
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 43D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-10-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 100.7'	BOTTOM OF LOG: 100.7
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



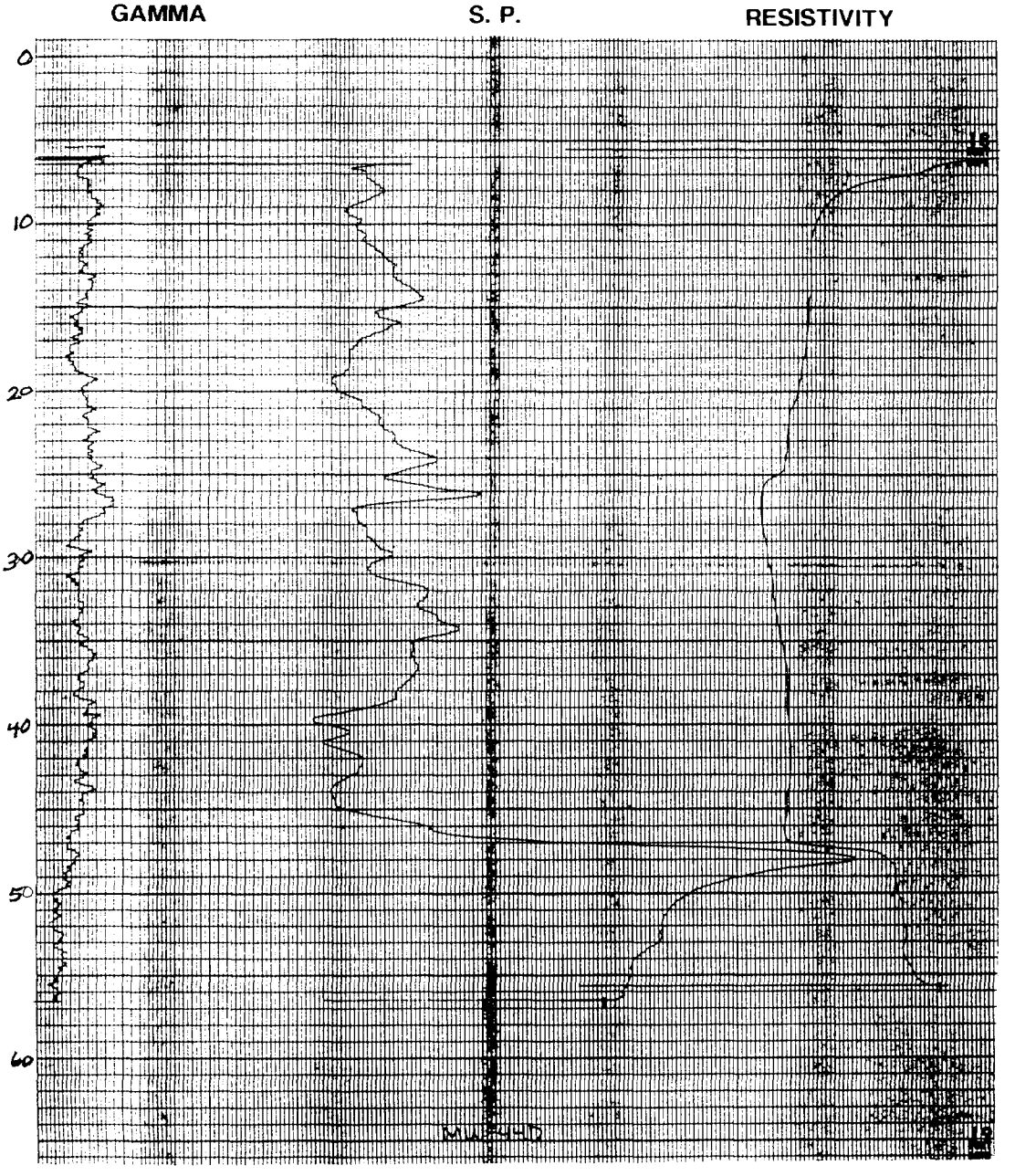
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-44D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-15-92
BOTTOM OF HOLE: 45.2'	BOTTOM OF LOG: 45
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



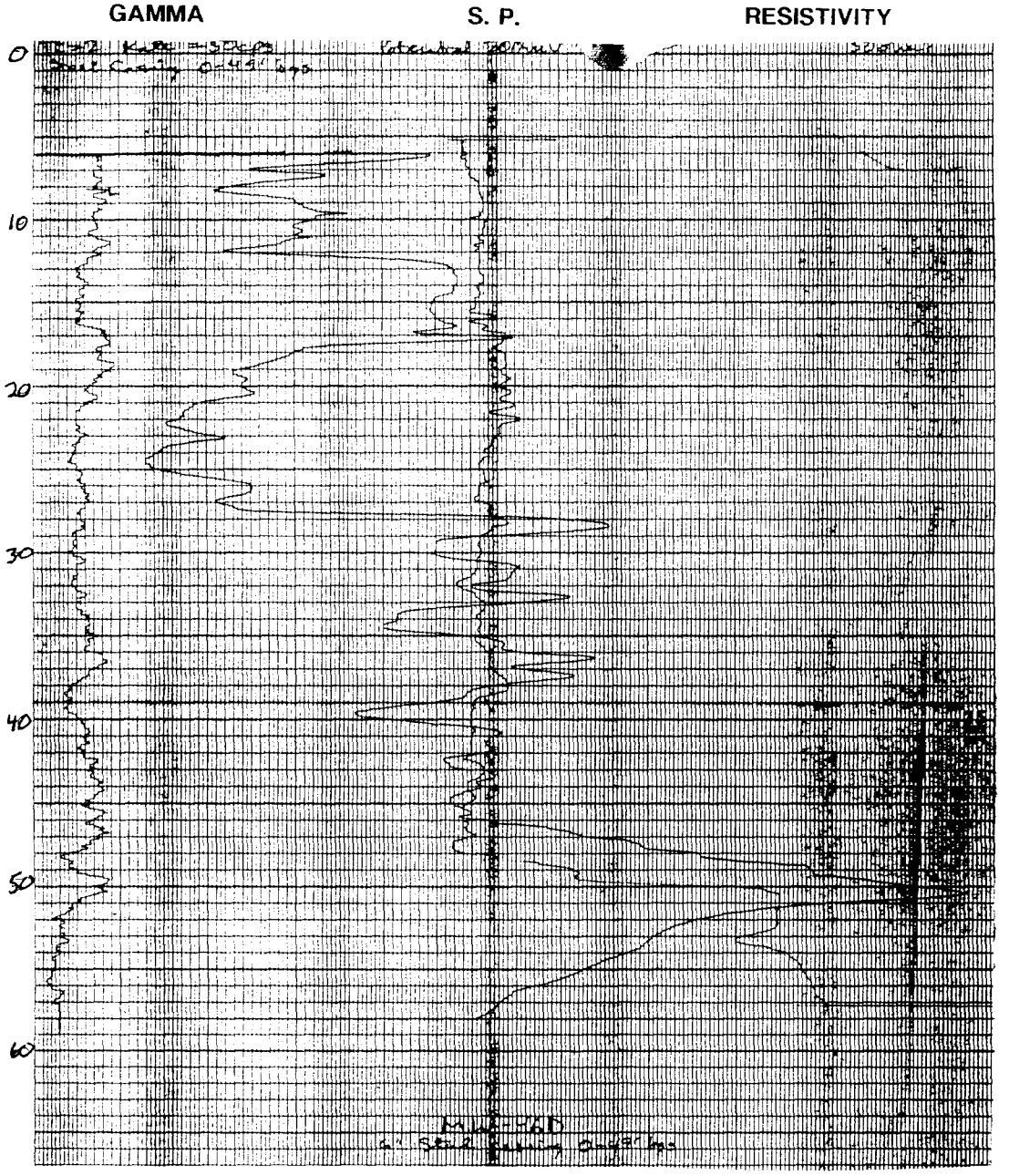
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 44D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-15-92	DATE LOGGED: 7-16-92
BOTTOM OF HOLE: 57'	BOTTOM OF LOG: 56.6'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 47'
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



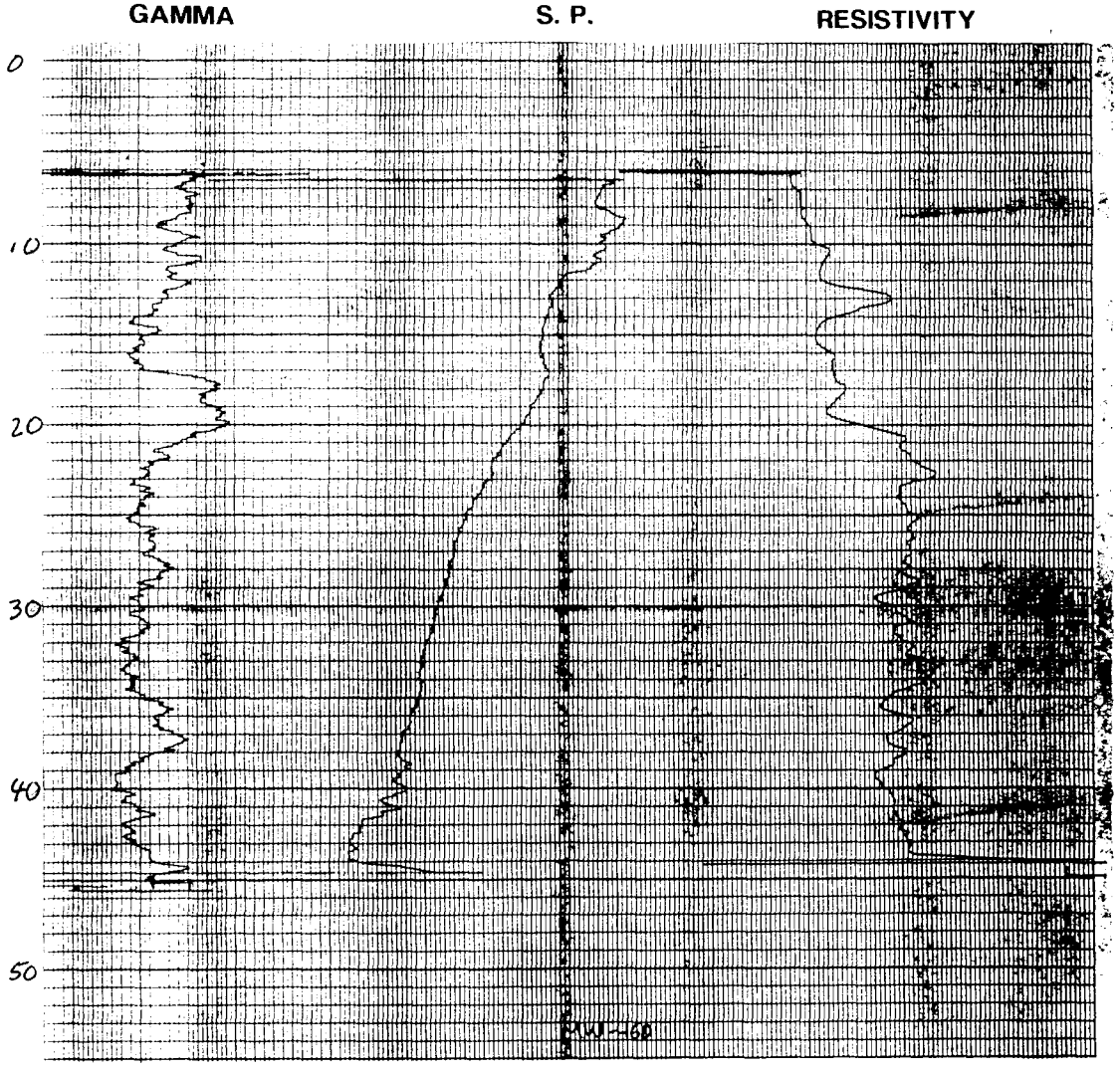
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	BORING: MW-46D
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-14-92
BOTTOM OF HOLE: 59'	BOTTOM OF LOG: 59'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 49'
VERTICAL SCALE: 1 IN = 10 FT.	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



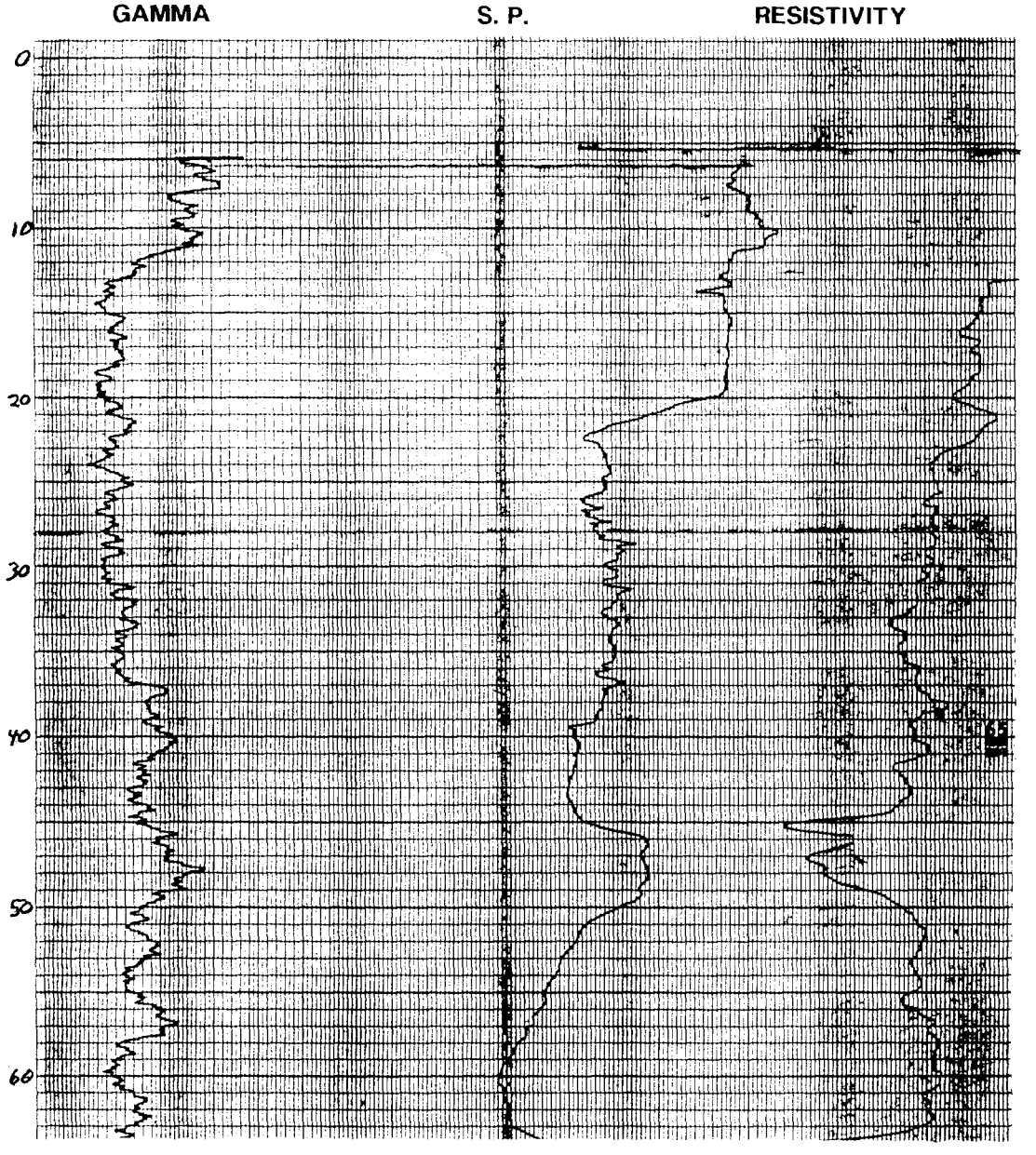
WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-46D**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-14-92	DATE LOGGED: 7-14-92
BOTTOM OF HOLE: 45.5'	BOTTOM OF LOG: 45.5'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



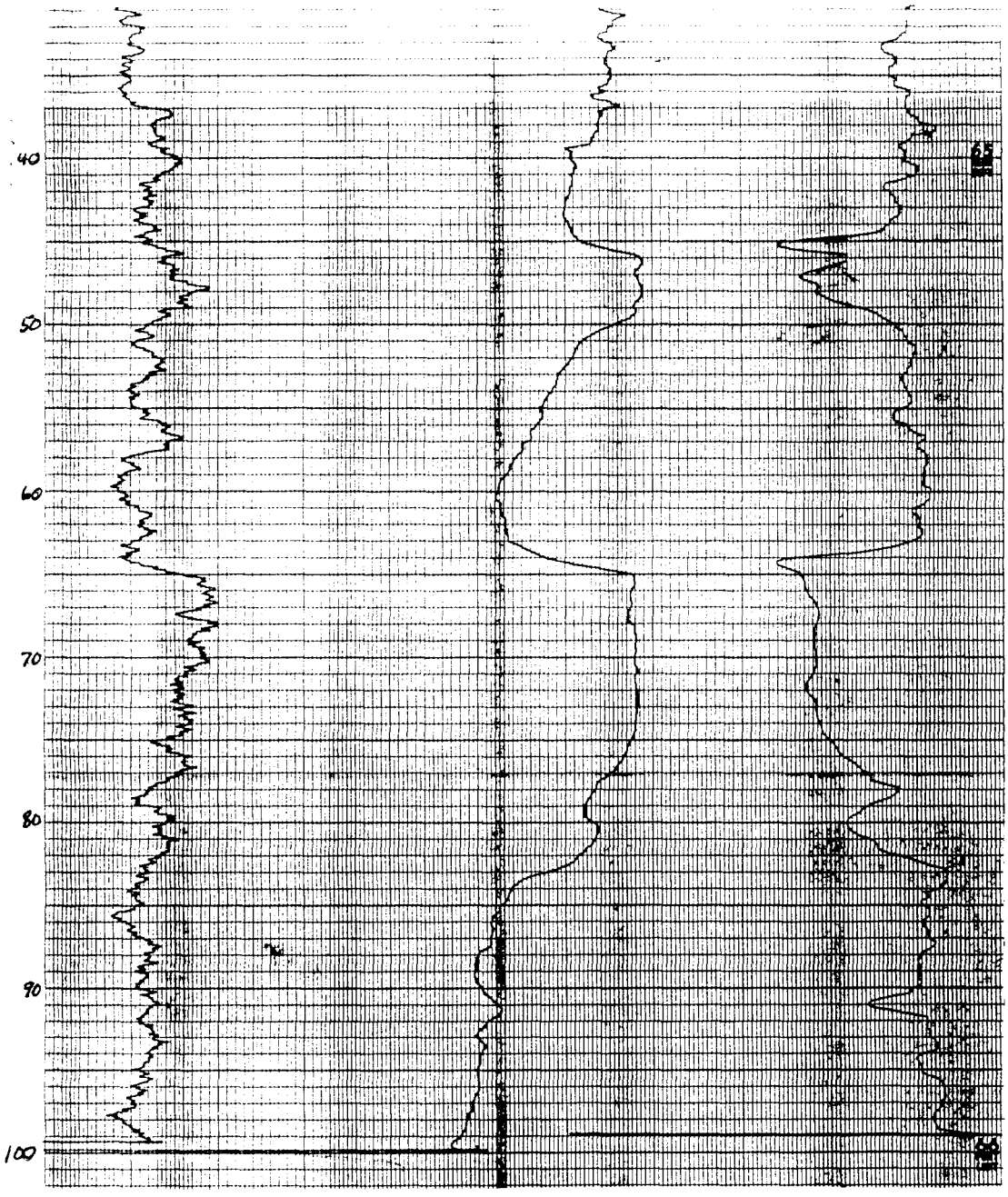
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 53A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-29-92	DATE LOGGED: 6-29-92
BOTTOM OF HOLE: 100.3'	BOTTOM OF LOG: 100.3'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



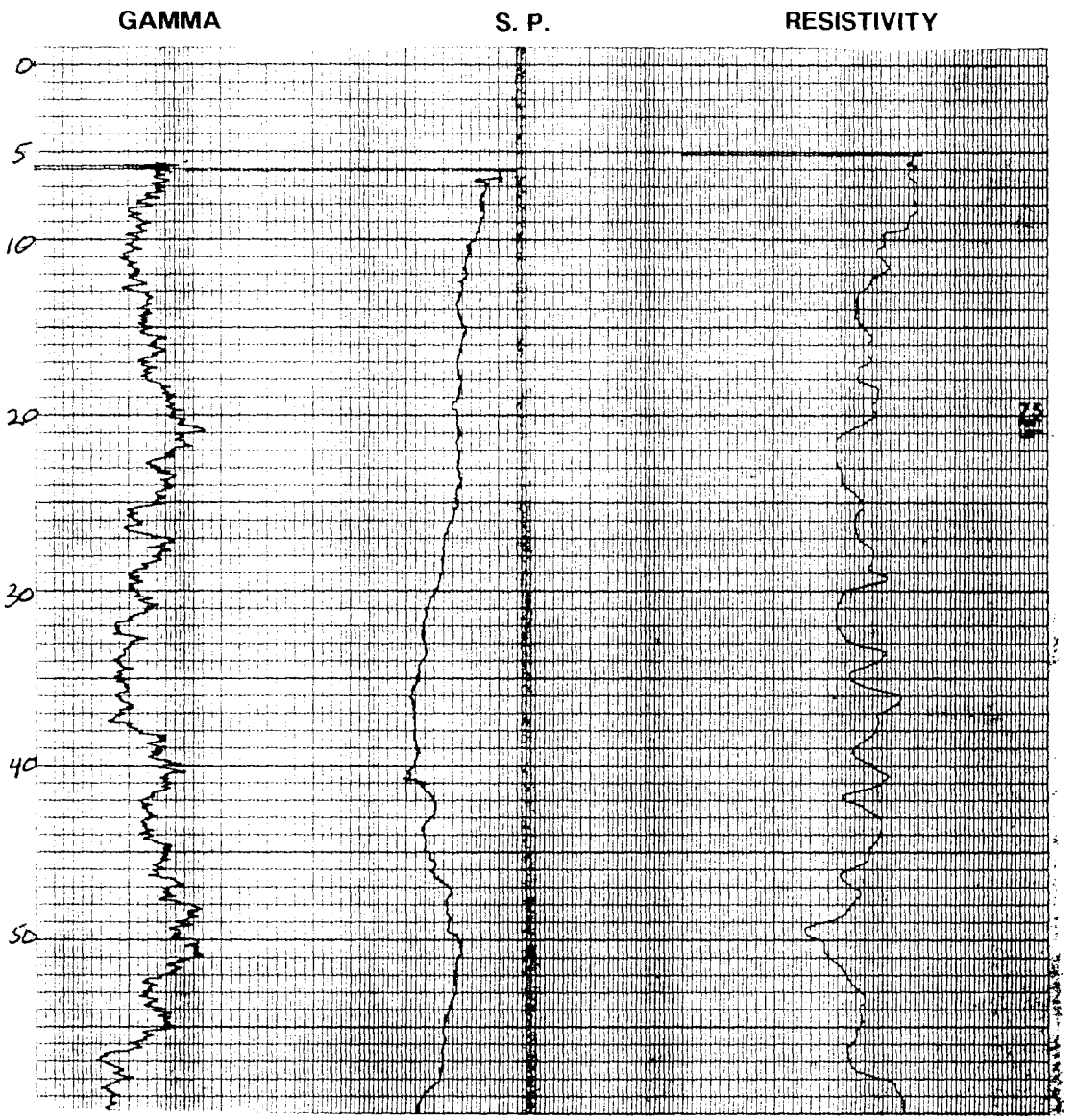
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 53A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-29-92	DATE LOGGED: 6-29-92
BOTTOM OF HOLE: 100.3'	BOTTOM OF LOG: 100.3'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



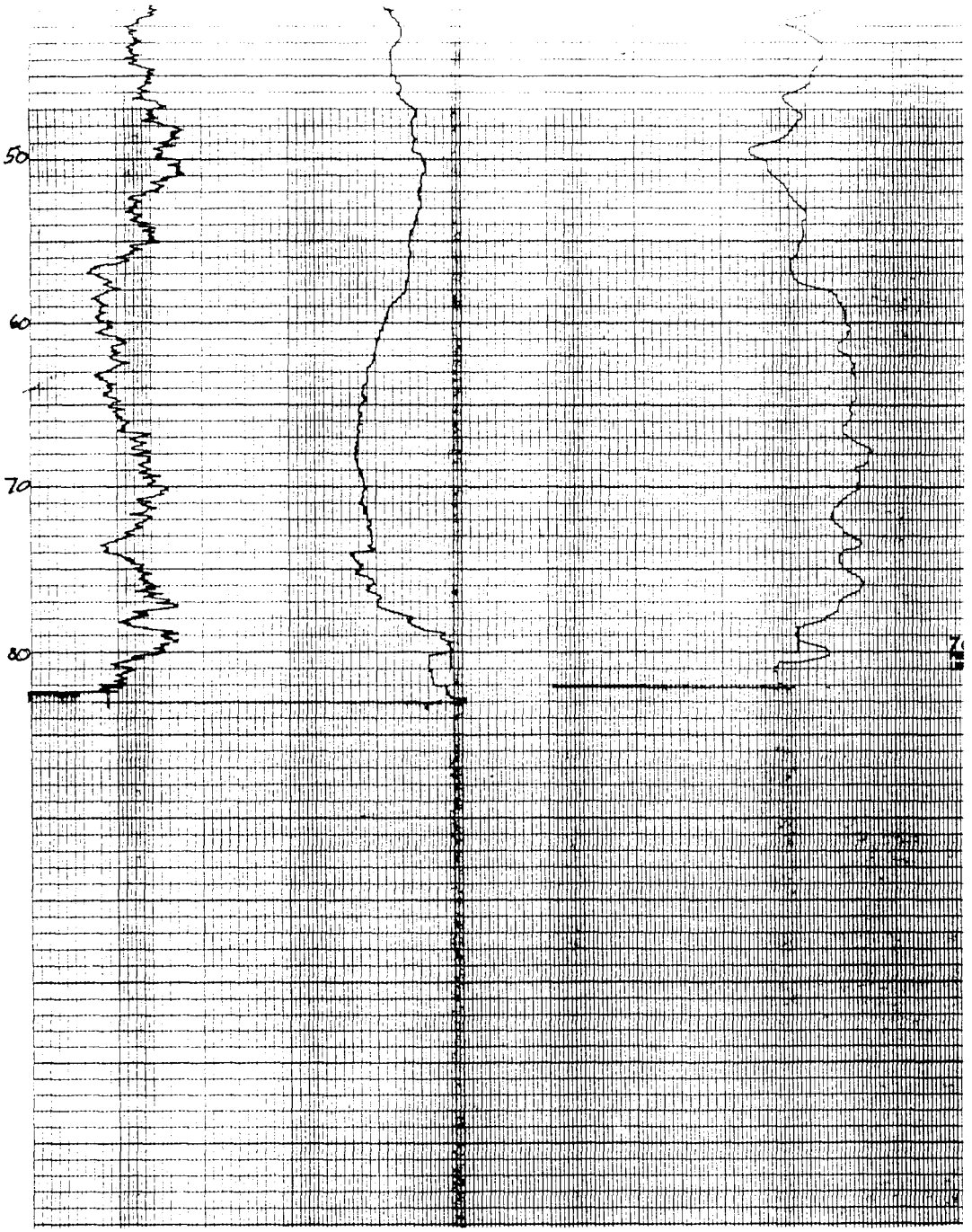
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-54A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-27-92	DATE LOGGED: 6-27-92
BOTTOM OF HOLE:83'	BOTTOM OF LOG: 83'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



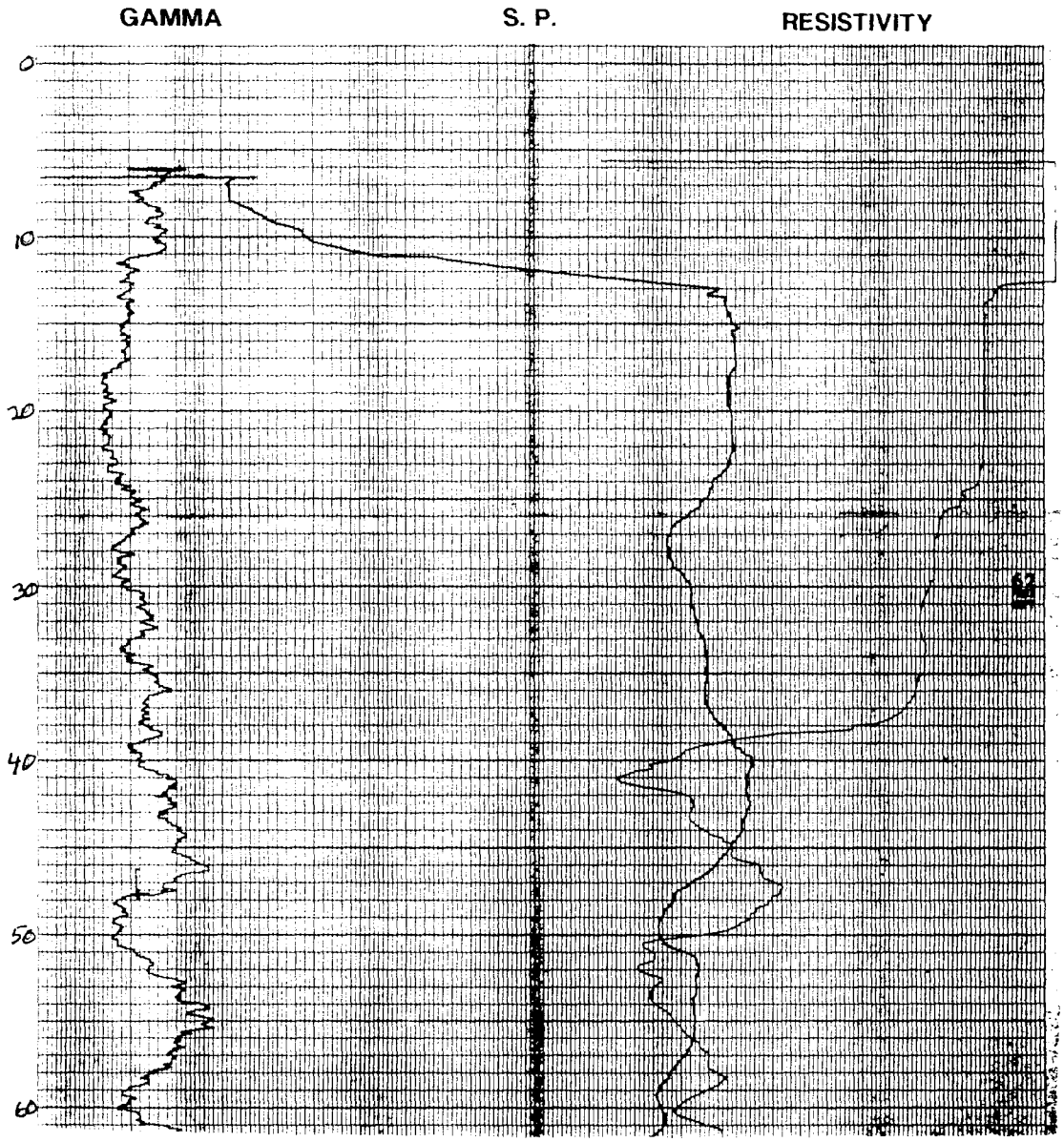
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-54A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 6-27-92	DATE LOGGED: 6-27-92
BOTTOM OF HOLE:83'	BOTTOM OF LOG: 83'
TYPE OF TEMPORARY CASING: NONE	BOTTOM OF CASING: NA
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



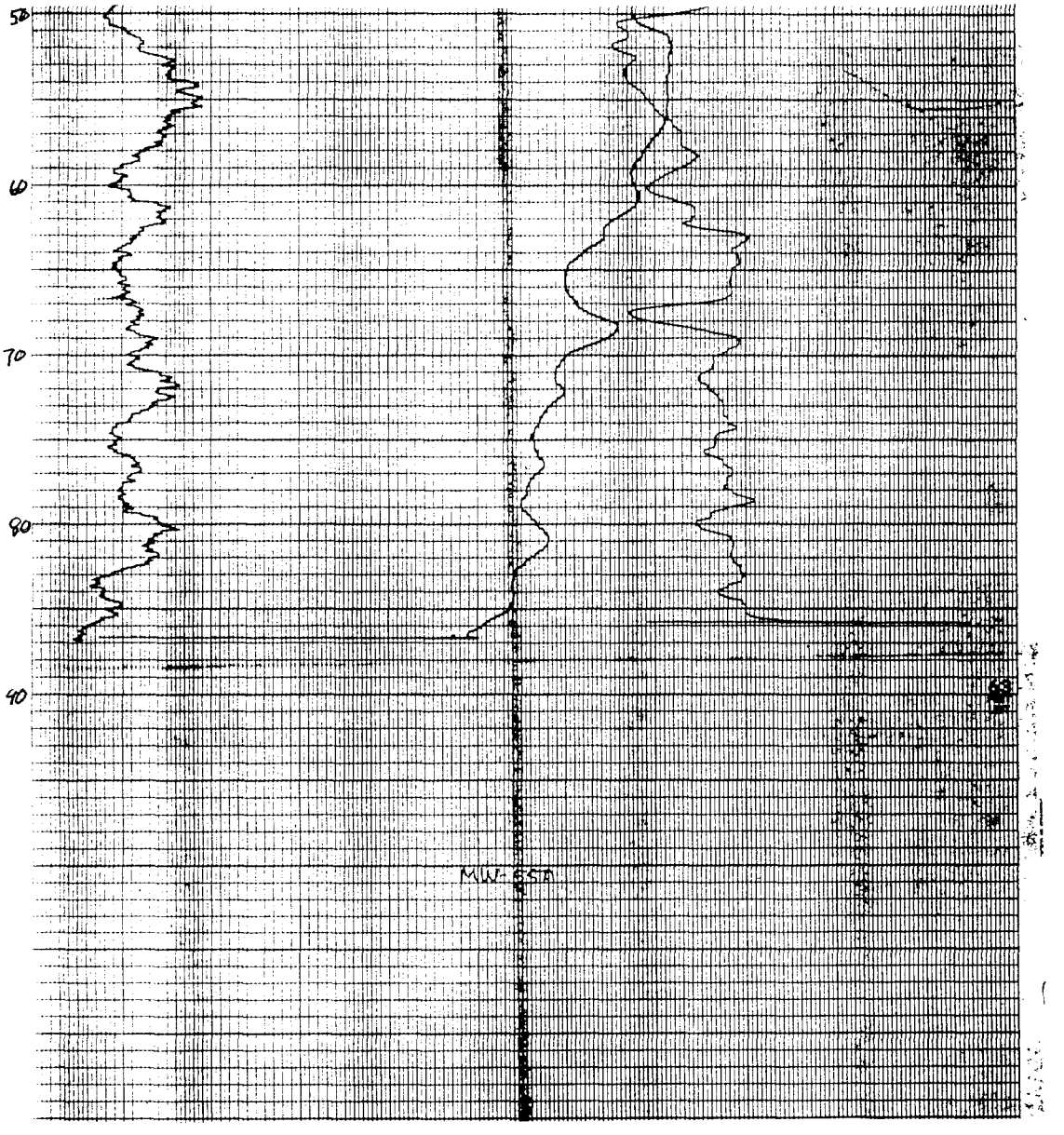
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-55A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-7-92	DATE LOGGED: 7-7-92
BOTTOM OF HOLE: 86.6'	BOTTOM OF LOG: 86.6'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 38
VERTICAL SCALE: 1 IN = 10 FT	LOGGING SPEED: 15 FT / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



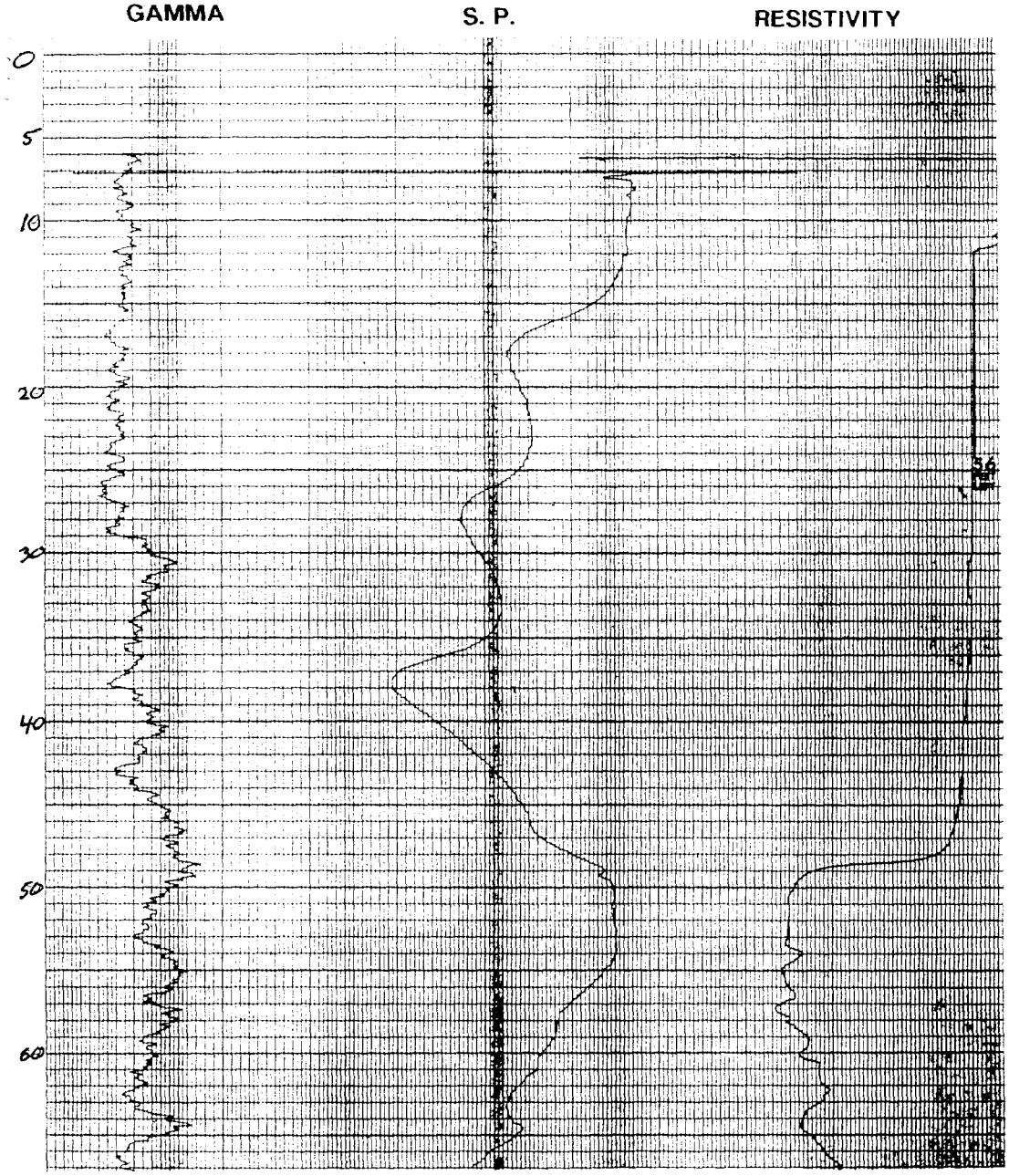
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-55A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-7-92	DATE LOGGED: 7-7-92
BOTTOM OF HOLE: 86.6'	BOTTOM OF LOG: 86.6'
TYPE OF TEMPORARY CASING: 6 IN. DIA	BOTTOM OF CASING: 38'
VERTICAL SCALE: 1 IN. = 10 FT.	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



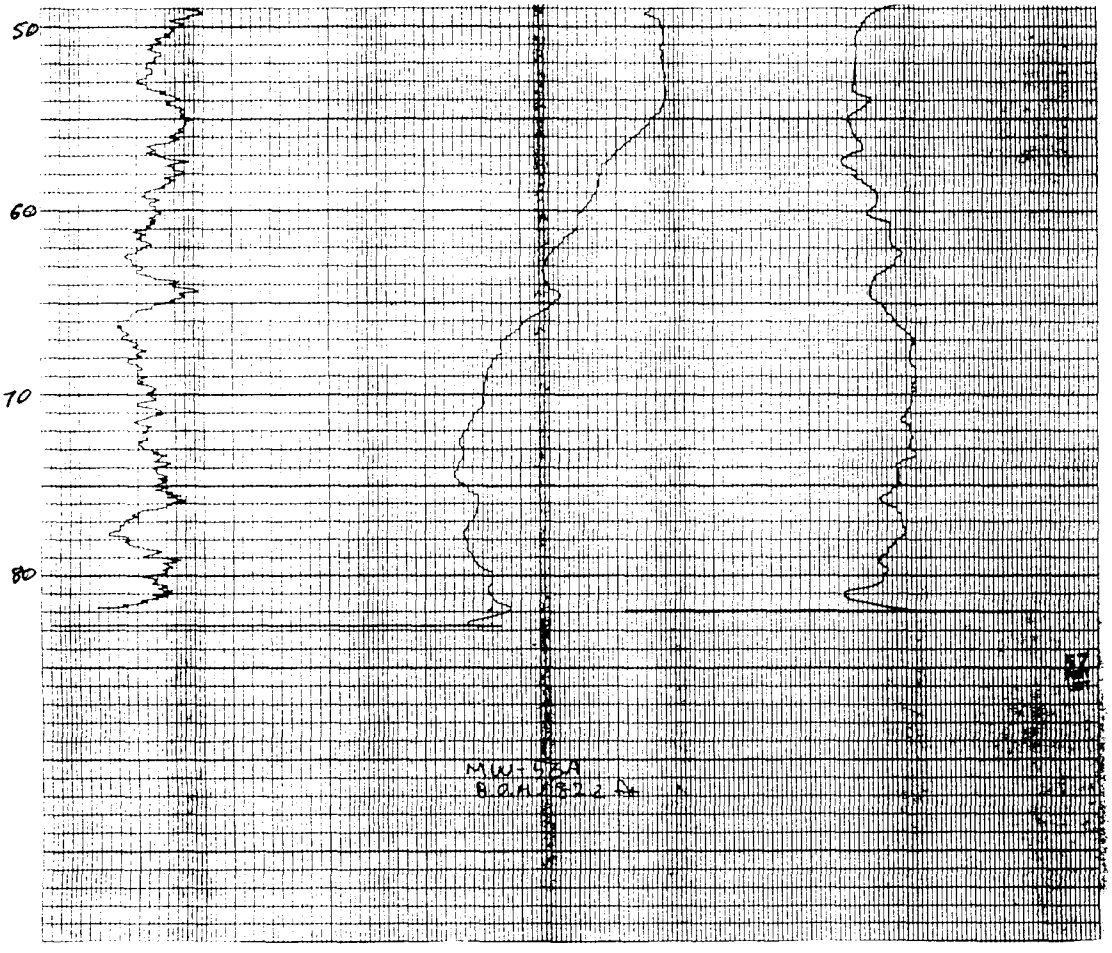
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 56A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-9-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 82.2'	BOTTOM OF LOG: 81.9'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 46.5'
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



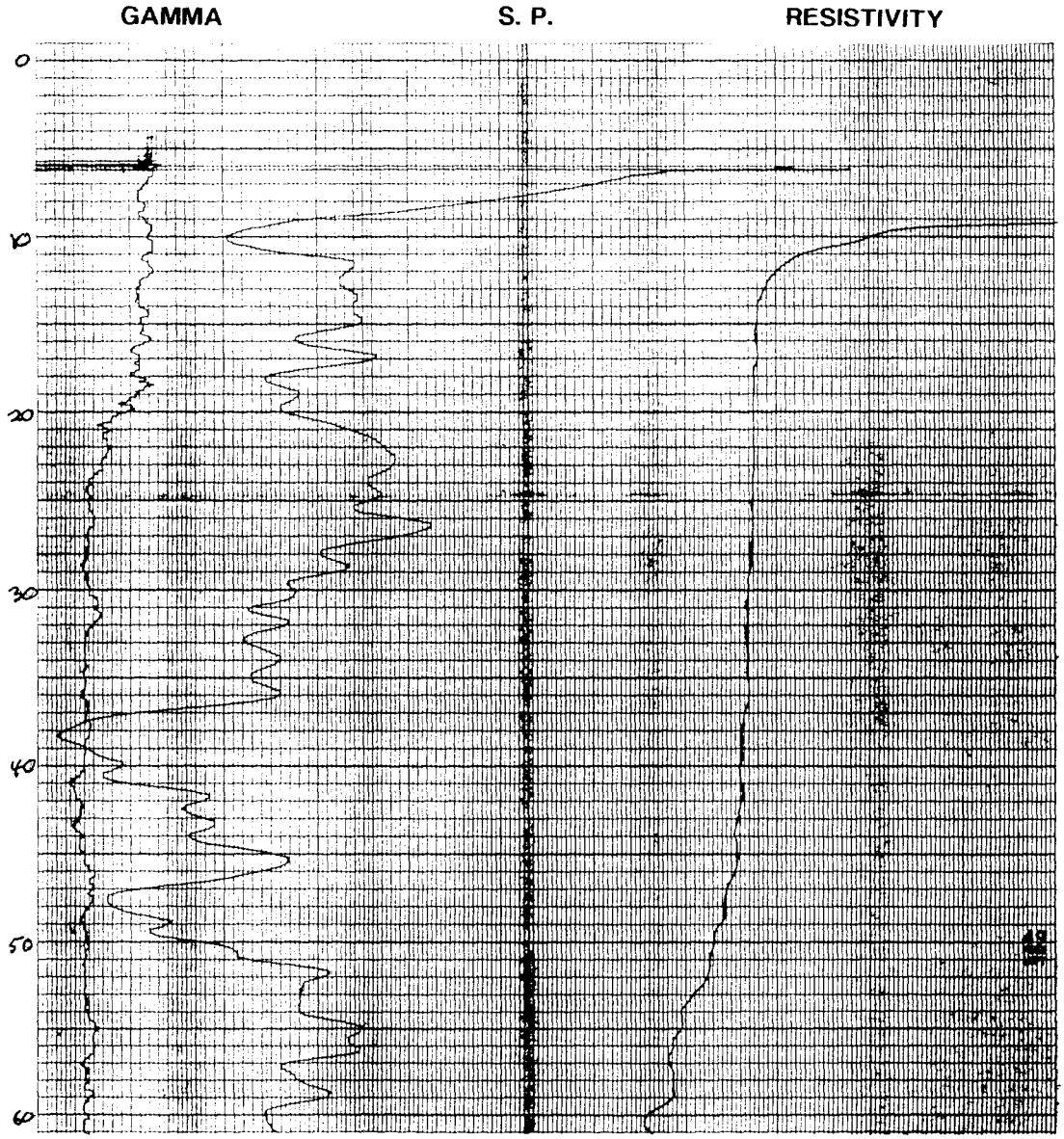
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 56A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-9-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 82.2'	BOTTOM OF LOG: 81.9'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING: 46.5'
VERTICAL SCALE: I IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



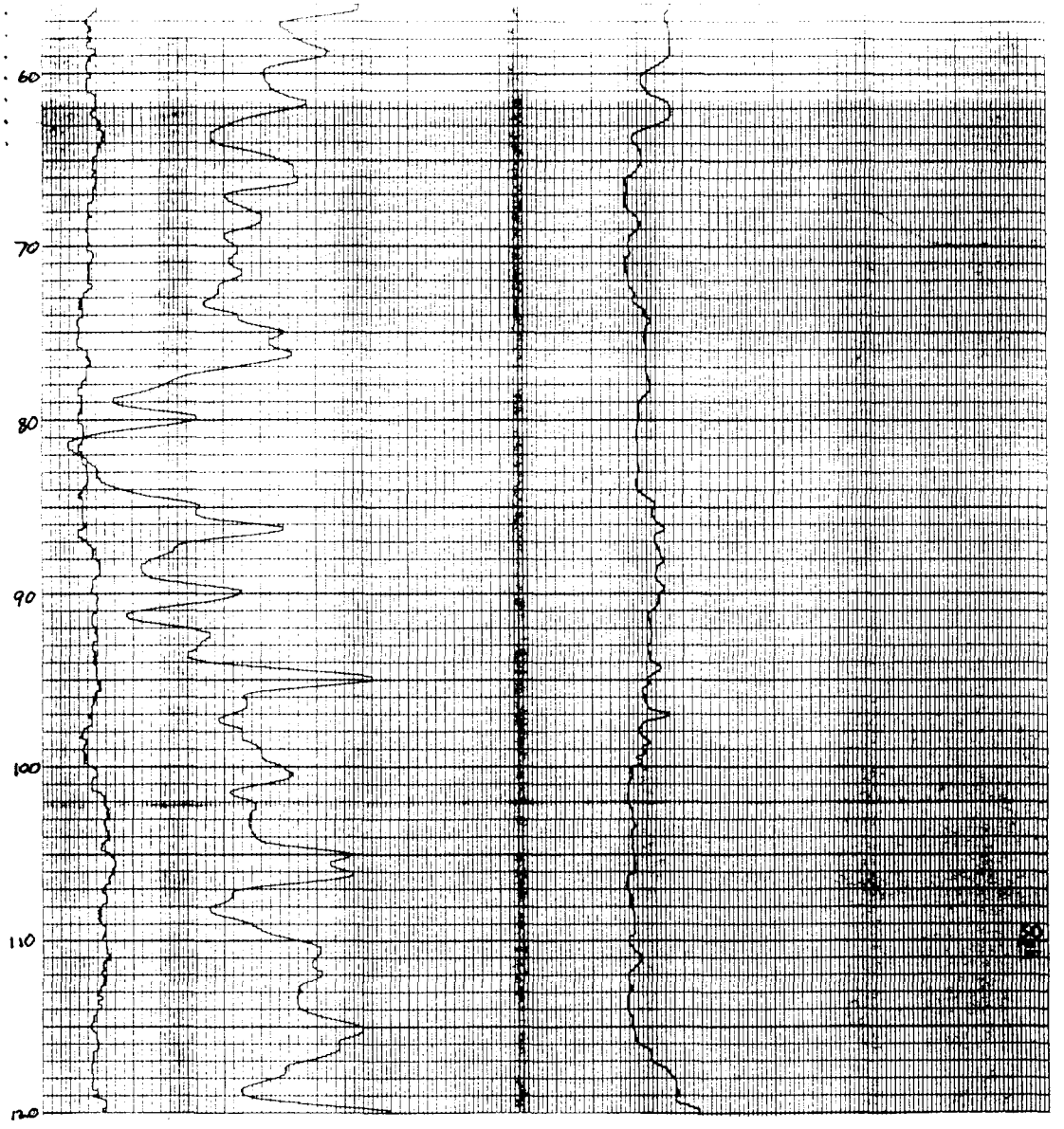
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 58A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-10-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 144.8	BOTTOM OF LOG: 144.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING:139'
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV /IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



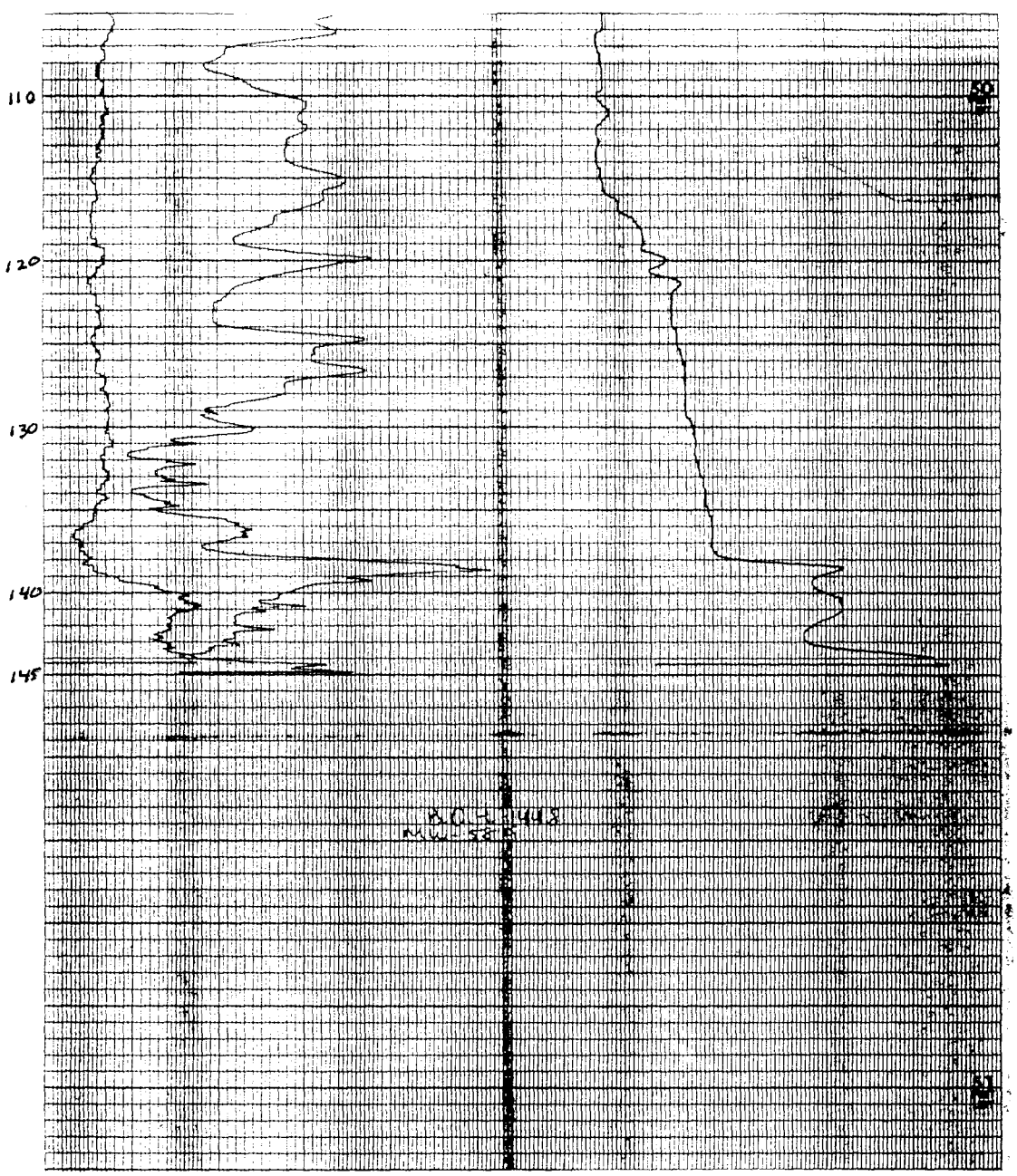
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 58A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-10-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 144.8	BOTTOM OF LOG: 144.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING:139'
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV /IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



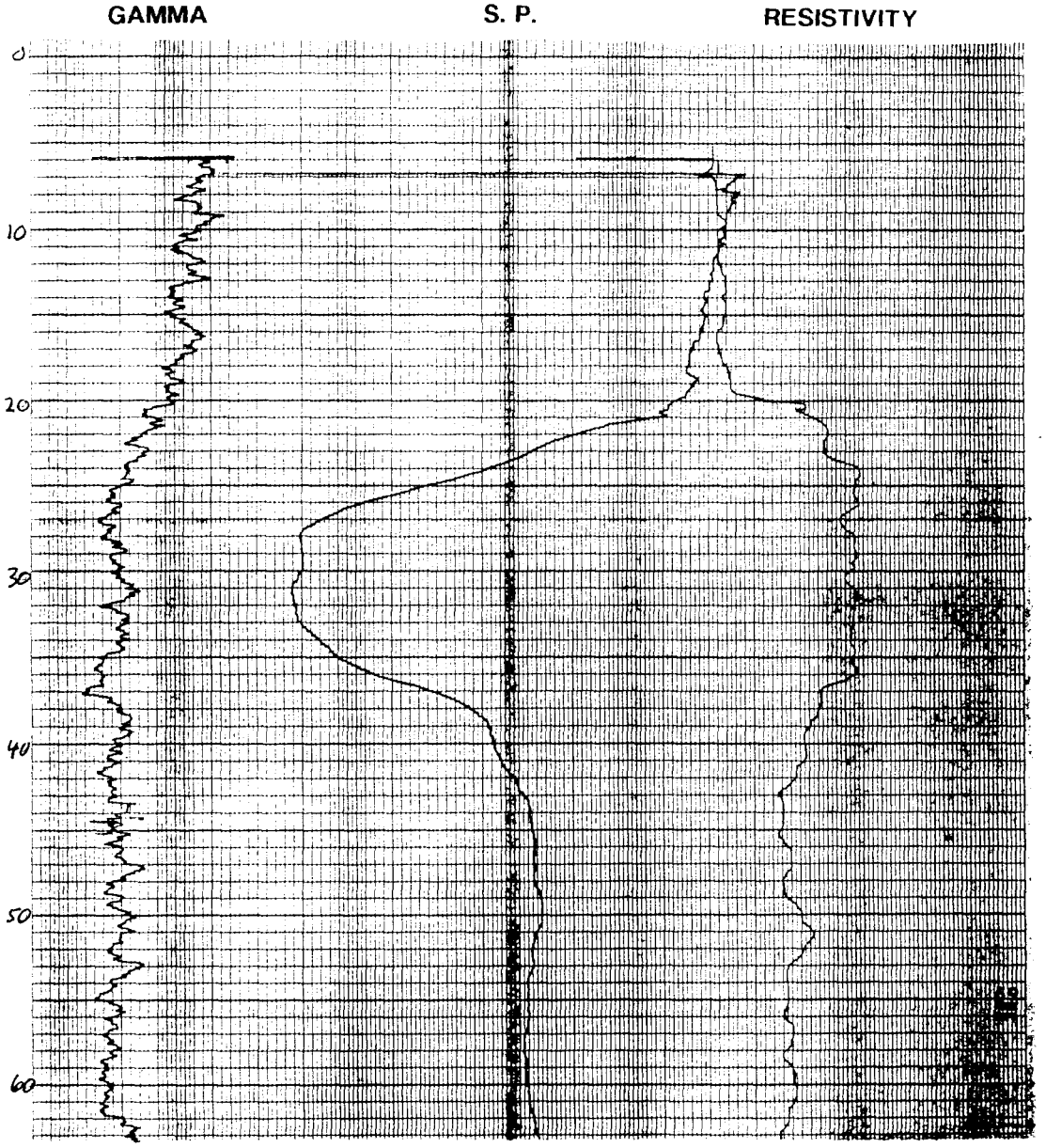
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW- 58A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-10-92	DATE LOGGED: 7-10-92
BOTTOM OF HOLE: 144.8	BOTTOM OF LOG: 144.8'
TYPE OF TEMPORARY CASING: 6 IN. DIA.	BOTTOM OF CASING:139'
VERTICAL SCALE: 1 IN.= 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV /IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-58A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-8-92	DATE LOGGED: 7-8-92
BOTTOM OF HOLE: 138.1'	BOTTOM OF LOG: 138.1'
TYPE OF TEMPORARY CASING: NONE	BITTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT.	LOGGING SPEED: 15 FT. / MIN.
RESISTIVITY: 100 OHMS / IN.	SPONTANEOUS POTENTIAL: 400 MV / IN.
NATURAL GAMMA COUNT RANGE: 100 CPS / IN.	TIME CONSTANT: 2 SECONDS



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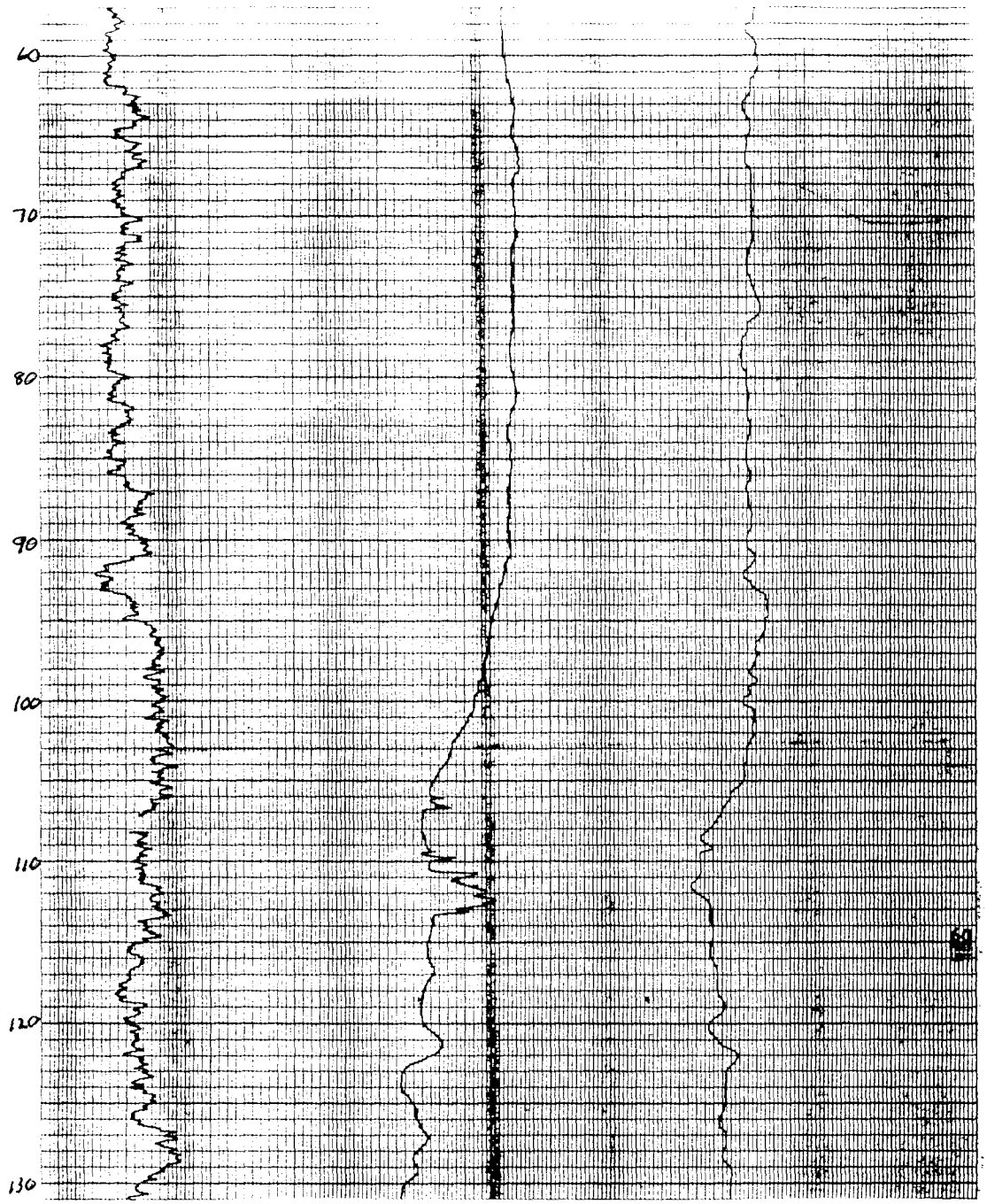
WOODWARD-CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

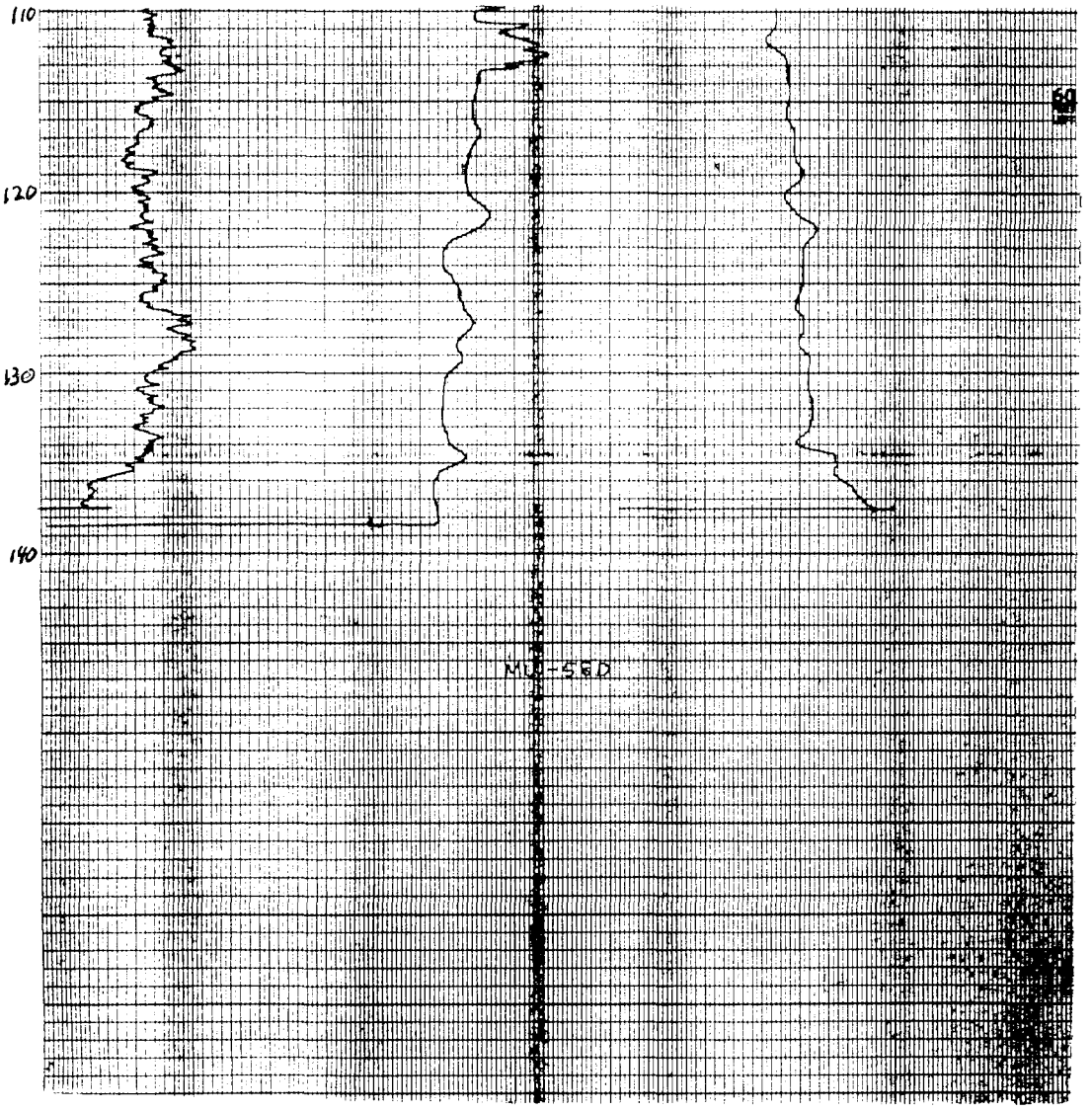
PROJECT NAME: NEBRASKA ORDNANCE PLANT
PROJECT LOCATION: MEAD, NEBRASKA
PROJECT NUMBER: 92KW030
LOGGED BY: MATT WILSON
DATE DRILLED: 7-8-92
BOTTOM OF HOLE: 138.1'
TYPE OF TEMPORARY CASING: NONE
VERTICAL SCALE: 1 IN. = 10 FT
RESISTIVITY: 100 OHMS / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN

BORING: MW-58A
CLIENT: USACE
DRILLED BY: WINNEK
DATE LOGGED: 7-8-92
BOTTOM OF LOG: 138.1'
BITTOM OF CASING: NA
LOGGING SPEED: 15 FT. / MIN
SPONTANEOUS POTENTIAL: 400 MV / IN
TIME CONSTANT: 2 SECONDS



WOODWARD CLYDE CONSULTANTS
DOWNHOLE GEOPHYSICAL LOG

PROJECT NAME: NEBRASKA ORDNANCE PLANT	
PROJECT LOCATION: MEAD, NEBRASKA	**BORING: MW-58A**
PROJECT NUMBER: 92KW030	CLIENT: USACE
LOGGED BY: MATT WILSON	DRILLED BY: WINNEK
DATE DRILLED: 7-8-92	DATE LOGGED: 7-8-92
BOTTOM OF HOLE: 138.1'	BOTTOM OF LOG: 138.1'
TYPE OF TEMPORARY CASING: NONE	BITTOM OF CASING: NA
VERTICAL SCALE: 1 IN. = 10 FT	LOGGING SPEED: 15 FT. / MIN
RESISTIVITY: 100 OHMS / IN	SPONTANEOUS POTENTIAL: 400 MV / IN
NATURAL GAMMA COUNT RANGE: 100 CPS / IN	TIME CONSTANT: 2 SECONDS



APPENDIX D
ANALYTICAL DATA

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Appendix D-1 Analytical Data of Administration Area Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene	
	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier
ADS-001-06		ND		ND		ND		ND		ND
ADS-001-20		ND		ND		ND		ND		ND
ADS-002-06		ND		ND		ND		ND		ND
ADS-002-18		ND		ND		ND		ND		ND
ADS-003-06		ND		ND		ND		ND		ND
ADS-003-18		ND		ND		ND		ND		ND
ADS-004-06		ND		ND		ND		ND		ND
ADS-004-18		ND		ND		ND		ND		ND
ADS-005-06		ND		ND		ND		ND		ND
ADS-005-18		ND		ND		ND		ND	0.02	
ADS-005-18D		ND		ND		ND		ND		ND
ADS-006-(03-06)		ND		ND		ND		ND		ND
ADS-006-18		ND		ND		ND		ND		ND
ADS-007-(03-06)		ND		ND		ND		ND		ND
ADS-007-18		ND		ND		ND		ND		ND
ADS-007-18D		ND		ND		ND		ND		ND
ADS-008-06		ND		ND		ND		ND		ND
ADS-008-18		ND		ND		ND		ND		ND
ADS-009-06		ND		ND		ND		ND		ND
ADS-009-18		ND		ND		ND		ND		ND
ADS-010-(03-06)		ND		ND		ND		ND		ND
ADS-010-18		ND		ND		ND		ND		ND
ADS-011-06		ND		ND		ND		ND		ND
ADS-011-18		ND		ND		ND		ND		ND
ADS-012-(15-18)		ND		ND		ND		ND		ND
ADS-012-06		ND		ND		ND		ND		ND
ADS-013-06		ND		ND		ND		ND		ND
ADS-013-18		ND		ND		ND		ND		ND
ADS-014-06		ND		ND		ND		ND		ND
ADS-014-18		ND		ND		ND		ND	0.12	
ADS-015-06		ND		ND		ND		ND		ND
ADS-015-18		ND		ND		ND		ND		ND
ADS-016-(03-06)		ND		ND		ND		ND		ND
ADS-016-18		ND		ND		ND		ND		ND
ADS-017-06		ND		ND		ND		ND		ND
ADS-017-18		ND		ND		ND		ND		ND
ADS-018-06		ND		ND		ND		ND		ND
ADS-018-18		ND		ND		ND		ND		ND
ADS-019-06		ND		ND		ND		ND		ND
ADS-019-18		ND		ND		ND		ND		ND
ADS-020-(03-06)		ND		ND		ND		ND		ND
ADS-020-18		ND	0.2			ND		ND		ND
ADS-021-06		ND		ND		ND		ND		ND
ADS-021-18		ND		ND		ND		ND		ND
ADS-022-06		ND		ND		ND		ND		ND
ADS-022-18		ND		ND		ND		ND		ND
ADS-023-06		ND		ND		ND		ND		ND
ADS-023-18		ND		ND		ND		ND	0.27	
ADS-023-18D		ND		ND		ND		ND	0.29	
ADS-024-06		ND		ND		ND		ND		ND
ADS-024-18		ND		ND		ND		ND	0.03	
ADS-025-06		ND		ND		ND		ND		ND
ADS-025-18		ND		ND		ND		ND		ND
ADS-026-06		ND		ND		ND		ND		ND
ADS-026-18		ND		ND		ND		ND		ND
ADS-027-06		ND		ND		ND		ND		ND

Appendix D-1 Analytical Data of Administration Area Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene	
	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier
ADS-027-18		ND		ND		ND		ND		ND
ADS-028-06		ND		ND		ND		ND		ND
ADS-028-18		ND		ND		ND		ND		ND
ADS-030-06		ND		ND		ND		ND		ND
ADS-030-18		ND		ND		ND		ND		ND
ADS-031-06		ND		ND		ND		ND		ND
ADS-031-18	0.5			ND		ND		ND		ND
ADS-032-06		ND		ND		ND		ND	0.01	
ADS-032-18		ND		ND		ND		ND	0.19	
ADS-036-06		ND		ND		ND		ND		ND
ADS-036-18		ND		ND		ND		ND		ND
ADS-045-06		ND		ND		ND		ND		ND
ADS-045-18		ND		ND		ND		ND		ND

Appendix D-1 Analytical Data of Administration Area Soil Gas Samples

Sample ID	Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier
ADS-001-06		ND		ND		ND		ND
ADS-001-20		ND		ND		ND		ND
ADS-002-06		ND		ND		ND		ND
ADS-002-18		ND	0.02			ND		ND
ADS-003-06		ND		ND		ND		ND
ADS-003-18		ND		ND		ND		ND
ADS-004-06	0.2			ND		ND		ND
ADS-004-18		ND	0.03			ND		ND
ADS-005-06		ND	0.23			ND		ND
ADS-005-18		ND	74.5			ND		ND
ADS-005-18D		ND	79.6			ND		ND
ADS-006-(03-06)		ND		ND		ND		ND
ADS-006-18		ND		ND		ND		ND
ADS-007-(03-06)		ND		ND		ND		ND
ADS-007-18		ND	0.26			ND		ND
ADS-007-18D		ND	0.24			ND		ND
ADS-008-06		ND		ND		ND		ND
ADS-008-18		ND		ND		ND		ND
ADS-009-06		ND		ND		ND		ND
ADS-009-18		ND		ND		ND		ND
ADS-010-(03-06)		ND		ND		ND		ND
ADS-010-18		ND		ND		ND		ND
ADS-011-06		ND		ND		ND		ND
ADS-011-18		ND		ND		ND		ND
ADS-012-(15-18)		ND	0.06			ND		ND
ADS-012-06		ND		ND		ND		ND
ADS-013-06		ND		ND		ND		ND
ADS-013-18		ND	0.02			ND		ND
ADS-014-06		ND		ND		ND		ND
ADS-014-18		ND	0.1			ND		ND
ADS-015-06		ND		ND		ND		ND
ADS-015-18		ND	3.06			ND		ND
ADS-016-(03-06)		ND		ND		ND		ND
ADS-016-18		ND		ND		ND		ND
ADS-017-06		ND		ND		ND	0.4	
ADS-017-18		ND	0.23			ND		ND
ADS-018-06		ND		ND		ND		ND
ADS-018-18		ND		ND		ND		ND
ADS-019-06		ND		ND		ND		ND
ADS-019-18		ND		ND		ND		ND
ADS-020-(03-06)		ND		ND		ND		ND
ADS-020-18		ND	0.02			ND		ND
ADS-021-06		ND		ND		ND		ND
ADS-021-18		ND		ND		ND		ND
ADS-022-06		ND		ND		ND		ND
ADS-022-18		ND		ND		ND		ND
ADS-023-06		ND		ND		ND		ND
ADS-023-18		ND		ND		ND		ND
ADS-023-18D		ND		ND		ND		ND
ADS-024-06		ND		ND		ND		ND
ADS-024-18		ND		ND		ND		ND
ADS-025-06		ND		ND		ND		ND
ADS-025-18		ND		ND		ND		ND
ADS-026-06		ND		ND		ND	0.1	
ADS-026-18		ND		ND		ND		ND
ADS-027-06		ND		ND		ND		ND

Appendix D-1 Analytical Data of Administration Area Soil Gas Samples

Sample ID	Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier
ADS-027-18		ND		ND		ND		ND
ADS-028-06		ND		ND		ND		ND
ADS-028-18		ND		ND		ND		ND
ADS-030-06		ND		ND		ND		ND
ADS-030-18		ND		ND		ND		ND
ADS-031-06		ND		ND		ND		ND
ADS-031-18		ND	0.11			ND		ND
ADS-032-06		ND		ND		ND		ND
ADS-032-18		ND		ND		ND		ND
ADS-036-06		ND		ND		ND		ND
ADS-036-18		ND		ND		ND		ND
ADS-045-06		ND		ND		ND		ND
ADS-045-18		ND		ND		ND		ND

Note : 1. ND indicates compound was not detected at the quantitation limit.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene,

Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

Appendix D-2 Analytical Data of Atlas Missile Area Soil Gas TCE Samples

Sample ID	Trichloroethene Results (ug/L)	Trichloroethene Data qualifier
ATL-001-04		ND
ATL-001-09		ND
ATL-002-03		ND
ATL-002-07		ND
ATL-003-04		ND
ATL-003-09		ND
ATL-004-06		ND
ATL-004-12	0.02	
ATL-005-06		ND
ATL-005-12		ND
ATL-006-06		ND
ATL-006-18		ND
ATL-007-06	0.02	
ATL-007-18	0.02	
ATL-008-06		ND
ATL-008-18	0.03	
ATL-009-06		ND
ATL-009-15		ND
ATL-010-06		ND
ATL-010-18	0.01	
ATL-011-04		ND
ATL-011-09		ND
ATL-012-04		ND
ATL-012-08		ND
ATL-013-04		ND
ATL-013-08		ND
ATL-014-04		ND
ATL-014-07		ND
ATL-015-03		ND
ATL-015-07		ND
ATL-016-06		ND
ATL-016-10		ND
ATL-017-06		ND
ATL-017-18		ND
ATL-018-06		ND
ATL-018-18		ND
ATL-019-06		ND
ATL-019-18	0.07	
ATL-020-06		ND
ATL-020-18	0.01	
ATL-021-06		ND
ATL-021-18	0.02	
ATL-022-06		ND
ATL-022-18	0.03	
ATL-023-06		ND
ATL-023-15		ND
ATL-024-06		ND
ATL-024-14		ND
ATL-025-06		ND
ATL-026-06		ND

Sample ID	Trichloroethene Results (ug/L)	Trichloroethene Data qualifier
ATL-026-12	0.03	
ATL-027-06		ND
ATL-028-05		ND
ATL-028-09		ND
ATL-029-04		ND
ATL-029-09		ND
ATL-030-04		ND
ATL-030-09		ND
ATL-031-06		ND
ATL-031-18	3.11	
ATL-032-06	0.04	
ATL-032-18	1.95	
ATL-033-06	0.03	
ATL-033-18	1.12	
ATL-034-06	0.02	
ATL-034-18	0.46	
ATL-035-06	0.06	
ATL-035-18	0.62	
ATL-036-06		ND
ATL-036-18	0.44	
ATL-037-06		ND
ATL-037-18	0.02	
ATL-038-06		ND
ATL-038-18	0.01	
ATL-039-06		ND
ATL-039-17	0.01	
ATL-040-06	0.01	
ATL-040-18	0.02	
ATL-041-06		ND
ATL-041-18	0.03	
ATL-042-06		ND
ATL-042-18	0.01	
ATL-043-06		ND
ATL-043-18	0.03	
ATL-044-09	0.01	
ATL-044-15		ND
ATL-045-06	1.83	
ATL-045-18	18.3	
ATL-045-18D	16.4	
ATL-046-06	0.15	
ATL-046-18	12.2	
ATL-046-18D	11.8	
ATL-047-06	0.02	
ATL-047-18	15.1	
ATL-048-06	0.07	
ATL-048-18	6.27	
ATL-049-06		ND
ATL-049-18	1.5	
ATL-050-06		ND
ATL-050-18	5.52	

Sample ID	Trichloroethene Results (ug/L)	Trichloroethene Data qualifier
ATL-051-06		ND
ATL-051-18	1.57	
ATL-052-06		ND
ATL-052-20	0.18	
ATL-052-20D	0.16	
ATL-053-06	0.01	
ATL-053-20	0.03	
ATL-054-06		ND
ATL-054-18		ND
ATL-055-06		ND
ATL-055-18		ND
ATL-056-06		ND
ATL-056-18		ND
ATL-057-06		ND
ATL-057-18		ND
ATL-058-06	0.03	
ATL-058-18		ND
ATL-059-06	22.2	
ATL-059-18	150	
ATL-060-06	0.47	
ATL-060-18	62.4	
ATL-061-06	0.91	
ATL-061-19	30.5	
ATL-061-19D	29.7	
ATL-062-06	0.18	
ATL-062-18	22	
ATL-063-06		ND
ATL-063-18	10.6	
ATL-063-18D	10.6	
ATL-064-06	0.34	
ATL-064-24	8.06	
ATL-064-24D	8.16	
ATL-065-06		ND
ATL-065-22	5.87	
ATL-066-06		ND
ATL-066-23	3.44	
ATL-067-06		ND
ATL-067-21	2.61	
ATL-067-21D	2.68	
ATL-068-06		ND
ATL-068-19	0.77	
ATL-069-06		ND
ATL-069-19		ND
ATL-070-06		ND
ATL-070-18		ND
ATL-071-06		ND
ATL-071-18	0.02	
ATL-072-06	0.02	
ATL-072-18	0.21	
ATL-073-06		ND

Appendix D-2 Analytical Data of Atlas Missile Area Soil Gas TCE Samples

Sample ID	Trichloroethene Results (ug/L)	Data qualifier
ATL-073-18	4.98	
ATL-074-06	0.07	
ATL-074-26	6.54	
ATL-074-26D	0.96	
ATL-075-06		ND
ATL-075-23	3.56	
ATL-076-06	0.02	
ATL-076-18	1.5	
ATL-077-06		ND
ATL-077-21	4.78	
ATL-078-06		ND
ATL-078-18	5.94	
ATL-079-06	0.39	
ATL-079-21	0.22	
ATL-080-06		ND
ATL-080-24	1.61	
ATL-081-06		ND
ATL-081-24	0.91	
ATL-082-06		ND
ATL-082-20	0.19	
ATL-082-20D	0.2	
ATL-083-06		ND
ATL-083-18		ND
ATL-084-06		ND
ATL-084-19		ND
ATL-085-06		ND
ATL-085-19		ND
ATL-086-06		ND
ATL-086-18		ND
ATL-087-06	2.36	
ATL-087-21	5.1	
ATL-088-06		ND
ATL-088-20	0.31	
ATL-089-07	0.03	
ATL-089-21	2.07	
ATL-090-06		ND
ATL-090-21	0.09	
ATL-091-06		ND
ATL-091-23	0.12	
ATL-092-06		ND
ATL-092-23	0.17	
ATL-093-06		ND
ATL-093-21	1.32	
ATL-093-21D	1.34	
ATL-094-06		ND
ATL-094-22	0.04	
ATL-095-06		ND
ATL-095-21	0.02	
ATL-096-06		ND
ATL-096-21		ND

Sample ID	Trichloroethene Results (ug/L)	Data qualifier
ATL-097-06		ND
ATL-097-21		ND
ATL-098-06		ND
ATL-098-25		ND
ATL-099-06		ND
ATL-099-22	1.01	
ATL-100-06		ND
ATL-100-25	0.4	
ATL-100-25D	0.41	
ATL-101-06		ND
ATL-101-26		ND
ATL-102-06		ND
ATL-102-24	5.91	
ATL-103-06	0.02	
ATL-103-21	5.28	
ATL-104-06		ND
ATL-104-22	2.56	
ATL-105-07		ND
ATL-105-24	0.67	
ATL-106-06		ND
ATL-106-21	0.17	
ATL-107-06		ND
ATL-107-22	0.03	
ATL-108-06		ND
ATL-108-23		ND
ATL-109-06		ND
ATL-109-22		ND
ATL-110-06		ND
ATL-110-18		ND
ATL-111-06		ND
ATL-111-18		ND
ATL-112-06		ND
ATL-112-18		ND
ATL-113-06		ND
ATL-113-18		ND
ATL-114-06		ND
ATL-114-22	1.05	
ATL-115-06	0.05	
ATL-115-22	2.44	
ATL-116-06		ND
ATL-116-23	0.24	
ATL-117-06		ND
ATL-117-21	0.03	
ATL-118-21	0.03	
ATL-119-06		ND
ATL-119-23		ND
ATL-120-06	0.02	
ATL-120-22	0.02	

Note : 1. ND indicates compound was not detected at the quantitation limit.
2. Quantitation limit of TCE is 0.01 ug/L

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-001-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-001-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-002-06		ND		ND		ND		ND		ND		ND		ND		ND	0.1	
LL-002-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-003-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-003-18		ND		ND		ND		ND		ND		ND	0.04			ND		ND
LL-004-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-004-18		ND		ND		ND		ND		ND		ND	0.02			ND		ND
LL-005-06		ND		ND		ND		ND		ND		ND		ND		ND	0.4	
LL-005-18		ND		ND		ND		ND		ND		ND	0.02			ND		ND
LL-006-(03-06)		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-006-18		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-007-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-007-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-008-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-008-18		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-009-06		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-009-18		ND		ND		ND		ND		ND		ND	0.17			ND		ND
LL-010-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-010-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-011-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-011-18		ND		ND		ND		ND		ND		ND	0.04			ND		ND
LL-012-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-012-18		ND		ND		ND		ND		ND		ND	0.06			ND		ND
LL-013-06		ND		ND		ND		ND		ND		ND	0.02			ND		ND
LL-013-18		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-014-(03-06)		ND		ND		ND		ND		ND		ND		ND		ND	0.3	
LL-014-15		ND		ND		ND		ND		ND		ND		ND		ND	0.3	
LL-015-06		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-015-18		ND		ND		ND		ND		ND		ND	0.09			ND		ND
LL-016-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-016-18		ND		ND		ND		ND		ND		ND	0.12			ND		ND
LL-017-06		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-017-18		ND		ND		ND		ND		ND		ND	0.12			ND		ND
LL-018-06		ND		ND		ND		ND		ND		ND	0.02			ND		ND
LL-018-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-019-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-019-18		ND		ND		ND		ND		ND		ND	0.1			ND		ND
LL-020-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-020-18		ND		ND		ND		ND		ND		ND	0.09			ND		ND

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-021-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-021-18		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-022-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-022-18		ND		ND		ND		ND		ND		ND	0.08			ND		ND
LL-023-06		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-023-18		ND		ND		ND		ND		ND	0.2		1.21			ND		ND
LL-023-18D		ND		ND		ND		ND		ND	0.2		1.33			ND		ND
LL-024-06		ND		ND		ND		ND		ND		ND	0.05			ND		ND
LL-024-18		ND		ND		ND		ND		ND	0.2		0.61			ND		ND
LL-025-06		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-025-18		ND		ND		ND		ND		ND		ND	0.25			ND		ND
LL-026-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-026-18		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-027-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-027-18		ND		ND		ND		ND		ND		ND	0.1			ND		ND
LL-028-06		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-028-18		ND		ND		ND		ND		ND		ND	0.34			ND		ND
LL-029-03		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-029-18		ND		ND		ND		ND		ND	0.5		0.09			ND	0.2	
LL-030-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-030-15		ND		ND		ND		ND		ND		ND	0.33			ND		ND
LL-031-06		ND		ND		ND		ND		ND		ND	6.86			ND		ND
LL-031-17		ND		ND		ND		ND		ND		ND	21.3			ND		ND
LL-032-06		ND		ND		ND		ND		ND		ND	3.18			ND		ND
LL-032-19		ND		ND		ND		ND	0.06			ND	21.2			ND		ND
LL-032-19D		ND		ND		ND		ND		ND		ND	21			ND		ND
LL-033-06		ND		ND		ND		ND		ND		ND	0.33			ND		ND
LL-033-19		ND		ND		ND		ND		ND	0.2		2.61			ND		ND
LL-034-06		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-034-18		ND		ND		ND		ND		ND		ND	0.65			ND		ND
LL-034-18D		ND		ND		ND		ND		ND		ND	0.7			ND		ND
LL-035-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-035-16		ND		ND		ND		ND		ND		ND	0.01			ND		ND
LL-035-18		ND		ND		ND		ND		ND		ND	0.25			ND		ND
LL-036-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-036-17		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-037-(03-06)		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-037-18		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-038-06		ND		ND		ND		ND		ND		ND	21.6			ND		ND
LL-038-15		ND		ND		ND		ND		ND		ND	30.2			ND		ND

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-038-15D		ND		ND		ND		ND		ND		ND	36.7			ND		ND
LL-039-06		ND		ND		ND		ND		ND		ND	50.2			ND		ND
LL-039-19		ND		ND		ND		ND		ND		ND	94.1			ND		ND
LL-039-19D		ND		ND		ND		ND		ND		ND	99.7			ND		ND
LL-040-06		ND		ND		ND		ND		ND		ND	16.6			ND		ND
LL-040-16		ND		ND		ND		ND		ND		ND	35.5			ND		ND
LL-041-06		ND		ND		ND		ND		ND		ND	16.1			ND		ND
LL-041-16		ND		ND		ND		ND		ND		ND	224			ND		ND
LL-042-06		ND		ND		ND		ND		ND		ND	0.36			ND		ND
LL-042-18		ND		ND		ND		ND		ND		ND	11.8			ND		ND
LL-043-06		ND		ND		ND		ND		ND		ND	0.22			ND		ND
LL-043-18		ND		ND		ND		ND		ND		ND	0.19			ND		ND
LL-044-06		ND		ND		ND		ND		ND		ND	0.13			ND		ND
LL-044-18		ND		ND		ND		ND		ND		ND	0.2			ND		ND
LL-045-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-045-06		ND		ND		ND		ND		ND		ND	26.8			ND		ND
LL-045-07G	NA		NA		NA		NA		NA		NA		38.5		NA		NA	
LL-045-16G	NA		NA		NA		NA		NA		NA		357		NA		NA	
LL-045-17		ND		ND		ND		ND		ND		ND	505			ND		ND
LL-045-21G	NA		NA		NA		NA		NA		NA		134		NA		NA	
LL-045-21G	NA		NA		NA		NA		NA		NA		326		NA		NA	
LL-046-(03-06)		ND		ND		ND		ND		ND		ND	1.22			ND		ND
LL-046-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-046-09G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-046-15G	NA		NA		NA		NA		NA		NA		225		NA		NA	
LL-046-16		ND		ND		ND		ND		ND		ND	410			ND		ND
LL-046-16D		ND		ND		ND		ND		ND		ND	497			ND		ND
LL-046-21G	NA		NA		NA		NA		NA		NA		237		NA		NA	
LL-047-06		ND		ND		ND		ND	0.01			ND	152			ND	0.3	
LL-047-17		ND		ND		ND		ND		ND		ND	185			ND		ND
LL-048-03G	NA		NA		NA		NA		NA		NA		25.9		NA		NA	
LL-048-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-048-09G	NA		NA		NA		NA		NA		NA		1.56		NA		NA	
LL-048-15G	NA		NA		NA		NA		NA		NA		437		NA		NA	
LL-048-16	0.7			ND		ND		ND	0.2			ND	707			ND	1.7	
LL-048-21G	NA		NA		NA		NA		NA		NA		468		NA		NA	
LL-049-06		ND		ND		ND		ND		ND		ND	0.04			ND		ND
LL-049-16		ND		ND		ND		ND		ND		ND	194			ND		ND
LL-050-06		ND		ND		ND		ND		ND		ND	0.13			ND		ND
LL-050-18		ND		ND		ND		ND		ND		ND	1.1			ND		ND

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-051-06		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-051-18		ND		ND		ND		ND		ND		ND	0.67			ND		ND
LL-051-18D		ND		ND		ND		ND		ND		ND	0.25			ND		ND
LL-052-06		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-052-18		ND		ND		ND		ND		ND		ND	0.35			ND		ND
LL-052-18D		ND		ND		ND		ND		ND		ND	0.39			ND		ND
LL-053-06		ND		ND		ND		ND		ND		ND	128			ND		ND
LL-053-18		ND		ND		ND		ND		ND		ND	184			ND		ND
LL-054-06		ND		ND		ND		ND		ND		ND	270			ND		ND
LL-054-18		ND		ND		ND		ND		ND		ND	10.5			ND		ND
LL-055-(03-06)		ND		ND		ND		ND		ND	3.5		0.18			ND		ND
LL-055-15		ND		ND		ND		ND		ND		ND	8.19			ND		ND
LL-056-06		ND		ND		ND		ND		ND		ND	0.12			ND		ND
LL-056-16		ND		ND		ND		ND		ND		ND	7.6			ND		ND
LL-057-(03-06)		ND		ND		ND		ND		ND		ND	0.29			ND		ND
LL-057-18	0.1			ND		ND		ND		ND		ND	160			ND		ND
LL-058-06		ND		ND		ND		ND		ND		ND	0.15			ND		ND
LL-058-18		ND		ND		ND		ND		ND		ND	0.13			ND		ND
LL-059-06		ND		ND		ND		ND		ND		ND	0.06			ND		ND
LL-059-18		ND		ND		ND		ND		ND		ND	0.41			ND		ND
LL-060-06		ND		ND		ND		ND		ND		ND	0.04			ND		ND
LL-060-18		ND		ND		ND		ND		ND		ND	0.07			ND		ND
LL-061-06		ND		ND		ND		ND		ND		ND	49.6			ND		ND
LL-061-18		ND		ND		ND		ND		ND		ND	174			ND		ND
LL-062-(03-06)		ND		ND		ND		ND		ND		ND	0.7			ND		ND
LL-062-18		ND		ND		ND		ND		ND		ND	6.33			ND		ND
LL-063-06		ND		ND		ND		ND		ND		ND	0.03			ND		ND
LL-063-18		ND		ND		ND		ND		ND		ND	0.74			ND		ND
LL-064-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-064-18		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-065-06		ND		ND		ND		ND		ND		ND		ND		ND		ND
LL-065-18		ND		ND		ND		ND		ND		ND	0.06			ND		ND
LL-066-06G	NA		NA		NA		NA		NA		NA		0.02		NA		NA	
LL-066-18G	NA		NA		NA		NA		NA		NA		2.99		NA		NA	
LL-067-06G	NA		NA		NA		NA		NA		NA		3.44		NA		NA	
LL-067-18G	NA		NA		NA		NA		NA		NA		36.8		NA		NA	
LL-67D-18G	NA		NA		NA		NA		NA		NA		32.4		NA		NA	
LL-068-18G	NA		NA		NA		NA		NA		NA		111		NA		NA	
LL-068-6G	NA		NA		NA		NA		NA		NA		3.44		NA		NA	
LL-069-04G	NA		NA		NA		NA		NA		NA		54.1		NA		NA	

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-069-06G	NA		NA		NA		NA		NA		NA		83.5		NA		NA	
LL-069-09G	NA		NA		NA		NA		NA		NA		64.7		NA		NA	
LL-069-15G	NA		NA		NA		NA		NA		NA		71.8		NA		NA	
LL-069-18G	NA		NA		NA		NA		NA		NA		335		NA		NA	
LL-069-21G	NA		NA		NA		NA		NA		NA		142		NA		NA	
LL-070-06G	NA		NA		NA		NA		NA		NA		2.12		NA		NA	
LL-070-18G	NA		NA		NA		NA		NA		NA		11.3		NA		NA	
LL-071-06G	NA		NA		NA		NA		NA		NA		6.84		NA		NA	
LL-071-18G	NA		NA		NA		NA		NA		NA		36.4		NA		NA	
LL-072-04G	NA		NA		NA		NA		NA		NA		15		NA		NA	
LL-072-06G	NA		NA		NA		NA		NA		NA		21.3		NA		NA	
LL-072-09G	NA		NA		NA		NA		NA		NA		14.9		NA		NA	
LL-072-15G	NA		NA		NA		NA		NA		NA		93.6		NA		NA	
LL-072-18G	NA		NA		NA		NA		NA		NA		168		NA		NA	
LL-072-21G	NA		NA		NA		NA		NA		NA		82		NA		NA	
LL-073-06G	NA		NA		NA		NA		NA		NA		7.55		NA		NA	
LL-073-18G	NA		NA		NA		NA		NA		NA		60.5		NA		NA	
LL-074-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-074-18G	NA		NA		NA		NA		NA		NA		0.1		NA		NA	
LL-075-06G	NA		NA		NA		NA		NA		NA		6.33		NA		NA	
LL-075-18G	NA		NA		NA		NA		NA		NA		47.1		NA		NA	
LL-076-06G	NA		NA		NA		NA		NA		NA		1.42		NA		NA	
LL-076-18G	NA		NA		NA		NA		NA		NA		28.3		NA		NA	
LL-76D-18G	NA		NA		NA		NA		NA		NA		17.5		NA		NA	
LL-077-06G	NA		NA		NA		NA		NA		NA		0.05		NA		NA	
LL-077-18G	NA		NA		NA		NA		NA		NA		0.91		NA		NA	
LL-078-06G	NA		NA		NA		NA		NA		NA		0.09		NA		NA	
LL-078-18G	NA		NA		NA		NA		NA		NA		2.69		NA		NA	
LL-079-05G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-079-18G	NA		NA		NA		NA		NA		NA		1.8		NA		NA	
LL-080-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-080-18G	NA		NA		NA		NA		NA		NA		0.41		NA		NA	
LL-081-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-081-18G	NA		NA		NA		NA		NA		NA		0.67		NA		NA	
LL-082-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-082-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-083-06G	NA		NA		NA		NA		NA		NA		0.15		NA		NA	
LL-083-18G	NA		NA		NA		NA		NA		NA		7.22		NA		NA	
LL-084-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-084-18G	NA		NA		NA		NA		NA		NA		1.1		NA		NA	

Appendix D-3 Analytical Data of Load Line 1 Soil Gas Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
LL-085-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-085-18G	NA		NA		NA		NA		NA		NA		0.06		NA		NA	
LL-086-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-086-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-087-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-087-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-87D-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-088-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-088-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-089-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-089-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-090-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-090-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-091-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-091-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-092-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-092-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-093-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-093-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-094-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-094-18G	NA		NA		NA		NA		NA		NA		2.16		NA		NA	
LL-095-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-095-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-096-04G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-096-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-097-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-097-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-098-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-098-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-099-06G	NA		NA		NA		NA		NA		NA			ND	NA		NA	
LL-099-18G	NA		NA		NA		NA		NA		NA			ND	NA		NA	

Note : 1. ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

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Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-003-06B			ADS-003-18B			ADS-005-06B			ADS-005-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/kg)												
4,4'-DDD		U	3.9		U	3.4	0.26	JP		0.27	JP	
4,4'-DDE		U	3.9		U	3.4		U	3.9		U	3.5
4,4'-DDT	1.2	JB		0.9	JB		1.1	JB		0.82	JB	
Aldrin	0.41	JPB		0.12	JPB		0.13	JPB		0.13	JPB	
Alpha chlordane		U	2		U	1.8		U	2		U	1.8
Alpha-BHC		U	2		U	1.8		U	2		U	1.8
Beta-BHC		U	2		U	1.8		U	2		U	1.8
Delta-BHC		U	2		U	1.8		U	2		U	1.8
Dieldrin	0.72	JPB		0.26	JPB		0.5	JPB		0.6	JPB	
Endosulfan I		U	2		U	1.8		U	2		U	1.8
Endosulfan II		U	3.9		U	3.4		U	3.9		U	3.5
Endosulfan sulfate		U	3.9		U	3.4		U	3.9		U	3.5
Endrin	0.46	JPB		0.19	JPB		0.29	JPB		0.14	JPB	
Endrin aldehyde		U	3.9		U	3.4		U	3.9		U	3.5
Endrin ketone		U	3.9		U	3.4		U	3.9		U	3.5
Gamma chlordane		U	2		U	1.8		U	2		U	1.8
Gamma-BHC (Lindane)	0.15	JPB		0.096	JPB		0.1	JPB		0.12	JPB	
Heptachlor	0.39	JB		0.22	JB		0.24	JPB		0.25	JB	
Heptachlor epoxide		U	2		U	1.8		U	2		U	1.8
PCB-1016		U	39		U	34		U	39		U	35
PCB-1221		U	79		U	70		U	79		U	71
PCB-1232		U	39		U	34		U	39		U	35
PCB-1242		U	39		U	34		U	39		U	35
PCB-1248		U	39		U	34		U	39		U	35
PCB-1254		U	39		U	34		U	39		U	35
PCB-1260		U	39		U	34		U	39		U	35
Toxaphene		U	200		U	180		U	200		U	180
p,p'-Methoxychlor		U	20		U	18		U	20		U	18

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-003-06B			ADS-003-18B			ADS-005-06B			ADS-005-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)												
1,2,4-Trichlorobenzene		U	390		U	340		U	390		U	350
1,2-Dichlorobenzene		U	390		U	340		U	390		U	350
1,3-Dichlorobenzene		U	390		U	340		U	390		U	350
1,4-Dichlorobenzene		U	390		U	340		U	390		U	350
2,2'-Oxybis(1-chloropropane)		U	390		U	340		U	390		U	350
2,4,5-Trichlorophenol		U	940		U	830		U	940		U	840
2,4,6-Trichlorophenol		U	390		U	340		U	390		U	350
2,4-Dichlorophenol		U	390		U	340		U	390		U	350
2,4-Dimethylphenol		U	390		U	340		U	390		U	350
2,4-Dinitrophenol		U	940		U	830		U	940		U	840
2,4-Dinitrotoluene		U	390		U	340		U	390		U	350
2,6-Dinitrotoluene		U	390		U	340		U	390		U	350
2-Chloronaphthalene		U	390		U	340		U	390		U	350
2-Chlorophenol		U	390		U	340		U	390		U	350
2-Methylnaphthalene		U	390		U	340		U	390		U	350
2-Methylphenol		U	390		U	340		U	390		U	350
2-Nitroaniline		U	940		U	830		U	940		U	840
2-Nitrophenol		U	390		U	340		U	390		U	350
3,3'-Dichlorobenzidine		U	390		U	340		U	390		U	350
3-Nitroaniline		U	940		U	830		U	940		U	840
4,6-Dinitro-2-methylphenol		U	940		U	830		U	940		U	840
4-Bromophenyl phenyl ether		U	390		U	340		U	390		U	350
4-Chloro-3-methylphenol		U	390		U	340		U	390		U	350
4-Chloroaniline		U	390		U	340		U	390		U	350
4-Chlorophenyl phenyl ether		U	390		U	340		U	390		U	350
4-Methylphenol		U	390		U	340		U	390		U	350
4-Nitroaniline		U	940		U	830		U	940		U	840
4-Nitrophenol		U	940		U	830		U	940		U	840
Acenaphthene		U	390		U	340		U	390		U	350
Acenaphthylene		U	390		U	340		U	390		U	350
Anthracene		U	390		U	340		U	390		U	350
Benzo(a)anthracene		U	390		U	340		U	390		U	350
Benzo(a)pyrene		U	390		U	340		U	390		U	350
Benzo(b)fluoranthene		U	390		U	340		U	390		U	350
Benzo(g,h,i)perylene		U	390		U	340		U	390		U	350

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-003-06B			ADS-003-18B			ADS-005-06B			ADS-005-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)												
Benzo(k)fluoranthene		U	390		U	340		U	390		U	350
Butyl benzyl phthalate		U	390		U	340		U	390		U	350
Carbazole		U	390		U	340		U	390		U	350
Chrysene		U	390		U	340		U	390		U	350
Di-n-butyl phthalate		U	390		U	340		U	390		U	350
Di-n-octyl phthalate		U	390		U	340		U	390		U	350
Dibenzo(a,h)anthracene		U	390		U	340		U	390		U	350
Dibenzofuran		U	390		U	340		U	390		U	350
Diethyl phthalate		U	390		U	340		U	390		U	350
Dimethyl phthalate		U	390		U	340		U	390		U	350
Fluoranthene		U	390		U	340		U	390		U	350
Fluorene		U	390		U	340		U	390		U	350
Hexachlorobenzene		U	390		U	340		U	390		U	350
Hexachlorobutadiene		U	390		U	340		U	390		U	350
Hexachlorocyclopentadiene		U	390		U	340		U	390		U	350
Hexachloroethane		U	390		U	340		U	390		U	350
Indeno(1,2,3-cd)pyrene		U	390		U	340		U	390		U	350
Isophorone		U	390		U	340		U	390		U	350
N-Nitroso-di-n-propylamine		U	390		U	340		U	390		U	350
N-Nitrosodiphenylamine(1)		U	390		U	340		U	390		U	350
Naphthalene		U	390		U	340		U	390		U	350
Nitrobenzene		U	390		U	340		U	390		U	350
Pentachlorophenol		U	940		U	830		U	940		U	840
Phenanthrene		U	390		U	340		U	390		U	350
Phenol		U	390		U	340		U	390		U	350
Pyrene		U	390		U	340		U	390		U	350
bis(2-Chloroethoxy)methane		U	390		U	340		U	390		U	350
bis(2-Chloroethyl)ether		U	390		U	340		U	390		U	350
bis(2-Ethylhexyl)phthalate		U	390		U	340		U	390		U	350

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-003-06B			ADS-003-18B			ADS-005-06B			ADS-005-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
METALS/CYANIDE (ug/kg)												
Aluminum	2130			2080			13200			2310		
Antimony		UN	8.9		UN	7.8		UN	8.9		UN	8.3
Arsenic	1.3	BW			U	0.83	13.3	S		1.4	B	
Barium	19.4	B		27.4	B		300			19.7	B	
Beryllium		U	0.23		U	0.2	0.76	B			U	0.21
Cadmium		U	1.1		U	1		U	1.1		U	1.1
Calcium	552	B		883	B		4180			688	B	
Chromium	2	B		2.3			15.5			2.7		
Cobalt		U	1.4	1.3	B		14.1				U	1.3
Copper	1.5	B		1.7	B		21.8			3.3	B	
Cyanide		UN	0.6		UN	0.52		UN	0.59		UN	0.53
Iron	2080			2220			20600			2840		
Lead	2.6			1.6			17.6			1.9		
Magnesium	670	B		727	B		4450			646	B	
Manganese	58.9			62.1			1160			23		
Mercury		U	0.11		U	0.1		U	0.11		U	0.11
Nickel		U	2.3	2.3	B		43.7			2.9	B	
Potassium	551	B		391	B		2330			556	B	
Selenium		UW	0.92		U	0.83		U	0.94		U	0.85
Silver		U	1.4		U	1.2		U	1.4		U	1.3
Sodium	85.2	B		68.8	B		166	B		83.7	B	
Thallium		U	0.46		U	0.42		U	0.47		U	0.42
Vanadium	5.1	B		4.6	B		33.2			5.4	B	
Zinc	11.3			10.6			73.5			9.3		
VOLATILES (VOC) (ug/kg)												
1,1,1-Trichloroethane		U	12		U	10		U	12		U	11
1,1,2,2-Tetrachloroethane		U	12		U	10		U	12		U	11
1,1,2-Trichloroethane		U	12		U	10		U	12		U	11
1,1-Dichloroethane		U	12		U	10		U	12		U	11
1,1-Dichloroethene		U	12		U	10		U	12		U	11
1,2-Dichloroethane		U	12		U	10		U	12		U	11
1,2-Dichloroethene(Total)		U	12		U	10		U	12		U	11
1,2-Dichloropropane		U	12		U	10		U	12		U	11
2-Butanone		U	12		U	10		U	12		U	11

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-003-06B			ADS-003-18B			ADS-005-06B			ADS-005-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)												
2-Hexanone		U	12		U	10		U	12		U	11
4-Methyl-2-pentanone		U	12		U	10		U	12		U	11
Acetone	220	B		90	B		31	B		28	B	
Benzene		U	12		U	10		U	12		U	11
Bromodichloromethane		U	12		U	10		U	12		U	11
Bromoform		U	12		U	10		U	12		U	11
Bromomethane		U	12		U	10		U	12		U	11
Carbon disulfide		U	12		U	10		U	12		U	11
Carbon tetrachloride		U	12		U	10		U	12		U	11
Chlorobenzene		U	12		U	10		U	12		U	11
Chloroethane		U	12		U	10		U	12		U	11
Chloroform		U	12		U	10		U	12		U	11
Chloromethane		U	12		U	10		U	12		U	11
Cis-1,3-Dichloropropene		U	12		U	10		U	12		U	11
Dibromochloromethane		U	12		U	10		U	12		U	11
Ethylbenzene		U	12		U	10		U	12		U	11
Methylene chloride	33	B		22	B		15	B		15	B	
Styrene		U	12		U	10		U	12		U	11
Tetrachloroethene		U	12		U	10		U	12		U	11
Toluene		U	12		U	10		U	12		U	11
Trans-1,3-Dichloropropene		U	12		U	10		U	12		U	11
Trichloroethene		U	12		U	10		U	12		U	11
Vinyl chloride		U	12		U	10		U	12		U	11
Xylenes (Total)		U	12		U	10		U	12		U	11

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-010-03B			ADS-022-06B			ADS-022-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/kg)									
4,4'-DDD		U	4.3		U	4.1	0.47	JP	
4,4'-DDE		U	4.3		U	4.1		U	3.5
4,4'-DDT	0.74	JPB		0.62	JPB		0.8	JPB	
Aldrin	0.11	JPB		0.15	JPB		0.14	JPB	
Alpha chlordane		U	2.2		U	2.1		U	1.8
Alpha-BHC		U	2.2		U	2.1		U	1.8
Beta-BHC		U	2.2		U	2.1		U	1.8
Delta-BHC		U	2.2		U	2.1		U	1.8
Dieldrin	0.46	JPB		0.35	JPB		0.41	JPB	
Endosulfan I		U	2.2		U	2.1		U	1.8
Endosulfan II		U	4.3		U	4.1		U	3.5
Endosulfan sulfate		U	4.3	0.18	JP			U	3.5
Endrin	0.44	JPB		0.19	JPB		0.54	JPB	
Endrin aldehyde		U	4.3		U	4.1		U	3.5
Endrin ketone		U	4.3	0.15	J			U	3.5
Gamma chlordane		U	2.2		U	2.1		U	1.8
Gamma-BHC (Lindane)	0.1	JPB		0.11	JPB		0.1	JPB	
Heptachlor	0.24	JB		0.28	JB		0.24	JB	
Heptachlor epoxide		U	2.2		U	2.1		U	1.8
PCB-1016		U	43		U	41		U	35
PCB-1221		U	88		U	83		U	71
PCB-1232		U	43		U	41		U	35
PCB-1242		U	43		U	41		U	35
PCB-1248		U	43		U	41		U	35
PCB-1254		U	43		U	41		U	35
PCB-1260		U	43		U	41		U	35
Toxaphene		U	220		U	210		U	180
p,p'-Methoxychlor		U	22		U	21		U	18

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-010-03B			ADS-022-06B			ADS-022-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)									
1,2,4-Trichlorobenzene		U	430		U	400		U	350
1,2-Dichlorobenzene		U	430		U	400		U	350
1,3-Dichlorobenzene		U	430		U	400		U	350
1,4-Dichlorobenzene		U	430		U	400		U	350
2,2'-Oxybis(1-chloropropane)		U	430		U	400		U	350
2,4,5-Trichlorophenol		U	1000		U	980		U	840
2,4,6-Trichlorophenol		U	430		U	400		U	350
2,4-Dichlorophenol		U	430		U	400		U	350
2,4-Dimethylphenol		U	430		U	400		U	350
2,4-Dinitrophenol		U	1000		U	980		U	840
2,4-Dinitrotoluene		U	430		U	400		U	350
2,6-Dinitrotoluene		U	430		U	400		U	350
2-Chloronaphthalene		U	430		U	400		U	350
2-Chlorophenol		U	430		U	400		U	350
2-Methylnaphthalene		U	430		U	400		U	350
2-Methylphenol		U	430		U	400		U	350
2-Nitroaniline		U	1000		U	980		U	840
2-Nitrophenol		U	430		U	400		U	350
3,3'-Dichlorobenzidine		U	430		U	400		U	350
3-Nitroaniline		U	1000		U	980		U	840
4,6-Dinitro-2-methylphenol		U	1000		U	980		U	840
4-Bromophenyl phenyl ether		U	430		U	400		U	350
4-Chloro-3-methylphenol		U	430		U	400		U	350
4-Chloroaniline		U	430		U	400		U	350
4-Chlorophenyl phenyl ether		U	430		U	400		U	350
4-Methylphenol		U	430		U	400		U	350
4-Nitroaniline		U	1000		U	980		U	840
4-Nitrophenol		U	1000		U	980		U	840
Acenaphthene		U	430		U	400		U	350
Acenaphthylene		U	430		U	400		U	350
Anthracene		U	430		U	400		U	350
Benzo(a)anthracene		U	430		U	400		U	350
Benzo(a)pyrene		U	430		U	400		U	350
Benzo(b)fluoranthene		U	430		U	400		U	350
Benzo(g,h,i)perylene		U	430		U	400		U	350

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-010-03B			ADS-022-06B			ADS-022-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)									
Benzo(k)fluoranthene		U	430		U	400		U	350
Butyl benzyl phthalate		U	430		U	400		U	350
Carbazole		U	430		U	400		U	350
Chrysene		U	430		U	400		U	350
Di-n-butyl phthalate	94	J			U	400		U	350
Di-n-octyl phthalate		U	430		U	400		U	350
Dibenzo(a,h)anthracene		U	430		U	400		U	350
Dibenzofuran		U	430		U	400		U	350
Diethyl phthalate		U	430		U	400		U	350
Dimethyl phthalate		U	430		U	400		U	350
Fluoranthene		U	430		U	400		U	350
Fluorene		U	430		U	400		U	350
Hexachlorobenzene		U	430		U	400		U	350
Hexachlorobutadiene		U	430		U	400		U	350
Hexachlorocyclopentadiene		U	430		U	400		U	350
Hexachloroethane		U	430		U	400		U	350
Indeno(1,2,3-cd)pyrene		U	430		U	400		U	350
Isophorone		U	430		U	400		U	350
N-Nitroso-di-n-propylamine		U	430		U	400		U	350
N-Nitrosodiphenylamine(1)		U	430		U	400		U	350
Naphthalene		U	430		U	400		U	350
Nitrobenzene		U	430		U	400		U	350
Pentachlorophenol		U	1000		U	980		U	840
Phenanthrene		U	430		U	400		U	350
Phenol		U	430		U	400		U	350
Pyrene		U	430		U	400		U	350
bis(2-Chloroethoxy)methane		U	430		U	400		U	350
bis(2-Chloroethyl)ether		U	430		U	400		U	350
bis(2-Ethylhexyl)phthalate	47	J		46	J			U	350

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-010-03B			ADS-022-06B			ADS-022-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
METALS/CYANIDE (ug/kg)									
Aluminum	16700			11500			1310		
Antimony		UN	10.2		UN	9.7		UN	8
Arsenic	10.8			9.1			0.94	BW	
Barium	333			266			15.2	B	
Beryllium	0.96	B		0.71	B			U	0.21
Cadmium		U	1.3		U	1.2		U	1
Calcium	5130			5040			471	B	
Chromium	20.1			14.8			2.7		
Cobalt	11.9	B		12.2	B			U	1.2
Copper	22.2			18.7			1.1	B	
Cyanide		UN	0.66		UN	0.62		UN	0.53
Iron	22600			18300			1340		
Lead	17.8			19.4	S		1.8		
Magnesium	5380			4690			446	B	
Manganese	740			794			35.1		
Mercury		U	0.13		U	0.12		U	0.11
Nickel	30.2			28				U	2.1
Potassium	2800			2260			338	B	
Selenium		U	1.1		U	2		UW	0.85
Silver		U	1.6		U	1.5		U	1.2
Sodium	235	B		239	B		103	B	
Thallium		U	0.53		UW	0.5		U	0.42
Vanadium	44.1			30.8			2.9	B	
Zinc	79.6			69.6			7.4		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	13		U	12		U	11
1,1,2,2-Tetrachloroethane		U	13		U	12		U	11
1,1,2-Trichloroethane		U	13		U	12		U	11
1,1-Dichloroethane		U	13		U	12		U	11
1,1-Dichloroethene		U	13		U	12		U	11
1,2-Dichloroethane		U	13		U	12		U	11
1,2-Dichloroethene(Total)		U	13		U	12		U	11
1,2-Dichloropropane		U	13		U	12		U	11
2-Butanone		U	13		U	12		U	11

Appendix D-4 Analytical Data of Administration Area Unsaturated Soil Samples

	ADS-010-03B			ADS-022-06B			ADS-022-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
2-Hexanone		U	13		U	12		U	11
4-Methyl-2-pentanone		U	13		U	12		U	11
Acetone	87	B		100	B		97	B	
Benzene		U	13		U	12		U	11
Bromodichloromethane		U	13		U	12		U	11
Bromoform		U	13		U	12		U	11
Bromomethane		U	13		U	12		U	11
Carbon disulfide		U	13		U	12		U	11
Carbon tetrachloride		U	13		U	12		U	11
Chlorobenzene		U	13		U	12		U	11
Chloroethane		U	13		U	12		U	11
Chloroform		U	13		U	12		U	11
Chloromethane		U	13		U	12		U	11
Cis-1,3-Dichloropropene		U	13		U	12		U	11
Dibromochloromethane		U	13		U	12		U	11
Ethylbenzene		U	13		U	12		U	11
Methylene chloride	49	B		45	B		24	B	
Styrene		U	13		U	12		U	11
Tetrachloroethene		U	13		U	12		U	11
Toluene		U	13		U	12		U	11
Trans-1,3-Dichloropropene		U	13		U	12		U	11
Trichloroethene		U	13		U	12		U	11
Vinyl chloride		U	13		U	12		U	11
Xylenes (Total)		U	13		U	12		U	11

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-006-06B			ATL-006-18B			ATL-026-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	10		U	12
1,1,2,2-Tetrachloroethane		U	11		U	10		U	12
1,1,2-Trichloroethane		U	11		U	10		U	12
1,1-Dichloroethane		U	11		U	10		U	12
1,1-Dichloroethene		U	11		U	10		U	12
1,2-Dichloroethane		U	11		U	10		U	12
1,2-Dichloroethene(Total)		U	11		U	10		U	12
1,2-Dichloropropane		U	11		U	10		U	12
2-Butanone		U	11		U	10		U	12
2-Hexanone		U	11		U	10		U	12
4-Methyl-2-pentanone		U	11		U	10		U	12
Acetone	9	BJ		14	B			U	12
Benzene	2	BJ		2	BJ			U	12
Bromodichloromethane		U	11		U	10		U	12
Bromoform		U	11		U	10		U	12
Bromomethane		U	11		U	10		U	12
Carbon disulfide		U	11		U	10		U	12
Carbon tetrachloride		U	11		U	10		U	12
Chlorobenzene		U	11		U	10		U	12
Chloroethane		U	11		U	10		U	12
Chloroform		U	11		U	10		U	12
Chloromethane		U	11		U	10		U	12
Cis-1,3-Dichloropropene		U	11		U	10		U	12
Dibromochloromethane		U	11		U	10		U	12
Ethylbenzene		U	11		U	10		U	12
Methylene chloride	16	B		14	B		33	B	
Styrene		U	11		U	10		U	12
Tetrachloroethene		U	11		U	10		U	12
Toluene		U	11		U	10		U	12
Trans-1,3-Dichloropropene		U	11		U	10		U	12
Trichloroethene		U	11		U	10		U	12
Vinyl chloride		U	11		U	10		U	12
Xylenes (Total)		U	11		U	10		U	12

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-031-06B			ATL-037-06B			ATL-048-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	10
1,1,2,2-Tetrachloroethane		U	12		U	12		U	10
1,1,2-Trichloroethane		U	12		U	12		U	10
1,1-Dichloroethane		U	12		U	12		U	10
1,1-Dichloroethene		U	12		U	12		U	10
1,2-Dichloroethane		U	12		U	12		U	10
1,2-Dichloroethene(Total)		U	12		U	12		U	10
1,2-Dichloropropane		U	12		U	12		U	10
2-Butanone		U	12		U	12		U	10
2-Hexanone		U	12		U	12		U	10
4-Methyl-2-pentanone		U	12		U	12		U	10
Acetone	14			14	B			U	10
Benzene		U	12	2	BJ			U	10
Bromodichloromethane		U	12		U	12		U	10
Bromoform		U	12		U	12		U	10
Bromomethane		U	12		U	12		U	10
Carbon disulfide		U	12		U	12		U	10
Carbon tetrachloride		U	12		U	12		U	10
Chlorobenzene		U	12		U	12		U	10
Chloroethane		U	12		U	12		U	10
Chloroform		U	12		U	12		U	10
Chloromethane		U	12		U	12		U	10
Cis-1,3-Dichloropropene		U	12		U	12		U	10
Dibromochloromethane		U	12		U	12		U	10
Ethylbenzene		U	12		U	12		U	10
Methylene chloride	25	B		38	B		24	B	
Styrene		U	12		U	12		U	10
Tetrachloroethene		U	12		U	12		U	10
Toluene		U	12		U	12		U	10
Trans-1,3-Dichloropropene		U	12		U	12		U	10
Trichloroethene		U	12		U	12		U	10
Vinyl chloride		U	12		U	12		U	10
Xylenes (Total)		U	12		U	12		U	10

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-048-18B			ATL-058-06B			ATL-058-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	12		U	10
1,1,2,2-Tetrachloroethane		U	11		U	12		U	10
1,1,2-Trichloroethane		U	11		U	12		U	10
1,1-Dichloroethane		U	11		U	12		U	10
1,1-Dichloroethene		U	11		U	12		U	10
1,2-Dichloroethane		U	11		U	12		U	10
1,2-Dichloroethene(Total)		U	11		U	12		U	10
1,2-Dichloropropane		U	11		U	12		U	10
2-Butanone		U	11		U	12		U	10
2-Hexanone		U	11		U	12		U	10
4-Methyl-2-pentanone		U	11		U	12		U	10
Acetone	67	B		26	B			U	10
Benzene		U	11		U	12		U	10
Bromodichloromethane		U	11		U	12		U	10
Bromoform		U	11		U	12		U	10
Bromomethane		U	11		U	12		U	10
Carbon disulfide		U	11		U	12		U	10
Carbon tetrachloride		U	11		U	12		U	10
Chlorobenzene		U	11		U	12		U	10
Chloroethane		U	11		U	12		U	10
Chloroform		U	11		U	12		U	10
Chloromethane		U	11		U	12		U	10
Cis-1,3-Dichloropropene		U	11		U	12		U	10
Dibromochloromethane		U	11		U	12		U	10
Ethylbenzene		U	11		U	12		U	10
Methylene chloride	25	B		30	B		12	B	
Styrene		U	11		U	12		U	10
Tetrachloroethene		U	11		U	12		U	10
Toluene		U	11		U	12		U	10
Trans-1,3-Dichloropropene		U	11		U	12		U	10
Trichloroethene		U	11		U	12		U	10
Vinyl chloride		U	11		U	12		U	10
Xylenes (Total)		U	11		U	12		U	10

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-059-06B			ATL-059-18B			ATL-060-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	13		U	10
1,1,2,2-Tetrachloroethane		U	12		U	13		U	10
1,1,2-Trichloroethane		U	12		U	13		U	10
1,1-Dichloroethane		U	12		U	13		U	10
1,1-Dichloroethene		U	12		U	13		U	10
1,2-Dichloroethane		U	12		U	13		U	10
1,2-Dichloroethene(Total)		U	12		U	13		U	10
1,2-Dichloropropane		U	12		U	13		U	10
2-Butanone		U	12		U	13		U	10
2-Hexanone		U	12		U	13		U	10
4-Methyl-2-pentanone		U	12		U	13		U	10
Acetone		U	12	50				U	10
Benzene		U	12		U	13		U	10
Bromodichloromethane		U	12		U	13		U	10
Bromoform		U	12		U	13		U	10
Bromomethane		U	12		U	13		U	10
Carbon disulfide		U	12		U	13		U	10
Carbon tetrachloride		U	12		U	13		U	10
Chlorobenzene		U	12		U	13		U	10
Chloroethane		U	12		U	13		U	10
Chloroform		U	12		U	13		U	10
Chloromethane		U	12		U	13		U	10
Cis-1,3-Dichloropropene		U	12		U	13		U	10
Dibromochloromethane		U	12		U	13		U	10
Ethylbenzene		U	12		U	13		U	10
Methylene chloride	16	B		42	B		14	B	
Styrene		U	12		U	13		U	10
Tetrachloroethene		U	12		U	13		U	10
Toluene		U	12		U	13		U	10
Trans-1,3-Dichloropropene		U	12		U	13		U	10
Trichloroethene	4	J		4	J			U	10
Vinyl chloride		U	12		U	13		U	10
Xylenes (Total)		U	12		U	13		U	10

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-063-06B			ATL-063-18B			ATL-065-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	10		U	12
1,1,2,2-Tetrachloroethane		U	12		U	10		U	12
1,1,2-Trichloroethane		U	12		U	10		U	12
1,1-Dichloroethane		U	12		U	10		U	12
1,1-Dichloroethene		U	12		U	10		U	12
1,2-Dichloroethane		U	12		U	10		U	12
1,2-Dichloroethene(Total)		U	12		U	10		U	12
1,2-Dichloropropane		U	12		U	10		U	12
2-Butanone		U	12		U	10		U	12
2-Hexanone		U	12		U	10		U	12
4-Methyl-2-pentanone		U	12		U	10		U	12
Acetone	78			18	B		13	B	
Benzene		U	12	2	BJ		2	BJ	
Bromodichloromethane		U	12		U	10		U	12
Bromoform		U	12		U	10		U	12
Bromomethane		U	12		U	10		U	12
Carbon disulfide		U	12		U	10		U	12
Carbon tetrachloride		U	12		U	10		U	12
Chlorobenzene		U	12		U	10		U	12
Chloroethane		U	12		U	10		U	12
Chloroform		U	12		U	10		U	12
Chloromethane		U	12		U	10		U	12
Cis-1,3-Dichloropropene		U	12		U	10		U	12
Dibromochloromethane		U	12		U	10		U	12
Ethylbenzene		U	12		U	10		U	12
Methylene chloride	36	B		15	B		23	B	
Styrene		U	12		U	10		U	12
Tetrachloroethene		U	12		U	10		U	12
Toluene		U	12		U	10		U	12
Trans-1,3-Dichloropropene		U	12		U	10		U	12
Trichloroethene		U	12		U	10		U	12
Vinyl chloride		U	12		U	10		U	12
Xylenes (Total)		U	12		U	10		U	12

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-065-22B			ATL-083-06B			ATL-083-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	10		U	12		U	11
1,1,2,2-Tetrachloroethane		U	10		U	12		U	11
1,1,2-Trichloroethane		U	10		U	12		U	11
1,1-Dichloroethane		U	10		U	12		U	11
1,1-Dichloroethene		U	10		U	12		U	11
1,2-Dichloroethane		U	10		U	12		U	11
1,2-Dichloroethene(Total)		U	10		U	12		U	11
1,2-Dichloropropane		U	10		U	12		U	11
2-Butanone		U	10		U	12		U	11
2-Hexanone		U	10		U	12		U	11
4-Methyl-2-pentanone		U	10		U	12		U	11
Acetone	22	B		21	B		9	BJ	
Benzene	2	BJ		2	BJ		2	BJ	
Bromodichloromethane		U	10		U	12		U	11
Bromoform		U	10		U	12		U	11
Bromomethane		U	10		U	12		U	11
Carbon disulfide		U	10		U	12		U	11
Carbon tetrachloride		U	10		U	12		U	11
Chlorobenzene		U	10		U	12		U	11
Chloroethane		U	10		U	12		U	11
Chloroform		U	10		U	12		U	11
Chloromethane		U	10		U	12		U	11
Cis-1,3-Dichloropropene		U	10		U	12		U	11
Dibromochloromethane		U	10		U	12		U	11
Ethylbenzene		U	10		U	12		U	11
Methylene chloride	16	B		14	B		18	B	
Styrene		U	10		U	12		U	11
Tetrachloroethene		U	10		U	12		U	11
Toluene		U	10		U	12		U	11
Trans-1,3-Dichloropropene		U	10		U	12		U	11
Trichloroethene		U	10		U	12		U	11
Vinyl chloride		U	10		U	12		U	11
Xylenes (Total)		U	10		U	12		U	11

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-086-06B			ATL-086-18B			ATL-086-18B-RE		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	13		U	11		U	19
1,1,2,2-Tetrachloroethane		U	13		U	11		U	19
1,1,2-Trichloroethane		U	13		U	11		U	19
1,1-Dichloroethane		U	13		U	11		U	19
1,1-Dichloroethene		U	13		U	11		U	19
1,2-Dichloroethane		U	13		U	11		U	19
1,2-Dichloroethene(Total)		U	13		U	11		U	19
1,2-Dichloropropane		U	13		U	11		U	19
2-Butanone		U	13		U	11		U	19
2-Hexanone		U	13		U	11		U	19
4-Methyl-2-pentanone		U	13		U	11		U	19
Acetone	33			300	E		220	B	
Benzene		U	13		U	11		U	19
Bromodichloromethane		U	13		U	11		U	19
Bromoform		U	13		U	11		U	19
Bromomethane		U	13		U	11		U	19
Carbon disulfide		U	13		U	11		U	19
Carbon tetrachloride		U	13		U	11		U	19
Chlorobenzene		U	13		U	11		U	19
Chloroethane		U	13		U	11		U	19
Chloroform		U	13		U	11		U	19
Chloromethane		U	13		U	11		U	19
Cis-1,3-Dichloropropene		U	13		U	11		U	19
Dibromochloromethane		U	13		U	11		U	19
Ethylbenzene		U	13		U	11		U	19
Methylene chloride	44	B		29	B		82	B	
Styrene		U	13		U	11		U	19
Tetrachloroethene		U	13		U	11		U	19
Toluene		U	13		U	11		U	19
Trans-1,3-Dichloropropene		U	13		U	11		U	19
Trichloroethene		U	13		U	11		U	19
Vinyl chloride		U	13		U	11		U	19
Xylenes (Total)		U	13		U	11		U	19

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-099-22B			ATL-105-24B			ATL-113-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	10		U	10		U	12
1,1,2,2-Tetrachloroethane		U	10		U	10		U	12
1,1,2-Trichloroethane		U	10		U	10		U	12
1,1-Dichloroethane		U	10		U	10		U	12
1,1-Dichloroethene		U	10		U	10		U	12
1,2-Dichloroethane		U	10		U	10		U	12
1,2-Dichloroethene(Total)		U	10		U	10		U	12
1,2-Dichloropropane		U	10		U	10		U	12
2-Butanone		U	10		U	10		U	12
2-Hexanone		U	10		U	10		U	12
4-Methyl-2-pentanone		U	10		U	10		U	12
Acetone	14	B		15	B		63		
Benzene	2	BJ		2	BJ			U	12
Bromodichloromethane		U	10		U	10		U	12
Bromoform		U	10		U	10		U	12
Bromomethane		U	10		U	10		U	12
Carbon disulfide		U	10		U	10		U	12
Carbon tetrachloride		U	10		U	10		U	12
Chlorobenzene		U	10		U	10		U	12
Chloroethane		U	10		U	10		U	12
Chloroform		U	10		U	10		U	12
Chloromethane		U	10		U	10		U	12
Cis-1,3-Dichloropropene		U	10		U	10		U	12
Dibromochloromethane		U	10		U	10		U	12
Ethylbenzene		U	10		U	10		U	12
Methylene chloride	34	B		20	B		34	B	
Styrene		U	10		U	10		U	12
Tetrachloroethene		U	10		U	10		U	12
Toluene		U	10		U	10		U	12
Trans-1,3-Dichloropropene		U	10		U	10		U	12
Trichloroethene		U	10		U	10		U	12
Vinyl chloride		U	10		U	10		U	12
Xylenes (Total)		U	10		U	10		U	12

Appendix D-5 Analytical Data of Atlas Missile Area Unsaturated Soil Samples

	ATL-113-18B		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)			
1,1,1-Trichloroethane		U	10
1,1,2,2-Tetrachloroethane		U	10
1,1,2-Trichloroethane		U	10
1,1-Dichloroethane		U	10
1,1-Dichloroethene		U	10
1,2-Dichloroethane		U	10
1,2-Dichloroethene(Total)		U	10
1,2-Dichloropropane		U	10
2-Butanone		U	10
2-Hexanone		U	10
4-Methyl-2-pentanone		U	10
Acetone	130		
Benzene		U	10
Bromodichloromethane		U	10
Bromoform		U	10
Bromomethane		U	10
Carbon disulfide		U	10
Carbon tetrachloride		U	10
Chlorobenzene		U	10
Chloroethane		U	10
Chloroform		U	10
Chloromethane		U	10
Cis-1,3-Dichloropropene		U	10
Dibromochloromethane		U	10
Ethylbenzene		U	10
Methylene chloride	17	B	
Styrene		U	10
Tetrachloroethene		U	10
Toluene		U	10
Trans-1,3-Dichloropropene		U	10
Trichloroethene		U	10
Vinyl chloride		U	10
Xylenes (Total)		U	10

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-002-06B			LL1-002-18B			LL1-012-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	13		U	10		U	13
1,1,2,2-Tetrachloroethane		U	13		U	10		U	13
1,1,2-Trichloroethane		U	13		U	10		U	13
1,1-Dichloroethane		U	13		U	10		U	13
1,1-Dichloroethene		U	13		U	10		U	13
1,2-Dichloroethane		U	13		U	10		U	13
1,2-Dichloroethene(Total)		U	13		U	10		U	13
1,2-Dichloropropane		U	13		U	10		U	13
2-Butanone		U	13		U	10		U	13
2-Hexanone		U	13		U	10		U	13
4-Methyl-2-pentanone		U	13		U	10		U	13
Acetone	31	B		40			25	B	
Benzene		U	13		U	10		U	13
Bromodichloromethane		U	13		U	10		U	13
Bromoform		U	13		U	10		U	13
Bromomethane		U	13		U	10		U	13
Carbon disulfide		U	13		U	10		U	13
Carbon tetrachloride		U	13		U	10		U	13
Chlorobenzene		U	13		U	10		U	13
Chloroethane		U	13		U	10		U	13
Chloroform		U	13		U	10		U	13
Chloromethane		U	13		U	10		U	13
Cis-1,3-Dichloropropene		U	13		U	10		U	13
Dibromochloromethane		U	13		U	10		U	13
Ethylbenzene		U	13		U	10		U	13
Methylene chloride	48	B		42	B		52	B	
Styrene		U	13		U	10		U	13
Tetrachloroethene		U	13		U	10		U	13
Toluene		U	13		U	10		U	13
Trans-1,3-Dichloropropene		U	13		U	10		U	13
Trichloroethene		U	13		U	10		U	13
Vinyl chloride		U	13		U	10		U	13
Xylenes (Total)		U	13		U	10		U	13

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-027-06B			LL1-031-06B			LL1-039-19B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	10
1,1,2,2-Tetrachloroethane		U	11		U	11		U	10
1,1,2-Trichloroethane		U	11		U	11		U	10
1,1-Dichloroethane		U	11		U	11		U	10
1,1-Dichloroethene		U	11		U	11		U	10
1,2-Dichloroethane		U	11		U	11		U	10
1,2-Dichloroethene(Total)		U	11		U	11		U	10
1,2-Dichloropropane		U	11		U	11		U	10
2-Butanone		U	11		U	11		U	10
2-Hexanone		U	11		U	11		U	10
4-Methyl-2-pentanone		U	11		U	11		U	10
Acetone	28			32				U	10
Benzene		U	11		U	11		U	10
Bromodichloromethane		U	11		U	11		U	10
Bromoform		U	11		U	11		U	10
Bromomethane		U	11		U	11		U	10
Carbon disulfide		U	11		U	11		U	10
Carbon tetrachloride		U	11		U	11		U	10
Chlorobenzene		U	11		U	11		U	10
Chloroethane		U	11		U	11		U	10
Chloroform		U	11		U	11		U	10
Chloromethane		U	11		U	11		U	10
Cis-1,3-Dichloropropene		U	11		U	11		U	10
Dibromochloromethane		U	11		U	11		U	10
Ethylbenzene		U	11		U	11		U	10
Methylene chloride	47	B		21	B		21	B	
Styrene		U	11		U	11		U	10
Tetrachloroethene		U	11		U	11		U	10
Toluene		U	11		U	11		U	10
Trans-1,3-Dichloropropene		U	11		U	11		U	10
Trichloroethene		U	11		U	11		U	10
Vinyl chloride		U	11		U	11		U	10
Xylenes (Total)		U	11		U	11		U	10

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-047-06B			LL1-047-17B			LL1-048-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	13
1,1,2,2-Tetrachloroethane		U	11		U	11		U	13
1,1,2-Trichloroethane		U	11		U	11		U	13
1,1-Dichloroethane		U	11		U	11		U	13
1,1-Dichloroethene		U	11		U	11		U	13
1,2-Dichloroethane		U	11		U	11		U	13
1,2-Dichloroethene(Total)		U	11		U	11		U	13
1,2-Dichloropropane		U	11		U	11		U	13
2-Butanone		U	11		U	11		U	13
2-Hexanone		U	11		U	11		U	13
4-Methyl-2-pentanone		U	11		U	11		U	13
Acetone	37	B		42	B		56	B	
Benzene	2	BJ		2	BJ		3	BJ	
Bromodichloromethane		U	11		U	11		U	13
Bromoform		U	11		U	11		U	13
Bromomethane		U	11		U	11		U	13
Carbon disulfide		U	11		U	11		U	13
Carbon tetrachloride		U	11		U	11		U	13
Chlorobenzene		U	11		U	11		U	13
Chloroethane		U	11		U	11		U	13
Chloroform		U	11		U	11		U	13
Chloromethane		U	11		U	11		U	13
Cis-1,3-Dichloropropene		U	11		U	11		U	13
Dibromochloromethane		U	11		U	11		U	13
Ethylbenzene		U	11		U	11		U	13
Methylene chloride	35	B		30	B		26	B	
Styrene		U	11		U	11		U	13
Tetrachloroethene		U	11		U	11		U	13
Toluene		U	11		U	11		U	13
Trans-1,3-Dichloropropene		U	11		U	11		U	13
Trichloroethene		U	11		U	11	10	J	
Vinyl chloride		U	11		U	11		U	13
Xylenes (Total)		U	11		U	11		U	13

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-048-16B			LL1-054-06B			LL1-055-15B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	12		U	11
1,1,2,2-Tetrachloroethane		U	11		U	12		U	11
1,1,2-Trichloroethane		U	11		U	12		U	11
1,1-Dichloroethane		U	11		U	12		U	11
1,1-Dichloroethene		U	11		U	12		U	11
1,2-Dichloroethane		U	11		U	12		U	11
1,2-Dichloroethene(Total)		U	11		U	12		U	11
1,2-Dichloropropane		U	11		U	12		U	11
2-Butanone		U	11		U	12		U	11
2-Hexanone		U	11		U	12		U	11
4-Methyl-2-pentanone		U	11		U	12		U	11
Acetone	53			16			44		
Benzene		U	11		U	12		U	11
Bromodichloromethane		U	11		U	12		U	11
Bromoform		U	11		U	12		U	11
Bromomethane		U	11		U	12		U	11
Carbon disulfide		U	11		U	12		U	11
Carbon tetrachloride		U	11		U	12		U	11
Chlorobenzene		U	11		U	12		U	11
Chloroethane		U	11		U	12		U	11
Chloroform		U	11		U	12		U	11
Chloromethane		U	11		U	12		U	11
Cis-1,3-Dichloropropene		U	11		U	12		U	11
Dibromochloromethane		U	11		U	12		U	11
Ethylbenzene		U	11		U	12		U	11
Methylene chloride	61	B		25	B		20	B	
Styrene		U	11		U	12		U	11
Tetrachloroethene		U	11		U	12		U	11
Toluene		U	11		U	12		U	11
Trans-1,3-Dichloropropene		U	11		U	12		U	11
Trichloroethene		U	11	10	J			U	11
Vinyl chloride		U	11		U	12		U	11
Xylenes (Total)		U	11		U	12		U	11

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-061-06B			LL1-068-18B			LL1-069-15B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	10
1,1,2,2-Tetrachloroethane		U	11		U	11		U	10
1,1,2-Trichloroethane		U	11		U	11		U	10
1,1-Dichloroethane		U	11		U	11		U	10
1,1-Dichloroethene		U	11		U	11		U	10
1,2-Dichloroethane		U	11		U	11		U	10
1,2-Dichloroethene(Total)		U	11		U	11		U	10
1,2-Dichloropropane		U	11		U	11		U	10
2-Butanone		U	11		U	11		U	10
2-Hexanone		U	11		U	11		U	10
4-Methyl-2-pentanone		U	11		U	11		U	10
Acetone	17	B		21			12		
Benzene		U	11		U	11		U	10
Bromodichloromethane		U	11		U	11		U	10
Bromoform		U	11		U	11		U	10
Bromomethane		U	11		U	11		U	10
Carbon disulfide		U	11		U	11		U	10
Carbon tetrachloride		U	11		U	11		U	10
Chlorobenzene		U	11		U	11		U	10
Chloroethane		U	11		U	11		U	10
Chloroform		U	11		U	11		U	10
Chloromethane		U	11		U	11		U	10
Cis-1,3-Dichloropropene		U	11		U	11		U	10
Dibromochloromethane		U	11		U	11		U	10
Ethylbenzene		U	11		U	11		U	10
Methylene chloride	25	B		15	B		14	B	
Styrene		U	11		U	11		U	10
Tetrachloroethene		U	11		U	11		U	10
Toluene		U	11		U	11		U	10
Trans-1,3-Dichloropropene		U	11		U	11		U	10
Trichloroethene		U	11		U	11		U	10
Vinyl chloride		U	11		U	11		U	10
Xylenes (Total)		U	11		U	11		U	10

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-069-17B			LL1-075-06B			LL1-075-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	10		U	11		U	10
1,1,2,2-Tetrachloroethane		U	10		U	11		U	10
1,1,2-Trichloroethane		U	10		U	11		U	10
1,1-Dichloroethane		U	10		U	11		U	10
1,1-Dichloroethene		U	10		U	11		U	10
1,2-Dichloroethane		U	10		U	11		U	10
1,2-Dichloroethene(Total)		U	10		U	11		U	10
1,2-Dichloropropane		U	10		U	11		U	10
2-Butanone		U	10		U	11		U	10
2-Hexanone		U	10		U	11		U	10
4-Methyl-2-pentanone		U	10		U	11		U	10
Acetone		U	10		U	11	12		
Benzene		U	10		U	11		U	10
Bromodichloromethane		U	10		U	11		U	10
Bromoform		U	10		U	11		U	10
Bromomethane		U	10		U	11		U	10
Carbon disulfide		U	10		U	11		U	10
Carbon tetrachloride		U	10		U	11		U	10
Chlorobenzene		U	10		U	11		U	10
Chloroethane		U	10		U	11		U	10
Chloroform		U	10		U	11		U	10
Chloromethane		U	10		U	11		U	10
Cis-1,3-Dichloropropene		U	10		U	11		U	10
Dibromochloromethane		U	10		U	11		U	10
Ethylbenzene		U	10		U	11		U	10
Methylene chloride	8	BJ		9	BJ		16	B	
Styrene		U	10		U	11		U	10
Tetrachloroethene		U	10		U	11		U	10
Toluene		U	10		U	11		U	10
Trans-1,3-Dichloropropene		U	10		U	11		U	10
Trichloroethene		U	10		U	11		U	10
Vinyl chloride		U	10		U	11		U	10
Xylenes (Total)		U	10		U	11		U	10

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-080-17B			LL1-083-06B			LL1-094-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	10		U	12		U	12
1,1,2,2-Tetrachloroethane		U	10		U	12		U	12
1,1,2-Trichloroethane		U	10		U	12		U	12
1,1-Dichloroethane		U	10		U	12		U	12
1,1-Dichloroethene		U	10		U	12		U	12
1,2-Dichloroethane		U	10		U	12		U	12
1,2-Dichloroethene(Total)		U	10		U	12		U	12
1,2-Dichloropropane		U	10		U	12		U	12
2-Butanone		U	10		U	12		U	12
2-Hexanone		U	10		U	12		U	12
4-Methyl-2-pentanone		U	10		U	12		U	12
Acetone	12			7	J		17		
Benzene		U	10		U	12		U	12
Bromodichloromethane		U	10		U	12		U	12
Bromoform		U	10		U	12		U	12
Bromomethane		U	10		U	12		U	12
Carbon disulfide		U	10		U	12		U	12
Carbon tetrachloride		U	10		U	12		U	12
Chlorobenzene		U	10		U	12		U	12
Chloroethane		U	10		U	12		U	12
Chloroform		U	10		U	12		U	12
Chloromethane		U	10		U	12		U	12
Cis-1,3-Dichloropropene		U	10		U	12		U	12
Dibromochloromethane		U	10		U	12		U	12
Ethylbenzene		U	10		U	12		U	12
Methylene chloride	8	BJ		11	BJ		12	B	
Styrene		U	10		U	12		U	12
Tetrachloroethene		U	10		U	12		U	12
Toluene		U	10		U	12		U	12
Trans-1,3-Dichloropropene		U	10		U	12		U	12
Trichloroethene		U	10		U	12		U	12
Vinyl chloride		U	10		U	12		U	12
Xylenes (Total)		U	10		U	12		U	12

Appendix D-6 Analytical Data of Load Line 1 Unsaturated Soil Samples

	LL1-094-18B		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)			
1,1,1-Trichloroethane		U	10
1,1,2,2-Tetrachloroethane		U	10
1,1,2-Trichloroethane		U	10
1,1-Dichloroethane		U	10
1,1-Dichloroethene		U	10
1,2-Dichloroethane		U	10
1,2-Dichloroethene(Total)		U	10
1,2-Dichloropropane		U	10
2-Butanone		U	10
2-Hexanone		U	10
4-Methyl-2-pentanone		U	10
Acetone	9	J	
Benzene		U	10
Bromodichloromethane		U	10
Bromoform		U	10
Bromomethane		U	10
Carbon disulfide		U	10
Carbon tetrachloride		U	10
Chlorobenzene		U	10
Chloroethane		U	10
Chloroform		U	10
Chloromethane		U	10
Cis-1,3-Dichloropropene		U	10
Dibromochloromethane		U	10
Ethylbenzene		U	10
Methylene chloride	7	BJ	
Styrene		U	10
Tetrachloroethene		U	10
Toluene		U	10
Trans-1,3-Dichloropropene		U	10
Trichloroethene		U	10
Vinyl chloride		U	10
Xylenes (Total)		U	10

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWA-040-104			MWB-040-059			MWC-040-052		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)	377			80.3			206		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	12
1,1,2,2-Tetrachloroethane		U	11		U	11		U	12
1,1,2-Trichloroethane		U	11		U	11		U	12
1,1-Dichloroethane		U	11		U	11		U	12
1,1-Dichloroethene		U	11		U	11		U	12
1,2-Dichloroethane		U	11		U	11		U	12
1,2-Dichloroethene(Total)		U	11		U	11		U	12
1,2-Dichloropropane		U	11		U	11		U	12
2-Butanone		U	11		U	11	5	BJ	
2-Hexanone		U	11		U	11		U	12
4-Methyl-2-pentanone		U	11		U	11		U	12
Acetone	110			120			280	E	
Benzene		U	11		U	11		U	12
Bromodichloromethane		U	11		U	11		U	12
Bromoform		U	11		U	11		U	12
Bromomethane		U	11		U	11		U	12
Carbon disulfide		U	11		U	11		U	12
Carbon tetrachloride		U	11		U	11		U	12
Chlorobenzene		U	11		U	11		U	12
Chloroethane		U	11		U	11		U	12
Chloroform		U	11		U	11		U	12
Chloromethane		U	11		U	11		U	12
Cis-1,3-Dichloropropene		U	11		U	11		U	12
Dibromochloromethane		U	11		U	11		U	12
Ethylbenzene		U	11		U	11		U	12
Methylene chloride	29	B		41	B		27	B	
Styrene		U	11		U	11		U	12
Tetrachloroethene		U	11		U	11		U	12
Toluene		U	11		U	11		U	12
Trans-1,3-Dichloropropene		U	11		U	11		U	12
Trichloroethene		U	11	1	J			U	12
Vinyl chloride		U	11		U	11		U	12
Xylenes (Total)		U	11		U	11		U	12

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWC-040-052-RE			MWA-043-099			MWB-043-047		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		NA			U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		NA			U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		NA			U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		NA			U	1		U	1
2-Nitrotoluene (2NT)		NA			U	1		U	1
3-Nitrotoluene (3NT)		NA			U	1		U	1
4-Nitrotoluene (4NT)		NA			U	1		U	1
RDX		NA			U	0.5		U	0.5
Tetryl		NA			U	1		U	1
Nitrobenzene (NB)		NA			U	0.5		U	0.5
HMX		NA			U	0.5		U	0.5
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)		NA		142			364		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	20		U	13		U	12
1,1,2,2-Tetrachloroethane		U	20		U	13		U	12
1,1,2-Trichloroethane		U	20		U	13		U	12
1,1-Dichloroethane		U	20		U	13		U	12
1,1-Dichloroethene		U	20		U	13		U	12
1,2-Dichloroethane		U	20		U	13		U	12
1,2-Dichloroethene(Total)		U	20		U	13		U	12
1,2-Dichloropropane		U	20		U	13		U	12
2-Butanone		U	20		U	13		U	12
2-Hexanone		U	20		U	13		U	12
4-Methyl-2-pentanone		U	20		U	13		U	12
Acetone	160	B		75	B		61	B	
Benzene		U	20		U	13		U	12
Bromodichloromethane		U	20		U	13		U	12
Bromoform		U	20		U	13		U	12
Bromomethane		U	20		U	13		U	12
Carbon disulfide		U	20		U	13		U	12
Carbon tetrachloride		U	20		U	13		U	12
Chlorobenzene		U	20		U	13		U	12
Chloroethane		U	20		U	13		U	12
Chloroform		U	20		U	13		U	12
Chloromethane		U	20		U	13		U	12
Cis-1,3-Dichloropropene		U	20		U	13		U	12
Dibromochloromethane		U	20		U	13		U	12
Ethylbenzene		U	20		U	13		U	12
Methylene chloride	28	B		55	B		16	B	
Styrene		U	20		U	13		U	12
Tetrachloroethene		U	20		U	13		U	12
Toluene		U	20		U	13		U	12
Trans-1,3-Dichloropropene		U	20		U	13		U	12
Trichloroethene		U	20		U	13		U	12
Vinyl chloride		U	20		U	13		U	12
Xylenes (Total)		U	20		U	13		U	12

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWC-043-041			MWD-043-105			MWA-044-035		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)	536			317			272		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	12
1,1,2,2-Tetrachloroethane		U	12		U	12		U	12
1,1,2-Trichloroethane		U	12		U	12		U	12
1,1-Dichloroethane		U	12		U	12		U	12
1,1-Dichloroethene		U	12		U	12		U	12
1,2-Dichloroethane		U	12		U	12		U	12
1,2-Dichloroethene(Total)		U	12		U	12		U	12
1,2-Dichloropropane		U	12		U	12		U	12
2-Butanone		U	12		U	12		U	12
2-Hexanone		U	12		U	12		U	12
4-Methyl-2-pentanone		U	12		U	12		U	12
Acetone	42	B		30	B		23	B	
Benzene		U	12		U	12		U	12
Bromodichloromethane		U	12		U	12		U	12
Bromoform		U	12		U	12		U	12
Bromomethane		U	12		U	12		U	12
Carbon disulfide		U	12		U	12		U	12
Carbon tetrachloride		U	12		U	12		U	12
Chlorobenzene		U	12		U	12		U	12
Chloroethane		U	12		U	12		U	12
Chloroform		U	12		U	12		U	12
Chloromethane		U	12		U	12		U	12
Cis-1,3-Dichloropropene		U	12		U	12		U	12
Dibromochloromethane		U	12		U	12		U	12
Ethylbenzene		U	12		U	12		U	12
Methylene chloride	15	B		10	BJ		69	B	
Styrene		U	12		U	12		U	12
Tetrachloroethene		U	12		U	12		U	12
Toluene		U	12		U	12		U	12
Trans-1,3-Dichloropropene		U	12		U	12		U	12
Trichloroethene		U	12		U	12		U	12
Vinyl chloride		U	12		U	12		U	12
Xylenes (Total)		U	12		U	12		U	12

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWB-044-023			MWC-044-010			MWD-044-051		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)	379			806			79.1		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	16
1,1,2,2-Tetrachloroethane		U	11		U	11		U	16
1,1,2-Trichloroethane		U	11		U	11		U	16
1,1-Dichloroethane		U	11		U	11		U	16
1,1-Dichloroethene		U	11		U	11		U	16
1,2-Dichloroethane		U	11		U	11		U	16
1,2-Dichloroethene(Total)		U	11		U	11		U	16
1,2-Dichloropropane		U	11		U	11		U	16
2-Butanone		U	11		U	11		U	16
2-Hexanone		U	11		U	11		U	16
4-Methyl-2-pentanone		U	11		U	11		U	16
Acetone	52	B		51	B		60	B	
Benzene		U	11		U	11		U	16
Bromodichloromethane		U	11		U	11		U	16
Bromoform		U	11		U	11		U	16
Bromomethane		U	11		U	11		U	16
Carbon disulfide		U	11		U	11		U	16
Carbon tetrachloride		U	11		U	11		U	16
Chlorobenzene		U	11		U	11		U	16
Chloroethane		U	11		U	11		U	16
Chloroform		U	11		U	11		U	16
Chloromethane		U	11		U	11		U	16
Cis-1,3-Dichloropropene		U	11		U	11		U	16
Dibromochloromethane		U	11		U	11		U	16
Ethylbenzene		U	11		U	11		U	16
Methylene chloride	33	B		27	B		89	B	
Styrene		U	11		U	11		U	16
Tetrachloroethene		U	11		U	11		U	16
Toluene		U	11		U	11		U	16
Trans-1,3-Dichloropropene		U	11		U	11		U	16
Trichloroethene		U	11		U	11		U	16
Vinyl chloride		U	11		U	11		U	16
Xylenes (Total)		U	11		U	11		U	16

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWA-045-034			MWB-045-022			MWC-045-012		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)	478			124			356		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	14		U	15		U	14
1,1,2,2-Tetrachloroethane		U	14		U	15		U	14
1,1,2-Trichloroethane		U	14		U	15		U	14
1,1-Dichloroethane		U	14		U	15		U	14
1,1-Dichloroethene		U	14		U	15		U	14
1,2-Dichloroethane		U	14		U	15		U	14
1,2-Dichloroethene(Total)		U	14		U	15		U	14
1,2-Dichloropropane		U	14		U	15		U	14
2-Butanone		U	14		U	15		U	14
2-Hexanone		U	14		U	15		U	14
4-Methyl-2-pentanone		U	14		U	15		U	14
Acetone	21	B		30	B		26	B	
Benzene		U	14		U	15		U	14
Bromodichloromethane		U	14		U	15		U	14
Bromoform		U	14		U	15		U	14
Bromomethane		U	14		U	15		U	14
Carbon disulfide		U	14		U	15		U	14
Carbon tetrachloride		U	14		U	15		U	14
Chlorobenzene		U	14		U	15		U	14
Chloroethane		U	14		U	15		U	14
Chloroform		U	14		U	15		U	14
Chloromethane		U	14		U	15		U	14
Cis-1,3-Dichloropropene		U	14		U	15		U	14
Dibromochloromethane		U	14		U	15		U	14
Ethylbenzene		U	14		U	15		U	14
Methylene chloride	23	B		24	B		22	B	
Styrene		U	14		U	15		U	14
Tetrachloroethene		U	14		U	15		U	14
Toluene		U	14		U	15		U	14
Trans-1,3-Dichloropropene		U	14		U	15		U	14
Trichloroethene		U	14		U	15		U	14
Vinyl chloride		U	14		U	15		U	14
Xylenes (Total)		U	14		U	15		U	14

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWD-045-042			MWD-045-042-RE			MWA-058-125		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		NA			NA	
1,3-Dinitrobenzene (DNB)		U	0.5		NA			NA	
2,4,6-Trinitrotoluene (TNT)		U	0.5		NA			NA	
2,4-Dinitrotoluene (24DNT)		U	0.5		NA			NA	
2,6-Dinitrotoluene (26DNT)		U	1		NA			NA	
2-Nitrotoluene (2NT)		U	1		NA			NA	
3-Nitrotoluene (3NT)		U	1		NA			NA	
4-Nitrotoluene (4NT)		U	1		NA			NA	
RDX		U	0.5		NA			NA	
Tetryl		U	1		NA			NA	
Nitrobenzene (NB)		U	0.5		NA			NA	
HMX		U	0.5		NA			NA	
Total Organic Carbon (mg/kg)									
Total Organic Carbon (TOC)	151				NA		464		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	19		U	11
1,1,2,2-Tetrachloroethane		U	11		U	19		U	11
1,1,2-Trichloroethane		U	11		U	19		U	11
1,1-Dichloroethane		U	11		U	19		U	11
1,1-Dichloroethene		U	11		U	19		U	11
1,2-Dichloroethane		U	11		U	19		U	11
1,2-Dichloroethene(Total)		U	11		U	19		U	11
1,2-Dichloropropane		U	11		U	19		U	11
2-Butanone		U	11		U	19	3	J	
2-Hexanone		U	11		U	19		U	11
4-Methyl-2-pentanone		U	11		U	19		U	11
Acetone	290	BE		260			20	B	
Benzene		U	11		U	19		U	11
Bromodichloromethane		U	11		U	19		U	11
Bromoform		U	11		U	19		U	11
Bromomethane		U	11		U	19		U	11
Carbon disulfide		U	11		U	19		U	11
Carbon tetrachloride		U	11		U	19		U	11
Chlorobenzene		U	11		U	19		U	11
Chloroethane		U	11		U	19		U	11
Chloroform		U	11		U	19	1	J	
Chloromethane		U	11		U	19		U	11
Cis-1,3-Dichloropropene		U	11		U	19		U	11
Dibromochloromethane		U	11		U	19		U	11
Ethylbenzene		U	11		U	19		U	11
Methylene chloride	39	B		35	B		15	B	
Styrene		U	11		U	19		U	11
Tetrachloroethene		U	11		U	19		U	11
Toluene		U	11		U	19		U	11
Trans-1,3-Dichloropropene		U	11		U	19		U	11
Trichloroethene		U	11		U	19		U	11
Vinyl chloride		U	11		U	19		U	11
Xylenes (Total)		U	11		U	19		U	11

Appendix D-7 Analytical Data of Atlas Missile Area Saturated Soil Samples

	MWB-058-082			MWC-058-046		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)						
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1
RDX		U	0.5		U	0.5
Tetryl		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5
HMX		U	0.5		U	0.5
Total Organic Carbon (mg/kg)						
Total Organic Carbon (TOC)	391			258		
VOLATILES (VOC) (ug/kg)						
1,1,1-Trichloroethane		U	11		U	12
1,1,2,2-Tetrachloroethane		U	11		U	12
1,1,2-Trichloroethane		U	11		U	12
1,1-Dichloroethane		U	11		U	12
1,1-Dichloroethene		U	11		U	12
1,2-Dichloroethane		U	11		U	12
1,2-Dichloroethene(Total)		U	11		U	12
1,2-Dichloropropane		U	11		U	12
2-Butanone		U	11		U	12
2-Hexanone		U	11		U	12
4-Methyl-2-pentanone		U	11		U	12
Acetone	43	B			U	12
Benzene		U	11		U	12
Bromodichloromethane		U	11		U	12
Bromoform		U	11		U	12
Bromomethane		U	11		U	12
Carbon disulfide		U	11		U	12
Carbon tetrachloride		U	11		U	12
Chlorobenzene		U	11		U	12
Chloroethane		U	11		U	12
Chloroform		U	11		U	12
Chloromethane		U	11		U	12
Cis-1,3-Dichloropropene		U	11		U	12
Dibromochloromethane		U	11		U	12
Ethylbenzene		U	11		U	12
Methylene chloride	25	B		19	B	
Styrene		U	11		U	12
Tetrachloroethene		U	11		U	12
Toluene		U	11		U	12
Trans-1,3-Dichloropropene		U	11		U	12
Trichloroethene		U	11		U	12
Vinyl chloride		U	11		U	12
Xylenes (Total)		U	11		U	12

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWA-023-098			MWB-023-072			MWC-023-036		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	256			158			164		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	12		U	12
1,1,2,2-Tetrachloroethane		U	11		U	12		U	12
1,1,2-Trichloroethane		U	11		U	12		U	12
1,1-Dichloroethane		U	11		U	12		U	12
1,1-Dichloroethene		U	11		U	12		U	12
1,2-Dichloroethane		U	11		U	12		U	12
1,2-Dichloroethene(Total)		U	11		U	12		U	12
1,2-Dichloropropane		U	11		U	12		U	12
2-Butanone		U	11		U	12		U	12
2-Hexanone		U	11		U	12		U	12
4-Methyl-2-pentanone		U	11		U	12		U	12
Acetone	23	B			U	12		U	12
Benzene		U	11		U	12		U	12
Bromodichloromethane		U	11		U	12		U	12
Bromoform		U	11		U	12		U	12
Bromomethane		U	11		U	12		U	12
Carbon disulfide		U	11		U	12		U	12
Carbon tetrachloride		U	11		U	12		U	12
Chlorobenzene		U	11		U	12		U	12
Chloroethane		U	11		U	12		U	12
Chloroform		U	11		U	12		U	12
Chloromethane		U	11		U	12		U	12
Cis-1,3-Dichloropropene		U	11		U	12		U	12
Dibromochloromethane		U	11		U	12		U	12
Ethylbenzene		U	11		U	12		U	12
Methylene chloride	38	B		11	BJ		7	BJ	
Styrene		U	11		U	12		U	12
Tetrachloroethene		U	11		U	12		U	12
Toluene		U	11		U	12		U	12
Trans-1,3-Dichloropropene		U	11		U	12		U	12
Trichloroethene		U	11		U	12		U	12
Vinyl chloride		U	11		U	12		U	12
Xylenes (Total)		U	11		U	12		U	12

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWA-025-151			MWB-025-083			MWC-025-047		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	183			188			190		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	11
1,1,2,2-Tetrachloroethane		U	12		U	12		U	11
1,1,2-Trichloroethane		U	12		U	12		U	11
1,1-Dichloroethane		U	12		U	12		U	11
1,1-Dichloroethene		U	12		U	12		U	11
1,2-Dichloroethane		U	12		U	12		U	11
1,2-Dichloroethene(Total)		U	12		U	12		U	11
1,2-Dichloropropane		U	12		U	12		U	11
2-Butanone		U	12		U	12		U	11
2-Hexanone		U	12		U	12		U	11
4-Methyl-2-pentanone		U	12		U	12		U	11
Acetone		U	12		U	12		U	11
Benzene		U	12		U	12		U	11
Bromodichloromethane		U	12		U	12		U	11
Bromoform		U	12		U	12		U	11
Bromomethane		U	12		U	12		U	11
Carbon disulfide		U	12		U	12		U	11
Carbon tetrachloride		U	12		U	12		U	11
Chlorobenzene		U	12		U	12		U	11
Chloroethane		U	12		U	12		U	11
Chloroform		U	12		U	12		U	11
Chloromethane		U	12		U	12		U	11
Cis-1,3-Dichloropropene		U	12		U	12		U	11
Dibromochloromethane		U	12		U	12		U	11
Ethylbenzene		U	12		U	12		U	11
Methylene chloride	11	BJ		7	BJ		8	BJ	
Styrene		U	12		U	12		U	11
Tetrachloroethene		U	12		U	12		U	11
Toluene		U	12		U	12		U	11
Trans-1,3-Dichloropropene		U	12		U	12		U	11
Trichloroethene		U	12		U	12		U	11
Vinyl chloride		U	12		U	12		U	11
Xylenes (Total)		U	12		U	12		U	11

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWD-025-167			MWA-031-093			MWB-031-059		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	105				NA		170		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		NA			U	12
1,1,2,2-Tetrachloroethane		U	12		NA			U	12
1,1,2-Trichloroethane		U	12		NA			U	12
1,1-Dichloroethane		U	12		NA			U	12
1,1-Dichloroethene		U	12		NA			U	12
1,2-Dichloroethane		U	12		NA			U	12
1,2-Dichloroethene(Total)		U	12		NA			U	12
1,2-Dichloropropane		U	12		NA			U	12
2-Butanone		U	12		NA			U	12
2-Hexanone		U	12		NA			U	12
4-Methyl-2-pentanone		U	12		NA			U	12
Acetone	28	B			NA		420	E	
Benzene		U	12		NA			U	12
Bromodichloromethane		U	12		NA			U	12
Bromoform		U	12		NA			U	12
Bromomethane		U	12		NA			U	12
Carbon disulfide		U	12		NA			U	12
Carbon tetrachloride		U	12		NA			U	12
Chlorobenzene		U	12		NA			U	12
Chloroethane		U	12		NA			U	12
Chloroform		U	12		NA			U	12
Chloromethane		U	12		NA			U	12
Cis-1,3-Dichloropropene		U	12		NA			U	12
Dibromochloromethane		U	12		NA			U	12
Ethylbenzene		U	12		NA			U	12
Methylene chloride	39	B			NA		47	B	
Styrene		U	12		NA			U	12
Tetrachloroethene		U	12		NA			U	12
Toluene		U	12		NA			U	12
Trans-1,3-Dichloropropene		U	12		NA			U	12
Trichloroethene		U	12		NA			U	12
Vinyl chloride		U	12		NA			U	12
Xylenes (Total)		U	12		NA			U	12

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWB-031-059-RE			MWC-031-047			MWD-031-112		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		NA			U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		NA			U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		NA			U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		NA			U	1		U	1
2-Nitrotoluene (2NT)		NA			U	1		U	1
3-Nitrotoluene (3NT)		NA			U	1		U	1
4-Nitrotoluene (4NT)		NA			U	1		U	1
RDX		NA			U	0.5		U	0.5
Tetryl		NA			U	1		U	1
Nitrobenzene (NB)		NA			U	0.5		U	0.5
HMX		NA			U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA		132			957		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	29		U	12		U	11
1,1,2,2-Tetrachloroethane		U	29		U	12		U	11
1,1,2-Trichloroethane		U	29		U	12		U	11
1,1-Dichloroethane		U	29		U	12		U	11
1,1-Dichloroethene		U	29		U	12		U	11
1,2-Dichloroethane		U	29		U	12		U	11
1,2-Dichloroethene(Total)		U	29		U	12		U	11
1,2-Dichloropropane		U	29		U	12		U	11
2-Butanone		U	29		U	12		U	11
2-Hexanone		U	29		U	12		U	11
4-Methyl-2-pentanone		U	29		U	12		U	11
Acetone	450			72			16	B	
Benzene		U	29		U	12	2	BJ	
Bromodichloromethane		U	29		U	12		U	11
Bromoform		U	29		U	12		U	11
Bromomethane		U	29		U	12		U	11
Carbon disulfide		U	29		U	12		U	11
Carbon tetrachloride		U	29		U	12		U	11
Chlorobenzene		U	29		U	12		U	11
Chloroethane		U	29		U	12		U	11
Chloroform		U	29		U	12		U	11
Chloromethane		U	29		U	12		U	11
Cis-1,3-Dichloropropene		U	29		U	12		U	11
Dibromochloromethane		U	29		U	12		U	11
Ethylbenzene		U	29		U	12		U	11
Methylene chloride	75	B		19	B		12	B	
Styrene		U	29		U	12		U	11
Tetrachloroethene		U	29		U	12		U	11
Toluene		U	29		U	12		U	11
Trans-1,3-Dichloropropene		U	29		U	12		U	11
Trichloroethene		U	29		U	12		U	11
Vinyl chloride		U	29		U	12		U	11
Xylenes (Total)		U	29		U	12		U	11

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWA-033-106			MWB-033-083			MWC-033-048		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	278			240			353		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	12
1,1,2,2-Tetrachloroethane		U	12		U	12		U	12
1,1,2-Trichloroethane		U	12		U	12		U	12
1,1-Dichloroethane		U	12		U	12		U	12
1,1-Dichloroethene		U	12		U	12		U	12
1,2-Dichloroethane		U	12		U	12		U	12
1,2-Dichloroethene(Total)		U	12		U	12		U	12
1,2-Dichloropropane		U	12		U	12		U	12
2-Butanone		U	12		U	12		U	12
2-Hexanone		U	12		U	12		U	12
4-Methyl-2-pentanone		U	12		U	12		U	12
Acetone	32	B		44			16	B	
Benzene		U	12		U	12	2	BJ	
Bromodichloromethane		U	12		U	12		U	12
Bromoform		U	12		U	12		U	12
Bromomethane		U	12		U	12		U	12
Carbon disulfide		U	12		U	12		U	12
Carbon tetrachloride		U	12		U	12		U	12
Chlorobenzene		U	12		U	12		U	12
Chloroethane		U	12		U	12		U	12
Chloroform		U	12		U	12		U	12
Chloromethane		U	12		U	12		U	12
Cis-1,3-Dichloropropene		U	12		U	12		U	12
Dibromochloromethane		U	12		U	12		U	12
Ethylbenzene		U	12		U	12		U	12
Methylene chloride	30	B		26	B		29	B	
Styrene		U	12		U	12		U	12
Tetrachloroethene		U	12		U	12		U	12
Toluene		U	12		U	12		U	12
Trans-1,3-Dichloropropene		U	12		U	12		U	12
Trichloroethene		U	12		U	12		U	12
Vinyl chloride		U	12		U	12		U	12
Xylenes (Total)		U	12		U	12		U	12

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWD-033-117			MWA-034-102			MWB-034-062		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		U	0.5
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		U	0.5
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		U	0.5
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		U	0.5
2,6-Dinitrotoluene (26DNT)		U	1		U	1		U	1
2-Nitrotoluene (2NT)		U	1		U	1		U	1
3-Nitrotoluene (3NT)		U	1		U	1		U	1
4-Nitrotoluene (4NT)		U	1		U	1		U	1
RDX		U	0.5		U	0.5		U	0.5
Tetryl		U	1		U	1		U	1
Nitrobenzene (NB)		U	0.5		U	0.5		U	0.5
HMX		U	0.5		U	0.5		U	0.5
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	106			181			107		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	13		U	12		U	12
1,1,2,2-Tetrachloroethane		U	13		U	12		U	12
1,1,2-Trichloroethane		U	13		U	12		U	12
1,1-Dichloroethane		U	13		U	12		U	12
1,1-Dichloroethene		U	13		U	12		U	12
1,2-Dichloroethane		U	13		U	12		U	12
1,2-Dichloroethene(Total)		U	13		U	12		U	12
1,2-Dichloropropane		U	13		U	12		U	12
2-Butanone		U	13		U	12		U	12
2-Hexanone		U	13		U	12		U	12
4-Methyl-2-pentanone		U	13		U	12		U	12
Acetone	38			88				U	12
Benzene		U	13		U	12		U	12
Bromodichloromethane		U	13		U	12		U	12
Bromoform		U	13		U	12		U	12
Bromomethane		U	13		U	12		U	12
Carbon disulfide		U	13		U	12		U	12
Carbon tetrachloride		U	13		U	12		U	12
Chlorobenzene		U	13		U	12		U	12
Chloroethane		U	13		U	12		U	12
Chloroform		U	13		U	12		U	12
Chloromethane		U	13		U	12		U	12
Cis-1,3-Dichloropropene		U	13		U	12		U	12
Dibromochloromethane		U	13		U	12		U	12
Ethylbenzene		U	13		U	12		U	12
Methylene chloride	41	B		17	B		17	B	
Styrene		U	13		U	12		U	12
Tetrachloroethene		U	13		U	12		U	12
Toluene		U	13		U	12		U	12
Trans-1,3-Dichloropropene		U	13		U	12		U	12
Trichloroethene		U	13		U	12		U	12
Vinyl chloride		U	13		U	12		U	12
Xylenes (Total)		U	13		U	12		U	12

Appendix D-8 Analytical Data of Load Lines 1, 2, 3, and 4 Saturated Soil Samples

	MWC-034-058			MWD-034-124			MWD-034-124-RE		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		U	0.5		NA	
1,3-Dinitrobenzene (DNB)		U	0.5		U	0.5		NA	
2,4,6-Trinitrotoluene (TNT)		U	0.5		U	0.5		NA	
2,4-Dinitrotoluene (24DNT)		U	0.5		U	0.5		NA	
2,6-Dinitrotoluene (26DNT)		U	1		U	1		NA	
2-Nitrotoluene (2NT)		U	1		U	1		NA	
3-Nitrotoluene (3NT)		U	1		U	1		NA	
4-Nitrotoluene (4NT)		U	1		U	1		NA	
RDX		U	0.5		U	0.5		NA	
Tetryl		U	1		U	1		NA	
Nitrobenzene (NB)		U	0.5		U	0.5		NA	
HMX		U	0.5		U	0.5		NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	86			2990				NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	12
1,1,2,2-Tetrachloroethane		U	12		U	12		U	12
1,1,2-Trichloroethane		U	12		U	12		U	12
1,1-Dichloroethane		U	12		U	12		U	12
1,1-Dichloroethene		U	12		U	12		U	12
1,2-Dichloroethane		U	12		U	12		U	12
1,2-Dichloroethene(Total)		U	12		U	12		U	12
1,2-Dichloropropane		U	12		U	12		U	12
2-Butanone		U	12		U	12		U	12
2-Hexanone		U	12		U	12		U	12
4-Methyl-2-pentanone		U	12		U	12		U	12
Acetone	43			110	B		96	D	
Benzene		U	12	2	BJ			U	12
Bromodichloromethane		U	12		U	12		U	12
Bromoform		U	12		U	12		U	12
Bromomethane		U	12		U	12		U	12
Carbon disulfide		U	12		U	12		U	12
Carbon tetrachloride		U	12		U	12		U	12
Chlorobenzene		U	12		U	12		U	12
Chloroethane		U	12		U	12		U	12
Chloroform		U	12		U	12		U	12
Chloromethane		U	12		U	12		U	12
Cis-1,3-Dichloropropene		U	12		U	12		U	12
Dibromochloromethane		U	12		U	12		U	12
Ethylbenzene		U	12		U	12		U	12
Methylene chloride	18	B		87	B		7	BDJ	
Styrene		U	12		U	12		U	12
Tetrachloroethene		U	12		U	12		U	12
Toluene		U	12		U	12		U	12
Trans-1,3-Dichloropropene		U	12		U	12		U	12
Trichloroethene		U	12		U	12		U	12
Vinyl chloride		U	12		U	12		U	12
Xylenes (Total)		U	12		U	12		U	12

Appendix D-9 Analytical Data of Administration Area ("G1") Groundwater Headspace VOC Screening Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier	Results (ug/L)	Data qualifier
G1-14I-33		ND		ND		ND		ND		ND		ND		ND		ND	5.3	
G1-14J		ND		ND		ND		ND		ND		ND		ND		ND	0.9	
G1-14SWI-44		ND		ND		ND		ND		ND		ND		ND		ND	0.7	
G1-15I-33		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-15J		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-24I-57		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-24J		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-25I-61		ND		ND		ND		ND		ND		ND	0.13			ND		ND
G1-26I-55		ND		ND		ND		ND		ND		ND	0.18			ND		ND
G1-27I-44		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-27J		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-35I-44		ND		ND		ND		ND		ND		ND		ND		ND	0.7	
G1-35J		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-36I-59		ND		ND		ND		ND		ND		ND	0.06			ND	1.3	
G1-37I-51		ND		ND		ND		ND		ND		ND		ND		ND	1.3	
G1-37J		ND		ND		ND		ND		ND		ND		ND		ND		ND
G1-46I-64		ND		ND		ND		ND	0.01			ND	0.23			ND		ND
G1-47I-59		ND		ND		ND		ND		ND		ND		ND		ND	0.9	
G1-47J		ND		ND		ND		ND		ND		ND	0.18			ND		ND

Note : 1. ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

Appendix D-10 Analytical Data of Atlas Missile Area ("G2") Groundwater Headspace VOC Screening Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
G2-02I-50	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-02J-117		ND		ND		ND		ND		ND		ND		ND		ND	0.2	
G2-03I-(51-54)	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-03J-(101-103)	NA		NA		NA		NA		NA		NA		0.09		NA			NA
G2-03J-(101-103)D	NA		NA		NA		NA		NA		NA		0.14		NA			NA
G2-04I-(63-65)	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-04I-(63-65)D	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-04J-(105-107)	NA		NA		NA		NA		NA		NA		0.03		NA			NA
G2-04J-(105-107)D	NA		NA		NA		NA		NA		NA		0.03		NA			NA
G2-05I-(57-60)	NA		NA		NA		NA		NA		NA		0.1		NA			NA
G2-06I-(60-63)	NA		NA		NA		NA		NA		NA		0.1		NA			NA
G2-07I-(57-60)	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-07I-(57-60)D	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-08I-57	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-08J-94.5		ND		ND		ND		ND	0.02			ND		ND		ND	3.7	
G2-09I-(57-60)	NA		NA		NA		NA		NA		NA		0.03		NA			NA
G2-09J-108.5	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-10I-(60-63)	NA		NA		NA		NA		NA		NA		29.2		NA			NA
G2-10I-(60-63)D	NA		NA		NA		NA		NA		NA		22.4		NA			NA
G2-11I-(60-63)	NA		NA		NA		NA		NA		NA		1200		NA			NA
G2-12I-43	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-12I-43D	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-12J-84		ND		ND		ND		ND		ND		ND	0.03			ND		ND
G2-14I-(54-57)	NA		NA		NA		NA		NA		NA		0.03		NA			NA
G2-14J-95		ND		ND		ND		ND		ND		ND		ND		ND	0.1	
G2-15I-(60-63)	NA		NA		NA		NA		NA		NA		0.14		NA			NA
G2-16I-(60-63)	NA		NA		NA		NA		NA		NA		11.7		NA			NA
G2-17I-(54-57)	NA		NA		NA		NA		NA		NA		0.11		NA			NA
G2-18I-45	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-18J-61		ND		ND		ND		ND		ND		ND	0.02			ND		ND
G2-20I-63	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-20J-84		ND		ND		ND		ND		ND		ND	0.02			ND	0.2	
G2-21I-53	NA		NA		NA		NA		NA		NA		0.01		NA			NA
G2-21J-69.5		ND		ND		ND		ND		ND		ND	21			ND	0.5	
G2-21J-69.5D		ND		ND		ND		ND		ND		ND	26.7			ND		ND
G2-22I-48	NA		NA		NA		NA		NA		NA			ND	NA			NA
G2-22J-77		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-25J-93		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-26J-93		ND		ND		ND		ND		ND		ND	0.9			ND		ND
G2-27J-101		ND		ND		ND		ND		ND		ND		ND		ND		ND

Appendix D-10 Analytical Data of Atlas Missile Area ("G2") Groundwater Headspace VOC Screening Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
G2-30J-90.5		ND		ND		ND		ND		ND		ND		ND		ND	0.7	
G2-31J-70		ND		ND		ND		ND		ND		ND	49			ND	5	
G2-32J-54		ND		ND		ND		ND		ND		ND		ND		ND	0.5	
G2-34J-43		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-35J-45.75		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-35J-46		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-36J-43	0.3			ND		ND		ND		ND		ND	21.2			ND		ND
G2-36J-43D	0.4			ND		ND		ND		ND		ND	27.6			ND	4.4	
G2-37J-47	0.6			ND		ND		ND		ND		ND	58.8			ND	4.7	
G2-38J-49.5		ND		ND		ND		ND		ND		ND		ND		ND		ND
G2-39J-48		ND		ND		ND		ND		ND		ND	7.47			ND	1	

Note : 1. ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

Appendix D-11 Analytical Data of Load Lines 1, 2, 3, and 4 ("G3") Groundwater Headspace VOC Screening Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroethene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
G3-01I-64	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-01J-98	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-02I-52	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-02J-100.5		ND		ND		ND		ND		ND		ND		ND		ND	2.2	
G3-04I-57	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-04J-115	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-05I-60	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-05J-100	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-05J-2-51	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-05J-60	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-06I-60	NA		NA		NA		NA		NA		NA		0.16		NA		NA	
G3-06I-60D	NA		NA		NA		NA		NA		NA		0.1		NA		NA	
G3-07I-61	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-07J-99	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-08I-56	NA		NA		NA		NA		NA		NA		0.05		NA		NA	
G3-08J-130	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-08J-130D	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-09I-44	NA		NA		NA		NA		NA		NA		0.07		NA		NA	
G3-09I-44D	NA		NA		NA		NA		NA		NA		0.04		NA		NA	
G3-10I-56	NA		NA		NA		NA		NA		NA		0.23		NA		NA	
G3-11I-60	NA		NA		NA		NA		NA		NA		0.11		NA		NA	
G3-12I-60	NA		NA		NA		NA		NA		NA		0.06		NA		NA	
G3-12J-100	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-13I-60	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-13I-60D	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-13J-95	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-14I-56	NA		NA		NA		NA		NA		NA		0.08		NA		NA	
G3-15I-60	NA		NA		NA		NA		NA		NA		0.01		NA		NA	
G3-15J-126		ND		ND		ND		ND		ND		ND		ND		ND	0.5	
G3-16I-60	NA		NA		NA		NA		NA		NA		0.05		NA		NA	
G3-16J-118		ND		ND		ND		ND		ND		ND	0.03			ND		ND
G3-19I-60	NA		NA		NA		NA		NA		NA			ND	NA		NA	
G3-19J-100	NA		NA		NA		NA		NA		NA			ND	NA		NA	

Note : 1. ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

Appendix D-12

Analytical Data of Platte River Alluvial Aquifer Hydropunch ("H") Groundwater and Surface Water Headspace VOC Screening Samples

Sample ID	1,1,1-Trichloroethane		1,1-Dichloroethane		Benzene		Ethylbenzene		Tetrachloroethene		Toluene		Trichloroehtene		Xylenes, Total		cis-1,2-Dichloroethene	
	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier	Results	Data qualifier
H-01I-68		ND		ND		ND		ND		ND		ND		ND		ND		ND
H-01J-88		ND		ND		ND		ND		ND		ND		ND		ND		ND
H-02I-22		ND		ND		ND		ND		ND		ND		ND		ND	0.2	
H-02J-48		ND		ND		ND		ND		ND		ND		ND		ND	1.5	
H-02J-48D		ND		ND		ND		ND		ND		ND		ND		ND	0.8	
H-03I-24		ND		ND		ND		ND		ND		ND		ND		ND	1.7	
H-03J-48		ND		ND		ND		ND		ND		ND		ND		ND		ND
H-04I-69		ND		ND		ND		ND		ND		ND		ND		ND	0.3	
H-04J-95		ND		ND		ND		ND		ND		ND		ND		ND	6.5	
H-05I-29		ND		ND		ND		ND		ND		ND		ND		ND	0.3	
H-05J-50		ND		ND		ND		ND		ND		ND		ND		ND	0.7	
H-06I-24		ND		ND		ND		ND		ND		ND		ND		ND		ND
H-06J-48		ND		ND		ND		ND		ND		ND		ND		ND	1.2	
H-06J-48D		ND		ND		ND		ND		ND		ND		ND		ND	2	
H-07I-29		ND		ND		ND		ND		ND		ND		ND		ND	0.3	
H-07J-53.5		ND		ND		ND		ND		ND		ND		ND		ND	1.4	
KTS-01-VOA		ND		ND		ND		ND		ND		ND	0.08			ND	0.7	

Note : 1. ND indicates compound was not detected at the quantitation limit, and NA indicates compound was not analyzed.

2. Quantitation limit of the various compunds are as follows,

1,1,1-Trichloroethane, 1,1-Dichloroethane, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-Dichloroethene : 0.1 ug/L

Tetrachloroethene , Trichloroethene : 0.01 ug/L

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	64.5	B		45.5	B		120	B	
Antimony		U	39		U	39		U	39
Arsenic	15.7			15	S		11.9		
Barium	134	B		147	B		122	B	
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	81000			89700			78000		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Iron	1280			1770			1020		
Lead		UWN	2		UWN	2		UWN	2
Magnesium	14900			17300			13000		
Manganese	428			391			320		
Mercury		UN	0.2		UN	0.2		UN	0.2
Nickel		U	10		U	10		U	10
Potassium	11200			10900			11100		
Selenium		UW	4		UW	4		U	20
Silver		U	6		U	6		U	6
Sodium	48200			24400			22100		
Thallium		UWN	2		UWN	2		UWN	2
Vanadium		U	5		U	5		U	5
Zinc	6.4	B		7.1	B		5.6	B	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin		U	0.1		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25		U	25		U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate		U	10	1	J			U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate		U	10	2	BJ			U	10
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol		U	10	3	J		1	J	
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	3	BJ		15	B		2	BJ	

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	168	B*		416	*		210	*	
Antimony		U	39		U	39		U	39
Arsenic	15.5			18			11.9		
Barium	127	B		140	B		116	B	
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	78900			85200			73600		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Cyanide		U	10		U	10		U	10
Iron	1310	*		1840	*		1030	*	
Lead		UW	2		UW	2		U	2
Magnesium	14500			16400			12300		
Manganese	416			373			303		
Mercury		U	0.2		U	0.2		U	0.2
Nickel		U	10		U	10		U	10
Potassium	10900			10400			10200		
Selenium		UWN	4		UWN	20		UWN	4
Silver		U	6		U	6		U	6
Sodium	46700	E		23500	E		21100	E	
Thallium		UW	2		U	2		U	2
Vanadium		U	5		U	5		U	5
Zinc	4.9	B		4.3	B		5.4	B	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-047-082			BMW-047-082			AMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride		U	2	0.8	BJ		2		
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	300			300			250		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4.2		
Hardness as Calcium Carbonate	270			300			250		
Nitrate-Nitrite-N	51			53			0.63		
Total Dissolved Solids (TDS)	430			420			360		
Total Suspended Solids (TSS)	5			16			9		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	550			494			441		
Temperature (Celsius)	12.8			12			12.2		
pH	6.94			6.9			7.16		

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		NA		102	B		116	B	
Antimony		NA			U	39		U	39
Arsenic		NA		9.2	B		20.6		
Barium		NA		244			141	B	
Beryllium		NA			U	1		U	1
Cadmium		NA			U	5		U	5
Calcium		NA		74700			79100		
Chromium		NA			U	6		U	6
Cobalt		NA			U	6		U	6
Copper		NA			U	4		U	4
Iron		NA			U	46	1480		
Lead		NA			UN	2		UWN	2
Magnesium		NA		18300			13600		
Manganese		NA		14.4	B		320		
Mercury		NA			UN	0.2		UN	0.2
Nickel		NA			U	10		U	10
Potassium		NA		10800			10600		
Selenium		NA			U	20		UW	4
Silver		NA			U	6		U	6
Sodium		NA		20900			24200		
Thallium		NA			UWN	2		UWN	2
Vanadium		NA		11.7	B			U	5
Zinc		NA		9.7	B		7.1	B	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		NA			U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		NA			U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		NA			U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		NA			U	0.5		U	0.5
2-Nitrotoluene (2NT)		NA			U	0.5		U	0.5
3-Nitrotoluene (3NT)		NA			U	0.5		U	0.5
4-Nitrotoluene (4NT)		NA			U	0.5		U	0.5
RDX		NA			U	0.15		U	0.15
Tetryl		NA			U	0.5		U	0.5
Nitrobenzene (NB)		NA			U	0.25		U	0.25
HMX		NA			U	0.25		U	0.25

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		NA			U	0.1		U	0.1
4,4'-DDE		NA			U	0.1		U	0.1
4,4'-DDT		NA			U	0.1		U	0.1
Aldrin		NA			U	0.05		U	0.05
Alpha chlordane		NA			U	0.05		U	0.05
Alpha-BHC		NA			U	0.05		U	0.05
Beta-BHC		NA			U	0.05		U	0.05
Delta-BHC		NA			U	0.05		U	0.05
Dieldrin		NA			U	0.1		U	0.1
Endosulfan I		NA			U	0.05		U	0.05
Endosulfan II		NA			U	0.1		U	0.1
Endosulfan sulfate		NA			U	0.1		U	0.1
Endrin		NA			U	0.1		U	0.1
Endrin aldehyde		NA			U	0.1		U	0.1
Endrin ketone		NA			U	0.1		U	0.1
Gamma chlordane		NA			U	0.05		U	0.05
Gamma-BHC (Lindane)		NA			U	0.05		U	0.05
Heptachlor		NA			U	0.05		U	0.05
Heptachlor epoxide		NA			U	0.05		U	0.05
PCB-1016		NA			U	1		U	1
PCB-1221		NA			U	2		U	2
PCB-1232		NA			U	1		U	1
PCB-1242		NA			U	1		U	1
PCB-1248		NA			U	1		U	1
PCB-1254		NA			U	1		U	1
PCB-1260		NA			U	1		U	1
Toxaphene		NA			U	5		U	5
p,p'-Methoxychlor		NA			U	0.5		U	0.5
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25		U	25		U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate		U	10		U	10	1	J	
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	1	J			U	10	2	BJ	
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol		U	10		U	10	3	J	
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	5	BJ		2	BJ		20	B	

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum		NA		230	*		230	*	
Antimony		NA			U	39		U	39
Arsenic		NA		9.3	B		19.8		
Barium		NA		234			134	B	
Beryllium		NA			U	1		U	1
Cadmium		NA			U	5		U	5
Calcium		NA		73000			75700		
Chromium		NA			U	6		U	6
Cobalt		NA			U	6		U	6
Copper		NA			U	4		U	4
Cyanide		NA			U	10		U	10
Iron		NA		64.4	B*		1430	*	
Lead		NA			U	2		UW	2
Magnesium		NA		17900			13000		
Manganese		NA		14.9	B		309		
Mercury		NA			U	0.2		U	0.2
Nickel		NA			U	10		U	10
Potassium		NA		10500			10200		
Selenium		NA			UWN	20		UN	20
Silver		NA			U	6		U	6
Sodium		NA		20400	E		23600	E	
Thallium		NA			UW	2		U	2
Vanadium		NA		11.3	B			U	5
Zinc		NA		4.3	B		11.7	B	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		NA			U	1		U	1
1,1,2,2-Tetrachloroethane		NA			U	1		U	1
1,1,2-Trichloroethane		NA			U	1		U	1
1,1-Dichloroethane		NA			U	1		U	1
1,1-Dichloroethene		NA			U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		U	1
1,2-Dichlorobenzene		NA			U	1		U	1
1,2-Dichloroethane		NA			U	1		U	1
1,2-Dichloropropane		NA			U	1		U	1
1,3-Dichlorobenzene		NA			U	1		U	1
1,4-Dichlorobenzene		NA			U	1		U	1
2-Butanone		NA			U	5		U	5
2-Hexanone		NA			U	5		U	5
4-Methyl-2-pentanone		NA			U	5		U	5
Acetone		NA			U	5		U	5
Benzene		NA			U	1		U	1
Bromochloromethane		NA			U	1		U	1
Bromodichloromethane		NA			U	1		U	1
Bromoform		NA			U	1		U	1
Bromomethane		NA			U	1		U	1
Carbon disulfide		NA			U	1		U	1

Appendix D-13 Analytical Data of Administration Area Groundwater Monitoring Well Samples

	AMW-048-082-RE			BMW-048-082			DMW-048-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Carbon tetrachloride		NA			U	1		U	1
Chlorobenzene		NA			U	1		U	1
Chloroethane		NA			U	1		U	1
Chloroform		NA			U	1		U	1
Chloromethane		NA			U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Cis-1,3-Dichloropropene		NA			U	1		U	1
Dibromochloromethane		NA			U	1		U	1
Ethylbenzene		NA			U	1		U	1
Methylene chloride		NA		0.7	J		0.7	BJ	
Styrene		NA			U	1		U	1
Tetrachloroethene		NA			U	1		U	1
Toluene		NA			U	1		U	1
Trans-1,2-Dichloroethene		NA			U	1		U	1
Trans-1,3-Dichloropropene		NA			U	1		U	1
Trichloroethene		NA			U	1		U	1
Vinyl chloride		NA			U	1		U	1
Xylenes (Total)		NA			U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA		110			250		
Biochemical Oxygen Demand (BOD)		NA			U	3		U	3
Hardness as Calcium Carbonate		NA		270			240		
Nitrate-Nitrite-N		NA		36				U	0.2
Total Dissolved Solids (TDS)		NA		520			380		
Total Suspended Solids (TSS)		NA		8			5		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)		NA		528			451		
Temperature (Celsius)		NA		12.4			12.8		
pH		NA		6.51			7		

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	80.2	B			NA		756		
Antimony		U	39		NA			U	39
Arsenic		UW	4		NA		7.8	B	
Barium	118	B			NA		145	B	
Beryllium		U	1		NA			U	1
Cadmium		U	5		NA			U	5
Calcium	47500				NA		81000		
Chromium		U	6		NA			U	6
Cobalt		U	6		NA			U	6
Copper		U	4		NA		4.9	B	
Iron	1010				NA		1130		
Lead		UW	2		NA			UW	2
Magnesium	17000				NA		15100		
Manganese	366				NA		475		
Mercury		UN	0.2		NA			UN	0.2
Nickel	21.5	B			NA			U	10
Potassium	9240				NA		13400		
Selenium		UWN	4		NA			UWN	20
Silver		U	6		NA			U	6
Sodium	19700				NA		36300		
Thallium		UWN	2		NA			UWN	2
Vanadium		U	5		NA			U	5
Zinc	412				NA		52.8		
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			U	0.5
2-Nitrotoluene (2NT)		U	0.5		NA			U	0.5
3-Nitrotoluene (3NT)		U	0.5		NA			U	0.5
4-Nitrotoluene (4NT)		U	0.5		NA			U	0.5
RDX		U	0.15		NA			U	0.15
Tetryl		U	0.5		NA			U	0.5
Nitrobenzene (NB)		U	0.25		NA			U	0.25
HMX		U	0.25		NA			U	0.25

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		NA			U	0.1
4,4'-DDE		U	0.1		NA			U	0.1
4,4'-DDT	0.0041	JP			NA			U	0.1
Aldrin		U	0.05		NA			U	0.05
Alpha chlordane		U	0.05		NA			U	0.05
Alpha-BHC		U	0.05		NA			U	0.05
Beta-BHC		U	0.05		NA			U	0.05
Delta-BHC		U	0.05		NA			U	0.05
Dieldrin		U	0.1		NA			U	0.1
Endosulfan I		U	0.05		NA			U	0.05
Endosulfan II	0.0038	JP			NA		0.011	JP	
Endosulfan sulfate		U	0.1		NA			U	0.1
Endrin		U	0.1		NA			U	0.1
Endrin aldehyde		U	0.1		NA			U	0.1
Endrin ketone		U	0.1		NA			U	0.1
Gamma chlordane		U	0.05		NA			U	0.05
Gamma-BHC (Lindane)		U	0.05		NA			U	0.05
Heptachlor		U	0.05		NA			U	0.05
Heptachlor epoxide		U	0.05		NA			U	0.05
PCB-1016		U	1		NA			U	1
PCB-1221		U	2		NA			U	2
PCB-1232		U	1		NA			U	1
PCB-1242		U	1		NA			U	1
PCB-1248		U	1		NA			U	1
PCB-1254		U	1		NA			U	1
PCB-1260		U	1		NA			U	1
Toxaphene		U	5		NA			U	5
p,p'-Methoxychlor		U	0.5		NA		0.024	JP	
SEMIVOLATILES (ug/l)									
1,2,4-Trichlorobenzene		U	10		NA			U	10
1,2-Dichlorobenzene		U	10		NA			U	10
1,3-Dichlorobenzene		U	10		NA			U	10
1,4-Dichlorobenzene		U	10		NA			U	10
2,2'-Oxybis(1-chloropropane)		U	10		NA			U	10
2,4,5-Trichlorophenol		U	25		NA			U	25
2,4,6-Trichlorophenol		U	10		NA			U	10
2,4-Dichlorophenol		U	10		NA			U	10
2,4-Dimethylphenol		U	10		NA			U	10
2,4-Dinitrophenol		U	25		NA			U	25
2,4-Dinitrotoluene		U	10		NA			U	10
2,6-Dinitrotoluene (26DNT)		U	10		NA			U	10
2-Chloronaphthalene		U	10		NA			U	10
2-Chlorophenol		U	10		NA			U	10
2-Methylnaphthalene		U	10		NA			U	10
2-Methylphenol		U	10		NA			U	10
2-Nitroaniline		U	25		NA			U	25
2-Nitrophenol		U	10		NA			U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)									
3,3'-Dichlorobenzidine		U	10		NA			U	10
3-Nitroaniline		U	25		NA			U	25
4,6-Dinitro-2-methylphenol		U	25		NA			U	25
4-Bromophenyl phenyl ether		U	10		NA			U	10
4-Chloro-3-methylphenol		U	10		NA			U	10
4-Chloroaniline		U	10		NA			U	10
4-Chlorophenyl phenyl ether		U	10		NA			U	10
4-Methylphenol		U	10		NA			U	10
4-Nitroaniline		U	25		NA			U	25
4-Nitrophenol		U	25		NA			U	25
Acenaphthene		U	10		NA			U	10
Acenaphthylene		U	10		NA			U	10
Anthracene		U	10		NA			U	10
Benzo(a)anthracene		U	10		NA			U	10
Benzo(a)pyrene		U	10		NA			U	10
Benzo(b)fluoranthene		U	10		NA			U	10
Benzo(g,h,i)perylene		U	10		NA			U	10
Benzo(k)fluoranthene		U	10		NA			U	10
Butyl benzyl phthalate		U	10		NA			U	10
Carbazole		U	10		NA			U	10
Chrysene		U	10		NA			U	10
Di-n-butyl phthalate		U	10		NA		1	BJ	
Di-n-octyl phthalate		U	10		NA			U	10
Dibenzo(a,h)anthracene		U	10		NA			U	10
Dibenzofuran		U	10		NA			U	10
Diethyl phthalate		U	10		NA			U	10
Dimethyl phthalate		U	10		NA			U	10
Fluoranthene		U	10		NA			U	10
Fluorene		U	10		NA			U	10
Hexachlorobenzene		U	10		NA			U	10
Hexachlorobutadiene		U	10		NA			U	10
Hexachlorocyclopentadiene		U	10		NA			U	10
Hexachloroethane		U	10		NA			U	10
Indeno(1,2,3-cd)pyrene		U	10		NA			U	10
Isophorone		U	10		NA			U	10
N-Nitroso-di-n-propylamine		U	10		NA			U	10
N-Nitrosodiphenylamine(1)		U	10		NA			U	10
Naphthalene		U	10		NA			U	10
Nitrobenzene (NB)		U	10		NA			U	10
Pentachlorophenol		U	25		NA			U	25
Phenanthrene		U	10		NA			U	10
Phenol		U	10		NA			U	10
Pyrene		U	10		NA			U	10
bis(2-Chloroethoxy)methane		U	10		NA			U	10
bis(2-Chloroethyl)ether		U	10		NA			U	10
bis(2-Ethylhexyl)phthalate	2	BJ			NA		3	BJ	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	284				NA		5730		
Antimony		U	42		NA			U	42
Arsenic		U	4		NA			U	4
Barium	119	B			NA		167	B	
Beryllium		U	2		NA			U	2
Cadmium		U	5		NA			U	5
Calcium	43700				NA		75200		
Chromium		U	8		NA		14.5		
Cobalt		U	7		NA			U	7
Copper		U	16		NA			U	16
Cyanide	13.8				NA			U	10
Iron	2520	E			NA		6800	E	
Lead		U	2		NA		3		
Magnesium	15900				NA		14600		
Manganese	338				NA		480		
Mercury		U	0.2		NA			U	0.2
Nickel	26.9	B			NA			U	25
Potassium	7770				NA		12200		
Selenium		UWN	4		NA			UWN	4
Silver		U	10		NA			U	10
Sodium	18500				NA		31700		
Thallium		UW	2		NA			U	2
Vanadium		U	8		NA		10.6	B	
Zinc	458				NA		130		
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2,2-Tetrachloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethene		U	1(10)		U	1(10)		U	1(10)
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,2-Dichloroethene(Total)		U	(10)		U	(10)		U	(10)
1,2-Dichloropropane		U	1(10)		U	1(10)		U	1(10)
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5(10)		U	5(10)		U	5(10)
2-Hexanone		U	5(10)		U	5(10)		U	5(10)
4-Methyl-2-pentanone		U	5(10)		U	5(10)		U	5(10)
Acetone	13(11)	(B)		(16)	U	5		U	5(10)
Benzene		U	1(10)		U	1(10)		U	1(10)
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1(10)		U	1(10)		U	1(10)
Bromoform		U	1(10)		U	1(10)		U	1(10)
Bromomethane		U	1(10)		U	1(10)		U	1(10)
Carbon Dissulfide		U	1(10)		U	1(10)	4(10)		
Carbon tetrachloride		U	1(10)		U	1(10)		U	1(10)
Chlorobenzene		U	1(10)		U	1(10)		U	1(10)

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-001-082			IH2-601-082			JH2-001-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Chloroethane		U	1(10)		U	1(10)		U	1(10)
Chloroform		U	1(10)		U	1(10)		U	1(10)
Chloromethane		U	1(10)		U	1(10)		U	1(10)
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Dibromochloromethane		U	1(10)		U	1(10)		U	1(10)
Ethylbenzene		U	1(10)		U	1(10)		U	1(10)
Methylene Chloride	3(1)	B(BJ)		4(2)	B(BJ)		2(2)	B(BJ)	
Styrene		U	1(10)		U	1(10)		U	1(10)
Tetrachloroethene		U	1(10)		U	1(10)		U	1(10)
Toluene		U	1(10)		U	1(10)		U	1(10)
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Trichloroethene		U	1(10)		U	1(10)		U	1(10)
Vinyl chloride		U	1(10)		U	1(10)		U	1(10)
Xylenes (Total)		U	1(10)		U	1(10)		U	1(10)
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	160				NA		290		
Biochemical Oxygen Demand (BOD)		U	4		NA		4		
Hardness as Calcium Carbonate	350				NA		360		
Nitrate-Nitrite-N	6.3				NA			U	0.2
Total Dissolved Solids (TDS)	300				NA		390		
Total Suspended Solids (TSS)	25				NA		30		

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		NA			U	41		NA	
Antimony		NA			U	39		NA	
Arsenic		NA			UW	4		NA	
Barium		NA		248				NA	
Beryllium		NA			U	1		NA	
Cadmium		NA			U	5		NA	
Calcium		NA		53700				NA	
Chromium		NA			U	6		NA	
Cobalt		NA		7.6	B			NA	
Copper		NA			U	4		NA	
Iron		NA		1240				NA	
Lead		NA			UW	2		NA	
Magnesium		NA		20300				NA	
Manganese		NA		558				NA	
Mercury		NA			UN	0.2		NA	
Nickel		NA		33.4	B			NA	
Potassium		NA		11200				NA	
Selenium		NA			UN	20		NA	
Silver		NA			U	6		NA	
Sodium		NA		24200				NA	
Thallium		NA			UWN	2		NA	
Vanadium		NA			U	5		NA	
Zinc		NA		103				NA	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			U	0.25		NA	
1,3-Dinitrobenzene (DNB)		NA			U	0.25		NA	
2,4,6-Trinitrotoluene (TNT)		NA			U	0.25		NA	
2,4-Dinitrotoluene (24DNT)		NA			U	0.25		NA	
2,6-Dinitrotoluene (26DNT)		NA			U	0.5		NA	
2-Nitrotoluene (2NT)		NA			U	0.5		NA	
3-Nitrotoluene (3NT)		NA			U	0.5		NA	
4-Nitrotoluene (4NT)		NA			U	0.5		NA	
RDX		NA			U	0.15		NA	
Tetryl		NA			U	0.5		NA	
Nitrobenzene (NB)		NA			U	0.25		NA	
HMX		NA			U	0.25		NA	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		NA			U	0.1		NA	
4,4'-DDE		NA			U	0.1		NA	
4,4'-DDT		NA			U	0.1		NA	
Aldrin		NA			U	0.05		NA	
Alpha chlordane		NA			U	0.05		NA	
Alpha-BHC		NA			U	0.05		NA	
Beta-BHC		NA			U	0.05		NA	
Delta-BHC		NA			U	0.05		NA	
Dieldrin		NA			U	0.1		NA	
Endosulfan I		NA			U	0.05		NA	
Endosulfan II		NA			U	0.1		NA	
Endosulfan sulfate		NA			U	0.1		NA	
Endrin		NA			U	0.1		NA	
Endrin aldehyde		NA			U	0.1		NA	
Endrin ketone		NA			U	0.1		NA	
Gamma chlordane		NA			U	0.05		NA	
Gamma-BHC (Lindane)		NA			U	0.05		NA	
Heptachlor		NA			U	0.05		NA	
Heptachlor epoxide		NA			U	0.05		NA	
PCB-1016		NA			U	1		NA	
PCB-1221		NA			U	2		NA	
PCB-1232		NA			U	1		NA	
PCB-1242		NA			U	1		NA	
PCB-1248		NA			U	1		NA	
PCB-1254		NA			U	1		NA	
PCB-1260		NA			U	1		NA	
Toxaphene		NA			U	5		NA	
p,p'-Methoxychlor		NA			U	0.5		NA	
SEMIVOLATILES (ug/l)									
1,2,4-Trichlorobenzene		NA			U	10		NA	
1,2-Dichlorobenzene		NA			U	10		NA	
1,3-Dichlorobenzene		NA			U	10		NA	
1,4-Dichlorobenzene		NA			U	10		NA	
2,2'-Oxybis(1-chloropropane)		NA			U	10		NA	
2,4,5-Trichlorophenol		NA			U	25		NA	
2,4,6-Trichlorophenol		NA			U	10		NA	
2,4-Dichlorophenol		NA			U	10		NA	
2,4-Dimethylphenol		NA			U	10		NA	
2,4-Dinitrophenol		NA			U	25		NA	
2,4-Dinitrotoluene		NA			U	10		NA	
2,6-Dinitrotoluene (26DNT)		NA			U	10		NA	
2-Chloronaphthalene		NA			U	10		NA	
2-Chlorophenol		NA			U	10		NA	
2-Methylnaphthalene		NA			U	10		NA	
2-Methylphenol		NA			U	10		NA	
2-Nitroaniline		NA			U	25		NA	
2-Nitrophenol		NA			U	10		NA	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)									
3,3'-Dichlorobenzidine		NA			U	10		NA	
3-Nitroaniline		NA			U	25		NA	
4,6-Dinitro-2-methylphenol		NA			U	25		NA	
4-Bromophenyl phenyl ether		NA			U	10		NA	
4-Chloro-3-methylphenol		NA			U	10		NA	
4-Chloroaniline		NA			U	10		NA	
4-Chlorophenyl phenyl ether		NA			U	10		NA	
4-Methylphenol		NA			U	10		NA	
4-Nitroaniline		NA			U	25		NA	
4-Nitrophenol		NA			U	25		NA	
Acenaphthene		NA			U	10		NA	
Acenaphthylene		NA			U	10		NA	
Anthracene		NA			U	10		NA	
Benzo(a)anthracene		NA			U	10		NA	
Benzo(a)pyrene		NA			U	10		NA	
Benzo(b)fluoranthene		NA			U	10		NA	
Benzo(g,h,i)perylene		NA			U	10		NA	
Benzo(k)fluoranthene		NA			U	10		NA	
Butyl benzyl phthalate		NA			U	10		NA	
Carbazole		NA			U	10		NA	
Chrysene		NA			U	10		NA	
Di-n-butyl phthalate		NA			U	10		NA	
Di-n-octyl phthalate		NA			U	10		NA	
Dibenzo(a,h)anthracene		NA			U	10		NA	
Dibenzofuran		NA			U	10		NA	
Diethyl phthalate		NA			U	10		NA	
Dimethyl phthalate		NA			U	10		NA	
Fluoranthene		NA			U	10		NA	
Fluorene		NA			U	10		NA	
Hexachlorobenzene		NA			U	10		NA	
Hexachlorobutadiene		NA			U	10		NA	
Hexachlorocyclopentadiene		NA			U	10		NA	
Hexachloroethane		NA			U	10		NA	
Indeno(1,2,3-cd)pyrene		NA			U	10		NA	
Isophorone		NA			U	10		NA	
N-Nitroso-di-n-propylamine		NA			U	10		NA	
N-Nitrosodiphenylamine(1)		NA			U	10		NA	
Naphthalene		NA			U	10		NA	
Nitrobenzene (NB)		NA			U	10		NA	
Pentachlorophenol		NA			U	25		NA	
Phenanthrene		NA			U	10		NA	
Phenol		NA			U	10		NA	
Pyrene		NA			U	10		NA	
bis(2-Chloroethoxy)methane		NA			U	10		NA	
bis(2-Chloroethyl)ether		NA			U	10		NA	
bis(2-Ethylhexyl)phthalate		NA			U	10		NA	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum		NA		1340				NA	
Antimony		NA			U	42		NA	
Arsenic		NA			UW	4		NA	
Barium		NA		220				NA	
Beryllium		NA			U	2		NA	
Cadmium		NA			U	5		NA	
Calcium		NA		45500				NA	
Chromium		NA		27.2				NA	
Cobalt		NA		7.1	B			NA	
Copper		NA		21.5	B			NA	
Cyanide		NA			U	10		NA	
Iron		NA		5160	E			NA	
Lead		NA			U	2		NA	
Magnesium		NA		17400				NA	
Manganese		NA		502				NA	
Mercury		NA			U	0.2		NA	
Nickel		NA		43.2				NA	
Potassium		NA		9770				NA	
Selenium		NA			UWN	4		NA	
Silver		NA			U	10		NA	
Sodium		NA		20200				NA	
Thallium		NA			U	2		NA	
Vanadium		NA			U	8		NA	
Zinc		NA		171				NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2,2-Tetrachloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethene		U	1(10)		U	1(10)		U	1(10)
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,2-Dichloroethene(Total)		U	(10)		U	(10)		U	(10)
1,2-Dichloropropane		U	1(10)		U	1(10)		U	1(10)
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5(10)		U	5(10)		U	5(10)
2-Hexanone		U	5(10)		U	5(10)		U	5(10)
4-Methyl-2-pentanone		U	5(10)		U	5(10)		U	5(10)
Acetone		U	5(10)	(12)	U(B)	5	(9)	U(BJ)	5
Benzene		U	1(10)		U	1(10)		U	1(10)
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1(10)		U	1(10)		U	1(10)
Bromoform		U	1(10)		U	1(10)		U	1(10)
Bromomethane		U	1(10)		U	1(10)		U	1(10)
Carbon Dissulfide		U	1(10)		U	1(10)		U	1(10)
Carbon tetrachloride		U	1(10)		U	1(10)		U	1(10)
Chlorobenzene		U	1(10)		U	1(10)		U	1(10)

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-601-082			IH2-002-082			IH2-602-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Chloroethane		U	1(10)		U	1(10)		U	1(10)
Chloroform		U	1(10)		U	1(10)		U	1(10)
Chloromethane		U	1(10)		U	1(10)		U	1(10)
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Dibromochloromethane		U	1(10)		U	1(10)		U	1(10)
Ethylbenzene		U	1(10)		U	1(10)		U	1(10)
Methylene Chloride	3(2)	B(BJ)		1(1)	BJ(BJ)		0.8(1)	BJ(BJ)	
Styrene		U	1(10)		U	1(10)		U	1(10)
Tetrachloroethene		U	1(10)		U	1(10)		U	1(10)
Toluene		U	1(10)		U	1(10)		U	1(10)
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Trichloroethene		U	1(10)		U	1(10)		U	1(10)
Vinyl chloride		U	1(10)		U	1(10)		U	1(10)
Xylenes (Total)		U	1(10)		U	1(10)		U	1(10)
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA		210				NA	
Biochemical Oxygen Demand (BOD)		NA			U	4		NA	
Hardness as Calcium Carbonate		NA		280				NA	
Nitrate-Nitrite-N		NA		6.3				NA	
Total Dissolved Solids (TDS)		NA		310				NA	
Total Suspended Solids (TSS)		NA		28				NA	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		U	41		NA			U	41
Antimony		U	39		NA			U	39
Arsenic	5.8	B			NA			UW	4
Barium	117	B			NA		141	B	
Beryllium		U	1		NA			U	1
Cadmium		U	5		NA			U	5
Calcium	91000				NA		62800		
Chromium		U	6		NA			U	6
Cobalt		U	6		NA			U	6
Copper		U	4		NA			U	4
Iron	2810				NA		4460		
Lead		UW	2		NA			UW	2
Magnesium	16200				NA		19800		
Manganese	601				NA		415		
Mercury		UN	0.2		NA			UN	0.2
Nickel	18.3	B			NA		27.3	B	
Potassium	12500				NA		11000		
Selenium		UWN	4		NA			UN	20
Silver		U	6		NA			U	6
Sodium	22800				NA		28500		
Thallium		UWN	2		NA			UWN	2
Vanadium		U	5		NA			U	5
Zinc	94.3				NA		248		
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			U	0.5
2-Nitrotoluene (2NT)		U	0.5		NA			U	0.5
3-Nitrotoluene (3NT)		U	0.5		NA			U	0.5
4-Nitrotoluene (4NT)		U	0.5		NA			U	0.5
RDX		U	0.15		NA			U	0.15
Tetryl		U	0.5		NA			U	0.5
Nitrobenzene (NB)		U	0.25		NA			U	0.25
HMX		U	0.25		NA			U	0.25

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		NA			U	0.1
4,4'-DDE		U	0.1		NA			U	0.1
4,4'-DDT		U	0.1		NA			U	0.1
Aldrin		U	0.05		NA			U	0.05
Alpha chlordane		U	0.05		NA			U	0.05
Alpha-BHC		U	0.05		NA			U	0.05
Beta-BHC		U	0.05		NA			U	0.05
Delta-BHC		U	0.05		NA			U	0.05
Dieldrin		U	0.1		NA			U	0.1
Endosulfan I		U	0.05		NA			U	0.05
Endosulfan II		U	0.1		NA			U	0.1
Endosulfan sulfate		U	0.1		NA			U	0.1
Endrin		U	0.1		NA			U	0.1
Endrin aldehyde		U	0.1		NA			U	0.1
Endrin ketone		U	0.1		NA			U	0.1
Gamma chlordane		U	0.05		NA		0.0029	JPB	
Gamma-BHC (Lindane)		U	0.05		NA			U	0.05
Heptachlor		U	0.05		NA			U	0.05
Heptachlor epoxide		U	0.05		NA			U	0.05
PCB-1016		U	1		NA			U	1
PCB-1221		U	2		NA			U	2
PCB-1232		U	1		NA			U	1
PCB-1242		U	1		NA			U	1
PCB-1248		U	1		NA			U	1
PCB-1254		U	1		NA			U	1
PCB-1260		U	1		NA			U	1
Toxaphene		U	5		NA			U	5
p,p'-Methoxychlor		U	0.5		NA			U	0.5
SEMIVOLATILES (ug/l)									
1,2,4-Trichlorobenzene		U	10		NA			U	10
1,2-Dichlorobenzene		U	10		NA			U	10
1,3-Dichlorobenzene		U	10		NA			U	10
1,4-Dichlorobenzene		U	10		NA			U	10
2,2'-Oxybis(1-chloropropane)		U	10		NA			U	10
2,4,5-Trichlorophenol		U	25		NA			U	25
2,4,6-Trichlorophenol		U	10		NA			U	10
2,4-Dichlorophenol		U	10		NA			U	10
2,4-Dimethylphenol		U	10		NA			U	10
2,4-Dinitrophenol		U	25		NA			U	25
2,4-Dinitrotoluene		U	10		NA			U	10
2,6-Dinitrotoluene (26DNT)		U	10		NA			U	10
2-Chloronaphthalene		U	10		NA			U	10
2-Chlorophenol		U	10		NA			U	10
2-Methylnaphthalene		U	10		NA			U	10
2-Methylphenol		U	10		NA			U	10
2-Nitroaniline		U	25		NA			U	25
2-Nitrophenol		U	10		NA			U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)									
3,3'-Dichlorobenzidine		U	10		NA			U	10
3-Nitroaniline		U	25		NA			U	25
4,6-Dinitro-2-methylphenol		U	25		NA			U	25
4-Bromophenyl phenyl ether		U	10		NA			U	10
4-Chloro-3-methylphenol		U	10		NA			U	10
4-Chloroaniline		U	10		NA			U	10
4-Chlorophenyl phenyl ether		U	10		NA			U	10
4-Methylphenol		U	10		NA			U	10
4-Nitroaniline		U	25		NA			U	25
4-Nitrophenol		U	25		NA			U	25
Acenaphthene		U	10		NA			U	10
Acenaphthylene		U	10		NA			U	10
Anthracene		U	10		NA			U	10
Benzo(a)anthracene		U	10		NA			U	10
Benzo(a)pyrene		U	10		NA			U	10
Benzo(b)fluoranthene		U	10		NA			U	10
Benzo(g,h,i)perylene		U	10		NA			U	10
Benzo(k)fluoranthene		U	10		NA			U	10
Butyl benzyl phthalate		U	10		NA			U	10
Carbazole		U	10		NA			U	10
Chrysene		U	10		NA			U	10
Di-n-butyl phthalate		U	10		NA		3	J	
Di-n-octyl phthalate		U	10		NA			U	10
Dibenzo(a,h)anthracene		U	10		NA			U	10
Dibenzofuran		U	10		NA			U	10
Diethyl phthalate	1	J			NA		1	J	
Dimethyl phthalate		U	10		NA			U	10
Fluoranthene		U	10		NA			U	10
Fluorene		U	10		NA			U	10
Hexachlorobenzene		U	10		NA			U	10
Hexachlorobutadiene		U	10		NA			U	10
Hexachlorocyclopentadiene		U	10		NA			U	10
Hexachloroethane		U	10		NA			U	10
Indeno(1,2,3-cd)pyrene		U	10		NA			U	10
Isophorone		U	10		NA			U	10
N-Nitroso-di-n-propylamine		U	10		NA			U	10
N-Nitrosodiphenylamine(1)		U	10		NA			U	10
Naphthalene		U	10		NA			U	10
Nitrobenzene (NB)		U	10		NA			U	10
Pentachlorophenol		U	25		NA			U	25
Phenanthrene		U	10		NA			U	10
Phenol	1	BJ			NA		2	J	
Pyrene		U	10		NA			U	10
bis(2-Chloroethoxy)methane		U	10		NA			U	10
bis(2-Chloroethyl)ether		U	10		NA			U	10
bis(2-Ethylhexyl)phthalate	10	B			NA		12	B	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	263				NA		889		
Antimony		U	42		NA			U	42
Arsenic	5	BW			NA			UW	4
Barium	113	B			NA		144	B	
Beryllium		U	2		NA			U	2
Cadmium		U	5		NA			U	5
Calcium	82200				NA		53900		
Chromium	10.2				NA		15.4		
Cobalt		U	7		NA			U	7
Copper		U	16		NA		19.7	B	
Cyanide		U	10		NA			U	10
Iron	6080	E			NA		8700	E	
Lead		U	2		NA			U	2
Magnesium	14800				NA		17200		
Manganese	525				NA		425		
Mercury		U	0.2		NA			U	0.2
Nickel	33.3	B			NA		39.1	B	
Potassium	12700				NA		9990		
Selenium		UWN	4		NA		43.2	SN	
Silver		U	10		NA			U	10
Sodium	20200				NA		23700		
Thallium		U	2		NA			U	2
Vanadium		U	8		NA			U	8
Zinc	130				NA		332		
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2,2-Tetrachloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethene		U	1(10)		U	1(10)		U	1(10)
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,2-Dichloroethene(Total)		U	('10)		U	('10)		U	('10)
1,2-Dichloropropane		U	1(10)		U	1(10)		U	1(10)
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5(10)		U	5(10)		U	5(10)
2-Hexanone		U	5(10)		U	5(10)		U	5(10)
4-Methyl-2-pentanone		U	5(10)		U	5(10)		U	5(10)
Acetone	('10)	U(B)	5	('7)	U(BJ)	5		U	5(10)
Benzene		U	1(10)		U	1(10)		U	1(10)
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1(10)		U	1(10)		U	1(10)
Bromoform		U	1(10)		U	1(10)		U	1(10)
Bromomethane		U	1(10)		U	1(10)		U	1(10)
Carbon Dissulfide		U	1(10)		U	1(10)	2(3)	(J)	
Carbon tetrachloride		U	1(10)		U	1(10)		U	1(10)
Chlorobenzene		U	1(10)		U	1(10)		U	1(10)

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-002-082			JH2-602-082			IH2-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Chloroethane		U	1(10)		U	1(10)		U	1(10)
Chloroform		U	1(10)		U	1(10)		U	1(10)
Chloromethane		U	1(10)		U	1(10)		U	1(10)
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Dibromochloromethane		U	1(10)		U	1(10)		U	1(10)
Ethylbenzene		U	1(10)		U	1(10)		U	1(10)
Methylene Chloride	1(1)	BJ(BJ)		0.9(1)	BJ(BJ)		0.8(2)	BJ(BJ)	
Styrene		U	1(10)		U	1(10)		U	1(10)
Tetrachloroethene		U	1(10)		U	1(10)		U	1(10)
Toluene		U	1(10)		U	1(10)		U	1(10)
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Trichloroethene		U	1(10)		U	1(10)		U	1(10)
Vinyl chloride		U	1(10)		U	1(10)		U	1(10)
Xylenes (Total)		U	1(10)		U	1(10)		U	1(10)
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	370				NA		210		
Biochemical Oxygen Demand (BOD)		U	4		NA			U	4
Hardness as Calcium Carbonate	480				NA		240		
Nitrate-Nitrite-N		U	0.2		NA		8.9		
Total Dissolved Solids (TDS)	390				NA		600		
Total Suspended Solids (TSS)	47				NA		47		

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		U	41	357			137	B	
Antimony		U	39		U	39		U	39
Arsenic		UW	4	8.7	BW		7.9	BW	
Barium	149	B		165	B		123	B	
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	62900			90700			89300		
Chromium		U	6	49				U	6
Cobalt		U	6		U	6		U	6
Copper		U	4	46.2				U	4
Iron	5230			22200			3790		
Lead		UW	2	3.5				U	2
Magnesium	19900			15800			16200		
Manganese	441			812			655		
Mercury		UN	0.2		UN	0.2		UN	0.2
Nickel	29.2	B		28.7	B		16.8	B	
Potassium	10700			12900			12900		
Selenium		UWN	20		UWN	20		UN	20
Silver		U	6		U	6		U	6
Sodium	28400			30900			34100		
Thallium		UWN	2		UN	2		UN	2
Vanadium		U	5		U	5		U	5
Zinc	272			530			144		
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1		U	0.1
Endosulfan I		U	0.05	0.0047	JP			U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin		U	0.1		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05		U	0.05
Heptachlor epoxide		U	0.05	0.013	JP			U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
SEMIVOLATILES (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)									
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25		U	25		U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate		U	10	1	J		1	J	
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate		U	10	2	J		1	J	
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol		U	10	2	BJ		3	BJ	
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	3	BJ		2	BJ		10	B	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	276			619			2220		
Antimony		U	42		U	42		U	42
Arsenic		UW	4	8.9	BW		11	W	
Barium	177	B		133	B		154	B	
Beryllium		U	2		U	2		U	2
Cadmium		U	5		U	5		U	5
Calcium	58700			87100			80500		
Chromium	10.5			18.5			95.8		
Cobalt		U	7		U	7		U	7
Copper	32.3				U	16	46.6		
Cyanide		U	10		U	10		U	10
Iron	11600	E		9210	E		28700	E	
Lead		U	2		U	2	3.1		
Magnesium	18500			15700			14400		
Manganese	495			693			733		
Mercury		U	0.2		U	0.2		U	0.2
Nickel	44.1			27.8	B		50.4		
Potassium	9860			12100			13000		
Selenium	26	N+			UWN	4		UWN	4
Silver		U	10		U	10		U	10
Sodium	25600			29700			26300		
Thallium		U	2		UW	2		U	2
Vanadium		U	8		U	8		U	8
Zinc	586			222			590		
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2,2-Tetrachloroethane		U	1(10)		U	1(10)		U	1(10)
1,1,2-Trichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,1-Dichloroethene		U	1(10)		U	1(10)		U	1(10)
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1(10)		U	1(10)		U	1(10)
1,2-Dichloroethene(Total)		U	(10)		U	(10)		U	(10)
1,2-Dichloropropane		U	1(10)		U	1(10)		U	1(10)
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5(10)		U	5(10)		U	5(10)
2-Hexanone		U	5(10)		U	5(10)		U	5(10)
4-Methyl-2-pentanone		U	5(10)		U	5(10)		U	5(10)
Acetone		U	5(10)		U	5(10)		U	5(10)
Benzene		U	1(10)		U	1(10)		U	1(10)
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1(10)		U	1(10)		U	1(10)
Bromoform		U	1(10)		U	1(10)		U	1(10)
Bromomethane		U	1(10)		U	1(10)		U	1(10)
Carbon Dissulfide		U	1(10)	1(1)	(J)			U	1(10)
Carbon tetrachloride		U	1(10)		U	1(10)		U	1(10)
Chlorobenzene		U	1(10)		U	1(10)		U	1(10)

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-603-082			JH2-003-082			JH2-603-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Chloroethane		U	1(10)		U	1(10)		U	1(10)
Chloroform		U	1(10)		U	1(10)		U	1(10)
Chloromethane		U	1(10)		U	1(10)		U	1(10)
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Dibromochloromethane		U	1(10)		U	1(10)		U	1(10)
Ethylbenzene		U	1(10)		U	1(10)		U	1(10)
Methylene Chloride	(1)	U(BJ)	2	3(3)	B(BJ)		4(2)	B(BJ)	
Styrene		U	1(10)		U	1(10)		U	1(10)
Tetrachloroethene		U	1(10)		U	1(10)		U	1(10)
Toluene		U	1(10)		U	1(10)		U	1(10)
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1(10)		U	1(10)		U	1(10)
Trichloroethene		U	1(10)		U	1(10)		U	1(10)
Vinyl chloride		U	1(10)		U	1(10)		U	1(10)
Xylenes (Total)		U	1(10)		U	1(10)		U	1(10)
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			340			330		
Biochemical Oxygen Demand (BOD)		U	6		U	15	19		
Hardness as Calcium Carbonate	250			280			300		
Nitrate-Nitrite-N	8.4				U	0.2		U	0.2
Total Dissolved Solids (TDS)	690			420			410		
Total Suspended Solids (TSS)	180			42			71		

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-004-082			IH2-604-082			JH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	293			52.7	B		5140		
Antimony		U	39		U	39		U	39
Arsenic	4.4	B		5	B		71.8		
Barium	111	B		80	B		997		
Beryllium		U	1		U	1	10.7		
Cadmium		U	5		U	5		U	5
Calcium	54600			55800			295000		
Chromium		U	6		U	6		U	6
Cobalt	6.2	B			U	6	19.4	B	
Copper	5.3	B		6.8	B		39.1		
Iron	639			1130			41500		
Lead		U	2	113			152		
Magnesium	17100			17600			32500		
Manganese	145			292			2160		
Mercury		UN	0.2		UN	0.2		UN	0.2
Nickel	12.9	B		21.8	B		31.9	B	
Potassium	10700			10900			29400		
Selenium		UWN	4		UWN	4		UWN	20
Silver		U	6		U	6		U	6
Sodium	21900			22800			26500		
Thallium		UN	2		UN	20		UWN	2
Vanadium		U	5		U	5	83.2		
Zinc	56.1			106			1100		
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	0.15		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-004-082			IH2-604-082			JH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05	0.002	JP	
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin		U	0.1		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05	0.0067	JP	
Heptachlor		U	0.05		U	0.05	0.017	J	
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
SEMIVOLATILES (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-004-082			IH2-604-082			JH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)									
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25	1	J			U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate	1	J			U	10		U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	2	J		2	J			U	10
Dimethyl phthalate	1	J		1	J			U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)	1	J			U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol	5	BJ		5	BJ			U	10
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	3	BJ		2	BJ			U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-004-082			IH2-604-082			JH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	1960			986			13200		
Antimony		U	42		U	42		U	42
Arsenic	5.2	BW			UW	4	37.6		
Barium	120	B		131	B		391		
Beryllium		U	2		U	2	3.5	B	
Cadmium		U	5		U	5		U	5
Calcium	48500			50800			131000		
Chromium	13.4			9.6	B		16		
Cobalt		U	7		U	7	18.3	B	
Copper		U	16	19.7	B		52		
Cyanide		U	10		U	10		U	10
Iron	2600	E		2190	E		19200	E	
Lead		U	2		U	2	44.4		
Magnesium	15100			15400			20500		
Manganese	79.6			98			829		
Mercury		U	0.2		U	0.2		U	0.2
Nickel		U	25		U	25		U	25
Potassium	8710			8510			21300		
Selenium		UWN	4		UWN	4		UWN	20
Silver		U	10		U	10		U	10
Sodium	18200			18500			23100		
Thallium		U	2		U	2		U	2
Vanadium		U	8		U	8	58.2		
Zinc	132			267			449		
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		U	1		U	1		U	1
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone	3	J		5			14		
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon Dissulfide		U	1	0.8	J			U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	IH2-004-082			IH2-604-082			JH2-004-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene Chloride	1	BJ		2	B		2	B	
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.7	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	180			180			320		
Biochemical Oxygen Demand (BOD)	4				U	3	6		
Hardness as Calcium Carbonate	220			210			300		
Nitrate-Nitrite-N	5.8			6.3				U	0.2
Total Dissolved Solids (TDS)	370			1500			410	*	
Total Suspended Solids (TSS)	15			730			3600		

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum		NA		390		
Antimony		NA			U	39
Arsenic		NA		33.9		
Barium		NA		719		
Beryllium		NA			U	1
Cadmium		NA			U	5
Calcium		NA		307000		
Chromium		NA			U	6
Cobalt		NA			U	6
Copper		NA			U	4
Iron		NA		21100		
Lead		NA			UW	2
Magnesium		NA		31300		
Manganese		NA		2020		
Mercury		NA			UN	0.2
Nickel		NA		13.4	B	
Potassium		NA		24300		
Selenium		NA			UWN	20
Silver		NA			U	6
Sodium		NA		25700		
Thallium		NA			UWN	2
Vanadium		NA			U	5
Zinc		NA		448		
EXPLOSIVES (ug/l)						
1,3,5-Trinitrobenzene (TNB)		NA			U	0.25
1,3-Dinitrobenzene (DNB)		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		NA			U	0.5
2-Nitrotoluene (2NT)		NA			U	0.5
3-Nitrotoluene (3NT)		NA			U	0.5
4-Nitrotoluene (4NT)		NA			U	0.5
RDX		NA			U	0.15
Tetryl		NA			U	0.5
Nitrobenzene (NB)		NA			U	0.25
HMX		NA			U	0.25

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)						
4,4'-DDD		NA			U	0.1
4,4'-DDE		NA			U	0.1
4,4'-DDT		NA			U	0.1
Aldrin		NA			U	0.05
Alpha chlordane		NA			U	0.05
Alpha-BHC		NA			U	0.05
Beta-BHC		NA			U	0.05
Delta-BHC		NA			U	0.05
Dieldrin		NA			U	0.1
Endosulfan I		NA			U	0.05
Endosulfan II		NA			U	0.1
Endosulfan sulfate		NA			U	0.1
Endrin		NA			U	0.1
Endrin aldehyde		NA			U	0.1
Endrin ketone		NA			U	0.1
Gamma chlordane		NA			U	0.05
Gamma-BHC (Lindane)		NA			U	0.05
Heptachlor		NA			U	0.05
Heptachlor epoxide		NA			U	0.05
PCB-1016		NA			U	1
PCB-1221		NA			U	2
PCB-1232		NA			U	1
PCB-1242		NA			U	1
PCB-1248		NA			U	1
PCB-1254		NA			U	1
PCB-1260		NA			U	1
Toxaphene		NA			U	5
p,p'-Methoxychlor		NA			U	0.5
SEMIVOLATILES (ug/l)						
1,2,4-Trichlorobenzene		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10
2,4-Dichlorophenol		U	10		U	10
2,4-Dimethylphenol		U	10		U	10
2,4-Dinitrophenol		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10
2-Chloronaphthalene		U	10		U	10
2-Chlorophenol		U	10		U	10
2-Methylnaphthalene		U	10		U	10
2-Methylphenol		U	10		U	10
2-Nitroaniline		U	25		U	25
2-Nitrophenol		U	10		U	10

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)						
3,3'-Dichlorobenzidine		U	10		U	10
3-Nitroaniline		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10
4-Chloroaniline		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10
4-Methylphenol		U	10		U	10
4-Nitroaniline		U	25		U	25
4-Nitrophenol		U	25	5	J	
Acenaphthene		U	10		U	10
Acenaphthylene		U	10		U	10
Anthracene		U	10		U	10
Benzo(a)anthracene		U	10		U	10
Benzo(a)pyrene		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10
Butyl benzyl phthalate		U	10		U	10
Carbazole		U	10		U	10
Chrysene		U	10		U	10
Di-n-butyl phthalate	7	J			U	10
Di-n-octyl phthalate		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10
Dibenzofuran		U	10		U	10
Diethyl phthalate	1	J			U	10
Dimethyl phthalate		U	10		U	10
Fluoranthene		U	10		U	10
Fluorene		U	10		U	10
Hexachlorobenzene		U	10		U	10
Hexachlorobutadiene		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10
Hexachloroethane		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10
Isophorone		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10
Naphthalene		U	10		U	10
Nitrobenzene (NB)		U	10		U	10
Pentachlorophenol		U	25		U	25
Phenanthrene		U	10		U	10
Phenol	1	J			U	10
Pyrene		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10
bis(2-Ethylhexyl)phthalate	4	BJ		1	BJ	

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)						
Aluminum		NA		93600		
Antimony		NA			U	42
Arsenic		NA		114		
Barium		NA		1670		
Beryllium		NA		20.8		
Cadmium		NA			U	5
Calcium		NA		397000		
Chromium		NA		83.4		
Cobalt		NA		55.8		
Copper		NA		102		
Cyanide		NA			U	10
Iron		NA		160000	E	
Lead		NA		70.8		
Magnesium		NA		59000		
Manganese		NA		3590		
Mercury		NA		0.22		
Nickel		NA		98.5		
Potassium		NA		44700		
Selenium		NA			UWN	20
Silver		NA			U	10
Sodium		NA		23000		
Thallium		NA			U	2
Vanadium		NA		345		
Zinc		NA		1720		
VOLATILES (ug/l)						
1,1,1-Trichloroethane		NA			U	1
1,1,2,2-Tetrachloroethane		NA			U	1
1,1,2-Trichloroethane		NA			U	1
1,1-Dichloroethane		NA			U	1
1,1-Dichloroethene		NA			U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1
1,2-Dichlorobenzene		NA			U	1
1,2-Dichloroethane		NA			U	1
1,2-Dichloroethene(Total)		NA			U	1
1,2-Dichloropropane		NA			U	1
1,3-Dichlorobenzene		NA			U	1
1,4-Dichlorobenzene		NA			U	1
2-Butanone		NA			U	5
2-Hexanone		NA			U	5
4-Methyl-2-pentanone		NA			U	5
Acetone		NA		6		
Benzene		NA			U	1
Bromochloromethane		NA			U	1
Bromodichloromethane		NA			U	1
Bromoform		NA			U	1
Bromomethane		NA			U	1
Carbon Dissulfide		NA			U	1
Carbon tetrachloride		NA			U	1
Chlorobenzene		NA			U	1

Appendix D-14 Analytical Data of Administration Area Hydropunch ("H2") Groundwater Samples

	JH2-004-082-RE			JH2-604-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)						
Chloroethane	NA				U	1
Chloroform	NA				U	1
Chloromethane	NA				U	1
Cis-1,2-Dichloroethene	NA				U	1
Cis-1,3-Dichloropropene	NA				U	1
Dibromochloromethane	NA				U	1
Ethylbenzene	NA				U	1
Methylene Chloride	NA				U	2
Styrene	NA				U	1
Tetrachloroethene	NA				U	1
Toluene	NA				U	1
Trans-1,2-Dichloroethene	NA				U	1
Trans-1,3-Dichloropropene	NA				U	1
Trichloroethene	NA				U	1
Vinyl chloride	NA				U	1
Xylenes (Total)	NA				U	1
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	NA			1220		
Biochemical Oxygen Demand (BOD)	NA			13		
Hardness as Calcium Carbonate	NA			280		
Nitrate-Nitrite-N	NA			490		
Total Dissolved Solids (TDS)	NA			440	*	
Total Suspended Solids (TSS)	NA			50000		

Note : When both the VOC CLP Analyses and the Low Level VOC CLP Analyses were performed to the sample, results, quantitation limits, and data qualifiers corresponding to the VOC CLP Analyses are enclosed in brackets.

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	118	B		148	B			U	41
Antimony		U	39		U	39		U	39
Arsenic		U	4		U	4	5.1	B	
Barium	197	B		152	B		153	B	
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	42400			28300			57000		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Iron		U	46		U	46		U	46
Lead		UWN	2		UWN	2		UWN	2
Magnesium	12600			8520			13300		
Manganese	82.6			76.9			2.9	B	
Mercury		UN	0.2		UN	0.2		UN	0.2
Nickel		U	10		U	10		U	10
Potassium	11100			6410			8390		
Selenium		UW	4		UW	4		UW	4
Silver		U	6		U	6		U	6
Sodium	12900			11600			13000		
Thallium		UWN	2		UWN	2		UWN	2
Vanadium		U	5		U	5		U	5
Zinc	5	B		4.7	B		4.5	B	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	3.1			0.37			4.8		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	0.92			0.48			1.9		

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05		U	0.05
Alpha chlordane	0.014	JP		0.0028	JP		0.01	JP	
Alpha-BHC		U	0.05		U	0.05	0.0024	JP	
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1	0.0033	JP			U	0.1
Endosulfan I		U	0.05		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin		U	0.1		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1		U	0.1
Gamma chlordane	0.0075	JP			U	0.05	0.0071	JP	
Gamma-BHC (Lindane)		U	0.05		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor	0.0098	JP			U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		U	1		U	1		U	1
Gross Beta (Radioactivity)	10.21			5.69			6.42		
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25		U	25		U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate	1	J			U	10		U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	2	BJ			U	10		U	10
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol		U	10		U	10		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	5	BJ		2	BJ		4	BJ	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	120	B*		397	*		174	B*	
Antimony		U	39		U	39		U	39
Arsenic		UW	4		U	4		UW	4
Barium	166	B		140	B		138	B	
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	37500			27100			54200		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Cyanide		U	10		U	10		U	10
Iron		U*	46	206	*		58	B*	
Lead		U	2		U	2		U	2
Magnesium	10700			8050			12700		
Manganese	73.3			82			10.7	B	
Mercury		U	0.2		U	0.2		U	0.2
Nickel		U	10		U	10		U	10
Potassium	9620			6180			7930		
Selenium		UWN	4		UWN	4		UN	40
Silver		U	6		U	6		U	6
Sodium	10800	E		11000	E		12700	E	
Thallium		UW	2		U	2		UW	2
Vanadium		U	5		U	5		U	5
Zinc	5	B		4.8	B		4.1	B	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-052-082			BMW-052-082			AMW-053-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1	3		
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene	2			2			2		
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.6	BJ			U	2	1	BJ	
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.6	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene	3			1			8		
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			84			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	160			120			210		
Nitrate-Nitrite-N	100			220				U	0.2
Total Dissolved Solids (TDS)	230			190			260		
Total Suspended Solids (TSS)		U	5	20			10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	290			215			321		
Temperature (Celsius)	12.5			12.5			12.3		
pH	6.72			6.83			6.68		

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	115	B			U	41	88.7	B	
Antimony		U	39		U	39		U	39
Arsenic	8.6	BW			U	4	4.1	BW	
Barium	191	B		221			413		
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	57100			51200			43400		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Iron		U	46		U	46		U	46
Lead		UWN	2		UWN	2		UWN	2
Magnesium	19000			12200			13900		
Manganese	14.1	B		6	B		1010		
Mercury		UN	0.2		UN	0.2		UN	0.2
Nickel		U	10		U	10		U	10
Potassium	9910			6720			8190		
Selenium		U	4		UW	20		UW	4
Silver		U	6		U	6		U	6
Sodium	18500			20500			13100		
Thallium		UWN	2		UWN	2		UWN	2
Vanadium		U	5		U	5		U	5
Zinc	13.6	B		4.8	B		50.4		
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	4.2			0.91				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	0.91				U	0.25		U	0.25

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin		U	0.1		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		U	1		U	1	1.38		
Gross Beta (Radioactivity)	8.27			6.79			8.69		
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		U	10		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2-Chlorophenol		U	10		U	10		U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10		U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25		U	25		U	25
Acenaphthene		U	10		U	10		U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate	1	J			U	10		U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	1	J			U	10	1	BJ	
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10		U	10
N-Nitrosodiphenylamine(1)	1	J			U	10		U	10
Naphthalene		U	10		U	10		U	10
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25		U	25		U	25
Phenanthrene		U	10		U	10		U	10
Phenol	4	BJ		1	J		2	J	

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Pyrene		U	10		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	12	B		2	BJ		4	BJ	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	211	*		149	B*		1820	*	
Antimony		U	39		U	39		U	39
Arsenic	7.8	B			UW	4		U	4
Barium	177	B		214			434		
Beryllium		U	1		U	1		U	1
Cadmium		U	5		U	5		U	5
Calcium	53000			49900			42700		
Chromium		U	6		U	6		U	6
Cobalt		U	6		U	6		U	6
Copper		U	4		U	4		U	4
Cyanide		U	10		U	10		U	10
Iron	58	B*			U*	46	1280	*	
Lead		UW	2		U	2		U	2
Magnesium	17900			11900			13800		
Manganese	20.9			7	B		1090		
Mercury		U	0.2		U	0.2		U	0.2
Nickel		U	10		U	10	11.1	B	
Potassium	9000			6600			7930		
Selenium		UWN	4		UN	40		UWN	40
Silver		U	6		U	6		U	6
Sodium	18000	E		20100	E		14000	E	
Thallium		UW	2		UW	2		U	2
Vanadium		U	5		U	5	5.5	B	
Zinc	30.6			4.3	B		47.1		
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		U	1
1,1,2,2-Tetrachloroethane		U	10		U	1		U	1
1,1,2-Trichloroethane		U	10		U	1		U	1
1,1-Dichloroethane		U	10		U	1		U	1
1,1-Dichloroethene		U	10		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		U	1
1,2-Dichlorobenzene		NA			U	1		U	1
1,2-Dichloroethane		U	10		U	1		U	1
1,2-Dichloroethene(Total)	10				NA			NA	
1,2-Dichloropropane		U	10		U	1		U	1
1,3-Dichlorobenzene		NA			U	1		U	1
1,4-Dichlorobenzene		NA			U	1		U	1
2-Butanone		U	10		U	5		U	5
2-Hexanone		U	10		U	5		U	5

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	BMW-053-082			AMW-054-082			BMW-054-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
4-Methyl-2-pentanone		U	10		U	5		U	5
Acetone		U	10		U	5		U	5
Benzene		U	10		U	1		U	1
Bromochloromethane		NA			U	1		U	1
Bromodichloromethane		U	10		U	1		U	1
Bromoform		U	10		U	1		U	1
Bromomethane		U	10		U	1		U	1
Carbon disulfide		U	10		U	1		U	1
Carbon tetrachloride		U	10		U	1		U	1
Chlorobenzene		U	10		U	1		U	1
Chloroethane		U	10		U	1		U	1
Chloroform	4	J			U	1		U	1
Chloromethane		U	10		U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Cis-1,3-Dichloropropene		U	10		U	1		U	1
Dibromochloromethane		U	10		U	1		U	1
Ethylbenzene		U	10		U	1		U	1
Methylene chloride	2	BJ		1	BJ		1	BJ	
Styrene		U	10		U	1		U	1
Tetrachloroethene		U	10		U	1		U	1
Toluene		U	10	0.6	J			U	1
Trans-1,2-Dichloroethene		NA			U	1		U	1
Trans-1,3-Dichloropropene		U	10		U	1		U	1
Trichloroethene	97				U	1		U	1
Vinyl chloride		U	10		U	1		U	1
Xylenes (Total)		U	10		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	160			180			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4.9		
Hardness as Calcium Carbonate	240			170			180		
Nitrate-Nitrite-N	6.5			4			1.3		
Total Dissolved Solids (TDS)	320			290			360		
Total Suspended Solids (TSS)	10			5			2600		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	370			334				NA	
Temperature (Celsius)	11.9			12.2				NA	
pH	6.31			6.55				NA	

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum	104	B		107	B	
Antimony		U	39		U	39
Arsenic	4	BW		4.3	BW	
Barium	149	B		260		
Beryllium		U	1		U	1
Cadmium		U	5		U	5
Calcium	57700			47000		
Chromium		U	6		U	6
Cobalt		U	6		U	6
Copper		U	4		U	4
Iron		U	46		U	46
Lead		UWN	2		UWN	2
Magnesium	12700			11200		
Manganese	7.3	B		19.1		
Mercury		UN	0.2		UN	0.2
Nickel		U	10		U	10
Potassium	7680			6910		
Selenium		UW	4		UW	4
Silver		U	6		U	6
Sodium	21400			15400		
Thallium		UWN	2		UWN	2
Vanadium		U	5		U	5
Zinc	6.2	B		5.1	B	
EXPLOSIVES (ug/l)						
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5
RDX	0.52			0.24		
Tetryl		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25
HMX		U	0.25		U	0.25

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)						
4,4'-DDD		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1
Endrin		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05
PCB-1016		U	1		U	1
PCB-1221		U	2		U	2
PCB-1232		U	1		U	1
PCB-1242		U	1		U	1
PCB-1248		U	1		U	1
PCB-1254		U	1		U	1
PCB-1260		U	1		U	1
Toxaphene		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)						
Gross Alpha (Radioactivity)		U	1		U	1
Gross Beta (Radioactivity)	3.65			5.18		
SEMIVOLATILES (SVOC) (ug/l)						
1,2,4-Trichlorobenzene		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10
2,4-Dichlorophenol		U	10		U	10
2,4-Dimethylphenol		U	10		U	10
2,4-Dinitrophenol		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10
2-Chloronaphthalene		U	10		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)						
2-Chlorophenol		U	10		U	10
2-Methylnaphthalene		U	10		U	10
2-Methylphenol		U	10		U	10
2-Nitroaniline		U	25		U	25
2-Nitrophenol		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10
3-Nitroaniline		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10
4-Chloroaniline		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10
4-Methylphenol		U	10		U	10
4-Nitroaniline		U	25		U	25
4-Nitrophenol		U	25		U	25
Acenaphthene		U	10		U	10
Acenaphthylene		U	10		U	10
Anthracene		U	10		U	10
Benzo(a)anthracene		U	10		U	10
Benzo(a)pyrene		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10
Butyl benzyl phthalate		U	10		U	10
Carbazole		U	10		U	10
Chrysene		U	10		U	10
Di-n-butyl phthalate		U	10		U	10
Di-n-octyl phthalate		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10
Dibenzofuran		U	10		U	10
Diethyl phthalate		U	10		U	10
Dimethyl phthalate		U	10		U	10
Fluoranthene		U	10		U	10
Fluorene		U	10		U	10
Hexachlorobenzene		U	10		U	10
Hexachlorobutadiene		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10
Hexachloroethane		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10
Isophorone		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10
Naphthalene		U	10		U	10
Nitrobenzene (NB)		U	10		U	10
Pentachlorophenol		U	25		U	25
Phenanthrene		U	10		U	10
Phenol	1	J		1	J	

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)						
Pyrene		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10
bis(2-Ethylhexyl)phthalate	9	BJ		6	BJ	
TOTAL METALS / CYANIDE (ug/l)						
Aluminum	191	B*		190	B*	
Antimony		U	39		U	39
Arsenic		UW	4		UW	4
Barium	130	B		243		
Beryllium		U	1		U	1
Cadmium		U	5		U	5
Calcium	52700			44400		
Chromium		U	6		U	6
Cobalt		U	6		U	6
Copper		U	4		U	4
Cyanide		U	10		U	10
Iron	77.3	B*			U*	46
Lead		U	2		U	2
Magnesium	11600			10600		
Manganese	9.1	B		16.8		
Mercury		U	0.2		U	0.2
Nickel		U	10		U	10
Potassium	7200			6320		
Selenium		UWN	4		UN	40
Silver		U	6		U	6
Sodium	19800	E		14700	E	
Thallium		UW	2		UW	2
Vanadium		U	5		U	5
Zinc	14.5	B			U	3
VOLATILES (VOC) (ug/l)						
1,1,1-Trichloroethane		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1
1,1-Dichloroethane		U	1		U	1
1,1-Dichloroethene		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1
1,2-Dichloroethane		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA	
1,2-Dichloropropane		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1
2-Butanone		U	5		U	5
2-Hexanone		U	5		U	5

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-055-082			BMW-055-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)						
4-Methyl-2-pentanone		U	5		U	5
Acetone		U	5	6		
Benzene		U	1		U	1
Bromochloromethane		U	1		U	1
Bromodichloromethane		U	1		U	1
Bromoform		U	1		U	1
Bromomethane		U	1		U	1
Carbon disulfide		U	1		U	1
Carbon tetrachloride		U	1		U	1
Chlorobenzene		U	1		U	1
Chloroethane		U	1		U	1
Chloroform		U	1		U	1
Chloromethane		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1
Dibromochloromethane		U	1		U	1
Ethylbenzene		U	1		U	1
Methylene chloride	0.8	BJ		0.9	BJ	
Styrene		U	1		U	1
Tetrachloroethene		U	1		U	1
Toluene		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1
Trichloroethene		U	1		U	1
Vinyl chloride		U	1		U	1
Xylenes (Total)		U	1		U	1
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	200			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3
Hardness as Calcium Carbonate	190			180		
Nitrate-Nitrite-N	3.3			3.6		
Total Dissolved Solids (TDS)	310			280		
Total Suspended Solids (TSS)	9				U	5
FIELD PARAMETERS						
Specific Conductance (umhos/cm)	350			290		
Temperature (Celsius)	11.8			11.7		
pH	6.6			6.41		

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)						
Aluminum	142	B		139	B	
Antimony		U	39		U	39
Arsenic	4.4	B		5.9	BW	
Barium	150	B		483		
Beryllium		U	1		U	1
Cadmium		U	5		U	5
Calcium	52800			111000		
Chromium		U	6		U	6
Cobalt		U	6		U	6
Copper		U	4		U	4
Iron		U	46		U	46
Lead		UWN	2		UW	2
Magnesium	12100			33900		
Manganese	9.4	B		25.7		
Mercury		UN	0.2		UN	0.2
Nickel		U	10		U	10
Potassium	7260			5720		
Selenium		UW	4		UW	4
Silver		U	6		U	6
Sodium	20600			34800		
Thallium		UWN	2		UWN	20
Vanadium		U	5		U	5
Zinc	10.1	B		7.7	B	
EXPLOSIVES (ug/l)						
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5
RDX	0.91			0.67		
Tetryl		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25
HMX		U	0.25	0.43		

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)						
4,4'-DDD		U	0.1		U	0.1
4,4'-DDE		U	0.1		U	0.1
4,4'-DDT		U	0.1		U	0.1
Aldrin		U	0.05		U	0.05
Alpha chlordane		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05
Dieldrin		U	0.1		U	0.1
Endosulfan I		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1
Endrin		U	0.1		U	0.1
Endrin aldehyde		U	0.1		U	0.1
Endrin ketone		U	0.1		U	0.1
Gamma chlordane		U	0.05		U	0.05
Gamma-BHC (Lindane)		U	0.05		U	0.05
Heptachlor		U	0.05		U	0.05
Heptachlor epoxide		U	0.05		U	0.05
PCB-1016		U	1		U	1
PCB-1221		U	2		U	2
PCB-1232		U	1		U	1
PCB-1242		U	1		U	1
PCB-1248		U	1		U	1
PCB-1254		U	1		U	1
PCB-1260		U	1		U	1
Toxaphene		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)						
Gross Alpha (Radioactivity)		U	1	5.12		
Gross Beta (Radioactivity)	6.42			2.36		
SEMIVOLATILES (SVOC) (ug/l)						
1,2,4-Trichlorobenzene		U	10		U	10
1,2-Dichlorobenzene		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10
1,4-Dichlorobenzene		U	10		U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10
2,4-Dichlorophenol		U	10		U	10
2,4-Dimethylphenol		U	10		U	10
2,4-Dinitrophenol		U	25		U	25
2,4-Dinitrotoluene		U	10		U	10
2,6-Dinitrotoluene (26DNT)		U	10		U	10
2-Chloronaphthalene		U	10		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)						
2-Chlorophenol		U	10		U	10
2-Methylnaphthalene		U	10		U	10
2-Methylphenol		U	10		U	10
2-Nitroaniline		U	25		U	25
2-Nitrophenol		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10
3-Nitroaniline		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10
4-Chloro-3-methylphenol		U	10		U	10
4-Chloroaniline		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10
4-Methylphenol		U	10		U	10
4-Nitroaniline		U	25		U	25
4-Nitrophenol		U	25		U	25
Acenaphthene		U	10		U	10
Acenaphthylene		U	10		U	10
Anthracene		U	10		U	10
Benzo(a)anthracene		U	10		U	10
Benzo(a)pyrene		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10
Butyl benzyl phthalate		U	10		U	10
Carbazole		U	10		U	10
Chrysene		U	10		U	10
Di-n-butyl phthalate		U	10		U	10
Di-n-octyl phthalate		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10
Dibenzofuran		U	10		U	10
Diethyl phthalate		U	10	1	BJ	
Dimethyl phthalate		U	10		U	10
Fluoranthene		U	10		U	10
Fluorene		U	10		U	10
Hexachlorobenzene		U	10		U	10
Hexachlorobutadiene		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10
Hexachloroethane		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10
Isophorone		U	10		U	10
N-Nitroso-di-n-propylamine		U	10		U	10
N-Nitrosodiphenylamine(1)		U	10		U	10
Naphthalene		U	10		U	10
Nitrobenzene (NB)		U	10		U	10
Pentachlorophenol		U	25		U	25
Phenanthrene		U	10		U	10
Phenol		U	10	3	BJ	

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)						
Pyrene		U	10		U	10
bis(2-Chloroethoxy)methane		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10
bis(2-Ethylhexyl)phthalate	4	BJ		3	BJ	
TOTAL METALS / CYANIDE (ug/l)						
Aluminum	137	B*		243		
Antimony		U	39		U	39
Arsenic		UW	4	5	BWN	
Barium	135	B		450		
Beryllium		U	1		U	1
Cadmium		U	5		U	5
Calcium	49600			99600		
Chromium		U	6		U	6
Cobalt		U	6		U	6
Copper		U	4		U	4
Cyanide		U	10		U	10
Iron		U*	46	75.8	B	
Lead		UW	2	2.6	BWN*	
Magnesium	11300			31200		
Manganese	8.8	B		25.2		
Mercury		U	0.2		U	0.2
Nickel		U	10		U	10
Potassium	6770			5280		
Selenium		UWN	4		UN	4
Silver		U	6		U	6
Sodium	18900	E		32900		
Thallium		U	2		UWN	2
Vanadium		U	5		U	5
Zinc	5.1	B		5.5	B	
VOLATILES (VOC) (ug/l)						
1,1,1-Trichloroethane		U	1		U	10
1,1,2,2-Tetrachloroethane		U	1		U	10
1,1,2-Trichloroethane		U	1		U	10
1,1-Dichloroethane		U	1		U	10
1,1-Dichloroethene		U	1		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA	
1,2-Dichlorobenzene		U	1		NA	
1,2-Dichloroethane		U	1		U	10
1,2-Dichloroethene(Total)		NA			U	10
1,2-Dichloropropane		U	1		U	10
1,3-Dichlorobenzene		U	1		NA	
1,4-Dichlorobenzene		U	1		NA	
2-Butanone		U	5		U	10
2-Hexanone		U	5		U	10

Appendix D-15 Analytical Data of Landfill Area Groundwater Monitoring Well Samples

	AMW-056-082			BMW-056-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)						
4-Methyl-2-pentanone		U	5		U	10
Acetone		U	5		U	10
Benzene		U	1		U	10
Bromochloromethane		U	1		NA	
Bromodichloromethane		U	1		U	10
Bromoform		U	1		U	10
Bromomethane		U	1		U	10
Carbon disulfide		U	1		U	10
Carbon tetrachloride		U	1		U	10
Chlorobenzene		U	1		U	10
Chloroethane		U	1		U	10
Chloroform		U	1		U	10
Chloromethane		U	1		U	10
Cis-1,2-Dichloroethene		U	1		NA	
Cis-1,3-Dichloropropene		U	1		U	10
Dibromochloromethane		U	1		U	10
Ethylbenzene		U	1		U	10
Methylene chloride	0.7	J		1	BJ	
Styrene		U	1		U	10
Tetrachloroethene		U	1		U	10
Toluene		U	1		U	10
Trans-1,2-Dichloroethene		U	1		NA	
Trans-1,3-Dichloropropene		U	1		U	10
Trichloroethene		U	1	11		
Vinyl chloride		U	1		U	10
Xylenes (Total)		U	1		U	10
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	180			150		
Biochemical Oxygen Demand (BOD)		U	3		U	3
Hardness as Calcium Carbonate	180			410		
Nitrate-Nitrite-N	3.9			13		
Total Dissolved Solids (TDS)	300			630		
Total Suspended Solids (TSS)		U	5	15		
FIELD PARAMETERS						
Specific Conductance (umhos/cm)	338			759		
Temperature (Celsius)	11.7			11.2		
pH	6.61			6.35		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-011-082			AMW-018-082			BMW-018-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	33				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	3.7				U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone	7				U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1	1				U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		1	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-011-082			AMW-018-082			BMW-018-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	160			250			180		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	170			390			190		
Nitrate-Nitrite-N		U	0.2		U	0.2	3		
Total Dissolved Solids (TDS)	220			860			320		
Total Suspended Solids (TSS)	14				U	5	12		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	281			936			351		
Temperature (Celsius)	12.3			12.9			12.2		
pH	7.05			6.89			6.72		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	CMW-018-082			AMW-019-082			BMW-019-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	1.9				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	0.26				U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		U	1
1,1,2,2-Tetrachloroethane		U	10		U	1		U	1
1,1,2-Trichloroethane		U	10		U	1		U	1
1,1-Dichloroethane		U	10		U	1		U	1
1,1-Dichloroethene		U	10		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		U	1
1,2-Dichlorobenzene		NA			U	1		U	1
1,2-Dichloroethane		U	10		U	1		U	1
1,2-Dichloroethene(Total)	3	J			NA			NA	
1,2-Dichloropropane		U	10		U	1		U	1
1,3-Dichlorobenzene		NA			U	1		U	1
1,4-Dichlorobenzene		NA			U	1		U	1
2-Butanone		U	10		U	5		U	5
2-Hexanone		U	10		U	5		U	5
4-Methyl-2-pentanone		U	10		U	5		U	5
Acetone		U	10		U	5		U	5
Benzene		U	10		U	1		U	1
Bromochloromethane		NA			U	1		U	1
Bromodichloromethane		U	10		U	1		U	1
Bromoform		U	10		U	1		U	1
Bromomethane		U	10		U	1		U	1
Carbon disulfide		U	10		U	1		U	1
Carbon tetrachloride		U	10		U	1		U	1
Chlorobenzene		U	10		U	1		U	1
Chloroethane		U	10		U	1		U	1
Chloroform	15				U	1		U	1
Chloromethane		U	10		U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Cis-1,3-Dichloropropene		U	10		U	1		U	1
Dibromochloromethane		U	10		U	1		U	1
Ethylbenzene		U	10		U	1		U	1
Methylene chloride	1	BJ		8	B		4	B	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	CMW-018-082			AMW-019-082			BMW-019-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	1		U	1
Tetrachloroethene		U	10		U	1		U	1
Toluene		U	10		U	1	1		
Trans-1,2-Dichloroethene		NA			U	1		U	1
Trans-1,3-Dichloropropene		U	10		U	1		U	1
Trichloroethene	76				U	1		U	1
Vinyl chloride		U	10		U	1		U	1
Xylenes (Total)		U	10		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	120			240			280		
Biochemical Oxygen Demand (BOD)	10				U	3		U	3
Hardness as Calcium Carbonate	290			600			440		
Nitrate-Nitrite-N	38				U	0.2		U	0.2
Total Dissolved Solids (TDS)	570			1400	*		900	*	
Total Suspended Solids (TSS)	1300			6				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)		NA		1337			921		
Temperature (Celsius)		NA		12.9			12.3		
pH		NA		7.09			7.02		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	CMW-019-082			AMW-040-082			BMW-040-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	10		U	170
1,1,2,2-Tetrachloroethane		U	1		U	10		U	170
1,1,2-Trichloroethane		U	1		U	10		U	170
1,1-Dichloroethane		U	1		U	10		U	170
1,1-Dichloroethene		U	1		U	10		U	170
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			NA	
1,2-Dichlorobenzene		U	1		NA			NA	
1,2-Dichloroethane		U	1		U	10		U	170
1,2-Dichloroethene(Total)		NA			U	10		U	170
1,2-Dichloropropane		U	1		U	10		U	170
1,3-Dichlorobenzene		U	1		NA			NA	
1,4-Dichlorobenzene		U	1		NA			NA	
2-Butanone		U	5		U	10		U	170
2-Hexanone		U	5		U	10		U	170
4-Methyl-2-pentanone		U	5		U	10		U	170
Acetone		U	5		U	10		U	170
Benzene		U	1		U	10		U	170
Bromochloromethane		U	1		NA			NA	
Bromodichloromethane		U	1		U	10		U	170
Bromoform		U	1		U	10		U	170
Bromomethane		U	1		U	10		U	170
Carbon disulfide		U	1		U	10		U	170
Carbon tetrachloride		U	1		U	10		U	170
Chlorobenzene		U	1		U	10		U	170
Chloroethane		U	1		U	10		U	170
Chloroform		U	1		U	10		U	170
Chloromethane		U	1		U	10		U	170
Cis-1,2-Dichloroethene		U	1		NA			NA	
Cis-1,3-Dichloropropene		U	1		U	10		U	170
Dibromochloromethane		U	1		U	10		U	170
Ethylbenzene		U	1		U	10		U	170
Methylene chloride	2	B		5	BJ		43	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	CMW-019-082			AMW-040-082			BMW-040-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	10		U	170
Tetrachloroethene		U	1		U	10		U	170
Toluene	1				U	10		U	170
Trans-1,2-Dichloroethene		U	1		NA			NA	
Trans-1,3-Dichloropropene		U	1		U	10		U	170
Trichloroethene		U	1	22			1800		
Vinyl chloride		U	1		U	10		U	170
Xylenes (Total)		U	1		U	10		U	170
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	110			280			160		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	300			300			230		
Nitrate-Nitrite-N	37				U	0.2	7.2		
Total Dissolved Solids (TDS)	670	*		470			310		
Total Suspended Solids (TSS)	61			13			13		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	558			517			329		
Temperature (Celsius)	12.9			5.3			5.2		
pH	6.37			6.99			6.68		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-041-082			BMW-041-082			DMW-041-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		0.9	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-041-082			BMW-041-082			DMW-041-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.8	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260			190			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	240			320			270		
Nitrate-Nitrite-N		U	0.2	36				U	0.2
Total Dissolved Solids (TDS)	370	*		550	*		390	*	
Total Suspended Solids (TSS)		U	5	32				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	440			487			454		
Temperature (Celsius)	12.3			12.3			12.5		
pH	6.93			6.75			7.02		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-042-082			BMW-042-082			DMW-042-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.73			0.26			1.2		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	1			0.8	J			U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		2	B		0.8	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-042-082			BMW-042-082			DMW-042-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.6	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	190			130			200		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	220			160			200		
Nitrate-Nitrite-N	150			160			100		
Total Dissolved Solids (TDS)	360			310			460		
Total Suspended Solids (TSS)		U	5		U	5	90		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	287			318			315		
Temperature (Celsius)	12.4			12.3			12.5		
pH	6.47			6.27			6.53		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-043-082			BMW-043-082			DMW-043-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15	18				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25	3.8				U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1	2	J			U	1
1,1,2,2-Tetrachloroethane		U	1		U	10		U	1
1,1,2-Trichloroethane		U	1		U	10		U	1
1,1-Dichloroethane		U	1		U	10		U	1
1,1-Dichloroethene		U	1		U	10		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			U	1
1,2-Dichlorobenzene		U	1		NA			U	1
1,2-Dichloroethane		U	1		U	10		U	1
1,2-Dichloroethene(Total)		NA		2	J			NA	
1,2-Dichloropropane		U	1		U	10		U	1
1,3-Dichlorobenzene		U	1		NA			U	1
1,4-Dichlorobenzene		U	1		NA			U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5		U	10		U	5
Benzene		U	1		U	10		U	1
Bromochloromethane		U	1		NA			U	1
Bromodichloromethane		U	1		U	10		U	1
Bromoform		U	1		U	10		U	1
Bromomethane		U	1		U	10		U	1
Carbon disulfide	1			5	J		2		
Carbon tetrachloride		U	1		U	10		U	1
Chlorobenzene		U	1		U	10		U	1
Chloroethane		U	1		U	10		U	1
Chloroform		U	1		U	10		U	1
Chloromethane		U	1		U	10		U	1
Cis-1,2-Dichloroethene		U	1		NA			U	1
Cis-1,3-Dichloropropene		U	1		U	10		U	1
Dibromochloromethane		U	1		U	10		U	1
Ethylbenzene		U	1		U	10		U	1
Methylene chloride	5	B		3	BJ		3	B	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-043-082			BMW-043-082			DMW-043-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	10		U	1
Tetrachloroethene		U	1		U	10		U	1
Toluene		U	1		U	10		U	1
Trans-1,2-Dichloroethene		U	1		NA			U	1
Trans-1,3-Dichloropropene		U	1		U	10		U	1
Trichloroethene		U	1	46				U	1
Vinyl chloride		U	1		U	10		U	1
Xylenes (Total)		U	1		U	10		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260			180			260		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	330			240			260		
Nitrate-Nitrite-N	570			150			130		
Total Dissolved Solids (TDS)	610			720			520		
Total Suspended Solids (TSS)	30			260			9		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	589			541			541		
Temperature (Celsius)	12.6			12.5			12.5		
pH	6.75			6.84			6.84		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-044-082			BMW-044-082			DMW-044-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.73			1.6				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		U	1
1,1,2,2-Tetrachloroethane		U	10		U	1		U	1
1,1,2-Trichloroethane		U	10		U	1		U	1
1,1-Dichloroethane		U	10		U	1		U	1
1,1-Dichloroethene		U	10		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		U	1
1,2-Dichlorobenzene		NA			U	1		U	1
1,2-Dichloroethane		U	10		U	1		U	1
1,2-Dichloroethene(Total)	1	J			NA			NA	
1,2-Dichloropropane		U	10		U	1		U	1
1,3-Dichlorobenzene		NA			U	1		U	1
1,4-Dichlorobenzene		NA			U	1		U	1
2-Butanone		U	10		U	5		U	5
2-Hexanone		U	10		U	5		U	5
4-Methyl-2-pentanone		U	10		U	5		U	5
Acetone		U	10		U	5		U	5
Benzene		U	10		U	1		U	1
Bromochloromethane		NA			U	1		U	1
Bromodichloromethane		U	10		U	1		U	1
Bromoform		U	10		U	1		U	1
Bromomethane		U	10		U	1		U	1
Carbon disulfide	1	J		4			9		
Carbon tetrachloride		U	10		U	1		U	1
Chlorobenzene		U	10		U	1		U	1
Chloroethane		U	10		U	1		U	1
Chloroform		U	10		U	1		U	1
Chloromethane		U	10		U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Cis-1,3-Dichloropropene		U	10		U	1		U	1
Dibromochloromethane		U	10		U	1		U	1
Ethylbenzene		U	10		U	1		U	1
Methylene chloride	3	BJ		7	B		1	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-044-082			BMW-044-082			DMW-044-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	1		U	1
Tetrachloroethene		U	10		U	1		U	1
Toluene		U	10		U	1	0.5	J	
Trans-1,2-Dichloroethene		NA			U	1		U	1
Trans-1,3-Dichloropropene		U	10		U	1		U	1
Trichloroethene	180				U	1	7		
Vinyl chloride		U	10		U	1		U	1
Xylenes (Total)		U	10		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	190			180			250		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	220			170			270		
Nitrate-Nitrite-N	410			480			510		
Total Dissolved Solids (TDS)	410			360			500		
Total Suspended Solids (TSS)		U	5	950			8		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	335				NA		562		
Temperature (Celsius)	12.3				NA		12.5		
pH	6.68				NA		6.76		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-045-082			BMW-045-082			DMW-045-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.67			0.79			0.44		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10	1	J			U	10
1,1,2,2-Tetrachloroethane		U	10		U	10		U	10
1,1,2-Trichloroethane		U	10		U	10		U	10
1,1-Dichloroethane		U	10		U	10		U	10
1,1-Dichloroethene		U	10		U	10		U	10
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		U	10		U	10		U	10
1,2-Dichloroethene(Total)		U	10	1	J			U	10
1,2-Dichloropropane		U	10		U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		U	10		U	10		U	10
2-Hexanone		U	10		U	10		U	10
4-Methyl-2-pentanone		U	10		U	10		U	10
Acetone		U	10		U	10		U	10
Benzene		U	10		U	10		U	10
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		U	10		U	10		U	10
Bromoform		U	10		U	10		U	10
Bromomethane		U	10		U	10		U	10
Carbon disulfide	6	J		3	J			U	10
Carbon tetrachloride		U	10		U	10		U	10
Chlorobenzene		U	10		U	10		U	10
Chloroethane		U	10		U	10		U	10
Chloroform		U	10		U	10		U	10
Chloromethane		U	10		U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		U	10		U	10		U	10
Dibromochloromethane		U	10		U	10		U	10
Ethylbenzene		U	10		U	10		U	10
Methylene chloride	18	B		2	BJ		2	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-045-082			BMW-045-082			DMW-045-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	10		U	10
Tetrachloroethene		U	10		U	10		U	10
Toluene	30				U	10		U	10
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		U	10		U	10		U	10
Trichloroethene	26			99			50		
Vinyl chloride		U	10		U	10		U	10
Xylenes (Total)		U	10		U	10		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			200			240		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	230			220			270		
Nitrate-Nitrite-N	6.5			7			3.4		
Total Dissolved Solids (TDS)	380			340			450		
Total Suspended Solids (TSS)		U	5		U	5	8		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	405			510			500		
Temperature (Celsius)	12			11.9			12.3		
pH	6.68			6.68			6.78		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-046-082			BMW-046-082			DMW-046-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1	0.6	J			U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		1	BJ	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-046-082			BMW-046-082			DMW-046-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			200			210		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	210			220			190		
Nitrate-Nitrite-N	60			590				U	0.2
Total Dissolved Solids (TDS)	420			370			440		
Total Suspended Solids (TSS)	14			5			140		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	392			336			285		
Temperature (Celsius)	12.4			11.8			12		
pH	6.73			6.75			6.67		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-058-082			BMW-058-082			AMW-059-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	10		U	1
1,1,2,2-Tetrachloroethane		U	1		U	10		U	1
1,1,2-Trichloroethane		U	1		U	10		U	1
1,1-Dichloroethane		U	1		U	10		U	1
1,1-Dichloroethene		U	1		U	10		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			U	1
1,2-Dichlorobenzene		U	1		NA			U	1
1,2-Dichloroethane		U	1		U	10		U	1
1,2-Dichloroethene(Total)		NA		1	J			NA	
1,2-Dichloropropane		U	1		U	10		U	1
1,3-Dichlorobenzene		U	1		NA			U	1
1,4-Dichlorobenzene		U	1		NA			U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5		U	10		U	5
Benzene		U	1		U	10		U	1
Bromochloromethane		U	1		NA			U	1
Bromodichloromethane		U	1		U	10		U	1
Bromoform		U	1		U	10		U	1
Bromomethane		U	1		U	10		U	1
Carbon disulfide		U	1		U	10		U	1
Carbon tetrachloride		U	1		U	10		U	1
Chlorobenzene		U	1		U	10		U	1
Chloroethane		U	1		U	10		U	1
Chloroform		U	1		U	10		U	1
Chloromethane		U	1		U	10		U	1
Cis-1,2-Dichloroethene		U	1		NA			U	1
Cis-1,3-Dichloropropene		U	1		U	10		U	1
Dibromochloromethane		U	1		U	10		U	1
Ethylbenzene		U	1		U	10		U	1
Methylene chloride	2	B		2	BJ		4	B	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	AMW-058-082			BMW-058-082			AMW-059-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	10		U	1
Tetrachloroethene		U	1		U	10		U	1
Toluene	0.8	J		1	J			U	1
Trans-1,2-Dichloroethene		U	1		NA			U	1
Trans-1,3-Dichloropropene		U	1		U	10		U	1
Trichloroethene		U	1	130				U	1
Vinyl chloride		U	1		U	10		U	1
Xylenes (Total)		U	1		U	10		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	290			200			300		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	340			270			270		
Nitrate-Nitrite-N		U	0.2	16				U	0.2
Total Dissolved Solids (TDS)	490			390			430	*	
Total Suspended Solids (TSS)	13				U	5	6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	491			468			398		
Temperature (Celsius)	12.2			12.5			12.3		
pH	6.98			6.82			6.76		

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	BMW-059-082			DMW-059-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)						
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5
RDX		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25
HMX		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)						
1,1,1-Trichloroethane		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1
1,1-Dichloroethane		U	1		U	1
1,1-Dichloroethene		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1
1,2-Dichloroethane		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA	
1,2-Dichloropropane		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1
2-Butanone		U	5		U	5
2-Hexanone		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5
Acetone		U	5		U	5
Benzene		U	1		U	1
Bromochloromethane		U	1		U	1
Bromodichloromethane		U	1		U	1
Bromoform		U	1		U	1
Bromomethane		U	1		U	1
Carbon disulfide		U	1		U	1
Carbon tetrachloride		U	1		U	1
Chlorobenzene		U	1		U	1
Chloroethane		U	1		U	1
Chloroform		U	1		U	1
Chloromethane		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1
Dibromochloromethane		U	1		U	1
Ethylbenzene		U	1		U	1
Methylene chloride	2	B		2	B	

Appendix D-16 Analytical Data of Atlas Missile Area Groundwater Monitoring Well Samples

	BMW-059-082			DMW-059-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)						
Styrene		U	1		U	1
Tetrachloroethene		U	1		U	1
Toluene	1				U	1
Trans-1,2-Dichloroethene		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1
Trichloroethene		U	1		U	1
Vinyl chloride		U	1		U	1
Xylenes (Total)		U	1		U	1
WATER QUALITY (mg/l)						
Alkalinity as Calcium Carbonate	100			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3
Hardness as Calcium Carbonate	340			230		
Nitrate-Nitrite-N	63				U	0.2
Total Dissolved Solids (TDS)	640	*		450	*	
Total Suspended Solids (TSS)	16			75		
FIELD PARAMETERS						
Specific Conductance (umhos/cm)	524			410		
Temperature (Celsius)	12.1			12.5		
pH	6.16			6.76		

Appendix D-17 Analytical Data of Atlas Missile Area ("G2") Hydropunch Groundwater Samples

	G2-26J		G2-27J		G2-30J		G2-31J		G2-32J		G2-34J		G2-39J	
	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier	Results	Qualifier
EXPLOSIVES (ug/l)														
1,3,5-Trinitrobenzene (TNB)		ND		ND		ND		ND		ND		ND		ND
1,3-Dinitrobenzene (DNB)		ND		ND		ND		ND		ND		ND		ND
2,4,6-Trinitrotoluene (TNT)		ND		ND		ND		ND		ND		ND		ND
2,4-Dinitrotoluene (24DNT)		ND		ND		ND		ND		ND		ND		ND
2,6-Dinitrotoluene (26DNT)		ND		ND		ND		ND		ND		ND		ND
2-Nitrotoluene (2NT)		ND		ND		ND		ND		ND		ND		ND
3-Nitrotoluene (3NT)		ND		ND		ND		ND		ND		ND		ND
4-Nitrotoluene (4NT)		ND		ND		ND		ND		ND		ND		ND
RDX		ND		ND	0.28			ND		ND	0.47			ND
Tetryl		ND		ND		ND		ND		ND		ND		ND
Nitrobenzene (NB)		ND		ND		ND		ND		ND		ND		ND
HMX		ND		ND		ND		ND		ND		ND		ND

Note : 1. ND indicates compound was not detected at the quantitation limit..

2. Quantitation limit of the various compounds are as follows,

TNB, DNB, TNT, 2,4-DNT, Nitrobenzene, and HMX : 0.25 ug/L

2,6-DNT, 2-Nitrotoluene, 3-Nitrotoluene, 4-Nitrotoluene, and Tetryl : 0.5 ug/L

RDX : 0.15 ug/L

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-001-082			BMW-001-082			AMW-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	0.17		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	10
1,1,2,2-Tetrachloroethane		U	1		U	1		U	10
1,1,2-Trichloroethane		U	1		U	1		U	10
1,1-Dichloroethane		U	1		U	1		U	10
1,1-Dichloroethene		U	1		U	1		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		NA	
1,2-Dichlorobenzene		U	1		U	1		NA	
1,2-Dichloroethane		U	1		U	1		U	10
1,2-Dichloroethene(Total)		NA			NA			U	10
1,2-Dichloropropane		U	1		U	1		U	10
1,3-Dichlorobenzene		U	1		U	1		NA	
1,4-Dichlorobenzene		U	1		U	1		NA	
2-Butanone		U	5		U	5		U	10
2-Hexanone		U	5		U	5		U	10
4-Methyl-2-pentanone		U	5		U	5		U	10
Acetone		U	5		U	5		U	10
Benzene		U	1		U	1		U	10
Bromochloromethane		U	1		U	1		NA	
Bromodichloromethane		U	1		U	1		U	10
Bromoform		U	1		U	1		U	10
Bromomethane		U	1		U	1		U	10
Carbon disulfide		U	1		U	1		U	10
Carbon tetrachloride		U	1		U	1		U	10
Chlorobenzene		U	1		U	1		U	10
Chloroethane		U	1		U	1		U	10
Chloroform		U	1		U	1		U	10
Chloromethane		U	1		U	1		U	10
Cis-1,2-Dichloroethene		U	1		U	1		NA	
Cis-1,3-Dichloropropene		U	1		U	1		U	10
Dibromochloromethane		U	1		U	1		U	10
Ethylbenzene		U	1		U	1		U	10
Methylene chloride		U	2	1	BJ			U	10

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-001-082			BMW-001-082			AMW-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	10
Tetrachloroethene		U	1		U	1		U	10
Toluene		U	1		U	1		U	10
Trans-1,2-Dichloroethene		U	1		U	1		NA	
Trans-1,3-Dichloropropene		U	1		U	1		U	10
Trichloroethene		U	1		U	1	130		
Vinyl chloride		U	1		U	1		U	10
Xylenes (Total)		U	1		U	1		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	300			170			180		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	370			190			250		
Nitrate-Nitrite-N		U	0.2	4.9			0.65		
Total Dissolved Solids (TDS)	650			280			340		
Total Suspended Solids (TSS)	11			5			9		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	650			300			424		
Temperature (Celsius)	12.3			12.3			12.5		
pH	6.91			6.44			7.01		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-002-082			AMW-003-082			BMW-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	2.2				U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)	6.5				U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	6.7			0.48			0.26		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	2	J		6		
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform	5				U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride		U	2	1	BJ		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-002-082			AMW-003-082			BMW-003-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.6	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene	11				U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	190			190			230		
Biochemical Oxygen Demand (BOD)		U	3		U	3	4		
Hardness as Calcium Carbonate	230			280			280		
Nitrate-Nitrite-N	4.2			11			17		
Total Dissolved Solids (TDS)	330			410			470		
Total Suspended Solids (TSS)	16			6				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	393			348			523		
Temperature (Celsius)	12.6			12.7			12.7		
pH	6.55			6.7			6.46		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-004-082			BMW-004-082			AMW-005-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.16			4.5				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25	1.3				U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		6	B		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-004-082			BMW-004-082			AMW-005-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.8	J		0.6	J		0.7	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1	4		
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			170			200		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	240			210			260		
Nitrate-Nitrite-N		U	0.2	4.4				U	0.2
Total Dissolved Solids (TDS)	350			320			370		
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	427			373			426		
Temperature (Celsius)	12.5			12.7			12.6		
pH	7			6.78			7.01		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-005-082			AMW-006-082			BMW-006-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	2				U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)	20				U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)	0.97				U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	98				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	45				U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1	0.6	J			U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		0.5	BJ			U	2

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-005-082			AMW-006-082			BMW-006-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	170			200			160		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	250			240			210		
Nitrate-Nitrite-N	6.8			3			6.3		
Total Dissolved Solids (TDS)	310			320			290		
Total Suspended Solids (TSS)	6			14			14		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	294			403			390		
Temperature (Celsius)	12.6			12.5			12.6		
pH	6.61			6.83			6.48		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-007-082			BMW-007-082			AMW-008-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25	0.39				U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25	7.5				U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.18			1.9				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	12				U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		0.9	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-007-082			BMW-007-082			AMW-008-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.5	J		1		
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			170			190		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	230			420			270		
Nitrate-Nitrite-N	1.8			11			4		
Total Dissolved Solids (TDS)	370			290			340		
Total Suspended Solids (TSS)		U	5		U	5	6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	440			350			437		
Temperature (Celsius)	12.8			12.6			12.6		
pH	6.9			6.72			6.67		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-008-082			AMW-009-082			BMW-009-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	4.7				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	17		U	10
1,1,2,2-Tetrachloroethane		U	1		U	17		U	10
1,1,2-Trichloroethane		U	1		U	17		U	10
1,1-Dichloroethane		U	1		U	17		U	10
1,1-Dichloroethene		U	1		U	17		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			NA	
1,2-Dichlorobenzene		U	1		NA			NA	
1,2-Dichloroethane		U	1		U	17		U	10
1,2-Dichloroethene(Total)		NA		2	J			U	10
1,2-Dichloropropane		U	1		U	17		U	10
1,3-Dichlorobenzene		U	1		NA			NA	
1,4-Dichlorobenzene		U	1		NA			NA	
2-Butanone		U	5		U	17		U	10
2-Hexanone		U	5		U	17		U	10
4-Methyl-2-pentanone		U	5		U	17		U	10
Acetone		U	5		U	17		U	10
Benzene		U	1		U	17		U	10
Bromochloromethane		U	1		NA			NA	
Bromodichloromethane		U	1		U	17		U	10
Bromoform		U	1		U	17		U	10
Bromomethane		U	1		U	17		U	10
Carbon disulfide		U	1		U	17		U	10
Carbon tetrachloride		U	1		U	17		U	10
Chlorobenzene		U	1		U	17		U	10
Chloroethane		U	1		U	17		U	10
Chloroform		U	1		U	17	26		
Chloromethane		U	1		U	17		U	10
Cis-1,2-Dichloroethene		U	1		NA			NA	
Cis-1,3-Dichloropropene		U	1		U	17		U	10
Dibromochloromethane		U	1		U	17		U	10
Ethylbenzene		U	1		U	17		U	10
Methylene chloride	1	BJ		3	BJ		2	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-008-082			AMW-009-082			BMW-009-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	17		U	10
Tetrachloroethene		U	1		U	17		U	10
Toluene	1				U	17	1	J	
Trans-1,2-Dichloroethene		U	1		NA			NA	
Trans-1,3-Dichloropropene		U	1		U	17		U	10
Trichloroethene		U	1	300			31		
Vinyl chloride		U	1		U	17		U	10
Xylenes (Total)		U	1		U	17		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	220			200			130		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	220			270			180		
Nitrate-Nitrite-N	5.3			6			4.2		
Total Dissolved Solids (TDS)	290			380			260		
Total Suspended Solids (TSS)	11			5			510		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	334			455			289		
Temperature (Celsius)	12.4			6.3			4.9		
pH	6.64			7.02			6.68		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-009-082			DMW-009-082-RE			AMW-010-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			U	0.5
2-Nitrotoluene (2NT)		U	0.5		NA			U	0.5
3-Nitrotoluene (3NT)		U	0.5		NA			U	0.5
4-Nitrotoluene (4NT)		U	0.5		NA			U	0.5
RDX		U	0.15		NA			U	0.15
Tetryl		U	0.5		NA			U	0.5
Nitrobenzene (NB)		U	0.25		NA			U	0.25
HMX		U	0.25		NA			U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	10		U	16		U	1
1,1,2,2-Tetrachloroethane		U	10		U	16		U	1
1,1,2-Trichloroethane		U	10		U	16		U	1
1,1-Dichloroethane		U	10		U	16		U	1
1,1-Dichloroethene		U	10		U	16		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			U	1
1,2-Dichlorobenzene		NA			NA			U	1
1,2-Dichloroethane		U	10		U	16		U	1
1,2-Dichloroethene(Total)		U	10		U	16		NA	
1,2-Dichloropropane		U	10		U	16		U	1
1,3-Dichlorobenzene		NA			NA			U	1
1,4-Dichlorobenzene		NA			NA			U	1
2-Butanone		U	10		U	16		U	5
2-Hexanone		U	10		U	16		U	5
4-Methyl-2-pentanone		U	10		U	16		U	5
Acetone		U	10		U	16		U	5
Benzene		U	10		U	16		U	1
Bromochloromethane		NA			NA			U	1
Bromodichloromethane		U	10		U	16		U	1
Bromoform		U	10		U	16		U	1
Bromomethane		U	10		U	16		U	1
Carbon disulfide		U	10		U	16		U	1
Carbon tetrachloride		U	10		U	16		U	1
Chlorobenzene		U	10		U	16		U	1
Chloroethane		U	10		U	16		U	1
Chloroform		U	10		U	16		U	1
Chloromethane		U	10		U	16		U	1
Cis-1,2-Dichloroethene		NA			NA			U	1
Cis-1,3-Dichloropropene		U	10		U	16		U	1
Dibromochloromethane		U	10		U	16		U	1
Ethylbenzene		U	10		U	16		U	1
Methylene chloride	2	BJ		3	BDJ		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-009-082			DMW-009-082-RE			AMW-010-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	10		U	16		U	1
Tetrachloroethene		U	10		U	16		U	1
Toluene		U	10		U	16		U	1
Trans-1,2-Dichloroethene		NA			NA			U	1
Trans-1,3-Dichloropropene		U	10		U	16		U	1
Trichloroethene	240	E		220	D			U	1
Vinyl chloride		U	10		U	16		U	1
Xylenes (Total)		U	10		U	16		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260				NA		180		
Biochemical Oxygen Demand (BOD)		U	3		NA		4		
Hardness as Calcium Carbonate	250				NA		180		
Nitrate-Nitrite-N	5.4				NA		3.1		
Total Dissolved Solids (TDS)	420				NA		260		
Total Suspended Solids (TSS)	15				NA			U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	394				NA		322		
Temperature (Celsius)	5.1				NA		12.1		
pH	7.09				NA		6.82		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-010-082			AMW-012-082			AMW-013-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	10		U	1
1,1,2,2-Tetrachloroethane		U	1		U	10		U	1
1,1,2-Trichloroethane		U	1		U	10		U	1
1,1-Dichloroethane		U	1		U	10		U	1
1,1-Dichloroethene		U	1		U	10		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			U	1
1,2-Dichlorobenzene		U	1		NA			U	1
1,2-Dichloroethane		U	1		U	10		U	1
1,2-Dichloroethene(Total)		NA			U	10		NA	
1,2-Dichloropropane		U	1		U	10		U	1
1,3-Dichlorobenzene		U	1		NA			U	1
1,4-Dichlorobenzene		U	1		NA			U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5		U	10		U	5
Benzene		U	1		U	10		U	1
Bromochloromethane		U	1		NA			U	1
Bromodichloromethane		U	1		U	10		U	1
Bromoform		U	1		U	10		U	1
Bromomethane		U	1		U	10		U	1
Carbon disulfide		U	1		U	10		U	1
Carbon tetrachloride		U	1		U	10		U	1
Chlorobenzene		U	1		U	10		U	1
Chloroethane		U	1		U	10		U	1
Chloroform		U	1		U	10		U	1
Chloromethane		U	1		U	10		U	1
Cis-1,2-Dichloroethene		U	1		NA			U	1
Cis-1,3-Dichloropropene		U	1		U	10		U	1
Dibromochloromethane		U	1		U	10		U	1
Ethylbenzene		U	1		U	10		U	1
Methylene chloride	1	BJ		1	BJ			U	2

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-010-082			AMW-012-082			AMW-013-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	10		U	1
Tetrachloroethene		U	1		U	10		U	1
Toluene		U	1		U	10	0.7	J	
Trans-1,2-Dichloroethene		U	1		NA			U	1
Trans-1,3-Dichloropropene		U	1		U	10		U	1
Trichloroethene		U	1	30				U	1
Vinyl chloride		U	1		U	10		U	1
Xylenes (Total)		U	1		U	10		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	110			100			120		
Biochemical Oxygen Demand (BOD)	5				U	3		U	3
Hardness as Calcium Carbonate	130			200			140		
Nitrate-Nitrite-N	6.7			17			6		
Total Dissolved Solids (TDS)	230			280			200		
Total Suspended Solids (TSS)	16			170			140		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	259			245			281		
Temperature (Celsius)	12.1			13.2			13.3		
pH	6.51			6.57			6.79		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-014-082			AMW-015-082			BMW-016-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane	25	E			U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform	3				U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		5	B		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-014-082			AMW-015-082			BMW-016-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1	3		
Toluene		U	1	0.6	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	290			300			270		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	300			260			300		
Nitrate-Nitrite-N	9.7			2.3				U	0.2
Total Dissolved Solids (TDS)	420			330			430	*	
Total Suspended Solids (TSS)	280			100			6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	591				NA		512		
Temperature (Celsius)	13.5				NA		12.2		
pH	7.02				NA		6.87		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-016-082			AMW-017-082			BMW-017-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.91			0.16				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	3	B		6	B		8	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-016-082			AMW-017-082			BMW-017-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	1			1		
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			230			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	400			340			180		
Nitrate-Nitrite-N	46				U	0.2	2.5		
Total Dissolved Solids (TDS)	710	*		900			300		
Total Suspended Solids (TSS)	9			10				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	692			1032			331		
Temperature (Celsius)	12.3				NA		12.7		
pH	6.21			6.89			6.97		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-017-082			AMW-020-082			BMW-020-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1	14			1		
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.9	BJ		0.9	BJ		3	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-017-082			AMW-020-082			BMW-020-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.7	J			U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	90			200			210		
Biochemical Oxygen Demand (BOD)		U	3		U	4		U	4
Hardness as Calcium Carbonate	110			250			200		
Nitrate-Nitrite-N		U	0.2		U	0.2		U	0.2
Total Dissolved Solids (TDS)	180			470	*		350	*	
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	203			596			414		
Temperature (Celsius)	12.7			12.7			12.6		
pH	6.2			6.95			7.01		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-020-082			AMW-021-082			BMW-021-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25	0.57		
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	10		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25	0.94		
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	10
1,1,2,2-Tetrachloroethane		U	1		U	1		U	10
1,1,2-Trichloroethane		U	1		U	1		U	10
1,1-Dichloroethane		U	1		U	1		U	10
1,1-Dichloroethene		U	1		U	1		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		NA	
1,2-Dichlorobenzene		U	1		U	1		NA	
1,2-Dichloroethane		U	1		U	1		U	10
1,2-Dichloroethene(Total)		NA			NA			U	10
1,2-Dichloropropane		U	1		U	1		U	10
1,3-Dichlorobenzene		U	1		U	1		NA	
1,4-Dichlorobenzene		U	1		U	1		NA	
2-Butanone		U	5		U	5		U	10
2-Hexanone		U	5		U	5		U	10
4-Methyl-2-pentanone		U	5		U	5		U	10
Acetone		U	5		U	5		U	10
Benzene		U	1		U	1		U	10
Bromochloromethane		U	1		U	1		NA	
Bromodichloromethane		U	1		U	1		U	10
Bromoform		U	1		U	1		U	10
Bromomethane		U	1		U	1		U	10
Carbon disulfide		U	1		U	1		U	10
Carbon tetrachloride		U	1		U	1		U	10
Chlorobenzene		U	1		U	1		U	10
Chloroethane		U	1		U	1		U	10
Chloroform		U	1		U	1		U	10
Chloromethane		U	1		U	1		U	10
Cis-1,2-Dichloroethene		U	1		U	1		NA	
Cis-1,3-Dichloropropene		U	1		U	1		U	10
Dibromochloromethane		U	1		U	1		U	10
Ethylbenzene		U	1		U	1		U	10
Methylene chloride	2	B		2	B		2	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	CMW-020-082			AMW-021-082			BMW-021-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	10
Tetrachloroethene		U	1		U	1		U	10
Toluene		U	1	0.7	J			U	10
Trans-1,2-Dichloroethene		U	1		U	1		NA	
Trans-1,3-Dichloropropene		U	1		U	1		U	10
Trichloroethene		U	1		U	1	140		
Vinyl chloride		U	1		U	1		U	10
Xylenes (Total)		U	1		U	1		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	56			260			160		
Biochemical Oxygen Demand (BOD)		U	4		U	3		U	3
Hardness as Calcium Carbonate	200			420			190		
Nitrate-Nitrite-N	22				U	0.2	4.7		
Total Dissolved Solids (TDS)	330	*		340			270		
Total Suspended Solids (TSS)	1600			5				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	596			350			323		
Temperature (Celsius)	12.7			12.1			12.2		
pH	6.95			6.97			6.7		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-021-082			AMW-022-082			BMW-022-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	0.25		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		0.8	BJ		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-021-082			AMW-022-082			BMW-022-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	250			280			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	290			280			250		
Nitrate-Nitrite-N		U	0.2		U	0.2	1.5		
Total Dissolved Solids (TDS)	330			380	*		350	*	
Total Suspended Solids (TSS)	38				U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	327			490			420		
Temperature (Celsius)	12.1			12.4			12.7		
pH	6.93			6.99			6.9		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-023-082			BMW-023-082			AMW-024-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	10		U	1
1,1,2,2-Tetrachloroethane		U	1		U	10		U	1
1,1,2-Trichloroethane		U	1		U	10		U	1
1,1-Dichloroethane		U	1		U	10		U	1
1,1-Dichloroethene		U	1		U	10		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			U	1
1,2-Dichlorobenzene		U	1		NA			U	1
1,2-Dichloroethane		U	1		U	10		U	1
1,2-Dichloroethene(Total)		NA			U	10		NA	
1,2-Dichloropropane		U	1		U	10		U	1
1,3-Dichlorobenzene		U	1		NA			U	1
1,4-Dichlorobenzene		U	1		NA			U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5		U	10		U	5
Benzene		U	1		U	10		U	1
Bromochloromethane		U	1		NA			U	1
Bromodichloromethane		U	1		U	10		U	1
Bromoform		U	1		U	10		U	1
Bromomethane		U	1		U	10		U	1
Carbon disulfide	5				U	10		U	1
Carbon tetrachloride		U	1		U	10		U	1
Chlorobenzene		U	1		U	10		U	1
Chloroethane		U	1		U	10		U	1
Chloroform		U	1		U	10		U	1
Chloromethane		U	1		U	10		U	1
Cis-1,2-Dichloroethene		U	1		NA			U	1
Cis-1,3-Dichloropropene		U	1		U	10		U	1
Dibromochloromethane		U	1		U	10		U	1
Ethylbenzene		U	1		U	10		U	1
Methylene chloride	1	BJ		1	BJ			U	2

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-023-082			BMW-023-082			AMW-024-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	10		U	1
Tetrachloroethene		U	1		U	10		U	1
Toluene	0.5	J			U	10		U	1
Trans-1,2-Dichloroethene		U	1		NA			U	1
Trans-1,3-Dichloropropene		U	1		U	10		U	1
Trichloroethene		U	1	97			0.9	J	
Vinyl chloride		U	1		U	10		U	1
Xylenes (Total)		U	1		U	10		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	260			270			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	310			290			250		
Nitrate-Nitrite-N		U	0.2	1.6				U	0.2
Total Dissolved Solids (TDS)	430			450			510	*	
Total Suspended Solids (TSS)	31				U	5	56		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	513			601			521		
Temperature (Celsius)	12.7			12.9			12.4		
pH	6.93			7.38			7.02		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-024-082			AMW-025-082			BMW-025-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)	0.32				U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.46				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	3	J			U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.8	BJ		0.8	BJ		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-024-082			AMW-025-082			BMW-025-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.7	J		0.8	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	140			260			150		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	180			250			140		
Nitrate-Nitrite-N	10				U	0.2	6.2		
Total Dissolved Solids (TDS)	290	*		430			330		
Total Suspended Solids (TSS)		U	5		U	5		U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	329			436			376		
Temperature (Celsius)	12.6			12.5			13.8		
pH	6.46			6.98			6.58		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-025-082			AMW-026-082			BMW-026-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1	0.8	J		0.9	J	
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.7	BJ		1	BJ		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	DMW-025-082			AMW-026-082			BMW-026-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	1				U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			220			210		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	680			270			240		
Nitrate-Nitrite-N		U	0.2	1.1			9.1		
Total Dissolved Solids (TDS)	1900			390			380		
Total Suspended Solids (TSS)		U	5	35				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	1894			454			447		
Temperature (Celsius)	12.8			12.7			12.4		
pH	6.94			7.14			6.75		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-027-082			BMW-027-082			AMW-028-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	2	J			U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	0.8	J			U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.8	BJ		0.9	BJ		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-027-082			BMW-027-082			AMW-028-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.5	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	240			180			240		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	280			220			230		
Nitrate-Nitrite-N		U	0.2	19				U	0.2
Total Dissolved Solids (TDS)	380			540			390		
Total Suspended Solids (TSS)	72			91			10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	427			519			423		
Temperature (Celsius)	12.4			12.3			12.5		
pH	7.01			6.43			7.06		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-028-082			DMW-028-082			AMW-029-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	4.4		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1	1		
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-028-082			DMW-028-082			AMW-029-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			260			230		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	4
Hardness as Calcium Carbonate	220			260			230		
Nitrate-Nitrite-N	10				U	0.2	6.18		
Total Dissolved Solids (TDS)	320			350			410	*	
Total Suspended Solids (TSS)		U	5		U	5	24		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	408			433			435		
Temperature (Celsius)	12.5			12.4			12.6		
pH	6.51			7.08			6.77		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-029-082			AMW-030-082			BMW-030-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	6				U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	2	B			U	2	0.9	J	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-029-082			AMW-030-082			BMW-030-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.9	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	120			280			150		
Biochemical Oxygen Demand (BOD)		U	4		U	3		U	3
Hardness as Calcium Carbonate	240			240			210		
Nitrate-Nitrite-N	25				U	0.2	8.4		
Total Dissolved Solids (TDS)	610	*		390			300		
Total Suspended Solids (TSS)		U	5		U	5	10		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	457			462			313		
Temperature (Celsius)	12.5			4.9			11.8		
pH	6.32			7.08			6.53		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-031-082			BMW-031-082			AMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15	4.7			3.9		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone	4	J		16				U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1	0.7	J	
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.8	BJ		1	BJ		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-031-082			BMW-031-082			AMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.6	J			U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	200			120			170		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	4
Hardness as Calcium Carbonate	180			150			210		
Nitrate-Nitrite-N	4.7			9.8			3.57		
Total Dissolved Solids (TDS)	300			240			320	*	
Total Suspended Solids (TSS)	11			11				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	351			273			328		
Temperature (Celsius)	12.2			11.9			12.4		
pH	6.9			6.51			6.87		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-032-082			BMW-032-082-RE			DMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			U	0.5
2-Nitrotoluene (2NT)		U	0.5		NA			U	0.5
3-Nitrotoluene (3NT)		U	0.5		NA			U	0.5
4-Nitrotoluene (4NT)		U	0.5		NA			U	0.5
RDX	0.16				NA		0.72		
Tetryl		U	0.5		NA			U	0.5
Nitrobenzene (NB)		U	0.25		NA			U	0.25
HMX		U	0.25		NA			U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	2		U	1
1,1,2,2-Tetrachloroethane		U	1		U	2		U	1
1,1,2-Trichloroethane		U	1		U	2		U	1
1,1-Dichloroethane		U	1		U	2		U	1
1,1-Dichloroethene		U	1		U	2		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	2		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	2		U	1
1,2-Dichlorobenzene		U	1		U	2		U	1
1,2-Dichloroethane		U	1		U	2		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	2		U	1
1,3-Dichlorobenzene		U	1		U	2		U	1
1,4-Dichlorobenzene		U	1		U	2		U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5		U	10		U	5
Benzene		U	1		U	2		U	1
Bromochloromethane		U	1		U	2		U	1
Bromodichloromethane		U	1		U	2		U	1
Bromoform		U	1		U	2		U	1
Bromomethane		U	1		U	2		U	1
Carbon disulfide	34	E		24			16		
Carbon tetrachloride		U	1		U	2		U	1
Chlorobenzene		U	1		U	2		U	1
Chloroethane		U	1		U	2		U	1
Chloroform		U	1		U	2		U	1
Chloromethane		U	1		U	2		U	1
Cis-1,2-Dichloroethene		U	1		U	2		U	1
Cis-1,3-Dichloropropene		U	1		U	2		U	1
Dibromochloromethane		U	1		U	2		U	1
Ethylbenzene		U	1		U	2		U	1
Methylene chloride		U	2	5	B		2	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	BMW-032-082			BMW-032-082-RE			DMW-032-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	2		U	1
Tetrachloroethene		U	1		U	2		U	1
Toluene		U	1		U	2		U	1
Trans-1,2-Dichloroethene		U	1		U	2		U	1
Trans-1,3-Dichloropropene		U	1		U	2		U	1
Trichloroethene		U	1		U	2		U	1
Vinyl chloride		U	1		U	2		U	1
Xylenes (Total)		U	1		U	2		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	140				NA		180		
Biochemical Oxygen Demand (BOD)		U	4		NA			U	4
Hardness as Calcium Carbonate	360				NA		220		
Nitrate-Nitrite-N	14.3				NA		2.54		
Total Dissolved Solids (TDS)	610	*			NA		310	*	
Total Suspended Solids (TSS)	300				NA			U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	300				NA		282		
Temperature (Celsius)	12.4				NA		12.5		
pH	6.63				NA		6.87		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-033-082			BMW-033-082			DMW-033-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	9.2			1.8				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX	0.98				U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		3	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-033-082			BMW-033-082			DMW-033-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.6	J		0.8	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene	1				U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	180			190			260		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	210			130			250		
Nitrate-Nitrite-N	2.9			3.8				U	0.2
Total Dissolved Solids (TDS)	440			280			600		
Total Suspended Solids (TSS)	50				U	5	12		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	440			582			582		
Temperature (Celsius)	13.6			16			16		
pH	6.68			7.06			7.06		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-034-082			BMW-034-082			DMW-034-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15	0.91				U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	2				U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.9	BJ		1	BJ		0.8	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-034-082			BMW-034-082			DMW-034-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.5	J			U	1	0.5	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	250			180			250		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	250			180			280		
Nitrate-Nitrite-N		U	0.2	3.17				U	0.2
Total Dissolved Solids (TDS)	390	*		600	*		460	*	
Total Suspended Solids (TSS)	16			180			29		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	369			275			405		
Temperature (Celsius)	12.8			12.9			12.6		
pH	7.14			6.67			6.94		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-035-082			BMW-035-082			DMW-035-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX	0.34				U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone	2	J			U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	1				U	1	0.6	J	
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		1	BJ		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-035-082			BMW-035-082			DMW-035-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.5	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	150			120			180		
Biochemical Oxygen Demand (BOD)		U	3		U	3		U	3
Hardness as Calcium Carbonate	185			150			200		
Nitrate-Nitrite-N	6.6			8.9			2.6		
Total Dissolved Solids (TDS)	320			320			390		
Total Suspended Solids (TSS)		U	5	20				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	337			277			413		
Temperature (Celsius)	13.2			12.9			12.6		
pH	6.66			6.59			6.65		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-036-082			BMW-036-082			DMW-036-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	10		U	10		U	1
1,1,2,2-Tetrachloroethane		U	10		U	10		U	1
1,1,2-Trichloroethane		U	10		U	10		U	1
1,1-Dichloroethane		U	10		U	10		U	1
1,1-Dichloroethene		U	10		U	10		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			U	1
1,2-Dichlorobenzene		NA			NA			U	1
1,2-Dichloroethane		U	10		U	10		U	1
1,2-Dichloroethene(Total)	1	J		1	J			NA	
1,2-Dichloropropane		U	10		U	10		U	1
1,3-Dichlorobenzene		NA			NA			U	1
1,4-Dichlorobenzene		NA			NA			U	1
2-Butanone		U	10		U	10		U	5
2-Hexanone		U	10		U	10		U	5
4-Methyl-2-pentanone		U	10		U	10		U	5
Acetone		U	10		U	10		U	5
Benzene		U	10		U	10		U	1
Bromochloromethane		NA			NA			U	1
Bromodichloromethane		U	10		U	10		U	1
Bromoform		U	10		U	10		U	1
Bromomethane		U	10		U	10		U	1
Carbon disulfide	25			5	J		7		
Carbon tetrachloride		U	10		U	10		U	1
Chlorobenzene		U	10		U	10		U	1
Chloroethane		U	10		U	10		U	1
Chloroform		U	10		U	10		U	1
Chloromethane		U	10		U	10		U	1
Cis-1,2-Dichloroethene		NA			NA			U	1
Cis-1,3-Dichloropropene		U	10		U	10		U	1
Dibromochloromethane		U	10		U	10		U	1
Ethylbenzene		U	10		U	10		U	1
Methylene chloride	2	BJ		2	BJ		1	BJ	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-036-082			BMW-036-082			DMW-036-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	10		U	10		U	1
Tetrachloroethene		U	10		U	10		U	1
Toluene	1	J			U	10		U	1
Trans-1,2-Dichloroethene		NA			NA			U	1
Trans-1,3-Dichloropropene		U	10		U	10		U	1
Trichloroethene	25			25				U	1
Vinyl chloride		U	10		U	10		U	1
Xylenes (Total)		U	10		U	10		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	210			200			250		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	230			220			320		
Nitrate-Nitrite-N	510			330			280		
Total Dissolved Solids (TDS)	430			380			710		
Total Suspended Solids (TSS)	33			5			6		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	436			418			771		
Temperature (Celsius)	11.6			11.6			11.6		
pH	6.65			6.67			6.78		

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-037-082			BMW-037-082			DMW-037-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	3				U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	2	B		1	BJ		3	B	

Appendix D-18 Analytical Data of Load Line 1, 2, 3, and 4 Groundwater Monitoring Well Samples

	AMW-037-082			BMW-037-082			DMW-037-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.9	J			U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	130			150			150		
Biochemical Oxygen Demand (BOD)		U	4		U	4		U	4
Hardness as Calcium Carbonate	150			170			190		
Nitrate-Nitrite-N	660			110			110		
Total Dissolved Solids (TDS)	280			310			290		
Total Suspended Solids (TSS)	6			6			26		
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	270			335			249		
Temperature (Celsius)	12.4			12.6			12.4		
pH	6.58			6.57			6.78		

Appendix D-19 Analytical Data of Platte River Alluvial Aquifer Groundwater Monitoring Well Samples

	AMW-038-082			DMW-038-082			AMW-039-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	5	B		0.6	BJ			U	2
Styrene		U	1		U	1		U	1

Appendix D-19 Analytical Data of Platte River Alluvial Aquifer Groundwater Monitoring Well Samples

	AMW-038-082			DMW-038-082			AMW-039-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	230			230			210		
Biochemical Oxygen Demand (BOD)		U	3	5				U	3
Hardness as Calcium Carbonate	210			210			230		
Nitrate-Nitrite-N	2.6				U	0.2		U	0.2
Total Dissolved Solids (TDS)	370			360			410		
Total Suspended Solids (TSS)	25			20				U	5
FIELD PARAMETERS									
Specific Conductance (umhos/cm)	432			324			419		
Temperature (Celsius)	12.2			12.2			10		
pH	6.8			6.73			7.01		

Appendix D-19 Analytical Data of Platte River Alluvial Aquifer Groundwater Monitoring Well Samples

	DMW-039-082		
	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)			
1,3,5-Trinitrobenzene (TNB)		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5
2-Nitrotoluene (2NT)		U	0.5
3-Nitrotoluene (3NT)		U	0.5
4-Nitrotoluene (4NT)		U	0.5
RDX		U	0.15
Tetryl		U	0.5
Nitrobenzene (NB)		U	0.25
HMX		U	0.25
VOLATILES (VOC) (ug/l)			
1,1,1-Trichloroethane		U	1
1,1,2,2-Tetrachloroethane		U	1
1,1,2-Trichloroethane		U	1
1,1-Dichloroethane		U	1
1,1-Dichloroethene		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1
1,2-Dichlorobenzene		U	1
1,2-Dichloroethane		U	1
1,2-Dichloropropane		U	1
1,3-Dichlorobenzene		U	1
1,4-Dichlorobenzene		U	1
2-Butanone		U	5
2-Hexanone		U	5
4-Methyl-2-pentanone		U	5
Acetone		U	5
Benzene		U	1
Bromochloromethane		U	1
Bromodichloromethane		U	1
Bromoform		U	1
Bromomethane		U	1
Carbon disulfide		U	1
Carbon tetrachloride		U	1
Chlorobenzene		U	1
Chloroethane		U	1
Chloroform		U	1
Chloromethane		U	1
Cis-1,2-Dichloroethene		U	1
Cis-1,3-Dichloropropene		U	1
Dibromochloromethane		U	1
Ethylbenzene		U	1
Methylene chloride		U	2
Styrene		U	1

Appendix D-19 Analytical Data of Platte River Alluvial Aquifer Groundwater Monitoring Well Samples

	DMW-039-082		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)			
Tetrachloroethene		U	1
Toluene		U	1
Trans-1,2-Dichloroethene		U	1
Trans-1,3-Dichloropropene		U	1
Trichloroethene		U	1
Vinyl chloride		U	1
Xylenes (Total)		U	1
WATER QUALITY (mg/l)			
Alkalinity as Calcium Carbonate	270		
Biochemical Oxygen Demand (BOD)		U	3
Hardness as Calcium Carbonate	360		
Nitrate-Nitrite-N		U	0.2
Total Dissolved Solids (TDS)	630		
Total Suspended Solids (TSS)	28		
FIELD PARAMETERS			
Specific Conductance (umhos/cm)	764		
Temperature (Celsius)	11.5		
pH	6.85		

Appendix D-20 Analytical Data of Platte River Alluvial Aquifer ("H") Hydropunch Groundwater Samples

	H-01I		H-01J		H-02I		H-02J		H-031		H-03J		H-04I	
	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
EXPLOSIVES (ug/l)														
1,3,5-Trinitrobenzene (TNB)		ND		ND		ND		ND		ND		ND		ND
1,3-Dinitrobenzene (DNB)		ND		ND		ND		ND		ND		ND		ND
2,4,6-Trinitrotoluene (TNT)		ND		ND		ND		ND		ND		ND		ND
2,4-Dinitrotoluene (24DNT)		ND		ND		ND		ND		ND		ND		ND
2,6-Dinitrotoluene (26DNT)		ND		ND		ND		ND		ND		ND		ND
2-Nitrotoluene (2NT)		ND		ND		ND		ND		ND		ND		ND
3-Nitrotoluene (3NT)		ND		ND		ND		ND		ND		ND		ND
4-Nitrotoluene (4NT)		ND		ND		ND		ND		ND		ND		ND
RDX	1.5		0.95			ND		ND		ND		ND		ND
Tetryl		ND		ND		ND		ND		ND		ND		ND
Nitrobenzene (NB)		ND		ND		ND		ND		ND		ND		ND
HMX		ND		ND		ND		ND		ND		ND		ND
VOLATILES (ug/l)														
1,1,1-Trichloroethane (1,1,1-TCA)		ND		ND		ND		ND		ND		ND		ND
1,1-Dichloroethane (1,1-DCA)		ND		ND		ND		ND		ND		ND		ND
Benzene		ND		ND		ND		ND		ND		ND		ND
Ethylbenzene		ND		ND		ND		ND		ND		ND		ND
Tetrachloroethene (PCE)		ND		ND		ND		ND		ND		ND		ND
Toluene		ND		ND		ND		ND		ND		ND		ND
Trichloroethene		ND		ND		ND		ND		ND		ND		ND
Xylenes, Total		ND		ND		ND		ND		ND		ND		ND
cis-1,2-Dichloroethene (c-1,2-DCE)		ND		ND	0.2		1.5		1.7			ND	0.3	

Appendix D-20 Analytical Data of Platte River Alluvial Aquifer ("H") Hydropunch Groundwater Samples

	H-04J		H-05I		H-05J		H-06I		H-06J		H-07I		H-07J	
	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
EXPLOSIVES (ug/l)														
1,3,5-Trinitrobenzene (TNB)		ND		ND		ND		ND		ND		ND		ND
1,3-Dinitrobenzene (DNB)		ND		ND		ND		ND		ND		ND		ND
2,4,6-Trinitrotoluene (TNT)		ND		ND		ND		ND		ND		ND		ND
2,4-Dinitrotoluene (24DNT)		ND		ND		ND		ND		ND		ND		ND
2,6-Dinitrotoluene (26DNT)		ND		ND		ND		ND		ND		ND		ND
2-Nitrotoluene (2NT)		ND		ND		ND		ND		ND		ND		ND
3-Nitrotoluene (3NT)		ND		ND		ND		ND		ND		ND		ND
4-Nitrotoluene (4NT)		ND		ND		ND		ND		ND		ND		ND
RDX		ND		ND		ND		ND		ND		ND		ND
Tetryl		ND		ND		ND		ND		ND		ND		ND
Nitrobenzene (NB)		ND		ND		ND		ND		ND		ND		ND
HMX		ND		ND		ND		ND		ND		ND		ND
VOLATILES (ug/l)														
1,1,1-Trichloroethane (1,1,1-TCA)		ND		ND		ND		ND		ND		ND		ND
1,1-Dichloroethane (1,1-DCA)		ND		ND		ND		ND		ND		ND		ND
Benzene		ND		ND		ND		ND		ND		ND		ND
Ethylbenzene		ND		ND		ND		ND		ND		ND		ND
Tetrachloroethene (PCE)		ND		ND		ND		ND		ND		ND		ND
Toluene		ND		ND		ND		ND		ND		ND		ND
Trichloroethene		ND		ND		ND		ND		ND		ND		ND
Xylenes, Total		ND		ND		ND		ND		ND		ND		ND
cis-1,2-Dichloroethene (c-1,2-DCE)	6.5		0.3		0.7			ND	1.2		0.3		1.4	

Note : 1. ND indicates compound was not detected at the quantitation limit.

2. Quantitation limit of the various compunds are as follows,

TNB, DNB, TNT, 24DNT, NB, and HMX : 0.25 ug/L

26DNT, 2NT, 3NT, 4NT, and Tetryl : 0.5 ug/L

RDX : 0.15 ug/L

1,1,1-TCA, 1,1-DCA, Benzene, Ethylbenzene, Toluene, Xylenes Total, and c-1,2-DCE : 0.1 ug/L

PCE , Trichloroethene : 0.01 ug/L

Appendix D-21 Analytical Data of Bomb Booster Area Groundwater Monitoring Well Samples

	BMW-057-082		
	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)			
1,3,5-Trinitrobenzene (TNB)		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5
2-Nitrotoluene (2NT)		U	0.5
3-Nitrotoluene (3NT)		U	0.5
4-Nitrotoluene (4NT)		U	0.5
RDX		U	0.15
Tetryl		U	0.5
Nitrobenzene (NB)		U	0.25
HMX		U	0.25
VOLATILES (VOC) (ug/l)			
1,1,1-Trichloroethane		U	1
1,1,2,2-Tetrachloroethane		U	1
1,1,2-Trichloroethane		U	1
1,1-Dichloroethane		U	1
1,1-Dichloroethene		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1
1,2-Dichlorobenzene		U	1
1,2-Dichloroethane		U	1
1,2-Dichloropropane		U	1
1,3-Dichlorobenzene		U	1
1,4-Dichlorobenzene		U	1
2-Butanone		U	5
2-Hexanone		U	5
4-Methyl-2-pentanone		U	5
Acetone		U	5
Benzene		U	1
Bromochloromethane		U	1
Bromodichloromethane		U	1
Bromoform		U	1
Bromomethane		U	1
Carbon disulfide		U	1
Carbon tetrachloride		U	1
Chlorobenzene		U	1
Chloroethane		U	1
Chloroform		U	1
Chloromethane		U	1
Cis-1,2-Dichloroethene		U	1
Cis-1,3-Dichloropropene		U	1
Dibromochloromethane		U	1
Ethylbenzene		U	1
Methylene chloride	6	B	
Styrene		U	1

Appendix D-21 Analytical Data of Bomb Booster Area Groundwater Monitoring Well Samples

	BMW-057-082		
	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)			
Tetrachloroethene		U	1
Toluene		U	1
Trans-1,2-Dichloroethene		U	1
Trans-1,3-Dichloropropene		U	1
Trichloroethene		U	1
Vinyl chloride		U	1
Xylenes (Total)		U	1
WATER QUALITY (mg/l)			
Alkalinity as Calcium Carbonate	68		
Biochemical Oxygen Demand (BOD)		U	3
Hardness as Calcium Carbonate	330		
Nitrate-Nitrite-N	57		
Total Dissolved Solids (TDS)	670		
Total Suspended Solids (TSS)	18		
FIELD PARAMETERS			
Specific Conductance (umhos/cm)	667		
Temperature (Celsius)	12.8		
pH	6.13		

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ADS-005-18B-MS			ADS-005-18B-MSD			ADS-205-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
PESTICIDES/PCB (ug/kg)									
4,4'-DDD	0.59	JP		0.53	JP		0.26	JP	
4,4'-DDE		U	3.5		U	3.5		U	3.5
4,4'-DDT	31	B		28	B		1	JB	
Aldrin	12	B		12	B		0.098	JPB	
Alpha chlordane		U	1.8		U	1.8		U	1.8
Alpha-BHC		U	1.8		U	1.8		U	1.8
Beta-BHC		U	1.8		U	1.8		U	1.8
Delta-BHC		U	1.8		U	1.8		U	1.8
Dieldrin	28	B		26	B		0.31	JPB	
Endosulfan I		U	1.8		U	1.8		U	1.8
Endosulfan II		U	3.5		U	3.5		U	3.5
Endosulfan sulfate		U	3.5		U	3.5		U	3.5
Endrin	30	B		27	B		0.39	JPB	
Endrin aldehyde		U	3.5		U	3.5		U	3.5
Endrin ketone	0.32	JP		0.37	JP			U	3.5
Gamma chlordane		U	1.8		U	1.8		U	1.8
Gamma-BHC (Lindane)	13	B		12	B		0.13	JPB	
Heptachlor	12	B		12	B		0.22	JB	
Heptachlor epoxide		U	1.8		U	1.8		U	1.8
PCB-1016		U	35		U	35		U	35
PCB-1221		U	71		U	71		U	71
PCB-1232		U	35		U	35		U	35
PCB-1242		U	35		U	35		U	35
PCB-1248		U	35		U	35		U	35
PCB-1254		U	35		U	35		U	35
PCB-1260		U	35		U	35		U	35
Toxaphene		U	180		U	180		U	180
p,p'-Methoxychlor		U	18		U	18		U	18

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ADS-005-18B-MS			ADS-005-18B-MSD			ADS-205-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)									
1,2,4-Trichlorobenzene	1600			1600				U	340
1,2-Dichlorobenzene		U	350		U	350		U	340
1,3-Dichlorobenzene		U	350		U	350		U	340
1,4-Dichlorobenzene	1200			1300				U	340
2,2'-Oxybis(1-chloropropane)		U	350		U	350		U	340
2,4,5-Trichlorophenol		U	840		U	840		U	840
2,4,6-Trichlorophenol		U	350		U	350		U	340
2,4-Dichlorophenol		U	350		U	350		U	340
2,4-Dimethylphenol		U	350		U	350		U	340
2,4-Dinitrophenol		U	840		U	840		U	840
2,4-Dinitrotoluene	1400			1400				U	340
2,6-Dinitrotoluene		U	350		U	350		U	340
2-Chloronaphthalene		U	350		U	350		U	340
2-Chlorophenol	2000			2000				U	340
2-Methylnaphthalene		U	350		U	350		U	340
2-Methylphenol		U	350		U	350		U	340
2-Nitroaniline		U	840		U	840		U	840
2-Nitrophenol		U	350		U	350		U	340
3,3'-Dichlorobenzidine		U	350		U	350		U	340
3-Nitroaniline		U	840		U	840		U	840
4,6-Dinitro-2-methylphenol		U	840		U	840		U	840
4-Bromophenyl phenyl ether		U	350		U	350		U	340
4-Chloro-3-methylphenol	2400			2500				U	340
4-Chloroaniline		U	350		U	350		U	340
4-Chlorophenyl phenyl ether		U	350		U	350		U	340
4-Methylphenol		U	350		U	350		U	340
4-Nitroaniline		U	840		U	840		U	840
4-Nitrophenol	2300			2100				U	840
Acenaphthene	1500			1500				U	340
Acenaphthylene		U	350		U	350		U	340
Anthracene		U	350		U	350		U	340
Benzo(a)anthracene		U	350		U	350		U	340
Benzo(a)pyrene		U	350		U	350		U	340
Benzo(b)fluoranthene		U	350		U	350		U	340
Benzo(g,h,i)perylene		U	350		U	350		U	340
Benzo(k)fluoranthene		U	350		U	350		U	340
Butyl benzyl phthalate		U	350		U	350		U	340
Carbazole		U	350		U	350		U	340
Chrysene		U	350		U	350		U	340
Di-n-butyl phthalate		U	350		U	350		U	340
Di-n-octyl phthalate		U	350		U	350		U	340
Dibenzo(a,h)anthracene		U	350		U	350		U	340
Dibenzofuran		U	350		U	350		U	340
Diethyl phthalate		U	350		U	350		U	340
Dimethyl phthalate		U	350		U	350		U	340
Fluoranthene		U	350		U	350		U	340
Fluorene		U	350		U	350		U	340

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ADS-005-18B-MS			ADS-005-18B-MSD			ADS-205-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/kg)									
Hexachlorobenzene		U	350		U	350		U	340
Hexachlorobutadiene		U	350		U	350		U	340
Hexachlorocyclopentadiene		U	350		U	350		U	340
Hexachloroethane		U	350		U	350		U	340
Indeno(1,2,3-cd)pyrene		U	350		U	350		U	340
Isophorone		U	350		U	350		U	340
N-Nitroso-di-n-propylamine	1100			1200				U	340
N-Nitrosodiphenylamine(1)		U	350		U	350		U	340
Naphthalene		U	350		U	350		U	340
Nitrobenzene		U	350		U	350		U	340
Pentachlorophenol	2500			2500				U	840
Phenanthrene		U	350		U	350		U	340
Phenol	2100			2200				U	340
Pyrene	1500			1500				U	340
bis(2-Chloroethoxy)methane		U	350		U	350		U	340
bis(2-Chloroethyl)ether		U	350		U	350		U	340
bis(2-Ethylhexyl)phthalate		U	350		U	350		U	340
METALS / CYANIDE (mg/kg)									
Aluminum		NA			NA		2110		
Antimony		NA			NA			UN	8.2
Arsenic		NA			NA			U	0.84
Barium		NA			NA		20	B	
Beryllium		NA			NA			U	0.21
Cadmium		NA			NA			U	1
Calcium		NA			NA		624	B	
Chromium		NA			NA		2	B	
Cobalt		NA			NA			U	1.3
Copper		NA			NA		1.9	B	
Cyanide		NA			NA			UN	0.52
Iron		NA			NA		2660		
Lead		NA			NA		2.2		
Magnesium		NA			NA		599	B	
Manganese		NA			NA		23.1		
Mercury		NA			NA			U	0.1
Nickel		NA			NA		2.8	B	
Potassium		NA			NA		585	B	
Selenium		NA			NA			U	0.84
Silver		NA			NA			U	1.3
Sodium		NA			NA		119	B	
Thallium		NA			NA			U	0.42
Vanadium		NA			NA		5	B	
Zinc		NA			NA		10.1		
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA			NA			NA	

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ADS-005-18B-MS			ADS-005-18B-MSD			ADS-205-18B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	11
1,1,2,2-Tetrachloroethane		U	11		U	11		U	11
1,1,2-Trichloroethane		U	11		U	11		U	11
1,1-Dichloroethane		U	11		U	11		U	11
1,1-Dichloroethene	59			61				U	11
1,2-Dichloroethane		U	11		U	11		U	11
1,2-Dichloroethene(Total)		U	11		U	11		U	11
1,2-Dichloropropane		U	11		U	11		U	11
2-Butanone		U	11		U	11		U	11
2-Hexanone		U	11		U	11		U	11
4-Methyl-2-pentanone		U	11		U	11		U	11
Acetone	53	B		63	B		71	B	
Benzene	49			50				U	11
Bromodichloromethane		U	11		U	11		U	11
Bromoform		U	11		U	11		U	11
Bromomethane		U	11		U	11		U	11
Carbon disulfide		U	11		U	11		U	11
Carbon tetrachloride		U	11		U	11		U	11
Chlorobenzene	51			51				U	11
Chloroethane		U	11		U	11		U	11
Chloroform		U	11		U	11		U	11
Chloromethane		U	11		U	11		U	11
Cis-1,3-Dichloropropene		U	11		U	11		U	11
Dibromochloromethane		U	11		U	11		U	11
Ethylbenzene		U	11		U	11		U	11
Methylene chloride	16	B		20	B		45	B	
Styrene		U	11		U	11		U	11
Tetrachloroethene		U	11		U	11		U	11
Toluene	51			48				U	11
Trans-1,3-Dichloropropene		U	11		U	11		U	11
Trichloroethene	46			49				U	11
Vinyl chloride		U	11		U	11		U	11
Xylenes (Total)		U	11		U	11		U	11

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ATL-063-18B-MS			ATL-063-18B-MSD			ATL-263-06B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA			NA			NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	10		U	10		U	12
1,1,2,2-Tetrachloroethane		U	10		U	10		U	12
1,1,2-Trichloroethane		U	10		U	10		U	12
1,1-Dichloroethane		U	10		U	10		U	12
1,1-Dichloroethene	75			73				U	12
1,2-Dichloroethane		U	10		U	10		U	12
1,2-Dichloroethene(Total)		U	10		U	10		U	12
1,2-Dichloropropane		U	10		U	10		U	12
2-Butanone		U	10		U	10		U	12
2-Hexanone		U	10		U	10		U	12
4-Methyl-2-pentanone		U	10		U	10		U	12
Acetone		U	10	27			270	E	
Benzene	65			67				U	12
Bromodichloromethane		U	10		U	10		U	12
Bromoform		U	10		U	10		U	12
Bromomethane		U	10		U	10		U	12
Carbon disulfide		U	10		U	10		U	12
Carbon tetrachloride		U	10		U	10		U	12
Chlorobenzene	63			64				U	12
Chloroethane		U	10		U	10		U	12
Chloroform		U	10		U	10		U	12
Chloromethane		U	10		U	10		U	12
Cis-1,3-Dichloropropene		U	10		U	10		U	12
Dibromochloromethane		U	10		U	10		U	12
Ethylbenzene		U	10		U	10		U	12
Methylene chloride	23	B		22	B		23	B	
Styrene		U	10		U	10		U	12
Tetrachloroethene		U	10		U	10		U	12
Toluene	65			66				U	12
Trans-1,3-Dichloropropene		U	10		U	10		U	12
Trichloroethene	64			66				U	12
Vinyl chloride		U	10		U	10		U	12
Xylenes (Total)		U	10		U	10		U	12

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	ATL-263-06B-RE			ATL-263-18B			LL1-247-17B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA			NA			NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	18		U	10		U	11
1,1,2,2-Tetrachloroethane		U	18		U	10		U	11
1,1,2-Trichloroethane		U	18		U	10		U	11
1,1-Dichloroethane		U	18		U	10		U	11
1,1-Dichloroethene		U	18		U	10		U	11
1,2-Dichloroethane		U	18		U	10		U	11
1,2-Dichloroethene(Total)		U	18		U	10		U	11
1,2-Dichloropropane		U	18		U	10		U	11
2-Butanone		U	18		U	10		U	11
2-Hexanone		U	18		U	10		U	11
4-Methyl-2-pentanone		U	18		U	10		U	11
Acetone	130	B		56			42	B	
Benzene		U	18		U	10	2	BJ	
Bromodichloromethane		U	18		U	10		U	11
Bromoform		U	18		U	10		U	11
Bromomethane		U	18		U	10		U	11
Carbon disulfide		U	18		U	10		U	11
Carbon tetrachloride		U	18		U	10		U	11
Chlorobenzene		U	18		U	10		U	11
Chloroethane		U	18		U	10		U	11
Chloroform		U	18		U	10		U	11
Chloromethane		U	18		U	10		U	11
Cis-1,3-Dichloropropene		U	18		U	10		U	11
Dibromochloromethane		U	18		U	10		U	11
Ethylbenzene		U	18		U	10		U	11
Methylene chloride	37	B		39	B		23	B	
Styrene		U	18		U	10		U	11
Tetrachloroethene		U	18		U	10		U	11
Toluene		U	18		U	10		U	11
Trans-1,3-Dichloropropene		U	18		U	10		U	11
Trichloroethene		U	18		U	10		U	11
Vinyl chloride		U	18		U	10		U	11
Xylenes (Total)		U	18		U	10		U	11

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	LL1-048-16B-MS			LL1-048-16B-MSD			LL1-269-15B		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA			NA			NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	11
1,1,2,2-Tetrachloroethane		U	11		U	11		U	11
1,1,2-Trichloroethane		U	11		U	11		U	11
1,1-Dichloroethane		U	11		U	11		U	11
1,1-Dichloroethene	67				U	11		U	11
1,2-Dichloroethane		U	11		U	11		U	11
1,2-Dichloroethene(Total)		U	11		U	11		U	11
1,2-Dichloropropane		U	11		U	11		U	11
2-Butanone		U	11		U	11		U	11
2-Hexanone		U	11		U	11		U	11
4-Methyl-2-pentanone		U	11		U	11		U	11
Acetone		U	11	26			25		
Benzene	65				U	11		U	11
Bromodichloromethane		U	11		U	11		U	11
Bromoform		U	11		U	11		U	11
Bromomethane		U	11		U	11		U	11
Carbon disulfide		U	11		U	11		U	11
Carbon tetrachloride		U	11		U	11		U	11
Chlorobenzene	61				U	11		U	11
Chloroethane		U	11		U	11		U	11
Chloroform		U	11		U	11		U	11
Chloromethane		U	11		U	11		U	11
Cis-1,3-Dichloropropene		U	11		U	11		U	11
Dibromochloromethane		U	11		U	11		U	11
Ethylbenzene		U	11		U	11		U	11
Methylene chloride	21	B		30	B		8	BJ	
Styrene		U	11		U	11		U	11
Tetrachloroethene		U	11		U	11		U	11
Toluene	60				U	11		U	11
Trans-1,3-Dichloropropene		U	11		U	11		U	11
Trichloroethene	64				U	11		U	11
Vinyl chloride		U	11		U	11		U	11
Xylenes (Total)		U	11		U	11		U	11

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	LL1-080-17B-MS			LL1-080-17B-MSD			MWB-023-072-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA			NA			NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane	1	J			U	10		U	12
1,1,2,2-Tetrachloroethane		U	10		U	10		U	12
1,1,2-Trichloroethane		U	10		U	10		U	12
1,1-Dichloroethane		U	10		U	10		U	12
1,1-Dichloroethene	70			55			66		
1,2-Dichloroethane		U	10		U	10		U	12
1,2-Dichloroethene(Total)		U	10		U	10		U	12
1,2-Dichloropropane		U	10		U	10		U	12
2-Butanone		U	10		U	10		U	12
2-Hexanone		U	10		U	10		U	12
4-Methyl-2-pentanone		U	10		U	10		U	12
Acetone	43	B		28				U	12
Benzene	54			62			61		
Bromodichloromethane		U	10		U	10		U	12
Bromoform		U	10		U	10		U	12
Bromomethane		U	10		U	10		U	12
Carbon disulfide		U	10		U	10		U	12
Carbon tetrachloride		U	10		U	10		U	12
Chlorobenzene	48			59			59		
Chloroethane		U	10		U	10		U	12
Chloroform		U	10		U	10		U	12
Chloromethane		U	10		U	10		U	12
Cis-1,3-Dichloropropene		U	10		U	10		U	12
Dibromochloromethane		U	10		U	10		U	12
Ethylbenzene		U	10		U	10		U	12
Methylene chloride	17	B		10	BJ		39	B	
Styrene		U	10		U	10		U	12
Tetrachloroethene		U	10		U	10		U	12
Toluene	60			61			58		
Trans-1,3-Dichloropropene		U	10		U	10		U	12
Trichloroethene	50			57			59		
Vinyl chloride		U	10		U	10		U	12
Xylenes (Total)		U	10		U	10		U	12

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	MWB-023-072-MSD			MWC-023-036-MS			MWC-023-036-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)		NA		2132			2070		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		NA			NA	
1,1,2,2-Tetrachloroethane		U	12		NA			NA	
1,1,2-Trichloroethane		U	12		NA			NA	
1,1-Dichloroethane		U	12		NA			NA	
1,1-Dichloroethene	63				NA			NA	
1,2-Dichloroethane		U	12		NA			NA	
1,2-Dichloroethene(Total)		U	12		NA			NA	
1,2-Dichloropropane		U	12		NA			NA	
2-Butanone		U	12		NA			NA	
2-Hexanone		U	12		NA			NA	
4-Methyl-2-pentanone		U	12		NA			NA	
Acetone	49	B			NA			NA	
Benzene	61				NA			NA	
Bromodichloromethane		U	12		NA			NA	
Bromoform		U	12		NA			NA	
Bromomethane		U	12		NA			NA	
Carbon disulfide		U	12		NA			NA	
Carbon tetrachloride		U	12		NA			NA	
Chlorobenzene	58	U	12		NA			NA	
Chloroethane		U	12		NA			NA	
Chloroform		U	12		NA			NA	
Chloromethane		U	12		NA			NA	
Cis-1,3-Dichloropropene		U	12		NA			NA	
Dibromochloromethane		U	12		NA			NA	
Ethylbenzene		U	12		NA			NA	
Methylene chloride	39	B			NA			NA	
Styrene		U	12		NA			NA	
Tetrachloroethene		U	12		NA			NA	
Toluene	57				NA			NA	
Trans-1,3-Dichloropropene		U	12		NA			NA	
Trichloroethene	58				NA			NA	
Vinyl chloride		U	12		NA			NA	
Xylenes (Total)		U	12		NA			NA	

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	MWB-231-059			MWB-231-059-MS			MWB-231-059-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		U	0.5		NA			NA	
1,3-Dinitrobenzene (DNB)		U	0.5		NA			NA	
2,4,6-Trinitrotoluene (TNT)		U	0.5		NA			NA	
2,4-Dinitrotoluene (24DNT)		U	0.5		NA			NA	
2,6-Dinitrotoluene (26DNT)		U	1		NA			NA	
2-Nitrotoluene (2NT)		U	1		NA			NA	
3-Nitrotoluene (3NT)		U	1		NA			NA	
4-Nitrotoluene (4NT)		U	1		NA			NA	
RDX		U	0.5		NA			NA	
Tetryl		U	1		NA			NA	
Nitrobenzene (NB)		U	0.5		NA			NA	
HMX		U	0.5		NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	68				NA			NA	
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	12		U	12		U	12
1,1,2,2-Tetrachloroethane		U	12		U	12		U	12
1,1,2-Trichloroethane		U	12		U	12		U	12
1,1-Dichloroethane		U	12		U	12		U	12
1,1-Dichloroethene		U	12	62	U	12	64		
1,2-Dichloroethane		U	12		U	12		U	12
1,2-Dichloroethene(Total)		U	12		U	12		U	12
1,2-Dichloropropane		U	12		U	12		U	12
2-Butanone		U	12		U	12		U	12
2-Hexanone		U	12		U	12		U	12
4-Methyl-2-pentanone		U	12		U	12		U	12
Acetone	170			100			62		
Benzene		U	12	58			57		
Bromodichloromethane		U	12		U	12		U	12
Bromoform		U	12		U	12		U	12
Bromomethane		U	12		U	12		U	12
Carbon disulfide		U	12		U	12		U	12
Carbon tetrachloride		U	12		U	12		U	12
Chlorobenzene		U	12	58			58		
Chloroethane		U	12		U	12		U	12
Chloroform		U	12		U	12		U	12
Chloromethane		U	12		U	12		U	12
Cis-1,3-Dichloropropene		U	12		U	12		U	12
Dibromochloromethane		U	12		U	12		U	12
Ethylbenzene		U	12		U	12		U	12
Methylene chloride	34	B		26	B		23	B	
Styrene		U	12		U	12		U	12
Tetrachloroethene		U	12		U	12		U	12
Toluene		U	12	60			59		
Trans-1,3-Dichloropropene		U	12		U	12		U	12
Trichloroethene		U	12	60			59		
Vinyl chloride		U	12		U	12		U	12
Xylenes (Total)		U	12		U	12		U	12

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	MWA-033-106-MS			MWA-033-106-MSD			MWC-033-048-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	2220			2476			2286		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		NA			NA			NA	
1,1,2,2-Tetrachloroethane		NA			NA			NA	
1,1,2-Trichloroethane		NA			NA			NA	
1,1-Dichloroethane		NA			NA			NA	
1,1-Dichloroethene		NA			NA			NA	
1,2-Dichloroethane		NA			NA			NA	
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		NA			NA			NA	
2-Butanone		NA			NA			NA	
2-Hexanone		NA			NA			NA	
4-Methyl-2-pentanone		NA			NA			NA	
Acetone		NA			NA			NA	
Benzene		NA			NA			NA	
Bromodichloromethane		NA			NA			NA	
Bromoform		NA			NA			NA	
Bromomethane		NA			NA			NA	
Carbon disulfide		NA			NA			NA	
Carbon tetrachloride		NA			NA			NA	
Chlorobenzene		NA			NA			NA	
Chloroethane		NA			NA			NA	
Chloroform		NA			NA			NA	
Chloromethane		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			NA			NA	
Dibromochloromethane		NA			NA			NA	
Ethylbenzene		NA			NA			NA	
Methylene chloride		NA			NA			NA	
Styrene		NA			NA			NA	
Tetrachloroethene		NA			NA			NA	
Toluene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			NA			NA	
Trichloroethene		NA			NA			NA	
Vinyl chloride		NA			NA			NA	
Xylenes (Total)		NA			NA			NA	

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	MWC-033-048-MSD			MWC-034-058-MS			MWC-034-058-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	2270			2044			2166		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		NA			NA			NA	
1,1,2,2-Tetrachloroethane		NA			NA			NA	
1,1,2-Trichloroethane		NA			NA			NA	
1,1-Dichloroethane		NA			NA			NA	
1,1-Dichloroethene		NA			NA			NA	
1,2-Dichloroethane		NA			NA			NA	
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		NA			NA			NA	
2-Butanone		NA			NA			NA	
2-Hexanone		NA			NA			NA	
4-Methyl-2-pentanone		NA			NA			NA	
Acetone		NA			NA			NA	
Benzene		NA			NA			NA	
Bromodichloromethane		NA			NA			NA	
Bromoform		NA			NA			NA	
Bromomethane		NA			NA			NA	
Carbon disulfide		NA			NA			NA	
Carbon tetrachloride		NA			NA			NA	
Chlorobenzene		NA			NA			NA	
Chloroethane		NA			NA			NA	
Chloroform		NA			NA			NA	
Chloromethane		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			NA			NA	
Dibromochloromethane		NA			NA			NA	
Ethylbenzene		NA			NA			NA	
Methylene chloride		NA			NA			NA	
Styrene		NA			NA			NA	
Tetrachloroethene		NA			NA			NA	
Toluene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			NA			NA	
Trichloroethene		NA			NA			NA	
Vinyl chloride		NA			NA			NA	
Xylenes (Total)		NA			NA			NA	

Appendix D-22 Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Soil Samples

	MWA-040-104-MS			MWA-040-104-MSD			MWA-240-104		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/g)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
TOTAL ORGANIC CARBON (mg/kg)									
Total Organic Carbon (TOC)	2226			2524			184		
VOLATILES (VOC) (ug/kg)									
1,1,1-Trichloroethane		U	11		U	11		U	13
1,1,2,2-Tetrachloroethane		U	11		U	11		U	13
1,1,2-Trichloroethane		U	11		U	11		U	13
1,1-Dichloroethane		U	11		U	11		U	13
1,1-Dichloroethene		U	11		U	11		U	13
1,2-Dichloroethane		U	11		U	11		U	13
1,2-Dichloroethene(Total)		U	11		U	11		U	13
1,2-Dichloropropane		U	11		U	11		U	13
2-Butanone		U	11	6	BJ		6	BJ	
2-Hexanone		U	11		U	11		U	13
4-Methyl-2-pentanone		U	11		U	11		U	13
Acetone	56			68			95		
Benzene		U	11		U	11		U	13
Bromodichloromethane		U	11		U	11		U	13
Bromoform		U	11		U	11		U	13
Bromomethane		U	11		U	11		U	13
Carbon disulfide		U	11		U	11		U	13
Carbon tetrachloride		U	11		U	11		U	13
Chlorobenzene		U	11		U	11		U	13
Chloroethane		U	11		U	11		U	13
Chloroform		U	11		U	11		U	13
Chloromethane		U	11		U	11		U	13
Cis-1,3-Dichloropropene		U	11		U	11		U	13
Dibromochloromethane		U	11		U	11		U	13
Ethylbenzene		U	11		U	11		U	13
Methylene chloride	31	B		22	B		30	B	
Styrene		U	11		U	11		U	13
Tetrachloroethene		U	11		U	11		U	13
Toluene		U	11		U	11		U	13
Trans-1,3-Dichloropropene		U	11		U	11		U	13
Trichloroethene		U	11		U	11		U	13
Vinyl chloride		U	11		U	11		U	13
Xylenes (Total)		U	11		U	11		U	13

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	DMW-209-082			CMW-018-082-MS			CMW-018-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			NA	
1,3-Dinitrobenzene (DNB)		U	0.25		NA			NA	
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			NA	
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			NA	
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			NA	
2-Nitrotoluene (2NT)		U	0.5		NA			NA	
3-Nitrotoluene (3NT)		U	0.5		NA			NA	
4-Nitrotoluene (4NT)		U	0.5		NA			NA	
RDX		U	0.15		NA			NA	
Tetryl		U	0.5		NA			NA	
Nitrobenzene (NB)		U	0.25		NA			NA	
HMX		U	0.25		NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	14		U	10		U	10
1,1,2,2-Tetrachloroethane		U	14		U	10		U	10
1,1,2-Trichloroethane		U	14		U	10		U	10
1,1-Dichloroethane		U	14		U	10		U	10
1,1-Dichloroethene		U	14	55			54		
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		U	14		U	10		U	10
1,2-Dichloroethene(Total)		U	14	3	J		3	J	
1,2-Dichloropropane		U	14		U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		U	14		U	10		U	10
2-Hexanone		U	14		U	10		U	10
4-Methyl-2-pentanone		U	14		U	10		U	10
Acetone		U	14		U	10		U	10
Benzene		U	14	56			57		
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		U	14		U	10		U	10
Bromoform		U	14		U	10		U	10
Bromomethane		U	14		U	10		U	10
Carbon disulfide		U	14		U	10		U	10
Carbon tetrachloride		U	14		U	10		U	10
Chlorobenzene		U	14	54			56		
Chloroethane		U	14		U	10		U	10
Chloroform		U	14	14			14		
Chloromethane		U	14		U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		U	14		U	10		U	10
Dibromochloromethane		U	14		U	10		U	10
Ethylbenzene		U	14		U	10		U	10
Methylene chloride	3	BJ		2	BJ		3	BJ	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	DMW-209-082			CMW-018-082-MS			CMW-018-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	14		U	10		U	10
Tetrachloroethene		U	14		U	10		U	10
Toluene		U	14	53			58		
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		U	14		U	10		U	10
Trichloroethene	230			130			130		
Vinyl chloride		U	14		U	10		U	10
Xylenes (Total)		U	14		U	10		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	230				NA			NA	
Biochemical Oxygen Demand (BOD)		U	3		NA			NA	
Hardness as Calcium Carbonate	200				NA			NA	
Nitrate-Nitrite-N	5.4				NA			NA	
Total Dissolved Solids (TDS)	420				NA			NA	
Total Suspended Solids (TSS)	9				NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-220-082			AMW-226-082			BMW-233-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15	2.8		
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	5				U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide	17			0.8	J			U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.6	BJ		0.9	BJ		2	B	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-220-082			AMW-226-082			BMW-233-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1	0.7	J			U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	180			250			180		
Biochemical Oxygen Demand (BOD)		U	4		U	3		U	3
Hardness as Calcium Carbonate	280			250			130		
Nitrate-Nitrite-N		U	0.2	1.2			3.8		
Total Dissolved Solids (TDS)	510	*		360			290		
Total Suspended Solids (TSS)	5			21			11		

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-040-082-MS			AMW-040-082-MSD			AMW-240-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			U	0.25
1,3-Dinitrobenzene (DNB)		NA			NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		NA			NA			U	0.25
2,4-Dinitrotoluene (24DNT)		NA			NA			U	0.25
2,6-Dinitrotoluene (26DNT)		NA			NA			U	0.5
2-Nitrotoluene (2NT)		NA			NA			U	0.5
3-Nitrotoluene (3NT)		NA			NA			U	0.5
4-Nitrotoluene (4NT)		NA			NA			U	0.5
RDX		NA			NA			U	0.15
Tetryl		NA			NA			U	0.5
Nitrobenzene (NB)		NA			NA			U	0.25
HMX		NA			NA			U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	10		U	10
1,1,2,2-Tetrachloroethane		U	10		U	10		U	10
1,1,2-Trichloroethane		U	10		U	10		U	10
1,1-Dichloroethane		U	10		U	10		U	10
1,1-Dichloroethene	49			51				U	10
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		U	10		U	10		U	10
1,2-Dichloroethene(Total)		U	10		U	10		U	10
1,2-Dichloropropane		U	10		U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		U	10		U	10		U	10
2-Hexanone		U	10		U	10		U	10
4-Methyl-2-pentanone		U	10		U	10		U	10
Acetone		U	10		U	10		U	10
Benzene	47			51				U	10
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		U	10		U	10		U	10
Bromoform		U	10		U	10		U	10
Bromomethane		U	10		U	10		U	10
Carbon disulfide		U	10		U	10		U	10
Carbon tetrachloride		U	10		U	10		U	10
Chlorobenzene	52			52				U	10
Chloroethane		U	10		U	10		U	10
Chloroform		U	10		U	10		U	10
Chloromethane		U	10		U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		U	10		U	10		U	10
Dibromochloromethane		U	10		U	10		U	10
Ethylbenzene		U	10		U	10		U	10
Methylene chloride	6	BJ		8	BJ		4	BJ	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-040-082-MS			AMW-040-082-MSD			AMW-240-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	10		U	10
Tetrachloroethene		U	10		U	10		U	10
Toluene	50			50				U	10
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		U	10		U	10		U	10
Trichloroethene	74			75			22		
Vinyl chloride		U	10		U	10		U	10
Xylenes (Total)		U	10		U	10		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA		270		
Biochemical Oxygen Demand (BOD)		NA			NA			U	3
Hardness as Calcium Carbonate		NA			NA		300		
Nitrate-Nitrite-N		NA			NA			U	0.2
Total Dissolved Solids (TDS)		NA			NA		480		
Total Suspended Solids (TSS)		NA			NA			U	5

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-044-082-MS			AMW-044-082-MSD			DMW-045-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	10		U	10
1,1,2,2-Tetrachloroethane		U	10		U	10		U	10
1,1,2-Trichloroethane		U	10		U	10		U	10
1,1-Dichloroethane		U	10		U	10		U	10
1,1-Dichloroethene	44			47			50		
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		U	10		U	10		U	10
1,2-Dichloroethene(Total)		U	10		U	10		U	10
1,2-Dichloropropane		U	10		U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		U	10		U	10		U	10
2-Hexanone		U	10		U	10		U	10
4-Methyl-2-pentanone		U	10		U	10		U	10
Acetone		U	10		U	10		U	10
Benzene	44			48			47		
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		U	10		U	10		U	10
Bromoform		U	10		U	10		U	10
Bromomethane		U	10		U	10		U	10
Carbon disulfide		U	10		U	10		U	10
Carbon tetrachloride		U	10		U	10		U	10
Chlorobenzene	42			44			44		
Chloroethane		U	10		U	10		U	10
Chloroform		U	10		U	10		U	10
Chloromethane		U	10		U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		U	10		U	10		U	10
Dibromochloromethane		U	10		U	10		U	10
Ethylbenzene		U	10		U	10		U	10
Methylene chloride	1	BJ		1	BJ		2	BJ	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	AMW-044-082-MS			AMW-044-082-MSD			DMW-045-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	10		U	10
Tetrachloroethene		U	10		U	10		U	10
Toluene	39			40			45		
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		U	10		U	10		U	10
Trichloroethene	190			190			92		
Vinyl chloride		U	10		U	10		U	10
Xylenes (Total)		U	10		U	10		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA			NA	
Biochemical Oxygen Demand (BOD)		NA			NA			NA	
Hardness as Calcium Carbonate		NA			NA			NA	
Nitrate-Nitrite-N		NA			NA			NA	
Total Dissolved Solids (TDS)		NA			NA			NA	
Total Suspended Solids (TSS)		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	DMW-045-082-MSD			DMW-246-082			H-22J		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		NA			U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		NA			U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		NA			U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		NA			U	0.5		U	0.5
2-Nitrotoluene (2NT)		NA			U	0.5		U	0.5
3-Nitrotoluene (3NT)		NA			U	0.5		U	0.5
4-Nitrotoluene (4NT)		NA			U	0.5		U	0.5
RDX		NA			U	0.15		U	0.15
Tetryl		NA			U	0.5		U	0.5
Nitrobenzene (NB)		NA			U	0.25		U	0.25
HMX		NA			U	0.25		U	0.25
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		NA	
1,1,2,2-Tetrachloroethane		U	10		U	1		NA	
1,1,2-Trichloroethane		U	10		U	1		NA	
1,1-Dichloroethane		U	10		U	1		NA	
1,1-Dichloroethene	57				U	1		NA	
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		NA	
1,2-Dichlorobenzene		NA			U	1		NA	
1,2-Dichloroethane		U	10		U	1		NA	
1,2-Dichloroethene(Total)		U	10		NA			NA	
1,2-Dichloropropane		U	10		U	1		NA	
1,3-Dichlorobenzene		NA			U	1		NA	
1,4-Dichlorobenzene		NA			U	1		NA	
2-Butanone		U	10		U	5		NA	
2-Hexanone		U	10		U	5		NA	
4-Methyl-2-pentanone		U	10		U	5		NA	
Acetone		U	10		U	5		NA	
Benzene	48				U	1		NA	
Bromochloromethane		NA			U	1		NA	
Bromodichloromethane		U	10		U	1		NA	
Bromoform		U	10		U	1		NA	
Bromomethane		U	10		U	1		NA	
Carbon disulfide		U	10	7				NA	
Carbon tetrachloride		U	10		U	1		NA	
Chlorobenzene	46				U	1		NA	
Chloroethane		U	10		U	1		NA	
Chloroform		U	10		U	1		NA	
Chloromethane		U	10		U	1		NA	
Cis-1,2-Dichloroethene		NA			U	1		NA	
Cis-1,3-Dichloropropene		U	10		U	1		NA	
Dibromochloromethane		U	10		U	1		NA	
Ethylbenzene		U	10		U	1		NA	
Methylene chloride	2	J		2	B			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	DMW-045-082-MSD			DMW-246-082			H-22J		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		U	10		U	1		NA	
Tetrachloroethene		U	10		U	1		NA	
Toluene	42				U	1		NA	
Trans-1,2-Dichloroethene		NA			U	1		NA	
Trans-1,3-Dichloropropene		U	10		U	1		NA	
Trichloroethene	100				U	1		NA	
Vinyl chloride		U	10		U	1		NA	
Xylenes (Total)		U	10		U	1		NA	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA		200				NA	
Biochemical Oxygen Demand (BOD)		NA			U	4		NA	
Hardness as Calcium Carbonate		NA		190				NA	
Nitrate-Nitrite-N		NA			U	0.2		NA	
Total Dissolved Solids (TDS)		NA		440				NA	
Total Suspended Solids (TSS)		NA		170				NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	H-26J			IH2-601-082-MS			IH2-601-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			NA	
1,3-Dinitrobenzene (DNB)		U	0.25		NA			NA	
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			NA	
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			NA	
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			NA	
2-Nitrotoluene (2NT)		U	0.5		NA			NA	
3-Nitrotoluene (3NT)		U	0.5		NA			NA	
4-Nitrotoluene (4NT)		U	0.5		NA			NA	
RDX		U	0.15		NA			NA	
Tetryl		U	0.5		NA			NA	
Nitrobenzene (NB)		U	0.25		NA			NA	
HMX		U	0.25		NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		NA			U	10		U	10
1,1,2,2-Tetrachloroethane		NA			U	10		U	10
1,1,2-Trichloroethane		NA			U	10		U	10
1,1-Dichloroethane		NA			U	10		U	10
1,1-Dichloroethene		NA		51			51		
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		NA			U	10		U	10
1,2-Dichloroethene(Total)		NA			U	10		U	10
1,2-Dichloropropane		NA			U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		NA		4	J		6	J	
2-Hexanone		NA			U	10		U	10
4-Methyl-2-pentanone		NA			U	10		U	10
Acetone		NA		15	B		17	B	
Benzene		NA		46			51		
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		NA			U	10		U	10
Bromoform		NA			U	10		U	10
Bromomethane		NA			U	10		U	10
Carbon disulfide		NA			U	10		U	10
Carbon tetrachloride		NA			U	10		U	10
Chlorobenzene		NA		51			52		
Chloroethane		NA			U	10		U	10
Chloroform		NA			U	10		U	10
Chloromethane		NA			U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			U	10		U	10
Dibromochloromethane		NA			U	10		U	10
Ethylbenzene		NA			U	10		U	10
Methylene chloride		NA		3	BJ		3	BJ	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	H-26J			IH2-601-082-MS			IH2-601-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
Styrene		NA			U	10		U	10
Tetrachloroethene		NA			U	10		U	10
Toluene		NA		44			44		
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			U	10		U	10
Trichloroethene		NA		53			51		
Vinyl chloride		NA			U	10		U	10
Xylenes (Total)		NA			U	10		U	10
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA			NA	
Biochemical Oxygen Demand (BOD)		NA			NA			NA	
Hardness as Calcium Carbonate		NA			NA			NA	
Nitrate-Nitrite-N		NA			NA			NA	
Total Dissolved Solids (TDS)		NA			NA			NA	
Total Suspended Solids (TSS)		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-053-082-MS			BMW-053-082-MSD			AMW-254-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		NA			NA		81	B	
Antimony		NA			NA			U	39
Arsenic		NA			NA			UW	4
Barium		NA			NA		220		
Beryllium		NA			NA			U	1
Cadmium		NA			NA			U	5
Calcium		NA			NA		50500		
Chromium		NA			NA			U	6
Cobalt		NA			NA			U	6
Copper		NA			NA			U	4
Iron		NA			NA			U	46
Lead		NA			NA			UWN	2
Magnesium		NA			NA		12200		
Manganese		NA			NA		5.8	B	
Mercury		NA			NA			UN	0.2
Nickel		NA			NA			U	10
Potassium		NA			NA		7050		
Selenium		NA			NA			UW	4
Silver		NA			NA			U	6
Sodium		NA			NA		20900		
Thallium		NA			NA			UWN	2
Vanadium		NA			NA			U	5
Zinc		NA			NA			U	3
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			U	0.25
1,3-Dinitrobenzene (DNB)		NA			NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		NA			NA			U	0.25
2,4-Dinitrotoluene (24DNT)		NA			NA			U	0.25
2,6-Dinitrotoluene (26DNT)		NA			NA			U	0.5
2-Nitrotoluene (2NT)		NA			NA			U	0.5
3-Nitrotoluene (3NT)		NA			NA			U	0.5
4-Nitrotoluene (4NT)		NA			NA			U	0.5
RDX		NA			NA		1.1		
Tetryl		NA			NA			U	0.5
Nitrobenzene (NB)		NA			NA			U	0.25
HMX		NA			NA			U	0.25

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-053-082-MS			BMW-053-082-MSD			AMW-254-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD	0.029	JP		0.02	JP			U	0.1
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT	0.65	P		0.69	P			U	0.1
Aldrin	0.39			0.43				U	0.05
Alpha chlordane		U	0.05	0.0035	JP			U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin	0.78			0.86				U	0.1
Endosulfan I		U	0.05		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin	0.82			0.93				U	0.1
Endrin aldehyde	0.011	JP		0.012	JP			U	0.1
Endrin ketone	0.0055	JP		0.014	JP			U	0.1
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)	0.46			0.5				U	0.05
Heptachlor	0.4	B		0.44	B			U	0.05
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor	0.027	JP			U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		NA			NA			U	1
Gross Beta (Radioactivity)		NA			NA		6.15		
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene	41			2	J			U	10
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene	40			1	J			U	10
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene	39			2	J			U	10

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-053-082-MS			BMW-053-082-MSD			AMW-254-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol	65			3	J			U	10
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol	68			3	J			U	10
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol	68			5	J			U	25
Acenaphthene	43			2	J			U	10
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate	1	J			U	10		U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	1	J			U	10		U	10
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine	44			2	J			U	10
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-053-082-MS			BMW-053-082-MSD			AMW-254-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol	73			4	J			U	25
Phenanthrene		U	10		U	10		U	10
Phenol	70	B		5	BJ			U	10
Pyrene	45			2	J			U	10
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	66	B		8	BJ		1	BJ	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum		NA			NA		159	B*	
Antimony		NA			NA			U	39
Arsenic		NA			NA		4.2	B	
Barium		NA			NA		211		
Beryllium		NA			NA			U	1
Cadmium		NA			NA			U	5
Calcium		NA			NA		48700		
Chromium		NA			NA			U	6
Cobalt		NA			NA			U	6
Copper		NA			NA			U	4
Cyanide		NA			NA			U	10
Iron		NA			NA			U*	46
Lead		NA			NA			UW	2
Magnesium		NA			NA		11600		
Manganese		NA			NA		7	B	
Mercury		NA			NA			U	0.2
Nickel		NA			NA			U	10
Potassium		NA			NA		7030		
Selenium		NA			NA			UWN	40
Silver		NA			NA			U	6
Sodium		NA			NA		19700	E	
Thallium		NA			NA			UW	2
Vanadium		NA			NA			U	5
Zinc		NA			NA		3.7	B	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		NA			NA			U	1
1,1,2,2-Tetrachloroethane		NA			NA			U	1
1,1,2-Trichloroethane		NA			NA			U	1
1,1-Dichloroethane		NA			NA			U	1
1,1-Dichloroethene		NA			NA			U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			U	1
1,2-Dichlorobenzene		NA			NA			U	1
1,2-Dichloroethane		NA			NA			U	1

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-053-082-MS			BMW-053-082-MSD			AMW-254-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		NA			NA			U	1
1,3-Dichlorobenzene		NA			NA			U	1
1,4-Dichlorobenzene		NA			NA			U	1
2-Butanone		NA			NA			U	5
2-Hexanone		NA			NA			U	5
4-Methyl-2-pentanone		NA			NA			U	5
Acetone		NA			NA			U	5
Benzene		NA			NA			U	1
Bromochloromethane		NA			NA			U	1
Bromodichloromethane		NA			NA			U	1
Bromoform		NA			NA			U	1
Bromomethane		NA			NA			U	1
Carbon disulfide		NA			NA		1		
Carbon tetrachloride		NA			NA			U	1
Chlorobenzene		NA			NA			U	1
Chloroethane		NA			NA			U	1
Chloroform		NA			NA			U	1
Chloromethane		NA			NA			U	1
Cis-1,2-Dichloroethene		NA			NA			U	1
Cis-1,3-Dichloropropene		NA			NA			U	1
Dibromochloromethane		NA			NA			U	1
Ethylbenzene		NA			NA			U	1
Methylene chloride		NA			NA		0.9	BJ	
Styrene		NA			NA			U	1
Tetrachloroethene		NA			NA			U	1
Toluene		NA			NA			U	1
Trans-1,2-Dichloroethene		NA			NA			U	1
Trans-1,3-Dichloropropene		NA			NA			U	1
Trichloroethene		NA			NA			U	1
Vinyl chloride		NA			NA			U	1
Xylenes (Total)		NA			NA			U	1
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA		180		
Biochemical Oxygen Demand (BOD)		NA			NA			U	3
Hardness as Calcium Carbonate		NA			NA		190		
Nitrate-Nitrite-N		NA			NA		4		
Total Dissolved Solids (TDS)		NA			NA		260		
Total Suspended Solids (TSS)		NA			NA			U	5

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-255-082			IH2-002-082-MS			IH2-002-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum	50.8	B			NA			NA	
Antimony		U	39		NA			NA	
Arsenic	4.7	BW			NA			NA	
Barium	257				NA			NA	
Beryllium		U	1		NA			NA	
Cadmium		U	5		NA			NA	
Calcium	47800				NA			NA	
Chromium		U	6		NA			NA	
Cobalt		U	6		NA			NA	
Copper		U	4		NA			NA	
Iron		U	46		NA			NA	
Lead		UWN	2		NA			NA	
Magnesium	11300				NA			NA	
Manganese	17.3				NA			NA	
Mercury		UN	0.2		NA			NA	
Nickel		U	10		NA			NA	
Potassium	7110				NA			NA	
Selenium		UW	4		NA			NA	
Silver		U	6		NA			NA	
Sodium	15000				NA			NA	
Thallium		UWN	2		NA			NA	
Vanadium		U	5		NA			NA	
Zinc	3.4	B			NA			NA	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-255-082			IH2-002-082-MS			IH2-002-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		NA			NA	
4,4'-DDE		U	0.1		NA			NA	
4,4'-DDT		U	0.1		NA			NA	
Aldrin		U	0.05		NA			NA	
Alpha chlordane		U	0.05		NA			NA	
Alpha-BHC		U	0.05		NA			NA	
Beta-BHC		U	0.05		NA			NA	
Delta-BHC		U	0.05		NA			NA	
Dieldrin		U	0.1		NA			NA	
Endosulfan I		U	0.05		NA			NA	
Endosulfan II		U	0.1		NA			NA	
Endosulfan sulfate		U	0.1		NA			NA	
Endrin		U	0.1		NA			NA	
Endrin aldehyde		U	0.1		NA			NA	
Endrin ketone		U	0.1		NA			NA	
Gamma chlordane		U	0.05		NA			NA	
Gamma-BHC (Lindane)		U	0.05		NA			NA	
Heptachlor		U	0.05		NA			NA	
Heptachlor epoxide		U	0.05		NA			NA	
PCB-1016		U	1		NA			NA	
PCB-1221		U	2		NA			NA	
PCB-1232		U	1		NA			NA	
PCB-1242		U	1		NA			NA	
PCB-1248		U	1		NA			NA	
PCB-1254		U	1		NA			NA	
PCB-1260		U	1		NA			NA	
Toxaphene		U	5		NA			NA	
p,p'-Methoxychlor		U	0.5		NA			NA	
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		U	1		NA			NA	
Gross Beta (Radioactivity)	5.31				NA			NA	
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		U	10	24			18		
1,2-Dichlorobenzene		U	10		U	10		U	10
1,3-Dichlorobenzene		U	10		U	10		U	10
1,4-Dichlorobenzene		U	10	19			14		
2,2'-Oxybis(1-chloropropane)		U	10		U	10		U	10
2,4,5-Trichlorophenol		U	25		U	25		U	25
2,4,6-Trichlorophenol		U	10		U	10		U	10
2,4-Dichlorophenol		U	10		U	10		U	10
2,4-Dimethylphenol		U	10		U	10		U	10
2,4-Dinitrophenol		U	25		U	25		U	25
2,4-Dinitrotoluene		U	10	44			27		

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-255-082			IH2-002-082-MS			IH2-002-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2,6-Dinitrotoluene (26DNT)		U	10		U	10		U	10
2-Chloronaphthalene		U	10		U	10		U	10
2-Chlorophenol		U	10	65			42		
2-Methylnaphthalene		U	10		U	10		U	10
2-Methylphenol		U	10		U	10		U	10
2-Nitroaniline		U	25		U	25		U	25
2-Nitrophenol		U	10		U	10		U	10
3,3'-Dichlorobenzidine		U	10		U	10		U	10
3-Nitroaniline		U	25		U	25		U	25
4,6-Dinitro-2-methylphenol		U	25		U	25		U	25
4-Bromophenyl phenyl ether		U	10		U	10		U	10
4-Chloro-3-methylphenol		U	10	88			49		
4-Chloroaniline		U	10		U	10		U	10
4-Chlorophenyl phenyl ether		U	10		U	10		U	10
4-Methylphenol		U	10		U	10		U	10
4-Nitroaniline		U	25		U	25		U	25
4-Nitrophenol		U	25	82			51		
Acenaphthene		U	10	36			22		
Acenaphthylene		U	10		U	10		U	10
Anthracene		U	10		U	10		U	10
Benzo(a)anthracene		U	10		U	10		U	10
Benzo(a)pyrene		U	10		U	10		U	10
Benzo(b)fluoranthene		U	10		U	10		U	10
Benzo(g,h,i)perylene		U	10		U	10		U	10
Benzo(k)fluoranthene		U	10		U	10		U	10
Butyl benzyl phthalate		U	10		U	10		U	10
Carbazole		U	10		U	10		U	10
Chrysene		U	10		U	10		U	10
Di-n-butyl phthalate		U	10	2	J			U	10
Di-n-octyl phthalate		U	10		U	10		U	10
Dibenzo(a,h)anthracene		U	10		U	10		U	10
Dibenzofuran		U	10		U	10		U	10
Diethyl phthalate	1	BJ		2	J		1	J	
Dimethyl phthalate		U	10		U	10		U	10
Fluoranthene		U	10		U	10		U	10
Fluorene		U	10		U	10		U	10
Hexachlorobenzene		U	10		U	10		U	10
Hexachlorobutadiene		U	10		U	10		U	10
Hexachlorocyclopentadiene		U	10		U	10		U	10
Hexachloroethane		U	10		U	10		U	10
Indeno(1,2,3-cd)pyrene		U	10		U	10		U	10
Isophorone		U	10		U	10		U	10
N-Nitroso-di-n-propylamine		U	10	45			27		
N-Nitrosodiphenylamine(1)		U	10		U	10		U	10
Naphthalene		U	10		U	10		U	10

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-255-082			IH2-002-082-MS			IH2-002-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Nitrobenzene (NB)		U	10		U	10		U	10
Pentachlorophenol		U	25	100			66		
Phenanthrene		U	10		U	10		U	10
Phenol	3	J		68	B		44	B	
Pyrene		U	10	43			32		
bis(2-Chloroethoxy)methane		U	10		U	10		U	10
bis(2-Chloroethyl)ether		U	10		U	10		U	10
bis(2-Ethylhexyl)phthalate	30	B		6	BJ		2	BJ	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum	174	B*			NA			NA	
Antimony		U	39		NA			NA	
Arsenic		UW	4		NA			NA	
Barium	232				NA			NA	
Beryllium		U	1		NA			NA	
Cadmium		U	5		NA			NA	
Calcium	43000				NA			NA	
Chromium		U	6		NA			NA	
Cobalt		U	6		NA			NA	
Copper		U	4		NA			NA	
Cyanide		U	10		NA			NA	
Iron		U*	46		NA			NA	
Lead		U	2		NA			NA	
Magnesium	10200				NA			NA	
Manganese	16.7				NA			NA	
Mercury		U	0.2		NA			NA	
Nickel		U	10		NA			NA	
Potassium	6360				NA			NA	
Selenium		UN	40		NA			NA	
Silver		U	6		NA			NA	
Sodium	13900	E			NA			NA	
Thallium		UW	2		NA			NA	
Vanadium		U	5		NA			NA	
Zinc	22.6				NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		U	1		NA			NA	
1,1,2,2-Tetrachloroethane		U	1		NA			NA	
1,1,2-Trichloroethane		U	1		NA			NA	
1,1-Dichloroethane		U	1		NA			NA	
1,1-Dichloroethene		U	1		NA			NA	
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			NA	
1,2-Dichlorobenzene		U	1		NA			NA	
1,2-Dichloroethane		U	1		NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	BMW-255-082			IH2-002-082-MS			IH2-002-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitatic Limit
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		NA			NA	
1,3-Dichlorobenzene		U	1		NA			NA	
1,4-Dichlorobenzene		U	1		NA			NA	
2-Butanone		U	5		NA			NA	
2-Hexanone		U	5		NA			NA	
4-Methyl-2-pentanone		U	5		NA			NA	
Acetone	4	J			NA			NA	
Benzene		U	1		NA			NA	
Bromochloromethane		U	1		NA			NA	
Bromodichloromethane		U	1		NA			NA	
Bromoform		U	1		NA			NA	
Bromomethane		U	1		NA			NA	
Carbon disulfide		U	1		NA			NA	
Carbon tetrachloride		U	1		NA			NA	
Chlorobenzene		U	1		NA			NA	
Chloroethane		U	1		NA			NA	
Chloroform		U	1		NA			NA	
Chloromethane		U	1		NA			NA	
Cis-1,2-Dichloroethene		U	1		NA			NA	
Cis-1,3-Dichloropropene		U	1		NA			NA	
Dibromochloromethane		U	1		NA			NA	
Ethylbenzene		U	1		NA			NA	
Methylene chloride		U	2		NA			NA	
Styrene		U	1		NA			NA	
Tetrachloroethene		U	1		NA			NA	
Toluene	0.6	J			NA			NA	
Trans-1,2-Dichloroethene		U	1		NA			NA	
Trans-1,3-Dichloropropene		U	1		NA			NA	
Trichloroethene		U	1		NA			NA	
Vinyl chloride		U	1		NA			NA	
Xylenes (Total)		U	1		NA			NA	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate	170				NA			NA	
Biochemical Oxygen Demand (BOD)		U	3		NA			NA	
Hardness as Calcium Carbonate	170				NA			NA	
Nitrate-Nitrite-N	3.6				NA			NA	
Total Dissolved Solids (TDS)	250				NA			NA	
Total Suspended Solids (TSS)	5				NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	JH2-603-082-MS			JH2-603-082-MSD			IH2-004-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		NA			NA			NA	
Antimony		NA			NA			NA	
Arsenic		NA			NA			NA	
Barium		NA			NA			NA	
Beryllium		NA			NA			NA	
Cadmium		NA			NA			NA	
Calcium		NA			NA			NA	
Chromium		NA			NA			NA	
Cobalt		NA			NA			NA	
Copper		NA			NA			NA	
Iron		NA			NA			NA	
Lead		NA			NA			NA	
Magnesium		NA			NA			NA	
Manganese		NA			NA			NA	
Mercury		NA			NA			NA	
Nickel		NA			NA			NA	
Potassium		NA			NA			NA	
Selenium		NA			NA			NA	
Silver		NA			NA			NA	
Sodium		NA			NA			NA	
Thallium		NA			NA			NA	
Vanadium		NA			NA			NA	
Zinc		NA			NA			NA	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	JH2-603-082-MS			JH2-603-082-MSD			IH2-004-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD		U	0.1		U	0.1	0.045	JP	
4,4'-DDE		U	0.1		U	0.1		U	0.1
4,4'-DDT	0.95			0.98			0.96		
Aldrin	0.47			0.46			0.45		
Alpha chlordane		U	0.05		U	0.05		U	0.05
Alpha-BHC		U	0.05		U	0.05		U	0.05
Beta-BHC		U	0.05		U	0.05		U	0.05
Delta-BHC		U	0.05		U	0.05		U	0.05
Dieldrin	0.99			0.98			0.95		
Endosulfan I		U	0.05		U	0.05		U	0.05
Endosulfan II		U	0.1		U	0.1		U	0.1
Endosulfan sulfate		U	0.1		U	0.1		U	0.1
Endrin	1			1			1		
Endrin aldehyde		U	0.1		U	0.1	0.012	J	
Endrin ketone		U	0.1		U	0.1	0.028	J	
Gamma chlordane		U	0.05		U	0.05		U	0.05
Gamma-BHC (Lindane)	0.52			0.5			0.54		
Heptachlor	0.48			0.47			0.47		
Heptachlor epoxide		U	0.05		U	0.05		U	0.05
PCB-1016		U	1		U	1		U	1
PCB-1221		U	2		U	2		U	2
PCB-1232		U	1		U	1		U	1
PCB-1242		U	1		U	1		U	1
PCB-1248		U	1		U	1		U	1
PCB-1254		U	1		U	1		U	1
PCB-1260		U	1		U	1		U	1
Toxaphene		U	5		U	5		U	5
p,p'-Methoxychlor		U	0.5		U	0.5		U	0.5
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		NA			NA			NA	
Gross Beta (Radioactivity)		NA			NA			NA	
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2,2'-Oxybis(1-chloropropane)		NA			NA			NA	
2,4,5-Trichlorophenol		NA			NA			NA	
2,4,6-Trichlorophenol		NA			NA			NA	
2,4-Dichlorophenol		NA			NA			NA	
2,4-Dimethylphenol		NA			NA			NA	
2,4-Dinitrophenol		NA			NA			NA	
2,4-Dinitrotoluene		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	JH2-603-082-MS			JH2-603-082-MSD			IH2-004-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Chloronaphthalene		NA			NA			NA	
2-Chlorophenol		NA			NA			NA	
2-Methylnaphthalene		NA			NA			NA	
2-Methylphenol		NA			NA			NA	
2-Nitroaniline		NA			NA			NA	
2-Nitrophenol		NA			NA			NA	
3,3'-Dichlorobenzidine		NA			NA			NA	
3-Nitroaniline		NA			NA			NA	
4,6-Dinitro-2-methylphenol		NA			NA			NA	
4-Bromophenyl phenyl ether		NA			NA			NA	
4-Chloro-3-methylphenol		NA			NA			NA	
4-Chloroaniline		NA			NA			NA	
4-Chlorophenyl phenyl ether		NA			NA			NA	
4-Methylphenol		NA			NA			NA	
4-Nitroaniline		NA			NA			NA	
4-Nitrophenol		NA			NA			NA	
Acenaphthene		NA			NA			NA	
Acenaphthylene		NA			NA			NA	
Anthracene		NA			NA			NA	
Benzo(a)anthracene		NA			NA			NA	
Benzo(a)pyrene		NA			NA			NA	
Benzo(b)fluoranthene		NA			NA			NA	
Benzo(g,h,i)perylene		NA			NA			NA	
Benzo(k)fluoranthene		NA			NA			NA	
Butyl benzyl phthalate		NA			NA			NA	
Carbazole		NA			NA			NA	
Chrysene		NA			NA			NA	
Di-n-butyl phthalate		NA			NA			NA	
Di-n-octyl phthalate		NA			NA			NA	
Dibenzo(a,h)anthracene		NA			NA			NA	
Dibenzofuran		NA			NA			NA	
Diethyl phthalate		NA			NA			NA	
Dimethyl phthalate		NA			NA			NA	
Fluoranthene		NA			NA			NA	
Fluorene		NA			NA			NA	
Hexachlorobenzene		NA			NA			NA	
Hexachlorobutadiene		NA			NA			NA	
Hexachlorocyclopentadiene		NA			NA			NA	
Hexachloroethane		NA			NA			NA	
Indeno(1,2,3-cd)pyrene		NA			NA			NA	
Isophorone		NA			NA			NA	
N-Nitroso-di-n-propylamine		NA			NA			NA	
N-Nitrosodiphenylamine(1)		NA			NA			NA	
Naphthalene		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	JH2-603-082-MS			JH2-603-082-MSD			IH2-004-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Nitrobenzene (NB)		NA			NA			NA	
Pentachlorophenol		NA			NA			NA	
Phenanthrene		NA			NA			NA	
Phenol		NA			NA			NA	
Pyrene		NA			NA			NA	
bis(2-Chloroethoxy)methane		NA			NA			NA	
bis(2-Chloroethyl)ether		NA			NA			NA	
bis(2-Ethylhexyl)phthalate		NA			NA			NA	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum		NA			NA			NA	
Antimony		NA			NA			NA	
Arsenic		NA			NA			NA	
Barium		NA			NA			NA	
Beryllium		NA			NA			NA	
Cadmium		NA			NA			NA	
Calcium		NA			NA			NA	
Chromium		NA			NA			NA	
Cobalt		NA			NA			NA	
Copper		NA			NA			NA	
Cyanide		NA			NA			NA	
Iron		NA			NA			NA	
Lead		NA			NA			NA	
Magnesium		NA			NA			NA	
Manganese		NA			NA			NA	
Mercury		NA			NA			NA	
Nickel		NA			NA			NA	
Potassium		NA			NA			NA	
Selenium		NA			NA			NA	
Silver		NA			NA			NA	
Sodium		NA			NA			NA	
Thallium		NA			NA			NA	
Vanadium		NA			NA			NA	
Zinc		NA			NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		NA			NA			NA	
1,1,2,2-Tetrachloroethane		NA			NA			NA	
1,1,2-Trichloroethane		NA			NA			NA	
1,1-Dichloroethane		NA			NA			NA	
1,1-Dichloroethene		NA			NA			NA	
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	JH2-603-082-MS			JH2-603-082-MSD			IH2-004-082-MS		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		NA			NA			NA	
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		NA			NA			NA	
2-Hexanone		NA			NA			NA	
4-Methyl-2-pentanone		NA			NA			NA	
Acetone		NA			NA			NA	
Benzene		NA			NA			NA	
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		NA			NA			NA	
Bromoform		NA			NA			NA	
Bromomethane		NA			NA			NA	
Carbon disulfide		NA			NA			NA	
Carbon tetrachloride		NA			NA			NA	
Chlorobenzene		NA			NA			NA	
Chloroethane		NA			NA			NA	
Chloroform		NA			NA			NA	
Chloromethane		NA			NA			NA	
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			NA			NA	
Dibromochloromethane		NA			NA			NA	
Ethylbenzene		NA			NA			NA	
Methylene chloride		NA			NA			NA	
Styrene		NA			NA			NA	
Tetrachloroethene		NA			NA			NA	
Toluene		NA			NA			NA	
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			NA			NA	
Trichloroethene		NA			NA			NA	
Vinyl chloride		NA			NA			NA	
Xylenes (Total)		NA			NA			NA	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA			NA	
Biochemical Oxygen Demand (BOD)		NA			NA			NA	
Hardness as Calcium Carbonate		NA			NA			NA	
Nitrate-Nitrite-N		NA			NA			NA	
Total Dissolved Solids (TDS)		NA			NA			NA	
Total Suspended Solids (TSS)		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	IH2-004-082-MSD			IH2-604-082-MS			IH2-604-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)									
Aluminum		NA			NA			NA	
Antimony		NA			NA			NA	
Arsenic		NA			NA			NA	
Barium		NA			NA			NA	
Beryllium		NA			NA			NA	
Cadmium		NA			NA			NA	
Calcium		NA			NA			NA	
Chromium		NA			NA			NA	
Cobalt		NA			NA			NA	
Copper		NA			NA			NA	
Iron		NA			NA			NA	
Lead		NA			NA			NA	
Magnesium		NA			NA			NA	
Manganese		NA			NA			NA	
Mercury		NA			NA			NA	
Nickel		NA			NA			NA	
Potassium		NA			NA			NA	
Selenium		NA			NA			NA	
Silver		NA			NA			NA	
Sodium		NA			NA			NA	
Thallium		NA			NA			NA	
Vanadium		NA			NA			NA	
Zinc		NA			NA			NA	
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	IH2-004-082-MSD			IH2-604-082-MS			IH2-604-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)									
4,4'-DDD	0.047	JP			NA			NA	
4,4'-DDE		U	0.1		NA			NA	
4,4'-DDT	0.92				NA			NA	
Aldrin	0.43				NA			NA	
Alpha chlordane		U	0.05		NA			NA	
Alpha-BHC		U	0.05		NA			NA	
Beta-BHC		U	0.05		NA			NA	
Delta-BHC		U	0.05		NA			NA	
Dieldrin	0.91				NA			NA	
Endosulfan I		U	0.05		NA			NA	
Endosulfan II		U	0.1		NA			NA	
Endosulfan sulfate		U	0.1		NA			NA	
Endrin	0.97				NA			NA	
Endrin aldehyde	0.012	J			NA			NA	
Endrin ketone	0.027	J			NA			NA	
Gamma chlordane		U	0.05		NA			NA	
Gamma-BHC (Lindane)	0.5				NA			NA	
Heptachlor	0.44				NA			NA	
Heptachlor epoxide		U	0.05		NA			NA	
PCB-1016		U	1		NA			NA	
PCB-1221		U	2		NA			NA	
PCB-1232		U	1		NA			NA	
PCB-1242		U	1		NA			NA	
PCB-1248		U	1		NA			NA	
PCB-1254		U	1		NA			NA	
PCB-1260		U	1		NA			NA	
Toxaphene		U	5		NA			NA	
p,p'-Methoxychlor		U	0.5		NA			NA	
GROSS Alpha/Beta (pCi/l)									
Gross Alpha (Radioactivity)		NA			NA			NA	
Gross Beta (Radioactivity)		NA			NA			NA	
SEMIVOLATILES (SVOC) (ug/l)									
1,2,4-Trichlorobenzene		NA		37			29		
1,2-Dichlorobenzene		NA			U	10		U	10
1,3-Dichlorobenzene		NA			U	10		U	10
1,4-Dichlorobenzene		NA		38			32		
2,2'-Oxybis(1-chloropropane)		NA			U	10		U	10
2,4,5-Trichlorophenol		NA			U	25		U	25
2,4,6-Trichlorophenol		NA			U	10		U	10
2,4-Dichlorophenol		NA			U	10		U	10
2,4-Dimethylphenol		NA			U	10		U	10
2,4-Dinitrophenol		NA			U	25		U	25
2,4-Dinitrotoluene		NA		46			40		

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	IH2-004-082-MSD			IH2-604-082-MS			IH2-604-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
2,6-Dinitrotoluene (26DNT)		NA			U	10		U	10
2-Chloronaphthalene		NA			U	10		U	10
2-Chlorophenol		NA		59			53		
2-Methylnaphthalene		NA			U	10		U	10
2-Methylphenol		NA			U	10		U	10
2-Nitroaniline		NA			U	25		U	25
2-Nitrophenol		NA			U	10		U	10
3,3'-Dichlorobenzidine		NA			U	10		U	10
3-Nitroaniline		NA			U	25		U	25
4,6-Dinitro-2-methylphenol		NA			U	25		U	25
4-Bromophenyl phenyl ether		NA			U	10		U	10
4-Chloro-3-methylphenol		NA		76			66		
4-Chloroaniline		NA			U	10		U	10
4-Chlorophenyl phenyl ether		NA			U	10		U	10
4-Methylphenol		NA			U	10		U	10
4-Nitroaniline		NA			U	25		U	25
4-Nitrophenol		NA		94			82		
Acenaphthene		NA		42			36		
Acenaphthylene		NA			U	10		U	10
Anthracene		NA			U	10		U	10
Benzo(a)anthracene		NA			U	10		U	10
Benzo(a)pyrene		NA			U	10		U	10
Benzo(b)fluoranthene		NA			U	10		U	10
Benzo(g,h,i)perylene		NA			U	10		U	10
Benzo(k)fluoranthene		NA			U	10		U	10
Butyl benzyl phthalate		NA			U	10		U	10
Carbazole		NA			U	10		U	10
Chrysene		NA			U	10		U	10
Di-n-butyl phthalate		NA		1	J		1	J	
Di-n-octyl phthalate		NA			U	10		U	10
Dibenzo(a,h)anthracene		NA			U	10		U	10
Dibenzofuran		NA			U	10		U	10
Diethyl phthalate		NA			U	10	1	J	
Dimethyl phthalate		NA			U	10		U	10
Fluoranthene		NA			U	10		U	10
Fluorene		NA			U	10		U	10
Hexachlorobenzene		NA			U	10		U	10
Hexachlorobutadiene		NA			U	10		U	10
Hexachlorocyclopentadiene		NA			U	10		U	10
Hexachloroethane		NA			U	10		U	10
Indeno(1,2,3-cd)pyrene		NA			U	10		U	10
Isophorone		NA			U	10		U	10
N-Nitroso-di-n-propylamine		NA		34			29		
N-Nitrosodiphenylamine(1)		NA			U	10		U	10
Naphthalene		NA			U	10		U	10

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	IH2-004-082-MSD			IH2-604-082-MS			IH2-604-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (SVOC) (ug/l)									
Nitrobenzene (NB)		NA			U	10		U	10
Pentachlorophenol		NA		71			61		
Phenanthrene		NA			U	10		U	10
Phenol		NA		66	B		57	B	
Pyrene		NA		43			38		
bis(2-Chloroethoxy)methane		NA			U	10		U	10
bis(2-Chloroethyl)ether		NA			U	10		U	10
bis(2-Ethylhexyl)phthalate		NA		6	BJ		18	B	
TOTAL METALS / CYANIDE (ug/l)									
Aluminum		NA			NA			NA	
Antimony		NA			NA			NA	
Arsenic		NA			NA			NA	
Barium		NA			NA			NA	
Beryllium		NA			NA			NA	
Cadmium		NA			NA			NA	
Calcium		NA			NA			NA	
Chromium		NA			NA			NA	
Cobalt		NA			NA			NA	
Copper		NA			NA			NA	
Cyanide		NA			NA			NA	
Iron		NA			NA			NA	
Lead		NA			NA			NA	
Magnesium		NA			NA			NA	
Manganese		NA			NA			NA	
Mercury		NA			NA			NA	
Nickel		NA			NA			NA	
Potassium		NA			NA			NA	
Selenium		NA			NA			NA	
Silver		NA			NA			NA	
Sodium		NA			NA			NA	
Thallium		NA			NA			NA	
Vanadium		NA			NA			NA	
Zinc		NA			NA			NA	
VOLATILES (VOC) (ug/l)									
1,1,1-Trichloroethane		NA			NA			NA	
1,1,2,2-Tetrachloroethane		NA			NA			NA	
1,1,2-Trichloroethane		NA			NA			NA	
1,1-Dichloroethane		NA			NA			NA	
1,1-Dichloroethene		NA			NA			NA	
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		NA			NA			NA	

Appendix D-23
Analytical Data of Field Split, Matrix Spike, and Matrix Spike Duplicate of Groundwater Samples

	IH2-004-082-MSD			IH2-604-082-MS			IH2-604-082-MSD		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (VOC) (ug/l)									
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		NA			NA			NA	
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		NA			NA			NA	
2-Hexanone		NA			NA			NA	
4-Methyl-2-pentanone		NA			NA			NA	
Acetone		NA			NA			NA	
Benzene		NA			NA			NA	
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		NA			NA			NA	
Bromoform		NA			NA			NA	
Bromomethane		NA			NA			NA	
Carbon disulfide		NA			NA			NA	
Carbon tetrachloride		NA			NA			NA	
Chlorobenzene		NA			NA			NA	
Chloroethane		NA			NA			NA	
Chloroform		NA			NA			NA	
Chloromethane		NA			NA			NA	
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			NA			NA	
Dibromochloromethane		NA			NA			NA	
Ethylbenzene		NA			NA			NA	
Methylene chloride		NA			NA			NA	
Styrene		NA			NA			NA	
Tetrachloroethene		NA			NA			NA	
Toluene		NA			NA			NA	
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			NA			NA	
Trichloroethene		NA			NA			NA	
Vinyl chloride		NA			NA			NA	
Xylenes (Total)		NA			NA			NA	
WATER QUALITY (mg/l)									
Alkalinity as Calcium Carbonate		NA			NA			NA	
Biochemical Oxygen Demand (BOD)		NA			NA			NA	
Hardness as Calcium Carbonate		NA			NA			NA	
Nitrate-Nitrite-N		NA			NA			NA	
Total Dissolved Solids (TDS)		NA			NA			NA	
Total Suspended Solids (TSS)		NA			NA			NA	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-218-082			RIN-218-082-RE			RIN-221-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		NA			U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			U	0.5
2-Nitrotoluene (2NT)		U	0.5		NA			U	0.5
3-Nitrotoluene (3NT)		U	0.5		NA			U	0.5
4-Nitrotoluene (4NT)		U	0.5		NA			U	0.5
RDX		U	0.15		NA			U	0.15
Tetryl		U	0.5		NA			U	0.5
Nitrobenzene (NB)		U	0.25		NA			U	0.25
HMX		U	0.25		NA			U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	2		U	1
1,1,2,2-Tetrachloroethane		U	1		U	2		U	1
1,1,2-Trichloroethane		U	1		U	2		U	1
1,1-Dichloroethane		U	1		U	2		U	1
1,1-Dichloroethene		U	1		U	2		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	2		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	2		U	1
1,2-Dichlorobenzene		U	1		U	2		U	1
1,2-Dichloroethane		U	1		U	2		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	2		U	1
1,3-Dichlorobenzene		U	1		U	2		U	1
1,4-Dichlorobenzene		U	1		U	2		U	1
2-Butanone		U	5		U	10		U	5
2-Hexanone		U	5		U	10		U	5
4-Methyl-2-pentanone		U	5		U	10		U	5
Acetone		U	5	5	DJ			U	5
Benzene		U	1		U	2		U	1
Bromochloromethane		U	1		U	2		U	1
Bromodichloromethane	0.6	J			U	2	0.7	J	
Bromoform		U	1		U	2		U	1
Bromomethane		U	1		U	2		U	1
Carbon disulfide	42	E		36	D			U	1
Carbon tetrachloride		U	1		U	2		U	1
Chlorobenzene		U	1		U	2		U	1
Chloroethane		U	1		U	2		U	1
Chloroform	1			1	DJ		2		
Chloromethane		U	1		U	2		U	1
Cis-1,2-Dichloroethene		U	1		U	2		U	1
Cis-1,3-Dichloropropene		U	1		U	2		U	1
Dibromochloromethane		U	1		U	2		U	1
Ethylbenzene		U	1		U	2		U	1
Methylene chloride	0.7	BJ		3	BDJ		2	B	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-218-082			RIN-218-082-RE			RIN-221-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	2		U	1
Tetrachloroethene		U	1		U	2		U	1
Toluene	1				U	2	1		
Trans-1,2-Dichloroethene		U	1		U	2		U	1
Trans-1,3-Dichloropropene		U	1		U	2		U	1
Trichloroethene		U	1		U	2		U	1
Vinyl chloride		U	1		U	2		U	1
Xylenes (Total)		U	1		U	2		U	1

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-225-082			RIN-231-082			RIN-238-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5	6				U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane	0.9	J			U	1	0.6	J	
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform	2				U	1	2		
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	1	BJ		0.8	BJ		1	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-225-082			RIN-231-082			RIN-238-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1	0.6	J	
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-240-082			RIN-241-082			RIN-243-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25	0.73		
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane	0.6	J		0.5	J			U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1	1		
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene	1				U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform	1			2			1		
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	0.9	J		1	BJ		0.9	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-240-082			RIN-241-082			RIN-243-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene	0.5	J			U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-045-082			RIN-258-082			H-21I-RN		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		U	0.25		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25		U	0.25		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25		U	0.25		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25		U	0.25		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5		U	0.5		U	0.5
2-Nitrotoluene (2NT)		U	0.5		U	0.5		U	0.5
3-Nitrotoluene (3NT)		U	0.5		U	0.5		U	0.5
4-Nitrotoluene (4NT)		U	0.5		U	0.5		U	0.5
RDX		U	0.15		U	0.15		U	0.15
Tetryl		U	0.5		U	0.5		U	0.5
Nitrobenzene (NB)		U	0.25		U	0.25		U	0.25
HMX		U	0.25		U	0.25		U	0.25
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		NA	
1,1,2,2-Tetrachloroethane		U	1		U	1		NA	
1,1,2-Trichloroethane		U	1		U	1		NA	
1,1-Dichloroethane		U	1		U	1		NA	
1,1-Dichloroethene		U	1		U	1		NA	
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		NA	
1,2-Dichlorobenzene		U	1		U	1		NA	
1,2-Dichloroethane		U	1		U	1		NA	
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		NA	
1,3-Dichlorobenzene		U	1		U	1		NA	
1,4-Dichlorobenzene		U	1		U	1		NA	
2-Butanone		U	5		U	5		NA	
2-Hexanone		U	5		U	5		NA	
4-Methyl-2-pentanone		U	5		U	5		NA	
Acetone	25				U	5		NA	
Benzene		U	1		U	1		NA	
Bromochloromethane		U	1		U	1		NA	
Bromodichloromethane		U	1	0.7	J			NA	
Bromoform		U	1		U	1		NA	
Bromomethane		U	1		U	1		NA	
Carbon disulfide	17			0.9	J			NA	
Carbon tetrachloride		U	1		U	1		NA	
Chlorobenzene		U	1		U	1		NA	
Chloroethane		U	1		U	1		NA	
Chloroform	1			2				NA	
Chloromethane		U	1		U	1		NA	
Cis-1,2-Dichloroethene		U	1		U	1		NA	
Cis-1,3-Dichloropropene		U	1		U	1		NA	
Dibromochloromethane		U	1		U	1		NA	
Ethylbenzene		U	1		U	1		NA	
Methylene chloride	18	B		3	B			NA	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-045-082			RIN-258-082			H-21I-RN		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		NA	
Tetrachloroethene		U	1		U	1		NA	
Toluene	1			1				NA	
Trans-1,2-Dichloroethene		U	1		U	1		NA	
Trans-1,3-Dichloropropene		U	1		U	1		NA	
Trichloroethene		U	1		U	1		NA	
Vinyl chloride		U	1		U	1		NA	
Xylenes (Total)		U	1		U	1		NA	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	H-21J-RN			TRB-001-082			TRB-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		U	0.25		NA			NA	
1,3-Dinitrobenzene (DNB)		U	0.25		NA			NA	
2,4,6-Trinitrotoluene (TNT)		U	0.25		NA			NA	
2,4-Dinitrotoluene (24DNT)		U	0.25		NA			NA	
2,6-Dinitrotoluene (26DNT)		U	0.5		NA			NA	
2-Nitrotoluene (2NT)		U	0.5		NA			NA	
3-Nitrotoluene (3NT)		U	0.5		NA			NA	
4-Nitrotoluene (4NT)		U	0.5		NA			NA	
RDX		U	0.15		NA			NA	
Tetryl		U	0.5		NA			NA	
Nitrobenzene (NB)		U	0.25		NA			NA	
HMX		U	0.25		NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		NA			U	10		U	10
1,1,2,2-Tetrachloroethane		NA			U	10		U	10
1,1,2-Trichloroethane		NA			U	10		U	10
1,1-Dichloroethane		NA			U	10		U	10
1,1-Dichloroethene		NA		2	J			U	10
1,2-Dibromo-3-chloropropane (DBCP)		NA			NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			NA			NA	
1,2-Dichlorobenzene		NA			NA			NA	
1,2-Dichloroethane		NA			U	10		U	10
1,2-Dichloroethene(Total)		NA			U	10		U	10
1,2-Dichloropropane		NA			U	10		U	10
1,3-Dichlorobenzene		NA			NA			NA	
1,4-Dichlorobenzene		NA			NA			NA	
2-Butanone		NA			U	10		U	10
2-Hexanone		NA			U	10		U	10
4-Methyl-2-pentanone		NA			U	10		U	10
Acetone		NA			U	10	7	BJ	
Benzene		NA			U	10		U	10
Bromochloromethane		NA			NA			NA	
Bromodichloromethane		NA			U	10		U	10
Bromoform		NA			U	10		U	10
Bromomethane		NA			U	10		U	10
Carbon disulfide		NA			U	10		U	10
Carbon tetrachloride		NA			U	10		U	10
Chlorobenzene		NA			U	10		U	10
Chloroethane		NA			U	10		U	10
Chloroform		NA			U	10		U	10
Chloromethane		NA			U	10		U	10
Cis-1,2-Dichloroethene		NA			NA			NA	
Cis-1,3-Dichloropropene		NA			U	10		U	10
Dibromochloromethane		NA			U	10		U	10
Ethylbenzene		NA			U	10		U	10
Methylene chloride		NA		7	BJ		1	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	H-21J-RN			TRB-001-082			TRB-002-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		NA			U	10		U	10
Tetrachloroethene		NA			U	10		U	10
Toluene		NA		1	J			U	10
Trans-1,2-Dichloroethene		NA			NA			NA	
Trans-1,3-Dichloropropene		NA			U	10		U	10
Trichloroethene		NA		2	J			U	10
Vinyl chloride		NA			U	10		U	10
Xylenes (Total)		NA			U	10		U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-020-082			TRB-027-082			TRB-02I-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	10
1,1,2,2-Tetrachloroethane		U	1		U	1		U	10
1,1,2-Trichloroethane		U	1		U	1		U	10
1,1-Dichloroethane		U	1		U	1		U	10
1,1-Dichloroethene		U	1		U	1		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		NA	
1,2-Dichlorobenzene		U	1		U	1		NA	
1,2-Dichloroethane		U	1		U	1		U	10
1,2-Dichloroethene(Total)		NA			NA			U	10
1,2-Dichloropropane		U	1		U	1		U	10
1,3-Dichlorobenzene		U	1		U	1		NA	
1,4-Dichlorobenzene		U	1		U	1		NA	
2-Butanone		U	5		U	5		U	10
2-Hexanone		U	5		U	5		U	10
4-Methyl-2-pentanone		U	5		U	5		U	10
Acetone		U	5		U	5	1	BJ	
Benzene		U	1		U	1		U	10
Bromochloromethane		U	1		U	1		NA	
Bromodichloromethane		U	1		U	1		U	10
Bromoform		U	1		U	1		U	10
Bromomethane		U	1		U	1		U	10
Carbon disulfide		U	1		U	1		U	10
Carbon tetrachloride		U	1		U	1		U	10
Chlorobenzene		U	1		U	1		U	10
Chloroethane		U	1		U	1		U	10
Chloroform		U	1		U	1		U	10
Chloromethane		U	1		U	1		U	10
Cis-1,2-Dichloroethene		U	1		U	1		NA	
Cis-1,3-Dichloropropene		U	1		U	1		U	10
Dibromochloromethane		U	1		U	1		U	10
Ethylbenzene		U	1		U	1		U	10
Methylene chloride	1	BJ		4	B		8	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-020-082			TRB-027-082			TRB-02I-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	10
Tetrachloroethene		U	1		U	1		U	10
Toluene		U	1		U	1		U	10
Trans-1,2-Dichloroethene		U	1		U	1		NA	
Trans-1,3-Dichloropropene		U	1		U	1		U	10
Trichloroethene		U	1		U	1		U	10
Vinyl chloride		U	1		U	1		U	10
Xylenes (Total)		U	1		U	1		U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-02J-082			TRB-035-082			TRB-03I-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		U	10
1,1,2,2-Tetrachloroethane		U	10		U	1		U	10
1,1,2-Trichloroethane		U	10		U	1		U	10
1,1-Dichloroethane		U	10		U	1		U	10
1,1-Dichloroethene		U	10		U	1		U	10
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		NA	
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1		NA	
1,2-Dichlorobenzene		NA			U	1		NA	
1,2-Dichloroethane		U	10		U	1		U	10
1,2-Dichloroethene(Total)		U	10		NA			U	10
1,2-Dichloropropane		U	10		U	1		U	10
1,3-Dichlorobenzene		NA			U	1		NA	
1,4-Dichlorobenzene		NA			U	1		NA	
2-Butanone		U	10		U	5		U	10
2-Hexanone		U	10		U	5		U	10
4-Methyl-2-pentanone		U	10		U	5		U	10
Acetone	9	BJ			U	5		U	10
Benzene		U	10		U	1		U	10
Bromochloromethane		NA			U	1		NA	
Bromodichloromethane		U	10		U	1		U	10
Bromoform		U	10		U	1		U	10
Bromomethane		U	10		U	1		U	10
Carbon disulfide		U	10		U	1		U	10
Carbon tetrachloride		U	10		U	1		U	10
Chlorobenzene		U	10		U	1		U	10
Chloroethane		U	10		U	1		U	10
Chloroform		U	10		U	1		U	10
Chloromethane		U	10		U	1		U	10
Cis-1,2-Dichloroethene		NA			U	1		NA	
Cis-1,3-Dichloropropene		U	10		U	1		U	10
Dibromochloromethane		U	10		U	1		U	10
Ethylbenzene		U	10		U	1		U	10
Methylene chloride		U	10	1	BJ		3	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-02J-082			TRB-035-082			TRB-03I-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	10		U	1		U	10
Tetrachloroethene		U	10		U	1		U	10
Toluene		U	10		U	1		U	10
Trans-1,2-Dichloroethene		NA			U	1		NA	
Trans-1,3-Dichloropropene		U	10		U	1		U	10
Trichloroethene		U	10		U	1		U	10
Vinyl chloride		U	10		U	1		U	10
Xylenes (Total)		U	10		U	1		U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-03J-082			TRB-040-082			TRB-042-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	10		U	1		U	1
1,1,2,2-Tetrachloroethane		U	10		U	1		U	1
1,1,2-Trichloroethane		U	10		U	1	0.5	J	
1,1-Dichloroethane		U	10		U	1		U	1
1,1-Dichloroethene		U	10		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		NA			U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		NA			U	1	0.6	J	
1,2-Dichlorobenzene		NA			U	1		U	1
1,2-Dichloroethane		U	10		U	1		U	1
1,2-Dichloroethene(Total)		U	10		NA			NA	
1,2-Dichloropropane		U	10		U	1		U	1
1,3-Dichlorobenzene		NA			U	1		U	1
1,4-Dichlorobenzene		NA			U	1	0.6	J	
2-Butanone		U	10		U	5		U	5
2-Hexanone		U	10		U	5		U	5
4-Methyl-2-pentanone		U	10		U	5		U	5
Acetone		U	10		U	5	10		
Benzene		U	10		U	1		U	1
Bromochloromethane		NA			U	1		U	1
Bromodichloromethane		U	10		U	1		U	1
Bromoform		U	10		U	1	0.8	J	
Bromomethane		U	10		U	1		U	1
Carbon disulfide		U	10		U	1		U	1
Carbon tetrachloride		U	10		U	1		U	1
Chlorobenzene		U	10		U	1		U	1
Chloroethane		U	10		U	1		U	1
Chloroform		U	10		U	1		U	1
Chloromethane		U	10		U	1		U	1
Cis-1,2-Dichloroethene		NA			U	1		U	1
Cis-1,3-Dichloropropene		U	10		U	1		U	1
Dibromochloromethane		U	10		U	1		U	1
Ethylbenzene		U	10		U	1		U	1
Methylene chloride	3	BJ			U	2	9	B	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-03J-082			TRB-040-082			TRB-042-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	10		U	1		U	1
Tetrachloroethene		U	10		U	1		U	1
Toluene		U	10		U	1		U	1
Trans-1,2-Dichloroethene		NA			U	1		U	1
Trans-1,3-Dichloropropene		U	10		U	1		U	1
Trichloroethene		U	10		U	1		U	1
Vinyl chloride		U	10		U	1		U	1
Xylenes (Total)		U	10		U	1		U	1

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-045-082			TRB-238-082			TRB-243-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane		U	1		U	1		U	1
1,1,2-Trichloroethane		U	1		U	1		U	1
1,1-Dichloroethane		U	1		U	1		U	1
1,1-Dichloroethene		U	1		U	1		U	1
1,2-Dibromo-3-chloropropane (DBCP)		U	1		U	1		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1		U	1		U	1
1,2-Dichlorobenzene		U	1		U	1		U	1
1,2-Dichloroethane		U	1		U	1		U	1
1,2-Dichloroethene(Total)		NA			NA			NA	
1,2-Dichloropropane		U	1		U	1		U	1
1,3-Dichlorobenzene		U	1		U	1		U	1
1,4-Dichlorobenzene		U	1		U	1		U	1
2-Butanone		U	5		U	5		U	5
2-Hexanone		U	5		U	5		U	5
4-Methyl-2-pentanone		U	5		U	5		U	5
Acetone		U	5		U	5		U	5
Benzene		U	1		U	1		U	1
Bromochloromethane		U	1		U	1		U	1
Bromodichloromethane		U	1		U	1		U	1
Bromoform		U	1		U	1		U	1
Bromomethane		U	1		U	1		U	1
Carbon disulfide		U	1		U	1		U	1
Carbon tetrachloride		U	1		U	1		U	1
Chlorobenzene		U	1		U	1		U	1
Chloroethane		U	1		U	1		U	1
Chloroform		U	1		U	1		U	1
Chloromethane		U	1		U	1		U	1
Cis-1,2-Dichloroethene		U	1		U	1		U	1
Cis-1,3-Dichloropropene		U	1		U	1		U	1
Dibromochloromethane		U	1		U	1		U	1
Ethylbenzene		U	1		U	1		U	1
Methylene chloride	2	B			U	2	2	B	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-045-082			TRB-238-082			TRB-243-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	1		U	1
Tetrachloroethene		U	1		U	1		U	1
Toluene		U	1		U	1		U	1
Trans-1,2-Dichloroethene		U	1		U	1		U	1
Trans-1,3-Dichloropropene		U	1		U	1		U	1
Trichloroethene		U	1		U	1		U	1
Vinyl chloride		U	1		U	1		U	1
Xylenes (Total)		U	1		U	1		U	1

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-255-082			TRB-62I-082			TRB-62J-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
EXPLOSIVES (ug/l)									
1,3,5-Trinitrobenzene (TNB)		NA			NA			NA	
1,3-Dinitrobenzene (DNB)		NA			NA			NA	
2,4,6-Trinitrotoluene (TNT)		NA			NA			NA	
2,4-Dinitrotoluene (24DNT)		NA			NA			NA	
2,6-Dinitrotoluene (26DNT)		NA			NA			NA	
2-Nitrotoluene (2NT)		NA			NA			NA	
3-Nitrotoluene (3NT)		NA			NA			NA	
4-Nitrotoluene (4NT)		NA			NA			NA	
RDX		NA			NA			NA	
Tetryl		NA			NA			NA	
Nitrobenzene (NB)		NA			NA			NA	
HMX		NA			NA			NA	
VOLATILES (ug/l)									
1,1,1-Trichloroethane		U	1		U	10		U	10
1,1,2,2-Tetrachloroethane		U	1		U	10		U	10
1,1,2-Trichloroethane		U	1		U	10		U	10
1,1-Dichloroethane		U	1		U	10		U	10
1,1-Dichloroethene		U	1		U	10		U	10
1,2-Dibromo-3-chloropropane (DBCP)		U	1		NA			NA	
1,2-Dibromoethane (Ethylene dibromide)		U	1		NA			NA	
1,2-Dichlorobenzene		U	1		NA			NA	
1,2-Dichloroethane		U	1		U	10		U	10
1,2-Dichloroethene(Total)		NA			U	10		U	10
1,2-Dichloropropane		U	1		U	10		U	10
1,3-Dichlorobenzene		U	1		NA			NA	
1,4-Dichlorobenzene		U	1		NA			NA	
2-Butanone		U	5		U	10		U	10
2-Hexanone		U	5		U	10		U	10
4-Methyl-2-pentanone		U	5		U	10		U	10
Acetone		U	5		U	10		U	10
Benzene		U	1		U	10		U	10
Bromochloromethane		U	1		NA			NA	
Bromodichloromethane		U	1		U	10		U	10
Bromoform		U	1		U	10		U	10
Bromomethane		U	1		U	10		U	10
Carbon disulfide		U	1		U	10		U	10
Carbon tetrachloride		U	1		U	10		U	10
Chlorobenzene		U	1		U	10		U	10
Chloroethane		U	1		U	10		U	10
Chloroform		U	1		U	10		U	10
Chloromethane		U	1		U	10		U	10
Cis-1,2-Dichloroethene		U	1		NA			NA	
Cis-1,3-Dichloropropene		U	1		U	10		U	10
Dibromochloromethane		U	1		U	10		U	10
Ethylbenzene		U	1		U	10		U	10
Methylene chloride	0.5	BJ		1	BJ			U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	TRB-255-082			TRB-62I-082			TRB-62J-082		
	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)									
Styrene		U	1		U	10		U	10
Tetrachloroethene		U	1		U	10		U	10
Toluene		U	1		U	10		U	10
Trans-1,2-Dichloroethene		U	1		NA			NA	
Trans-1,3-Dichloropropene		U	1		U	10		U	10
Trichloroethene		U	1		U	10		U	10
Vinyl chloride		U	1		U	10		U	10
Xylenes (Total)		U	1		U	10		U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-002-082		
	Result	Qualifier	Quantitation Limit
DISSOLVED METALS (ug/l)			
Aluminum	66	B	
Antimony		U	39
Arsenic		UW	4
Barium		U	1
Beryllium		U	1
Cadmium		U	5
Calcium	207	B	
Chromium		U	6
Cobalt		U	6
Copper	4.2	B	
Iron		U	46
Lead		U	2
Magnesium	42.8	B	
Manganese		U	1
Mercury		UN	0.2
Nickel		U	10
Potassium		U	1250
Selenium		UN	4
Silver		U	6
Sodium	1360	B	
Thallium		UN	2
Vanadium		U	5
Zinc	12.8	B	
EXPLOSIVES (ug/l)			
1,3,5-Trinitrobenzene (TNB)		U	0.25
1,3-Dinitrobenzene (DNB)		U	0.25
2,4,6-Trinitrotoluene (TNT)		U	0.25
2,4-Dinitrotoluene (24DNT)		U	0.25
2,6-Dinitrotoluene (26DNT)		U	0.5
2-Nitrotoluene (2NT)		U	0.5
3-Nitrotoluene (3NT)		U	0.5
4-Nitrotoluene (4NT)		U	0.5
RDX		U	0.15
Tetryl		U	0.5
Nitrobenzene (NB)		U	0.25
HMX		U	0.25

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-002-082		
	Result	Qualifier	Quantitation Limit
PESTICIDES/PCB (ug/l)			
4,4'-DDD		U	0.1
4,4'-DDE		U	0.1
4,4'-DDT		U	0.1
Aldrin		U	0.05
Alpha chlordane		U	0.05
Alpha-BHC		U	0.05
Beta-BHC		U	0.05
Delta-BHC		U	0.05
Dieldrin		U	0.1
Endosulfan I		U	0.05
Endosulfan II		U	0.1
Endosulfan sulfate		U	0.1
Endrin		U	0.1
Endrin aldehyde		U	0.1
Endrin ketone		U	0.1
Gamma chlordane		U	0.05
Gamma-BHC (Lindane)		U	0.05
Heptachlor		U	0.05
Heptachlor epoxide		U	0.05
PCB-1016		U	1
PCB-1221		U	2
PCB-1232		U	1
PCB-1242		U	1
PCB-1248		U	1
PCB-1254		U	1
PCB-1260		U	1
Toxaphene		U	5
p,p'-Methoxychlor		U	0.5
SEMIVOLATILES (ug/l)			
1,2,4-Trichlorobenzene		U	10
1,2-Dichlorobenzene		U	10
1,3-Dichlorobenzene		U	10
1,4-Dichlorobenzene		U	10
2,2'-Oxybis(1-chloropropane)		U	10
2,4,5-Trichlorophenol		U	25
2,4,6-Trichlorophenol		U	10
2,4-Dichlorophenol		U	10
2,4-Dimethylphenol		U	10
2,4-Dinitrophenol		U	25
2,4-Dinitrotoluene		U	10
2,6-Dinitrotoluene (26DNT)		U	10
2-Chloronaphthalene		U	10
2-Chlorophenol		U	10
2-Methylnaphthalene		U	10
2-Methylphenol		U	10
2-Nitroaniline		U	25
2-Nitrophenol		U	10
3,3'-Dichlorobenzidine		U	10

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-002-082		
	Result	Qualifier	Quantitation Limit
SEMIVOLATILES (ug/l)			
3-Nitroaniline		U	25
4,6-Dinitro-2-methylphenol		U	25
4-Bromophenyl phenyl ether		U	10
4-Chloro-3-methylphenol		U	10
4-Chloroaniline		U	10
4-Chlorophenyl phenyl ether		U	10
4-Methylphenol		U	10
4-Nitroaniline		U	25
4-Nitrophenol		U	25
Acenaphthene		U	10
Acenaphthylene		U	10
Anthracene		U	10
Benzo(a)anthracene		U	10
Benzo(a)pyrene		U	10
Benzo(b)fluoranthene		U	10
Benzo(g,h,i)perylene		U	10
Benzo(k)fluoranthene		U	10
Butyl benzyl phthalate		U	10
Carbazole		U	10
Chrysene		U	10
Di-n-butyl phthalate		U	10
Di-n-octyl phthalate		U	10
Dibenzo(a,h)anthracene		U	10
Dibenzofuran		U	10
Diethyl phthalate	1	J	
Dimethyl phthalate		U	10
Fluoranthene		U	10
Fluorene		U	10
Hexachlorobenzene		U	10
Hexachlorobutadiene		U	10
Hexachlorocyclopentadiene		U	10
Hexachloroethane		U	10
Indeno(1,2,3-cd)pyrene		U	10
Isophorone		U	10
N-Nitroso-di-n-propylamine		U	10
N-Nitrosodiphenylamine(1)		U	10
Naphthalene		U	10
Nitrobenzene (NB)		U	10
Pentachlorophenol		U	25
Phenanthrene		U	10
Phenol	2	BJ	
Pyrene		U	10
bis(2-Chloroethoxy)methane		U	10
bis(2-Chloroethyl)ether		U	10
bis(2-Ethylhexyl)phthalate	1	BJ	

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-002-082		
	Result	Qualifier	Quantitation Limit
TOTAL METALS / CYANIDE (ug/l)			
Aluminum	167	B	
Antimony		U	42
Arsenic		U	4
Barium		U	2
Beryllium		U	2
Cadmium		U	5
Calcium		U	947
Chromium		U	8
Cobalt		U	7
Copper		U	16
Cyanide		U	10
Iron	25	BE	
Lead		U	2
Magnesium		U	213
Manganese		U	5
Mercury		U	0.2
Nickel		U	25
Potassium		U	3520
Selenium		UN	4
Silver		U	10
Sodium	1340	B	
Thallium		U	2
Vanadium		U	8
Zinc	4.9	B	
VOLATILES (ug/l)			
1,1,1-Trichloroethane		U	1(10)
1,1,2,2-Tetrachloroethane		U	1(10)
1,1,2-Trichloroethane		U	1(10)
1,1-Dichloroethane		U	1(10)
1,1-Dichloroethene		U	1(10)
1,2-Dibromo-3-chloropropane (DBCP)		U	1
1,2-Dibromoethane (Ethylene dibromide)		U	1
1,2-Dichlorobenzene		U	1
1,2-Dichloroethane		U	1(10)
1,2-Dichloroethene(Total)		(U)	('10)
1,2-Dichloropropane		U	1(10)
1,3-Dichlorobenzene		U	1
1,4-Dichlorobenzene		U	1
2-Butanone		U	5(10)
2-Hexanone		U	5(10)
4-Methyl-2-pentanone		U	5(10)
Acetone	('10)	U(B)	5
Benzene		U	1(10)
Bromochloromethane		U	1
Bromodichloromethane	2(1)	(J)	
Bromoform		U	1(10)
Bromomethane		U	1(10)
Carbon disulfide		U	1(10)

Appendix D-24 Analytical Data of Rinsate and Trip Blank Samples

	RIN-002-082		
	Result	Qualifier	Quantitation Limit
VOLATILES (ug/l)			
Carbon tetrachloride		U	1(10)
Chlorobenzene		U	1(10)
Chloroethane		U	1(10)
Chloroform	4(3)	(J)	
Chloromethane		U	1(10)
Cis-1,2-Dichloroethene		U	1
Cis-1,3-Dichloropropene		U	1(10)
Dibromochloromethane		U	1(10)
Ethylbenzene		U	1(10)
Methylene chloride	5	U(B)	(10)
Styrene		U	1(10)
Tetrachloroethene		U	1(10)
Toluene		U	1(10)
Trans-1,2-Dichloroethene		U	1
Trans-1,3-Dichloropropene		U	1(10)
Trichloroethene		U	1(10)
Vinyl chloride		U	1(10)
Xylenes (Total)		U	1(10)

Note : When both the VOC CLP Analyses and the Low Level VOC CLP Analyses were performed to the sample, results, quantitation limits, and data qualifiers corresponding to the VOC CLP Analyses are enclosed in brackets.

APPENDIX E
DATA VALIDATION REPORT

DRAFT REPORT

DATA VALIDATION REPORT

Prepared for
Department of the Army
U.S. Army Engineers
Kansas City District
Corps of Engineers
Kansas City, Missouri
February 1993

Woodward-Clyde

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DRAFT REPORT

■■■■■■DATA VALIDATION REPORT

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WCC Project 92KW030A

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1.0
INTRODUCTION

During the period of June through August 1992, 88 soil and 177 groundwater samples were taken at the former Nebraska Ordnance Plant Remedial Investigation, Mead, Nebraska phase I investigation for Operable Unit Number 2 (groundwater). In addition, 53 samples were taken for quality assurance and quality control. These samples were shipped to CompuChem Laboratories, Inc. (CCL)[1] and analyzed under Contract Laboratory Program (CLP) Statement of Work (SOW)[2] for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOC), TCL pesticides/PCB's, Target Analyte List (TAL) metals, and cyanide using methods specified in the Chemical Data Acquisition Plan (CDAP) Quality Assurance Plan (QAP)[3]. Samples for Nitrate, Total Nitrogen, Biochemical Oxygen Demand (BOD), Total Suspended Solids, Total Dissolved Solids, Alkalinity, and Total Hardness were sent to and analyzed by Ortek Environmental Laboratory[4]. Samples for explosives were shipped to and analyzed by Midwest Research Institute (MRI)[5] .

A level 1 QA/QC review was performed by Compuchem as defined in the SOW. A level 2 QA/QC review or data assessment was performed by WCC personnel which included a Contract Compliance Screen (CCS) and validation of data. A total of 100 percent of the data were reviewed in a Contract Compliance Screen (CCS) by WCC personnel. In addition, a total of 12 percent of the VOC, SVOC, pesticides, and metals were validated by WCC personnel. The EPA CLP National Functional Guidelines for Data Review were

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[1] CompuChem Laboratories, Inc. 3308 Chapel Hill/Nelson Highway, PO Box 121652, Research Triangle Park, North Carolina, 27709 USA

[2] EPA Statement of Work (SOW) 3/90 ILMO1.0 was utilized for inorganic and organic analyses except organic Low Concentration Water (LCW) which was EPA Superfund Analytical Methods for Low Concentration Water for Organics Analysis 6/91.

[3] Chemical Data Acquisition Plan Part II and Part III-Quality Assurance Plan for Former Nebraska Ordnance Plant Remedial Investigation Operable Unit No. 1 and No. 2 Mead, Nebraska

[4] Ortek Environmental Laboratory, 2496 West Mason Street, P.O. Box 12435 Green Bay, WI 54307-2435

[5] Midwest Research Institute, 425 Volker Blvd., Kansas City, MO 64110

B07NE003702-06236

used as a guide for the CCS and data validation. The explosives data were validated by MRI per the CDAP.

Data assessment is the systematic, structured process of evaluating, editing, screening, checking, verifying, and reviewing to assure that analytical data are in compliance with established criteria and are valid for the intended use.

The CCS consists of reviewing CLP results summary sheets, instrument reports, and raw analytical data for QA/QC parameters such as matrix spike (MS), matrix spike duplicate (MSD) results, detection limits, calibrations, Laboratory Control Samples (LCS), chain of custody forms, sample preparations, holding times, etc. The data validation, in addition to the CCS review consists of recalculating all laboratory data, standard calibration curves, detection limits, and carefully checking chromatograms and reconstructed ion chromatograms.

The purpose of the CCS and data validation is to evaluate whether laboratory performance and analytical data are in compliance with method requirements and project specifications for accuracy, precision, validity, and completeness.

The data assessment process provides information on analytical limitations of data based on regulatory or method specific QA/QC criteria. In addition, the review process includes assignment of qualifiers and provides a statement concerning useability of data. Moreover, the ultimate goal is to ensure that data generated are scientifically valid, and legally defensible.

This report summarizes the findings of the investigation.

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2.0
HOLDING TIMES

Holding time is defined as the period of time during which samples can be stored after collection and preservation according to a specific method, regulation, or project requirement. Maximum holding times are stated in the CDAP, appropriate CLP Statement of Work (SOW), Volume 40-Codes of Federal Register (CFR), or National Functional Guidelines for Data Review.

The eight samples listed in Table 1 had exceeded holding times for the VOC and Low Concentration Water (LCW) analyses. One sample, MW-34-124RE, was originally analyzed outside of the 12-hour instrument tuning period (see instrument performance Section 4.0) and was reanalyzed outside of holding times to verify results of the original analysis. The results matched well between the two analyses. These samples should have all VOC results greater than (>) Contract Required Detection Limit (CRDL) qualified as estimated (J) and results less than (<) CRDL qualified as not detected (ND) estimated (UJ). All other holding times were met for preparation and analysis of organic compounds, SVOC, VOC, and Pest/PCB's.

All holding times were met for pesticide analyses.

All holding times were met for extraction and analyses of metals, mercury, and cyanide.

3.0
PREPARATION AND ANALYSIS

All investigative samples were prepared and analyzed in accordance with the analytical methods and the CLP Statement of Work (SOW) identified in the CDAP. The correct analysis methods were followed, detection limits were correct, percent moisture was reported for soils, and reporting units were consistent for both inorganic and organic analyses. The correct target compound checks for pesticides were made and compound quantitation was verified with an additional GC column. Samples that were re-extracted by the lab are shown in Table 2.

4.0
INSTRUMENT PERFORMANCE

Instrumental performance criteria are established to assess laboratory analytical ability to identify and quantify target analytes. Instrument performance for VOC analysis by GC/MS is evaluated using 4-bromoflourobenzene (BFB). Similarly, instrument performance for semivolatile analysis by GC/MS is evaluated using decafluorotriphenylphosphine (DFTPP).

One percent relative abundance value was incorrectly reported for the SVOC SDG 273 DFTPP tuning at 07:45 on 08/28/92 for mass 70 because of a transcription error to form 5B. This transcription error was discovered by comparing raw data printouts with summary data reports. The tuning report was corrected and resubmitted by the laboratory.

The sample MW34124 was initially analyzed for VOC outside of the allowed 12-hour period for the tuning on 6/17/92 at 09:52. The sample was re-extracted and re-analyzed outside of holding time with comparable results to the original analysis. Associated VOC data for MW34124RE has been previously qualified (see section 2.0 Holding Times) for exceeding holding time. Therefore, no additional action is required.

Remaining mass spectra were evaluated and found to meet all specified criteria for tuning, performance, and sensitivity. In addition, criteria set for required frequency of tuning (daily or every 12 hours) were met. Therefore, gas chromatograph/mass spectrometers were in proper working condition prior to sample analysis.

Instrument performance checks for gas chromatographic analysis showed that adequate resolution and sensitivity was achieved through analysis of resolution check mixtures and Performance Evaluation Mixtures (PEM) for pesticides. In addition, DDT/Endrin breakdown or degradation was checked for each analysis and found to be within criteria limits.

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5.0
INITIAL CALIBRATION

Initial calibration data are used to assess the linearity of the mass spectrometer response versus analyte concentration and assure that analytical measurements produce correct results. VOC and SVOC analyses proceed after a 5-point initial calibration that has met contractual specifications as follows; each VOC and SVOC System Performance Check Compound (SPCC) is required to meet a minimum criterion for Relative Response Factor (RRF). Each Calibration Check Compound (CCC) must meet a specific criterion for Maximum Relative Standard Deviation (RSD). All compounds quantitated are required to meet RRF and RSD criteria limits for data assessment purposes as defined in the EPA National Functional Guidelines for Data Review.

The VOC compounds that did not meet initial calibration criteria are shown in Tables 3 and 4. Specific compounds in associated samples shown in the tables should be qualified as estimated (J) for analyses with positive results and unusable (R) for results less than CRDL that failed RRF (>0.05) criteria. Similarly, compounds that did not meet RSD criteria (<30 percent) should be qualified as estimated (J) for positive results (>CRDL). The compounds affected are not site related chemicals.

The SVOC compounds in associated samples that did not meet RSD initial calibration criteria are shown in Table 5. Compounds that did not meet RSD (<30 percent) criteria should be qualified as (J) estimated for positive results (>CRDL) in associated samples shown. The compounds affected are not site related chemicals.

The pesticide initial calibrations that did not meet criteria limits for methoxychlor, b-BHC, and Endrin Ketone are shown in Table 6. These compounds should be qualified as estimated (J) for analyses with positive results and estimated not-detected (UJ) for results <CRDL.

For inorganic analyses, the inductively coupled plasma (ICP) spectrometer was calibrated using a 2-point curve (one blank and one standard); cold vapor mercury was calibrated with five standards; cyanide calibration with five standards; and arsenic, lead, thallium, and

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selenium calibration with three standards. Selenium and lead should be qualified as estimated (J) for results >IDL and estimated not-detected (UJ) for results <IDL because of unacceptable initial calibration correlation coefficients as shown in Table 7 for associated samples.

Percent recoveries for the analyzed inorganic standards were within specified limits; therefore, the instruments were properly calibrated for the remainder of analyses and inorganic sample data were not qualified.

6.0
CONTINUING CALIBRATION CHECKS

A mass spectrometer continuing calibration check is required each day or every 12 hours of analysis to ensure that instruments are consistently producing acceptable qualitative and quantitative data, and that analyte response factors have not changed significantly from the initial calibration. In this regard, each VOC and SVOC SPCC is required to meet a minimum criterion for RRF and each CCC is required to meet a minimum criterion for percent Difference (%D) with the associated initial calibration. All quantitated compounds are required to meet RRF and %D criteria limits for data assessment purposes as defined in the EPA National Functional Guidelines for Data Review.

Samples affected by volatile continuing calibrations that did not meet criteria are shown in Tables 8 and 9. The specific compounds that did not meet %D criteria should be qualified as estimated (J) for positive results in those samples shown. In addition, VOC compounds that did not meet minimum (>0.05) RRF criteria should have positive results (>CRDL) qualified as estimated (J) and qualified as unusable (R) for results <CRDL for specific compounds in associated samples shown.

Additionally, all SVOC continuing calibrations met specified RRF (>0.05) criteria. The SVOC continuing calibrations that did not meet %D criteria are shown in Table 10. The specific SVOC compounds that did not meet %D criteria should be qualified as estimated (J) for positive results in associated samples shown.

All continuing calibrations for pesticide analysis met criteria limits and were acceptable.

All metals and cyanide analyses continuing calibration standards percent recovery were within specified limits and acceptable.

7.0
METHOD BLANKS

Method Blank samples are used to assess possible sample contamination due to laboratory procedure and/or equipment. Method blanks are prepared using a laboratory supplied matrix (aqueous, soil, or solid) that has been previously analyzed and is well defined. Method blanks are carried through the entire preparation and analysis process.

The VOC and SVOC compounds found in method blanks are shown in Table 11. Pesticide compounds found in method blanks are shown in Table 12. The majority of VOC method blanks contained methylene chloride. In addition, method blanks commonly contained acetone, and phthalate compounds. These compounds are specified (CLP SOW 1990) as common laboratory contaminants. Concentrations of compounds (including pesticides) found in method blanks and associated investigative samples are shown in Table 13. Compounds that should be qualified as not-detected (U) in associated samples because of presence in method blanks are shown in Table 14. Pesticide instrument blanks were analyzed at the correct frequency with acceptable results.

The storage blanks required for the VOC LCW analyses were found to be free of contamination and acceptable.

Method blank samples for mercury and cyanide were analyte free. Inorganic method (ICP preparation) blanks contained aluminum, zinc, and sodium. These analytes should be qualified as (U) not-detected in associated samples (for sample results greater than IDL but less than 5 times the amount present in the blank) as shown in Table 15.

8.0
LABORATORY CONTROL SAMPLES

Analytical accuracy for metals is assessed using laboratory control samples. Analyte percent recoveries for solid and liquid LCS must fall between 80 and 120 percent. All metals met the Laboratory Control Sample (LCS) criteria and were acceptable.

Laboratory performance and accuracy were evaluated for LCW VOC analyses by LCS. All LCS analyses met criteria limits for recovery and were acceptable.

9.0
SURROGATE COMPOUND PERCENT RECOVERY

Organic data accuracy is judged on an individual sample basis by surrogate compound recoveries. Surrogate standards are intended to represent the entire suite of analyzed compounds with similar chemical/physical characteristics.

One trip blank, TRB255082, had a low surrogate bromofluorobenzene (BFB) recovery (79 percent) for the Low Concentration Water (LCW) VOC analysis. Detected volatile compounds for the blank should be qualified as estimated (J) and ND results should be qualified as not-detected estimated (UJ).

Two pesticide samples, BMW047082 and BMW054082, in SDG 273, had low (34 to 58 percent) recoveries for 3 out of 4 surrogate determinations. Detected pesticide compounds for the samples should be qualified as estimated (J) and ND results should be qualified as not-detected estimated (UJ). The majority (9 of 12) of pesticide samples in SDG153 failed surrogate recovery criteria. These samples should be qualified as estimated (J) for detected results and qualified as not-detected estimated (UJ). Similarly, four pesticide samples in SDG85 should have detected results qualified as estimated (J) and ND results qualified as not-detected estimated (UJ). These samples are summarized in Table 16.

Sample AMW048082 had unacceptable SVOC surrogate recoveries (3 of 8 surrogates failed recovery limits). However, the sample was re-extracted with acceptable surrogate standard recoveries. The Matrix Spike Duplicate (MSD) BMW053082MSD had all SVOC surrogates with recoveries less than 10 percent. Both fractions (acid and base/neutral) with detected compounds should be qualified as estimated (J) and ND compounds are qualified as unusable (R).

10.0
MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

A matrix is defined as the predominant material composition of the sample to be analyzed. A matrix is usually referred to as aqueous, soil, or solid, but is not synonymous with phase (liquid or solid). A matrix spike (MS) is an aliquot (a measured portion of a field sample taken for analysis) of an investigative sample fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix and possible matrix effects by measuring recovery and analytical precision. A matrix spike duplicate (MSD) is simply a duplicate of the matrix spike.

Matrix effects can result in poor preparation (such as low extraction or purge efficiencies) of samples and physical effects causing incorrect quantitative or qualitative analysis of compounds/analytes in investigative samples. Sample matrix effects are evaluated using MS/MSD (VOC and Semivolatiles) and MS (Inorganics) analyses. The MS/MSD's were not required for VOC LCW analyses per EPA SOW 1991.

The samples utilized for MS/MSD analyses are shown in Table 17.

The MSD VOC analysis for SDG192 showed high %RPD (19) for trichloroethene (14 percent criteria maximum) although percent recoveries of the MS and MSD were within accepted criteria range. In addition, the recovery of trichloroethene in the MD/MSD analysis for SDG220 was low (MS=22 percent and MSD=26 percent) with an RPD of 17 (14 percent criteria maximum). Surrogates for these analyses showed acceptable performance, therefore, data remained unqualified.

The SVOC MS/MSD analysis for SDG153 showed unacceptable recovery results for 6 of 11 compounds and consequently, unacceptable %RPD's for 7 out of 11 compounds. These results indicate a possible matrix effect or matrix interference and the SVOC investigative samples in Table 18 should be qualified as estimated (J) for positive results and estimated not-detected (UJ) for ND results.

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The SVOC MS/MSD analysis for SDG273 showed extremely low recoveries (1 to 6 percent) for all compounds in the MSD. In contrast, all but one of the MS compounds had acceptable recoveries. This variance resulted in unacceptable RPD's that exceeded criteria range by 80 to 95 percent. In addition, all surrogate compounds for the MSD sample (BMW053082MSD) had extremely low recoveries (3 to 4 percent). Moreover, all but one of the 20 investigative samples in SDG273 had acceptable surrogate recoveries (the sample, AMW04082, has been qualified previously because of surrogate performance-see Surrogates Section 9.0). Therefore, the MSD sample failed all limits for QA/QC standards while the remaining samples in the SDG had acceptable standards results. Clearly, the laboratory had an isolated procedural or preparation problem specific to the MSD sample and therefore, investigative sample data remain unqualified.

MS/MSD analyses for LCW VOC analyses were not required per SOW 1991.

Pesticide MS/MSD's met criteria limits and were acceptable.

Matrix spike data for metals, mercury, and cyanide showed low recoveries for specific analytes in associated samples as summarized in Table 19 and should be qualified as estimated not-detected (UJ). No inorganic MS recoveries were less than 30 percent.

11.0
LABORATORY DUPLICATE ANALYSIS (METALS)

Precision for metals data is checked using laboratory (non-field) duplicate analysis. Table 20 shows 6 analytes, arsenic, iron, manganese, lead, copper, and zinc, in associated samples of the same matrix that should be qualified as estimated (J) for positive results based on duplicate analyses that exceeded criteria control limits for Relative Percent Difference (RPD).

12.0
ICP DILUTION

Serial dilutions indicate whether significant physical or chemical interferences exist due to the sample matrix. For ICP serial dilution, the sample should have a sufficiently high concentration (minimally a factor of 50 above the IDL) for an analysis of a 5-fold dilution. All samples that required a serial dilution met criteria limits for recovery and percent difference and are, therefore, acceptable.

13.0
INTERNAL STANDARD SUMMARIES

For VOC and semivolatile analyses, internal standard peak areas and retention times are used to assess GC/MS performance (sensitivity and response). All internal standard peak areas and retention times were within control limits, therefore, the GC/MS performance was acceptable.

14.0
ICP INTERFERENCE CHECK SAMPLES

Interelemental interference effects on the ICP data are checked by using ICP interference check samples. Percent recoveries must be between 80 and 120. All ICP interference check samples had recoveries within control limits; therefore, no interelement interferences were observed.

15.0
GRAPHITE FURNACE POST DIGESTION CHECK SAMPLES

Duplicate injections and furnace atomic absorption (AA) post digestion spikes establish the precision and accuracy of the individual furnace analytical measurements. Analytes in associated samples should be qualified as estimated (J) for positive results and estimated (UJ) for results less than IDL for failure to meet furnace post digestion spike recovery criteria as shown in Table 21.

Arsenic in sample ADS00506B was run by Method of Standard Additions and failed correlation coefficient criteria. Therefore, arsenic in sample ADS00506B should be qualified as estimated (J). Several samples had duplicate injections outside the 20 percent RSD criteria but were rerun with acceptable results.

16.0
FIELD BLANKS

Blanks are utilized to ensure that the possible existence and magnitude of laboratory background contamination, sampling activities, and shipping do not interfere with analyses of investigative samples. Blank data are evaluated for the analysis of type of blank, frequency of blank analysis, and to determine that results are within required criteria.

The samples listed in Table 22 are field blank (rinsates) quality assurance samples. Rinsates were used to evaluate potential cross-contamination of samples through physical sample handling and equipment. A total of 11 rinsate samples were collected and analyzed during this sampling event. One rinsate sample was re-extracted because carbon disulfide exceeded calibration range.

VOC and SVOC compounds that were found in rinsate samples are shown in Table 23 with the frequency of detection and maximum concentrations. The majority of compounds found in rinsates were common laboratory contaminants such as acetone, methylene chloride, toluene, bis(2-ethylhexyl)phthalate, and chloroform, carbon disulfide, and bromodichloromethane.

Methylene chloride and acetone have been qualified previously because of method blank contamination (see Method Blanks Section 7.0). These compounds should not be used to determine cross-contamination because they are laboratory contaminants.

Phenol, bis(2-ethylhexyl)phthalate, and diethylphthalate were detected in one rinsate sample below Contract Required Detection Limit (CRDL). Therefore, there was no overall effect on data quality and data remain unqualified.

DNB (1,3-dinitrobenzene) was detected in one rinsate at detection limit (1ug/L). DNB was not detected in investigative samples, therefore, data remain unqualified.

Chloroform and bromodichloromethane are organochlorine compounds commonly found in chlorine treated water. These compounds were found in rinsates but were not found in

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method blanks or trip blanks. Bromodichloromethane was found in all rinsates but was not found in investigative samples, therefore, no action was required. However, chloroform was found in 6 investigative samples with a concentration range of 1-26ug/L and in rinsates with a concentration range of 1-3 ug/L. Five of these six investigative samples should be qualified as not-detected (U) for chloroform because the sample concentration of chloroform is less than five times the maximum rinsate concentration. These samples are listed in Table 24.

Toluene appeared in six rinsate samples at a concentration range of 0.5-1.0 ug/L and investigative samples at a concentration range of 0.5-30 ug/L resulting in data qualified not-detected (U) in 42 associated samples (following the 10X rule defined in guidance for laboratory contaminants) shown in Table 25.

Carbon disulfide was detected in a total 5 rinsate samples and at a maximum concentration of 42 ug/L in one rinsate. This resulted in 40 samples being qualified as not-detected (U) for carbon-disulfide as summarized in Table 26.

Analytes (metals) found in rinsate sample RIN002082 are shown in Table 27. Analytes detected in samples with less than 5 times the maximum rinsate blank concentration should be qualified as (U) not-detected as shown in Table 28.

17.0
TRIP BLANKS

Trip blanks are used to assess effects of shipping and sampling activities on investigative sample data. The 17 organic trip blank samples analyzed for VOC's are listed in Table 29. Volatile compounds detected in trip blanks are shown in Table 30. Over 90 percent of the trip blanks contained the common laboratory contaminants acetone and methylene chloride. These compounds have been qualified previously because of method blank contamination.

The remainder of trip blank contaminants were detected in only one or two trip blanks. The compounds bromoform, 1,4-dichlorobenzene, 1,2-dibromoethane, and 1,1,2-trichloroethane were present in one trip blank sample at Detection Limit (DL) (1ug/L or 1ppb) for Low Concentration Water (LCW). The compound 1,1-dichloroethene was also detected in one trip blank at 2ug/L (LCW DL equals 1ug/L). These compounds were not detected in investigative samples and therefore, no qualification of data is necessary.

Toluene, while not present in method blanks, was present in field blanks (rinsates) and one trip blank at detection limit for LCW (1ug/L). Toluene has been qualified previously because of field blank contamination (see Section 16.0, Field Blanks). The trip blank presence of toluene is an isolated occurrence at very low level concentration (1ug/L) and did not have an effect on overall data quality.

The volatile compound trichloroethene was present in one trip blank very close to detection limit for LCW-2ug/L (DL equals 1ug/L). This compound was not detected in any other blanks (method or field blanks) and associated investigative samples shipped with the trip blank (SDG 153) did not contain detectable trichloroethene. Therefore, data remain unqualified.

Trip blanks were clean overall, with the exception of common laboratory contaminants and isolated halogenated compounds. Therefore, the effects of shipping the samples were negligible and did not have an effect on overall data quality.

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18.0
FIELD DUPLICATE SAMPLES

Field precision for the sampling event was assessed by collecting and analyzing field duplicate sample sets. Sixteen field duplicate sample sets were collected during the sampling event. Field duplicate sample sets are shown in Table 31 with total suspended and dissolved solids shown in Table 32. Results of the duplicate analyses are shown in Tables 33 and 34. Only those analytes or compounds with more than one positive result in investigative samples are shown.

Examining inorganic groundwater sample data shows that approximately 90 percent of the metals had acceptable duplicate results. However, aluminum and zinc had high Relative Percent Differences (RPD) or large variation in duplicate results. Both analytes were found in rinsate samples and aluminum was found in method blanks. These analytes have been qualified in associated samples due to blank contamination. More importantly, these samples have high dissolved solids reported (see Table 32) which, when considered with factors discussed above, would contribute significantly to a variability in inorganic field duplicate sample results.

The phthalate compounds, methylene chloride, toluene, and acetone have been identified as common laboratory contaminants and have been identified in blank samples (rinsates and method blanks) resulting in qualification of data. Also, methylene chloride and acetone were found in trip (travel) blanks. In addition, phenol was identified in method and field blanks and data was qualified accordingly. Carbon disulfide was also detected in field blanks (rinsates). Variability of duplicate results occurred because these compounds were present as background contaminants. The field duplicate results for tricholoroethene (TCE) were very close. One duplicate set had 0 percent RPD while the other set had 4.26 percent RPD for TCE.

Soil field duplicate results were poor for most compounds and analytes, including those discussed above. Poor precision in soils duplicates is likely the result of elemental heterogeneity commonly found in soil matrices. This is not necessarily indicative of a sampling or laboratory precision problem.

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19.0
TENTATIVELY IDENTIFIED COMPOUNDS

Tentatively Identified Compounds (TIC's) are non-verified compounds which are matched against mass fragments in the laboratory spectral library without benefit of internal standards. Therefore, qualitative and quantitative identification is uncertain.

The most numerous TIC's detected included unknown hydrocarbons and laboratory artifacts. Tetrachloroethane and benzothiazole were each detected once. Additional TIC's reported (detected once or twice) included a substituted phenol, unknown phthalate, unknown carboxylic acid, unknown propanoic acid, and an amide compound.

The TIC's did not have an effect on overall data quality or laboratory analyses.

MIDWEST RESEARCH LABORATORY MUNITIONS SUMMARY REVIEW

The Midwest Research Institute (MRI) summary report Results of Munitions Analyses for the Remedial Investigation, Operable Unit No.2 (Groundwater) at the Former Nebraska Ordnance Plant, Mead, Nebraska, has been reviewed by WCC personnel as required in the CDAP. The munitions data and summary report was produced, validated, and reviewed by MRI as defined in the CDAP. The munitions data was not validated by WCC. This summary presents the WCC review of the MRI munitions summary report and excerpts from that report.

MRI stated that precision, accuracy, blank analyses, and standard spike recoveries met specified criteria with "few exceptions". Field duplicate results as provided in Table 5a of the MRI report show that 2 out of 6 (or 33 percent) of field duplicate RPD results failed the criteria limit of 35 percent (one RPD result was 53 percent and the other was 89 percent). However, these results were from a very limited data set (six data points) since most analysis results were not-detected. In addition, five of the six data points were for RDX and one was for HMX. Therefore, the number of total compounds evaluated was very limited. The laboratory demonstrated that method blanks were free of contaminants. Laboratory precision was demonstrated with MS/MSD RPD's and accuracy was demonstrated with MS/MSD recoveries. 88 percent of the RPD's were acceptable while 100 percent of the recoveries were within range for water. Soil matrix MS/MSD recoveries and RPD's were 100 percent acceptable. Results for the laboratory control samples, as shown in the MRI report, were all within criteria specified ranges for accuracy and precision.

Instead of using data validation forms (validation checklist, page 20 of the MRI SOP), MRI checked each item on the checklist form in the actual data package as shown in an example that was provided by MRI. A summary of steps followed for the data validation process was provided in the summary report. The following are excerpts from the MRI report. Field chain-of-custody records were used to verify sample identifications. Two independent reviews of chromatographic data were performed. Sample data were tabulated for analytical sequence, sample identifications, peak retention times, peak areas, concentrations, dilution

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factors, and original sample amounts to facilitate technical review. Calibration data were reviewed to assure linearity and to verify that quantitative sample data were within range. Quality control data were tabulated, summarized and evaluated. "Suspect" or "unusual" data were reverified as necessary to assure technical validity and accuracy. Final reports were proof-read to correct any transcription errors.

Signed Chain of Custody forms were supplied to WCC as required in the CDAP Section 9.1, Data Packages for Explosives.

The review of the MRI summary report by WCC showed that MRI followed their SOP defined in the CDAP. The correct analysis and preparation methods were used and specified quality control and quality assurance procedures were followed.

21.0
OVERALL ASSESSMENT

A total of 177 groundwater, 88 soil, and 53 quality assurance/quality control samples representing approximately 21,600 analytical measurements for TCL volatiles, semi-volatiles, pesticides, cyanide, mercury, and TAL metals (total and dissolved) were taken during this sampling event.

A total of 100 percent of the data were reviewed in a CCS. 12 percent of the data were validated. The qualification of the data presented was from the CCS, none of the data were qualified as a result of the validation. The majority of the investigative data (> 80 percent) are acceptable without any qualification. The degree of completeness, as defined in the CDAP (section 3.2.1.4), is more than 95 percent. Thus, the overall data quality objectives were met. These qualified data are summarized and discussed below.

- **Sample Holding Times and Laboratory Preparations**

  Sample preparations, detection limits, reporting units, and analysis methods were correct as specified. Eight VOC samples exceeded holding times and were qualified accordingly. All laboratory preparations were correct as specified. The correct analysis methods were followed.

- **Instrument Performance and Calibrations**

  Instrument (GC/MS) performance (tuning) was acceptable. The laboratory performed instrument tunings at the correct frequency (daily or every 12 hours) for VOC and SVOC analyses. Volatile and semivolatile compounds and inorganic analytes that did not meet criteria limits for initial and continuing calibrations were reported and qualified according to validation guidelines. Instrument performance checks for gas chromatographic analysis of pesticides were acceptable.

- **Laboratory Method Blanks**

  The majority of organic method blanks contained the common laboratory contaminants methylene chloride, acetone, and phthalate

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compounds. Benzene, phenol, and 6 pesticide compounds were found in method blanks at much less frequency. Over 100 positive sample results for one or more of the above compounds should be qualified not-detected (U) because of laboratory method blank contamination. Inorganic method blanks contained aluminum, zinc, and sodium. These analytes should be qualified as not-detected (U) in appropriate associated samples according to validation guidelines.

- **Surrogate Recoveries**

  Surrogate compound recoveries were acceptable for all VOC analyses with the exception of one Trip Blank sample that had data qualified according to validation guidelines. One SVOC MSD sample analysis had low recoveries for surrogate compounds and should also be qualified accordingly. Thus, the laboratory demonstrated acceptable accuracy for VOC/SVOC organic analyses overall. Fifteen pesticide samples should be qualified because of low surrogate recoveries.

- **MS/MSD Analyses**

  MS/MSD analyses of VOC samples were acceptable with the exception of trichloroethene which exhibited poor recovery and RPD's in two SDG's. Surrogate performance for the analyses was acceptable and data remained unqualified.

  The SVOC MS/MSD analysis for two SDG's showed poor performance. A possible matrix effect was identified for one SDG and data were qualified. The laboratory appeared to have a preparation or procedural problem with the other SDG and data remained unqualified.

  Pesticides MS/MSD analyses were acceptable.

  MS data for metals failed criteria limits for 6 analytes in 5 samples and should be qualified accordingly.

- **Internal Standards**

  All internal standards for VOC and SVOC analyses met specified criteria and were acceptable.

- **Inorganic QA/QC**

  Inorganic data were qualified because furnace post digestion spikes failed criteria limits for arsenic, lead, thallium, and selenium in 17 samples. In addition, one sample had arsenic qualified because of failed MSA correlation coefficient criteria. The remainder of furnace atomic absorption QA/QC criteria were met for all inorganic analyses.

  ICP interference check samples were within control limits and acceptable. Samples that required ICP serial dilutions met criteria limits for recovery and percent difference.

  Precision for metals was demonstrated to be acceptable with duplicate analyses by the laboratory with the exception of 6 analytes, arsenic, iron, manganese, lead, copper, and zinc. These analytes should be qualified in associated samples because of duplicate sample analyses that failed criteria limits for relative percent difference. Analytical accuracy was assessed using Laboratory Control Samples (LCS). All inorganic analyses met criteria for LCS recovery. Thus, the laboratory demonstrated acceptable accuracy for metals analyses.

- **Field Equipment Blank (Rinsate) and Travel Blanks**

  The majority of compounds found in equipment (rinsate) blanks were the common laboratory contaminants such as acetone, methylene chloride, toluene, phthalates, compounds commonly found in municipal drinking water (chloroform and bromodichloromethane) treated with chlorine, and carbon disulfide. A total of 5 rinsate samples contained carbon disulfide, with one sample containing 42 ug/L, resulting in 40 samples that should be qualified as not-detected. Toluene appeared in 6 rinsates resulting in 42 investigative samples that should be qualified as not-detected for toluene. A total of 5 analytes were detected in the inorganic rinsate sample. Associated samples should be qualified as not-detected for these specific analytes.

  Travel or trip blanks were clean overall. The effects of shipping the samples were negligible and did not have an effect on overall data quality.

- **Field Duplicate Sample Results**

  The majority (90 percent) of inorganic groundwater duplicate samples had acceptable results. Two analytes had large RPD values or large variation in duplicate results. However, these analytes were found in rinsates and method blanks which indicated possible contamination and resulted in the variance of results. In addition, the duplicate samples had high dissolved solids reported indicating that the matrix may have been heterogenous. Therefore, these factors contributed to poor precision in duplicate results.

  Organic field duplicate results showed high RPD's for 7 compounds which were found in blanks and qualified accordingly. Variability of duplicate results occurred because of the presence of these compounds as background contaminants.

  Soil field duplicate results were poor for most compounds and analytes analyzed. Poor precision in soils duplicates is likely the result of elemental heterogeneity of the soil matrix and was not indicative of poor sampling or laboratory precision.

- **MRI Laboratory Summary Review**

  The review of the MRI explosives data and validation summary report showed that MRI followed their SOP defined in the CDAP. The correct preparation and analysis methods were used and specified quality control and quality assurance procedures were followed.

TABLES

TABLE 1

SAMPLES WITH VOC RESULTS > CRDL QUALIFIED AS ESTIMATED (J) AND RESULTS < CRDL QUALIFIED AS NOT DETECTED ESTIMATED (UJ) BECAUSE OF EXCEEDED HOLDING TIMES

IH2001082

IH2002082

IH2601082

IH2602082

JH2001082

JH2601082

RIN002082

MW-34-124RE

TABLE 2

SAMPLES RE-EXTRACTED BY LABORATORY

ATL-086-18B-RE

ATL-263-06B-RE

MWB-031-059-RE

MWC-040-052-RE

MWD-034-124-RE

MWD-045-042-RE

AMW-048-082-RE

BMW-032-082-RE

DMW-009-082-RE

JH2-004-082-RE

RIN-218-082-RE

TABLE 3

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50054	06/09/92 & 06/10/92	Methylene Chloride	MC	44.0	48	LL104816B	LL105406B
						LL103919B	LL103106B
						LL105515B	MWB033083
		Acetone	MC	32.7		MWD033117	LL100206B
						LL101206B	LL106106B
						LL100218B	LL102706B
F50054	06/09/92 & 06/10/92	Methylene Chloride	MC	44.0	14	ATL06318B	ATL04806B
						ATL-86-6B	ATL9922B
						MW-34-124	ATL09922B
						MWC033044	ATL03706B
						ATL10524B	ATL06506B
		Acetone	MC	32.7		MW-31-112	ATL00606B
						ATL00618B	ATL08306B
						LL104706B	LL104717B
						LL124717B	LL104806B
						ATL08318B	ATL06522B
F50054	06/09/92 & 06/10/92	Methylene Chloride	MC	44.0	69	MWC023036	MWB023072
						MWB025083	MWC025047
						MWA023098	MWA025151
		Acetone	MC	32.7		MWD025167	MWC058046
						MWA033106	MWB058082
OWA18	06/16/92	Methylene Chloride	MC	55.0	14	ATL00606B	ATL00618B
						ATL03706B	ATL06318B
						ATL06506B	ATL06522B
		Acetone	MC	78.1		ATL08306B	ATL08318B
						ATL09922B	ATL10524B
						MW-31-112	MWC033048

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 3
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50053	07/20/92	Methylene Chloride	MC	80.8	134	C-045-012 B-045-022 MWB040059 MWC040052 MWA058125	A-045-034 MWD045042 MWA040104 MWA240104
		Acetone	MC	63.0			
F50051	07/21/92	Chloromethane	MC	40.0	220	AMW044082	BMW043082
		2-Butanone	MC	59.4			
F50053	08/18/92	Acetone	MC	59.3	220	AMW044082MS	AMW044082MSD
		2-Butanone	MC	48.5			
F50053	08/18/92	Acetone	MC	59.3	192	TRB031082 RIN045082 DMW045082 BMW046082 BMW036082 DMW246082 AMW036082 DMW037082 BMW042082 DMW046082 JH2003082 TRB031082 IH2603082	AMW045082 BMW045082 TRB045082 AMW046082 DMW036082 AMW037082 BMW037082 DMW042082 AMW042082 TRB042082 IH2603082 IH2003082
		2-Butanone	MC	48.5			

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 3
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50055	08/24/92 08/25/92	2-Butanone	MC	37.5	307	BMW023082 BMW058082 BMW053082 BMW056082 BMW009082 DMW209082 AMW240082	AMW012082 BMW021082 AMW002082 AMW009082 DMW009082 AMW040082 BMW040082
OWA13	07/13/92	Methylene Chloride	MC	53.0	85	MWC043041 MWA043099 ADS00318D	MWB043047 ADS01003B ADS00306B
		Acetone	MC	77.6		ADS02206B ADS00506B ADS20518B	ADS02218B ADS00518B
OWA13	07/20/92	Methylene Chloride	MC	42.0	85	MWD043105 MWA044035 MWB044023	MWC044010 MWD044051
		Acetone	MC	52.0			
		2-Butanone	MC	46.4			
F50054	06/30/92	Methylene Chloride	MC	61.1	1	MW-34-58 MW-31-47 MW-34-62 MW-34-102 MW-31-59	ATL-58-6B ATL04818B ATL06306B ATL26306B ATL26318B
		Acetone	MC	37.4		MW-3159-S ATL60-18B ATL59-18B ATL-59-6B ATL58-18B	ATL86-18B ATL11306B ATL11318B ATL02606B ATL03106B
F50053	08/13/92	Acetone	MC	53.5	153	IH2001082 JH2601082 TRB001082	JH2001082 IH2601082

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 3
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
OWA03	08/17/92	Chloromethane	MC	38.3	153	IH2002082	IH2602082
						JH2002082	JH2602082
						RIN002082	TRB002082
		Acetone	MC	57.6		TRB021082	TRB02J082
						TRB621082	TRB62J082
OWA13	07/13/92	Methylene Chloride	MC	53.0	85	MWC043041	MWB043047
						MWA043099	ADS01003B
						ADS00306B	ADS02206B
						ADS02218B	ADS00506B
		Acetone	MC	77.6		ADS00518B	ADS20518B
						MWD043105	MWC044010
						MWB044023	MWA044035
						MWD044051	ADS00318D

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 4

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR LOW CONCENTRATION VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50051	08/17/92	Chloromethane	MC	57.5	220	TRB020082 BMW044082 BMW029082 BMW032082 DMW043082 RIN243082 DMW034082 AMW220082	TRB243082 DMW044082 AMW032082 DMW032082 CMW020082 AMW043082 BMW020082 AMW034082
		Methylene Chloride	MC	55.9			
		Acetone	0.018	76.6			
		2-Butanone	0.018	56.7			
		2-Hexanone	0.043	MC			
F50051	08/17/92	Chloromethane	MC	57.5	192	TRB031082 RIN045082 DMW045082 BMW046082 BMW036082 DMW246082 AMW036082 DMW037082 BMW042082 DMW046082	AMW045082 BMW045082 TRB045082 AMW046082 DMW036082 AMW037082 BMW037082 DMW042082 AMW042082 TRB042082
		Methylene Chloride	MC	55.9			
		Acetone	0.018	76.6			
		2-Butanone	0.018	56.7			
		2-Hexanone	0.043	MC			
F50051	08/17/92	Chloromethane	MC	57.5	430	AMW024082 RIN238082 DMW038082	BMW010082 AMW038082 TRB238082
		Methylene Chloride	MC	55.9			
		Acetone	0.018	76.6			
		2-Butanone	0.018	56.7			
		2-Hexanone	0.043	MC			

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 4
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR LOW CONCENTRATION VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50051	08/17/92	Chloromethane	MC	57.5	278	RIN221082	DMW021082
						AMW041082	DMW059082
		Methylene Chloride	MC	55.9		AMW028082	BMW028082
						RIN241082	CMW017082
		Acetone	0.018	76.6		BMW017082	DMW041082
						AMW059082	BMW016082
		2-Butanone	0.018	56.7		DMW033082	AMW026082
						AMW023082	AMW015082
		2-Hexanone	0.043	MC		BMW019082	BMW004082
						BMW057082	AMW019082
F50051	08/17/92	Chloromethane	MC	57.5	297	AMW008082	CMW019082
						BMW008082	BMW005082
		Methylene Chloride	MC	55.9		AMW021082	AMW004082
						AMW005082	TRB027082
		Acetone	0.018	76.6		AMW053082	BMW059082
						CMW016082	AMW058082
		2-Butanone	0.018	56.7		RIN258082	BMW026082
						BMW022082	AMW017082
		2-Hexanone	0.043	MC		AMW027082	AMW007082
						BMW041082	DMW028082

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 4
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR LOW CONCENTRATION VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50053	08/26/92	Chloromethane	MC	30.8	346	AMW022082	BMW024082
		Methylene Chloride	MC	47.4		AMW226082	BMW027082
		Acetone	0.007	38.3		BMW007082	AMW001082
		2-Hexanone	0.024	30.5		BMW001082	BMW002082
		2-Butanone	0.013	MC		AMW006082	BMW006082
		4-Methyl-2-Pentanone	0.043	MC		AMW013082	AMW014082
		1,2-Dibromo-3-Chloropropane	0.046	MC		RIN231082	AMW031082
						BMW031082	AMW055082
						BMW055082	BMW255082
						TRB255082	TRB040082
F50053	08/26/92	Chloromethane	MC	30.8	356	BMW054082	AMW254082
		Methylene Chloride	MC	47.4		BMW048082	AMW047082
		Acetone	0.007	38.3		AMW048082	BMW047082
		2-Hexanone	0.024	30.5		DMW048082	AMW052082
		2-Butanone	0.013	MC		AMW056082	BMW052082
		4-Methyl-2-Pentanone	0.043	MC		AMW039082	DMW039082
		1,2-Dibromo-3-Chloropropane	0.046	MC		AMW030082	RIN240082
						BMW030082	AMW054082
						AMW011082	AMW003082
						BMW003082	AMW010082

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 4
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR LOW CONCENTRATION VOC ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG[3]	Samples Affected	
F50053	08/26/92	Chloromethane	MC	30.8	236	JH2604082	JH2004082
						AMW020082	BMW034082
						AMW035082	BMW035082
		Methylene Chloride	MC	47.4		DMW035082	AMW018082
						BMW018082	RIN218082
		Acetone	MC	38.3		AMW025082	BMW025082
						DMW025082	RIN225082
						TRB035082	BMW033082
		4-Methyl-2-Pentanone	MC	30.5		BMW233082	AMW033082
						IH2604082	IH2004082

Notes: MC = Met Criteria
[1] Relative Response Factor
[2] Relative Standard Deviation
[3] Sample Data Group

TABLE 5

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR SEMIVOLATILE ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG	Samples Affected	
OWA21	05/05/92	4-Chloroaniline	MC	47.4	273	BMW053082	BMW048082
						AMW053082	AMW047082
		3-Nitroaniline	MC	46.1		BMW255082	AMW048082
						AMW055082	BMW047082
		2,4-Dinitrophenol	MC	36.2		BMW055082	DMW048082
						AMW054082	AMW052082
		4-Nitroaniline	MC	45.1		BMW054082	AMW056082
						AMW254082	BMW052082
		3,3′-Dichlorobenzidine	MC	31.4		BMW056082	
OWA21	05/05/92	4-Chloroaniline	MC	47.4	236	JH2604082	JH2004082
						AMW020082	BMW034082
		3-Nitroaniline	MC	46.1		AMW035082	BMW035082
						DMW035082	AMW018082
		2,4-Dinitrophenol	MC	36.2		BMW018082	RIN218082
						AMW025082	BMW025082
		4-Nitroaniline	MC	45.1		DMW025082	RIN225082
						TRB035082	BMW033082
		3,3′-Dichlorobenzidine	MC	31.4		BMW233082	AMW033082
						IH2604082	IH2004082
OWA07	07/15/92	3-Nitroaniline	MC	32.7	153	IH2001082	IH2002082
						IH2003082	IH2603082
		2,4-Dinitrophenol	MC	34.4		JH2001082	JH2002082
						JH2003082	JH2603082
						RIN002082	

Notes: [1] RRF - Relative Response Factor
[2] RSD - Relative Standard Deviation
MC - Met criteria

TABLE 5
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR SEMIVOLATILE ANALYSES BY GC/MS

Instrument	Date	Compound	RRF[1]	RSD[2]	Associated SDG	Samples Affected	
0WA07	07/15/92	3-Nitroaniline	MC	32.7	85	MWC043041	MWB043047
						MWA043099	ADS00318D
						ADS00306B	ADS00506B
						ADS02206B	ADS20518B
		2,4-Dinitrophenol	MC	34.4		ADS00518B	MWC044010
						MWD043105	MWA044035
						MWB044023	ADS02218B
						MWD044051	ADS01003B

Notes: [1] RRF - Relative Response Factor
[2] RSD - Relative Standard Deviation
MC - Met criteria

TABLE 6

SAMPLES AFFECTED BY UNACCEPTABLE INITIAL CALIBRATIONS FOR PESTICIDE ANALYSIS BY GC

Instrument	Date	Compound	RSD[1]	Associated SDG[2]	Samples Affected	
VARIAN24	07/22/92	Methoxychlor	21	153	IH2001082 IH2003082 JH2001082 JH2003082 RIN002082	IH2002082 IH2603082 JH2002082 JH2603082
VARIAN05	07/22/92	ß-BHC	21	273	BMW053082 BMW255082 BMW055082 BMW054082 BMW048082 AMW048082 DMW048082 AMW056082 BMW056082	AMW053082 AMW055082 AMW054082 AMW254082 AMW047082 BMW047082 AMW052082 BMW052082
VARIAN04	07/10/92	Endrin Ketone	21	85	ADS00518BMS ADS01003B ADS00318D ADS02218B ADS00518B	ADS00518BMSD ADS00306B ADS02206B ADS00506B ADS20518B

Notes: [1] Relative Standard Deviation
[2] Sample Data Group

TABLE 7

ANALYTES WITH UNACCEPTABLE INITIAL CALIBRATION CORRELATION COEFFICIENTS QUALIFIED AS (J) ESTIMATED FOR RESULTS > IDL AND (UJ) FOR RESULTS < IDL IN ASSOCIATED SAMPLES

Analyte	Correlation Coefficient	SDG	Associated Samples
Selenium	0.994	682750	AMW047082 BMW047082 AMW048082 BMW048082 AMW052082 BMW052082 AMW053082 BMW053082 AMW054082 BMW054082 AMW055082 BMW055082 AMW056082 BMW255082 AMW254082 DMW048082
Lead	0.993	68398D	BMW056082
Selenium	0.993	68160D	IH2001082 JH2001082 IH2002082 RIN002082 JH2002082 JH2603082 JH2003082 IH2003082 IH2603082 JH2604082 JH2004082 IH2604082 IH2004082
Silver, Lead	0.994	68160D	
Selenium	0.990	668158	IH2001082 JH2001082 IH2002082 RIN002082 JH2002082 JH2603082 JH2003082 IH2003082 IH2603082 JH2604082 JH2004082 IH2604082 IH2004082

TABLE 8

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected
F50053	08/14/92	12:34	153	2-Butanone	MC	25.7	IH2601082
				Tetrachloroethene	MC	-27.6	
F50053	08/17/92	19:37	153	Acetone	MC	32.9	TRB001082
F50053	08/20/92	01:01	153	Acetone	MC	48.1	IH2003082 IH2603082
				2-Butanone	MC	38.1	
OWA13	07/14/92	02:50	85	Acetone	MC	53.7	ADS00306B ADS00318D ADS00506B ADS00518B ADS01003B ADS02206B ADS02218B ADS20518B
				2-Butanone	MC	37.5	MWA043099 MWB043047 MWC043041 ADS20518BMS ADS20518BMSD
OWA13	07/14/92	21:00	85	Methylene Chloride	MC	-61.6	MWD043105
				Acetone	MC	53.9	
				2-Butanone	MC	44.9	
				2-Hexanone	MC	36.0	
OWA13	07/21/92	01:22	85	Methylene Chloride	MC	30.6	MWB044023 MWC044010
				Trichloroethene	MC	-26.0	
OWA13	07/21/92	13:57	85	Chloromethane	MC	36.0	MWA044035
				Chloroethane	MC	43.1	
				Methylene Chloride	MC	31.1	
				Acetone	MC	-44.5	

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected
OWA13	07/22/92	02:48	85	Methylene Chloride	MC	43.7	MWD044051
				2-Butanone	MC	44.1	
				Trans-1,3-Dichloropropene	MC	31.6	
F50054	06/05/92	08:43	1	Carbon Disulfide	MC	-32.7	MW-31-59 MW-3159-SMS MW-3159-SMSD
				1,1-Dichloroethane	MC	-29.7	
				2-Butanone	MC	-27.3	
F50054	06/08/92	22:47	1	Acetone	MC	-74.2	MW-31-59RE MW3159-S
				Carbon Disulfide	MC	-26.0	
				1,1-Dichloroethene	MC	-25.9	
				2-Butanone	MC	-78.6	
				4-Methyl-2-Pentanone	MC	-41.2	
				2-Hexanone	MC	-25.6	
F50054	06/15/92	05:38	1	Methylene Chloride	MC	35.3	ATL-59-6B ATL11318B ATL26306B ATL58-18B ATL60-18B ATL86-18B
				Acetone	MC	89.8	
				1,1-Dichloroethane	MC	-31.4	
				2-Butanone	MC	65.7	
				4-Methyl-2-Pentanone	MC	55.7	
				2-Hexanone	MC	61.6	
				1,1,2,2-Tetrachloroethane	MC	28.7	
F50054	06/16/92	15:33	1	Methylene Chloride	MC	33.0	ATL02606B ATL03106B ATL06306B ATL11306B ATL26318B ATL59-18B
				Acetone	MC	28.8	
				Bromoform	MC	-36.6	

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected
F50054	06/17/92	19:23	1	Methylene Chloride	MC	33.9	ATL-58-6B ATL04818B ATL26306BRE ATL86-18BRE
				Acetone	MC	30.8	
				4-Methyl-2-Pentanone	MC	26.3	
				2-Hexanone	MC	27.4	
OWA18	06/17/92	10:02	14	Acetone	MC	40.4	LL104706B LL104717B LL104806B LL124717B MW-34-124
F50054	06/29/92	08:08	69	Methylene Chloride	MC	42.6	MWB023072MS MWB023072MSD
				Acetone	MC	58.4	
				Carbon Tetrachloride	MC	-29.1	
				Bromoform	MC	-27.4	
F50054	07/01/92	22:11	69	4-Methyl-2-Pentanone	MC	28.0	MWD025167
				2-Hexanone	MC	31.3	
F50054	07/02/92	10:49	69	Acetone	MC	27.2	MWA023098
F50054	07/06/92	00:57	69	Methylene Chloride	MC	46.4	MWA025151
				Acetone	MC	62.5	
				2-Butanone	MC	30.5	
				4-Methyl-2-Pentanone	MC	28.7	
				2-Hexanone	MC	42.0	

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected	
F50054	07/08/92	01:59	69	Methylene Chloride	MC	37.0	MWC058046	
				Acetone	MC	44.1		
				2-Butanone	MC	43.4		
				4-Methyl-2-Pentanone	MC	28.9		
				2-Hexanone	MC	47.7		
F50054	07/09/92	10:37	69	Acetone	MC	38.9	MWA033106	MWB058082
				1,2-Dichloroethane	MC	-33.1		
				Carbon Tetrachloride	MC	-26.6		
				2-Hexanone	MC	29.9		
				1,2-Dichloroethane-d_4	MC	-26.0		
F50054	06/28/92	16:22	69	Chloroethane	MC	-26.6	MWB023072	MWB025083
				Methylene Chloride	MC	30.0	MWC023036	MWC025047
				Acetone	MC	48.6		
				Chloroform	MC	-28.2		
				4-Methyl-2-Pentanone	MC	25.8		
				2-Hexanone	MC	32.4		
F50054	06/17/92	05:27	48	Methylene Chloride	MC	26.8	LL103106B	LL103919B
				Acetone	MC	50.8	LL105406B	LL105515B
							MWB033083	MWD033117
				2-Hexanone	MC	28.1	LL104816BMS	LL104816BMSD

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected	
F50054	06/18/92	08:02	48	Methylene Chloride	MC	32.7	LL100206B	LL101206B
				Acetone	MC	35.8		
				4-Methyl-2-Pentanone	MC	30.4		
				2-Hexanone	MC	44.1		
F50054	06/18/92	21:56	48	2-Butanone	MC	31.1	LL106106B	
				4-Methyl-2-Pentanone	MC	38.1		
				2-Hexanone	MC	48.0		
F50054	06/19/92	09:14	48	Methylene Chloride	MC	37.6	LL100218B	
				Acetone	MC	45.3		
F50054	06/12/92	06:09	14	Methylene Chloride	MC	33.9	ATL-86-6B	ATL04806B
				Acetone	MC	65.9	ATL06318BMS	ATL06318BMSD
				2-Butanone	MC	46.8		
				4-Methyl-2-Pentanone	MC	50.8		
				2-Hexanone	MC	54.1		
				1,1,2,2-Tetrachloroethane	MC	26.7		
F50054	06/28/92	16:22	14	Chloroethane	MC	-26.6	MW-34-124RE	
				Methylene Chloride	MC	30.0		
				Acetone	MC	48.6		
				Chloroform	MC	-28.2		
				2-Butanone	MC	27.9		
				4-Methyl-2-Pentanone	MC	25.8		
				2-Hexanone	MC	32.4		

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected
F50053	08/20/92	01:01	192	Acetone	MC	48.1	TRB03I082
				2-Butanone	MC	38.1	
F50053	08/23/92	16:10	192	Acetone	MC	38.1	AMW036082 BMW036082
				2-Butanone	MC	33.2	
				4-Methyl-2-Pentanone	MC	47.2	
				2-Hexanone	MC	41.6	
F50053	08/25/92	00:49	192	Chloromethane	MC	41.6	DMW045082MSD
				Vinyl Chloride	MC	31.1	
				Chloroethane	MC	25.2	
				Acetone	MC	34.4	
				2-Butanone	MC	32.4	
				4-Methyl-2-Pentanone	MC	29.0	
F50053	08/25/92	13:20	192	Chloromethane	MC	49.0	DMW045082MS
				Vinyl Chloride	MC	36.8	
				Chloroethane	MC	38.2	
				Acetone	MC	41.9	
				2-Butanone	MC	38.4	

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected	
F50053	07/28/92	08:31	134	Chloroethane	MC	-26.2	MWA040104	MWA240104
				Methylene Chloride	MC	46.9	MWB040059	MWC040052
				Acetone	MC	58.4	MWD045042RE	MWA040104MS
				2-Butanone	MC	41.2	MWA040104MSD	
				4-Methyl-2-Pentanone	MC	37.4		
				2-Hexanone	MC	45.5		
F50051	08/24/92	08:29	220	Vinyl Chloride	MC	-26.5		
				2-Butanone	MC	39.2		
F50053	08/25/92	13:20	220	Chloromethane	MC	49.0	AMW044082MS	AMW044082MSD
				Vinyl Chloride	MC	36.8		
				Chloroethane	MC	38.2		
				Acetone	MC	41.9		
				2-Butanone	MC	38.4		
				4-Methyl-2-Pentanone	MC	30.6		
				2-Hexanone	MC	36.6		
F50051	08/24/92	08:29	220	Vinyl Chloride	MC	-26.5	AMW044082	BMW043082
				2-Butanone	MC	39.2		
F50055	08/30/92	15:42	307	Chloroethane	MC	47.8	AMW009082	BMW009082
				2-Butanone	MC	29.1	BMW040082	DMW009082
				4-Methyl-2-Pentanone	MC	39.6	DMW009082RE	DMW209082
				2-Hexanone	MC	31.4		

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 8
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[3]	Compound	RRF[2]	%D[1]	Samples Affected
F50055	08/30/92	00:44	307	Chloromethane	MC	-36.6	AMW002082 AMW012082 AMW040082 AMW240082 BMW021082 BMW023082 BMW053082 BMW056082 BMW058052 AMW040082MS AMW040082MSD
				4-Methyl-2-Pentanone	MC	32.3	
				2-Hexanone	MC	25.6	
F50053	07/22/92	21:38	134	Methylene Chloride	MC	39.5	A-045-034 B-045-022 C-045-012
				Acetone	MC	42.5	
				2-Butanone	MC	39.2	
				4-Methyl-2-Pentanone	MC	37.6	
				2-Hexanone	MC	43.7	
F50053	07/24/92	08:40	134	Methylene Chloride	MC	46.7	MWD045042
				Acetone	MC	37.1	
F50053	07/29/92	12:14	134	Methylene Chloride	MC	39.5	MWC040052RE
				Acetone	MC	40.7	
				2-Butanone	MC	42.7	
				4-Methyl-2-Pentanone	MC	37.4	
				2-Hexanone	MC	45.5	
F50053	08/03/92	19:39	134	Chloroethane	MC	34.9	MWA058125
				Methylene Chloride	MC	53.2	
				Acetone	MC	40.7	

Notes: MC = Met Criteria
[1] Percent Difference
[2] Relative Response Factor
[3] Sample Data Group

TABLE 9

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	08/27/92	1300	192	Chloromethane	MC	-67.7	DMW036082
				Acetone	0.010	44.4	
				2-Butanone	0.013	MC	
				2-Hexanone	0.042	MC	
				1,2-Dibromo-3-Chloropropane	0.041	34.9	
F50051	08/25/92	2213	220	Acetone	0.010	44.4	TRB020082 TRB243082
				2-Butanone	0.010	44.4	
				2-Hexanone	0.035	MC	
				1,2-Dibromo-3-Chloropropane	0.044	30.2	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	08/26/92	1052	220	Chloromethane	MC	-33.6	AMW029082 AMW032082 AMW034082 AMW043082 AMW220082 BMW020082 BMW029082 BMW032082 BMW032082RE BMW044082 CMW020082 DMW032082 DMW034082 DMW043082 DMW044082 RIN243082
				Methylene Chloride	MC	33.7	
				Acetone	0.010	44.4	
				2-Butanone	0.013	MC	
				2-Hexanone	0.040	MC	
				1,2-Dibromo-3-Chloropropane	0.040	36.5	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	09/02/92	1308	430	Chloromethane	MC	32.9	AMW024082 DMW038082 TRB238082
				Acetone	0.012	33.3	
				2-Butanone	0.013	MC	
				Carbon Tetrachloride	MC	-37.3	
				2-Hexanone	0.045	MC	
F50051	09/01/92	2347	430	Chloromethane	MC	-39.4	AMW038082 BMW010082 RIN238082 VLCS244
				Vinyl Chloride	MC	31.6	
				Methylene Chloride	MC	30.6	
				Acetone	0.011	38.9	
				2-Butanone	0.015	MC	
				2-Hexanone	0.041	MC	
				1,2-Dibromo-3-Chloropropane	0.040	36.5	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	08/24/92	2330	192	Acetone	0.022	MC	AMW037082 AMW042082 AMW046082 BMW037082 BMW042082 BMW046082 DMW037082 DMW042082 DMW046082 DMW246082 RIN045082 TRB045082 VLCS235
				2-Butanone	0.008	55.6	
				2-Hexanone	0.034	MC	
				1,2-Dibromo-3-Chloropropane	0.047	MC	
F50051	08/25/92	1157	192	Methylene Chloride	MC	31.4	TRB042082
				Acetone	0.011	38.9	
				2-Butanone	0.008	55.6	
				2-Hexanone	0.031	MC	
F50051	08/27/92	2032	278	Chloromethane	MC	-76.8	AMW015082 AMW019082 AMW059082 BMW004082 BMW019082 BMW057082 DMW033082
				Acetone	0.010	44.4	
				2-Butanone	0.015	MC	
				2-Hexanone	0.041	MC	
				1,2-Dibromo-3-Chloropropane	0.045	MC	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	08/27/92	0015	278	Vinyl Chloride	MC	33.5	AMW023082 AMW026082 AMW028082 AMW041082 BMW016082 BMW017082 BMW028082 CMW017082 DMW021082 DMW041082 DMW059082 RIN221082 RIN241082 VLCS239
				Chloroethane	MC	25.7	
				Methylene Chloride	MC	28.8	
				Acetone	0.010	44.8	
				2-Butanone	0.013	27.8	
				2-Hexanone	0.038	MC	
				1,2-Dibromo-3-Chloropropane	0.043	31.8	
F50051	08/31/92	1303	297	Acetone	0.005	MC	AMW004082
				2-Butatone	0.010	MC	
				4-Methyl-2-Pentanone	0.029	32.6	
				2-Hexanone	0.016	33.3	
				1,2-Dibromo-3-Chloropropane	0.031	32.6	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50051	08/28/92	0852	297	Chloromethane	MC	-76.1	AMW007082 AMW017082 AMW027082
				Bromomethane	MC	36.7	AMW053082 AMW058082 BMW022082
				Acetone	0.010	44.4	BMW026082 BMW041082 BMW059082
				2-Butanone	0.017	MC	CMW016082 CMW019082 DMW028082
				2-Hexanone	0.040	MC	RIN258082 TRB027082

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50053	08/31/92	1915	346	Acetone	0.009	MC	AMW022082 BMW024082 AMW226082 BMW027082 BMW007082
				2-Butanone	0.011	MC	AMW001082 BMW001082 BMW002082 AMW006082 BMW006082
				4-Methyl-2-Pentanone	0.032	MC	AMW013082 AMW014082 RIN231082 AMW031082 BMW031082
				2-Hexanone	0.022	MC	AMW055082 BMW055082 BMW255082 TRB255082
				1,2-Dibromo-3-Chloropropane	0.029	37.0	TRB040082

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50053	08/30/92	1115	356	Chloroethane	MC	46.1	AMW030082 AMW039082 AMW047082 AMW052082 AMW254082 BMW047082 BMW052082 BMW054082 DMW039082 DMW048082 VLCS243
				Acetone	0.001	85.7	
				2-Butatone	0.009	30.8	
				4-Methyl-2-Pentanone	0.028	34.9	
				2-Hexanone	0.015	37.5	
				1,1,2,2-Tetrachlorethane	MC	30.5	
				1,2-Dibromo-3-Chloropropane	0.030	34.8	
F50053	08/31/92	0334	356	Chloroethane	MC	39.1	AMW048082 AMW056082 BMW030082 BMW048082 RIN240082
				Acetone	0.006	MC	
				Carbon Disulfide	MC	-30	
				1,1-Dichlorethene	MC	-31.1	
				2-Butanone	0.009	30.8	
				1,2-Dichloropropane	MC	30.6	
				4-Methyl-2-Pentanone	0.030	30.2	
				2-Hexanone	0.016	33.3	
				1,2-Dibromo-3-Chloropropane	0.030	34.8	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50053	09/01/92	0920	356	Vinyl Chloride	MC	31.1	AMW003082 AMW010082 AMW011082 AMW054082 BMW003082
				Acetone	0.007	MC	
				2-Butanone	0.008	38.5	
				4-Methyl-2-Pentanone	0.028	34.9	
				2-Hexanone	0.015	37.5	
				1,1,2,2-Tetrachloroethane	MC	36.0	
				1,2-Dibromo-3-Chloropropane	MC	37.0	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50053	08/28/92	1705	346	Methylene Chloride	MC	-69.8	AMW022082 BMW024082 AMW226082 BMW027082
				Acetone	0.007	MC	BMW007082 AMW001082 BMW001082 BMW002082
				2-Butanone	0.013	MC	AMW006082 BMW006082 AMW013082 AMW014082 RIN231082
				4-Methyl-2-Pentanone	0.034	MC	AMW031082 BMW031082 AMW055082 BMW055082
				2-Hexanone	0.021	MC	BMW255082 TRB255082 TRB040082
				1-2-Dibromo-3-Chloropropane	0.036	MC	

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 9
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR VOC LOW CONCENTRATION ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[1]	Compound	RRF[2]	%D[3]	Samples Affected
F50053	08/27/92	2156	346	Acetone	0.006	MC	AMW022082 BMW024082 AMW226082 BMW027082
				2-Butanone	0.012	MC	BMW007082 AMW001082 BMW001082 BMW002082
				4-Methyl-2-Pentanone	0.034	MC	AMW006082 BMW006082 AMW013082 AMW014082
				2-Hexanone	0.020	MC	RIN231082 AMW031082 BMW031082 AMW055082
				1,2-Dibromo-3-Chloropropane	0.035	MC	BMW055082 BMW255082 TRB255082 TRB040082

Notes: MC = Met Criteria
[1] Sample Data Group
[2] Relative Response Factor
[3] Percent Difference

TABLE 10

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
OWA07	08/20/92	16:49	153	2,2′-Oxybis(1-Chloropropane)	29.4	IH2603082
				4-Chloroaniline	-47.5	
				4-Chloro-3-Methylphenol	-28.5	
				Hexachlorocyclopentadiene	25.8	
				3-Nitroaniline	-167.7	
				2,4-Dinitrophenol	-35.9	
				2,4-Dinitrotoluene	-26.9	
				N-Nitrosodiphenylamine(1)	51.0	
				Carbazole	25.3	
				3,3′-Dichlorobenzidine	58.0	
				2,4,6-Tribromophenol	-35.2	
OWA07	07/17/92	12:36	85	4-Chloroaniline	25.5	ADS00306B ADS00318D ADS00506B ADS00518B ADS01003B ADS02206B ADS02218B ADS20518B ADS00518BMS ADS00518BMSD
				3-Nitroaniline	-112.9	
				2,4-Dinitrophenol	-43.7	
				4-Nitrophenol	-27.1	
				4-Nitroaniline	-27.6	
				3,3′-Dichlorobenzidine	38.5	

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 10
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
OWA07	08/14/92	21:35	153	4-Chloroaniline	-47.5	IH2002082 JH2002082 JH2003082 JH2603082 RIN002082
				Hexachlorocyclopentadiene	32.7	
				2-Nitroaniline	-35.2	
				3-Nitroaniline	-61.3	
				4-Nitroaniline	34.3	
				4,6-Dinitro-2-Methylphenol	36.8	
				4-Bromophenyl-phenylether	29.1	
				Hexachlorobenzene	29.2	
				Pentachlorophenol	29.5	
				Pyrene	-25.2	
				Butylbenzylphthalate	-31.3	
				bis(2-Ethylhexyl)Phthalate	-32.3	
				Di-n-Octyl Phthalate	-32.3	
OWA07	08/17/92	19:29	153	4-Chloroaniline	-87.9	IH2003082
				4-Chloro-3-Methylphenol	-34.1	
				Hexachlorocyclopentadiene	41.4	
				3-Nitroaniline	-145.2	
				4,6-Dinitro-2-Methylphenol	34.6	
				Hexachlorobenzene	29.4	
				Pentachlorophenol	35.7	
				Carbazole	-28.1	
				Butylbenzylphthalate	-33.6	
				bis(2-Ethylhexyl)Phthalate	-31.8	
				Di-n-Octyl Phthalate	-32.0	

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 10
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
OWA07	08/13/92	20:40	153	N-Nitroso-Di-n-Propylamine	-31.5	IH2001082
				4-Chloroaniline	-56.0	
				4-Chloro-3-Methylphenol	-35.3	
				2-Nitroaniline	-43.0	
				3-Nitroaniline	-66.1	
				4,6-Dinitro-2-Methylphenol	30.2	
				4-Bromophenyl-phenylether	31.6	
				Hexachlorobenzene	34.2	
				Carbazole	29.7	
				Butylbenzylphthalate	-28.6	
				3,3'-Dichlorobenzidine	38.0	
				bis(2-Ethylhexyl)Phthalate	-25.7	
OWA07	08/14/92	10:17	153	4-Chloroaniline	-31.9	JH2001082
				4-Chloro-3-Methylphenol	-27.7	
				Hexachlorocyclopentadiene	31.1	
				2-Nitroaniline	-34.5	
				3-Nitroaniline	-40.3	
				4,6-Dinitro-2-Methylphenol	33.8	
				4-Bromophenyl-phenylether	29.8	
				Hexachlorobenzene	33.2	
				Butylbenzylphthalate	-36.5	
				3,3'-Dichlorobenzidine	36.5	
				bis(2-Ethylhexyl)Phthalate	-34.5	
				Di-n-Octyl Phthalate	-34.0	

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 10
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
OWA02	09/03/92	15:07	273	4-Chloroaniline	58.9	BMW052082 BMW056082
				Hexachlorobutadiene	-42.4	
				4-Nitrophenol	-83.3	
				Pentachlorophenol	-35.2	
				3,3′-Dichlorobenzidine	26.6	
				2,4,6-Tribromophenol	-46.0	
OWA02	09/14/92	16:53	273	Phenol	25.4	AMW048082RE
				2,2′-Oxybis(1-Chloropropane)	38.6	
				4-Chloroaniline	68.5	
				Hexachlorobutadiene	-55.0	
				Hexachlorocyclopentadiene	-40.9	
				3-Nitroaniline	43.2	
				2,4-Dinitrophenol	32.5	
				4-Nitrophenol	-71.6	
				Diethylphthalate	-26.4	
				4-Nitroaniline	51.3	
				N-Nitrosodiphenylamine	45.0	
				Di-n-Butylphthalate	-28.4	
				3,3′-Dichlorobenzidine	49.4	
				Phenol-d_5	27.2	

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 10
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
OWA07	08/30/92	12:47	273	4-Chloroaniline	56.0	AMW056082
				3-Nitroaniline	-29.4	
				4-Nitroaniline	41.1	
				N-Nitrosodiphenylamine(1)	38.4	
				Carbazole	49.6	
				3,3'-Dichlorobenzidine	88.1	
OWA21	08/28/92	08:04	-273	3-Nitroaniline	-26.2	AMW053082 BMW053082 BMW053082MS BMW053082MSD
				N-Nitrosodiphenylamine(1)	25.2	
				Carbazole	34.7	
				Butylbenzylphthalate	-25.8	
				3,3'-Dichlorobenzidine	-85.7	
				2,4,6-Tribromophenol	-36.5	
F50052	09/02/92	23:45	273	4-Chloroaniline	74.7	AMW047082 AMW052082 AMW054082 AMW055082 AMW254082 BMW047082 BMW054082 BMW055082 BMW255082 DMW048082

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 10
(Continued)

SAMPLES AFFECTED BY UNACCEPTABLE CONTINUING CALIBRATIONS FOR SVOC ANALYSES BY GC/MS

Instrument	Date	Time	Associated SDG[2]	Compound	%D[1]	Samples Affected
F50057	09/10/92	20:00	273	1,2,4-Trichlorobenzene	-35.4	AMW048082 BMW048082
				4-Chloroaniline	74.4	
				Hexachlorobutadiene	-33.8	
				2-Nitroaniline	27.0	
				3-Nitroaniline	34.2	
				4-Nitrophenol	47.0	
				4-Nitroaniline	33.5	
				N-Nitrosodiphenylamine	27.3	
				Pentachlorophenol	29.6	
				Butylbenzylphthalate	25.2	

Notes: [1] Percent Difference
[2] Sample Data Group

TABLE 11

SUMMARY OF COMPOUNDS FOUND IN METHOD BLANKS

Phenol

Diethyl Phthalate

Dimethyl Phthalate

bis(2-Ethyl Hexyl)Phthalate

Benzene

Methylene Chloride

Acetone

Di-n-Butyl Phthalate

Butyl Benzyl Phthalate

2-Butanone

TABLE 12

SUMMARY OF PESTICIDES FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/kg)	Samples Associated	SDG[1]
PBLK63	gamma-BHC (Lindane)	0.11	ADS01003B ADS00306B ADS00318D ADS02206B ADS02218B ADS00506B ADS00518B ADS20518B	85
	Heptachlor	0.18		
	Aldrin	0.13		
	Dieldrin	0.45		
	Endrin	0.14		
	4-4'-DDT	0.36		

Notes: [1] Sample Data Group

TABLE 13

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/kg)	Samples Associated	SDG[1]
VBLKR8	Methylene Chloride	10	ATL00606B ATL00618B ATL03706B ATL06318B ATL06506B ATL06522B ATL08306B ATL08318B ATL09922B ATL10524B MW-31-112 MWC033048	14
	Acetone	11		
	Benzene	2		
VBLKF2	Methylene Chloride	2	MW-34-124RE	14
VBLK06	Methylene Chloride	19	ATL-86-6B ATL04806B	14
VBLKV3	Methylene Chloride	7	MW-34-124	14
	Benzene	2		
VBLKT6	Benzene	2	LL104706B LL104717B LL104806B LL124717B	14
VBLKP2	Methylene Chloride	8	MWA058125	134
	Acetone	11		
VBLKL7	Methylene Chloride	17	MWC040052RE	134
	Acetone	10		
VBLKI9	Methylene Chloride	20	MWA040104 MWA240104 MWB040059 MWC040052 MWD045042RE	134
VBLKI5	Methylene Chloride	19	MWD045042	134
	Acetone	23		
	2-Butanone (MEK)	3		

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/kg)	Samples Associated	SDG[1]
VBLKD4	Methylene Chloride	11	MWA045034 MWA045022 MWC045012	134
	Acetone	25		
SBLK81	Butyl Benzyl Phthalate	97	ADS00306B ADS00318D ADS00506B ADS00518B ADS01003B ADS02206B ADS02218B ADS20518B	85
VBLKB9	Methylene Chloride	16	MWD044051	85
	Acetone	20		
VBLKX7	Methylene Chloride	19	MWA044035	85
	Acetone	21		
VBLKX6	Methylene Chloride	9	MWB044023 MWC044010	85
	Acetone	23		
VBLKT3	Methylene Chloride	10	MWD043105	85
	Acetone	5		
VBLKS2	Methylene Chloride	11	ADS00306B ADS00318D ADS00506B ADS00518B ADS01003B ADS02206B ADS02218B ADS20518B MWA043099 MWB043047 MWC043041	85
	Acetone	26		
VBLKA6	Methylene Chloride	28	LL102706B LL104816B	48
VBLKY2	Methylene Chloride	19	LL100218B	48

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/kg)	Samples Associated	SDG[1]
VBLKV8	Methylene Chloride	19	LL106106B	48
	Acetone	21		
VBLKV7	Methylene Chloride	30	LL100206B LL101206B	48
	Acetone	34		
VBLKT3	Methylene Chloride	10	LL103106B LL103919B LL105406B LL105515B MWB033083 MWD033117	48
	Acetone	10		
VBLKF9	Methylene Chloride	15	MW-31-47 MW-34-102 MW-34-58 MW-34-62	1
VBLKH1	Methylene Chloride	17	MW-31-59	1
VBLKK5	Methylene Chloride	19	MW-31-59RE MW-31-59S	1
VBLKP8	Methylene Chloride	12	ATL-59-6B ATL11318B ATL26306B ATL58-18B ATL60-18B ATL86-18B	1
VBLKT1	Methylene Chloride	7	ATL02606B ATL03106B ATL06306B ATL11306B ATL26318B ATL59-18B	1
VBLKV5	Methylene Chloride	20	ATL-58-6B ATL04818B	1
	Acetone	21		

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/kg)	Samples Associated	SDG[1]
VBLKE4	Methylene Chloride	2	MWB023072 MWB025083 MWC023036 MWC025047	69
VBLKH5	Methylene Chloride	5	MWA025151	69

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/L)	Samples Associated	SDG[1]
VBLKXI	Methylene Chloride	2	TRB042082	192
VBLKXK	Methylene Chloride	1	DMW036082	192
VBLKSE	Methylene Chloride	1	DWM042082 DMW046082 DMW246082 RIN045082 TRB045082 VLCS235 AMW037082 AMW042082 AMW046082 BMW037082 BMW042082 BMW046082 DMW037082	192
VBLKA5	Methylene Chloride	1	BMW002082 BMW006082 BMW007082 BMW024082 BMW027082 AMW006082 AMW013082 AMW014082 AMW022082 AMW226082 BMW001082	346
VBLKDU	Methylene Chloride	1	TRB255082	346
VBLKDN	Methylene Chloride	1	AMW001082 AMW031082 AMW055082 BMW031082 BMW055082 BMW255082 RIN231082 TRB040082	346

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/L)	Samples Associated	SDG[1]
VBLKXI	Methylene Chloride	2	JH2004082	236
VBLKFN	Methylene Chloride	1	AMW020082 AMW033082 BMW033082 BMW233082 IH2004082 IH2604082 JH2604082 RIN218082RE TRB035082	236
SBLK43	Phenol	2	AMW053082 BMW053082	273
	bis(2-ethylhexyl)phthalate	6		
SBLK56	bis(2-ethylhexyl)phthalate	3	AMW056082	273
SBLK57	Diethyl Phthalate bis(2-ethylhexyl)phthalate	2 8	AMW047082 AMW052082 AMW054082 AMW055082 AMW254082 BMW047082 BMW054082 BMW055082 BMW255082 DMW048082	273
SBLK81	Diethyl Phthalate Di-n-Butyl Phthalate Dis(2-EthylHexyl)Phthalate Phenol Dimethyl Phthalate	2 1 9 3 1	BMW052082 BMW056082	273

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/L)	Samples Associated	SDG[1]
VBLKPL	Methylene Chloride	1	AMW009082 BMW009082 BMW040082 DMW009082 DMW009082RE DMW209082	307
VBLKSH	Methylene Chloride	2	AMW009082 BMW009082 BMW040082 DMW009082 DMW009082RE DMW209082	307
VBLKAM	Methylene Chloride	1	AMW038082 BMW010082 RIN238082	430
VBLKXR	Methylene Chloride	1	AMW024082 DMW038082 TRB238082	430
VBLKXP	Methylene Chloride	1	AMW004082	297
VBLKDM	Methylene Chloride	1	AMW005082 AMW008082 AMW021082 BMW005082 BMW008082	297
VBLKXL	Methylene Chloride	1	AMW007082 AMW017082 AMW027082 AMW053082 AMW058082 BMW022082 BMW026082 BMW041082 BMW059082 CMW016082 CMW019082 DMW028082 RIN258082 TRB027082	297

Note: [1] Sample Data Group

TABLE 13
(Continued)

COMPOUNDS FOUND IN METHOD BLANKS

Method Blank	Compound	Concentration (µg/L)	Samples Associated	SDG[1]
VBLKAH	Methylene Chloride	0.9	TRB020082 TRB243082	220
VBLKXJ	Methylene Chloride	2	AMW029082 AMW032082 AMW034082 AMW043082 AMW220082 BMW020082 BMW029082 BMW032082 BMW032082RE BMW044082 CMW020082 DMW032082 DMW034082 DMW043082 DMW044082 RIN243082	220
VBLKXI	Methylene Chloride	2	JH2004082	236
SBLK27	Phenol Dimethyl Phthalate Diethyl Phthalate bis(2-Ethyl Hexyl)phthalate	5 1 2 3	JH2004082 JH2604082	236
SBLK29	Phenol bis(2-Ethyl Hexyl)phthalate	2 4	IH2004082 IH2604082	236
SBLK50	bis(2-Ethyl Hexyl)phathalate	3	JH2004082RE	236
HAZRAPBLK	Methylene Chloride	5	AMW036082 BMW036082	192
VBLKPK	Methylene Chloride	5	TRB03I082	192
VBLKXM	Methylene Chloride	2	AMW030082 AMW039082 AMW047082 AMW052082 AMW254082 BMW047082 BMW052082 BMW054082 DMW039082 DMW048082	356

Note: [1] Sample Data Group

TABLE 14

COMPOUNDS QUALIFIED AS NOT-DETECTED (U) IN ASSOCIATED SAMPLES BECAUSE OF PRESENCE IN METHOD BLANKS

Compound	Associated Samples			
Benzene	LL1-047-06B	LL1-047-17B	LL1-048-06B	LL1-247-17B
Diethyl Phthalate	AMW-052-082	BMW-056-082	IH2-004-082	IH2-604-082
Phenol	BMW-053-082	BMW-056-082	IH2-004-082	IH2-604-082
Methylene Chloride	BMW-007-082	ATL-048-18B	DMW-009-082-RE	LL1-054-06B
	BMW-008-082	ATL-058-06B	DMW-028-082	LL1-055-15B
	BMW-009-082	ATL-058-18B	DMW-032-082	LL1-061-06B
	BMW-010-082	ATL-059-06B	DMW-034-082	MWA-025-151
	BMW-020-082	ATL-059-18B	DMW-036-082	AMW-004-082
	BMW-022-082	ATL-060-18B	MWA-040-104	AMW-005-082
	BMW-024-082	ATL-063-18B	MWA-043-099	AMW-006-082
	BMW-026-082	ATL-065-06B	MWA-044-035	AMW-007-082
	BMW-027-082	ATL-065-22B	MWA-045-034	AMW-008-082
	BMW-029-082	ATL-083-06B	MWA-058-125	AMW-009-082
	BMW-032-082-RE	JH2-004-082	MWB-023-072	AMW-014-082
	BMW-033-082	RIN-218-082-RE	MWB-025-083	AMW-017-082
	BMW-036-082	RIN-238-082	MWB-033-083	AMW-020-082
	BMW-037-082	RIN-243-082	MWB-040-059	AMW-021-082
	BMW-041-082	RIN-258-082	MWB-043-047	AMW-022-082
	BMW-042-082	TRB-002-082	MWB-044-023	AMW-027-082
	DMW-037-082	TRB-021-082	MWC-023-036	AMW-029-082
	DMW-038-082	TRB-035-082	MWC-025-047	AMW-031-082
	DMW-042-082	TRB-031-082	MWC-033-048	AMW-032-082
	DMW-043-082	MWC-040-052	MWC-034-058	AMW-033-082
	DMW-044-082	MWC-040-052-RE	TRB-042-082	AMW-034-082
	DMW-045-082	MWC-043-041	TRB-045-082	AMW-036-082
	DMW-046-082	MWC-044-010	TRB-243-082	AMW-037-082
	DMW-048-082	MWC-045-012	TRB-255-082	AMW-038-082
	DMW-209-082	MWD-033-117	ATL-083-18B	AMW-042-082
	DMW-246-082	MWD-043-105	ATL-086-06B	AMW-043-082
	IH2-004-082	MWD-044-051	ATL-099-22B	AMW-046-082
	IH2-604-082	MWD-045-042	ATL-105-24B	AMW-052-082

TABLE 14
(Continued)

COMPOUNDS QUALIFIED AS NOT-DETECTED (U) IN ASSOCIATED SAMPLES BECAUSE OF PRESENCE IN METHOD BLANKS

Compound	Associated Samples			
Methylene Chloride (Continued)	ADS-003-06B	MWD-045-042-RE	ATL-113-06B	AMW-053-082
	ADS-003-18D	BMW-044-082	ATL-113-18B	AMW-055-082
	ADS-005-06B	BMW-045-082	ATL-263-06B	AMW-056-082
	ADS-005-18B	BMW-046-082	ATL-263-18B	AMW-058-082
	ADS-010-03B	BMW-047-082	LL1-002-06B	AMW-220-082
	ADS-022-06B	BMW-053-082	LL1-002-18B	AMW-226-082
	ADS-022-18B	BMW-054-082	LL1-012-06B	AMW-254-082
	ADS-205-18B	BMW-055-082	LL1-027-06B	BMW-001-082
	ATL-006-06B	BMW-059-082	LL1-031-06B	BMW-005-082
	ATL-006-18B	BMW-233-082	LL1-039-19B	
	ATL-026-06B	CMW-016-082	LL1-047-06B	
	ATL-031-06B	CMW-019-082	LL1-047-17B	
	ATL-037-06B	CMW-020-082	LL1-048-06B	
	ATL-048-06B	DMW-009-082	LL1-048-16B	
Acetone	MWB-033-083	LL1-031-06B	ADS-005-18B	ATL-086-06B
	MWB-043-047	LL1-054-06B	ADS-010-03B	ATL-099-22B
	MWC-033-048	LL1-055-15B	ADS-022-06B	ATL-105-24B
	MWC-040-052-RE	LL1-061-06B	ADS-022-18B	ATL-058-06B
	MWC-043-041	MWA-040-104	ADS-205-18B	ATL-063-18B
	MWC-044-010	MWA-043-099	ATL-006-06B	ATL-065-06B
	MWC-045-012	MWA-045-034	ATL-006-18B	ATL-065-22B
	MWD-033-117	MWA-058-125	ATL-031-06B	ATL-083-06B
	MWD-043-105	ADS-003-06B	ATL-037-06B	
	MWD-045-042	ADS-003-18D	ATL-048-18B	
	LL1-012-06B	ADS-005-06B	ATL-083-18B	
Gamma-BHC (Lindane)	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B
Heptachlor	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B

TABLE 14
(Continued)

COMPOUNDS QUALIFIED AS NOT-DETECTED (U) IN ASSOCIATED SAMPLES BECAUSE OF PRESENCE IN METHOD BLANKS

Compound	Associated Samples			
Aldrin	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B
Dieldrin	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B
Endrin	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B
4,4'-DDT	ADS01003B	ADS00306B	ADS00318D	ADS02206B
	ADS02218B	ADS00506B	ADS00518B	ADS20518B

TABLE 15

ANALYTES QUALIFIED AS NOT-DETECTED (U) IN ASSOCIATED SAMPLES BECAUSE OF PRESENCE IN METHOD (PREPARATION) BLANKS

Analyte	SDG	Associated Samples
Sodium	668106	ADS-003-06B ADS-003-18B ADS-005-06B ADS-005-18B ADS-010-03B ADS-022-06B ADS-022-18B ADS-205-18B
Aluminum	668274	AMW-047-082 AMW-048-082 AMW-052-082 AMW-053-082 AMW-054-082 AMW-055-082 AMW-056-082 AMW-254-082 BMW-047-082 BMW-048-082 BMW-052-082 BMW-053-082 BMW-055-082 BMW-255-082 DMW-048-082
Aluminum	66839	BMW-056-082

TABLE 16

PESTICIDES SAMPLES AND BLANKS WITH QUALIFIED DATA BECAUSE OF UNACCEPTABLE SURROGATE RECOVERIES

Sample	Results Qualified	
	Detected	ND
BMW047082	J	UJ
BMW054082	J	UJ
IH2001082	J	UJ
JH2603082MS	J	UJ
JH2603082MSD	J	UJ
JH2001082	J	-----
RIN002082	J	UJ
JH2603082	J	UJ
JH2003082	J	UJ
IH2003082	J	UJ
IH2603082	J	UJ
PBLK74	J	UJ
PBLK64	J	UJ
ADS01003B	J	UJ
ADS00518MSD	J	UJ
ADS00518B	J	UJ
PBLK63	J	UJ

TABLE 17

SAMPLES UTILIZED FOR MATRIX SPIKE/ MATRIX SPIKE DUPLICATES (MS/MSD)

ADS-005-18B

ADS-205-18B

ATL-063-18B

LL1-048-16B

MWA-033-106

MWA-040-104

MWB-023-072

MWB-231-059

MWC-023-036

MWC-033-048

MWC-034-058

AMW-040-082

AMW-044-082

BMW-053-082

CMW-018-082

DMW-045-083

IH2-002-082

IH2-004-082

IH2-601-082

IH2-604-082

JH2-603-082

TABLE 18

SVOC SAMPLES WITH DATA QUALIFIED AS ESTIMATED (J) FOR POSITIVE RESULTS AND ESTIMATED NOT-DETECTED (UJ) FOR ND RESULTS BECAUSE OF POSSIBLE MATRIX INTERFERRENCE

IH2001082

IH2002082

IH2003082

IH2603082

JH2001082

JH2002082

JH2003082

JH260382

RIN002082

TABLE 19

ANALYTES IN ASSOCIATED SAMPLES THAT FAILED INORGANIC MATRIX SPIKE RECOVERY CRITERIA AND QUALIFIED AS ESTIMATED (UJ)

Analyte	Associated Sample	%R[1]
Selenium	BMW053082S	70.4
	IH2001082S	56.5
	BMW056082	71.2
Antimony	ADS00518BS	48.4
Cyanide	ADS00518BS	52.5
Mercury	BMW056082S	47.4
	IH2001082S	39.4
	BMW053082S	58.0
Thallium	BMW056082S	31.9
	BMW053082S	62.4
Lead	BMW053082S	73.2

[1]%R - Percent Recovery

TABLE 20

ANALYTES NOT MEETING INORGANIC DUPLICATE SAMPLE CRITERIA AND QUALIFIED AS ESTIMATED (J) IN ASSOCIATED SAMPLES

Analyte	Sample	SDG	Samples Associated
Arsenic Iron Manganese Zinc	BMW053082D	668274	BMW053082 AMW-53082 BMW225082 AMW055082 BMW055082 AMW054082 BMW054082 AMW254082 BMW048082 AMW047082 AMW048082 BMW047082 DMW048082 AMW052082 AMW056082 BMW052082
Arsenic Copper Lead	AD500518BD	668106	ADS01003B ADS00306B ADS00318D ADS02206B ADS02218B ADS00506B ADS00518B ADS20518B
Arsenic	BMW056082D	68398D	BMW056082
Arsenic Copper	IH2001082D	68160D	IH201082 IH2003082 JH2001082 IH2603082 IH2002082 JH2603082 RIN002082 JH2004082 JH2002082 IH2604082 JH2603082 IH2004082 JH2003082

TABLE 21

ANALYTES QUALIFIED AS NOT-DETECTED ESTIMATED (UJ) FOR RESULTS < IDL AND ESTIMATED (J) FOR RESULTS > IDL BECAUSE OF UNACCEPTABLE POST DIGESTION SPIKES IN ASSOCIATED SAMPLES

Sample	Analyte	Qualifier
BMW056082	Arsenic	J
	Lead	J
	Thallium	UJ
AMW047082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
AMW048082	Lead	UJ
	Thallium	UJ
AMW052082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
AMW053082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
AMW054082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
AMW055082	Selenium	UJ
	Arsenic	J
	Lead	UJ
	Thallium	UJ
AMW056082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
AMW254082	Selenium	UJ
	Arsenic	UJ
	Lead	UJ
	Thallium	UJ
BMW047-082	Selenium	UJ
	Arsenic	J
	Lead	UJ
	Thallium	UJ
BMW048082	Thallium	UJ
BMW052082	Selenium	UJ
	Lead	UJ
	Thallium	UJ
BMW053082	Arsenic	J
	Lead	UJ
	Thallium	UJ
BMW054082	Arsenic	J
	Selenium	UJ
	Lead	UJ
	Thallium	UJ
BMW055082	Selenium	UJ
	Arsenic	J
	Lead	UJ
	Thallium	UJ
BMW255082	Selenium	UJ
	Arsenic	J
	Lead	UJ
	Thallium	UJ
DMW048082	Selenium	UJ
	Lead	UJ
	Thallium	UJ

TABLE 22

EQUIPMENT BLANK (RINSATE) SAMPLES

RIN-002-082

RIN-045-082

RIN-218-082

RIN-218-082-RE

RIN-221-082

RIN-225-082

RIN-231-082

RIN-238-082

RIN-240-082

RIN-241-082

RIN-243-082

RIN-258-082

TABLE 23

ORGANIC COMPOUNDS FOUND IN RINSATE SAMPLES

Compound	Frequency of Detection	Max Concentration (µg/L)
Methylene Chloride	12/12	18
Acetone	3/12	10
Bromodichloromethane	9/12	2
Chloroform	12/12	4
Carbon Disulfide	5/12	42
Toluene	6/12	1
Chlorobenzene	1/12	1
Phenol	1/12	2
bis (2-Ethylhexyl) phthalate	1/12	1
1,3-Dinitrobenzene (DNB)	1/12	1

TABLE 24

CHLOROFORM QUALIFIED IN ASSOCIATED SAMPLES AS (U) NOT DETECTED BECAUSE OF PRESENCE IN FIELD BLANKS

Sample	Concentration (µg/L)
AMW-014-082	3
BMW-002-082	5
BMW-053-082	4
CMW-018-082	15
MWA-058-125	1

TABLE 25

SAMPLES WITH TOLUENE QUALIFIED AS (U) NOT-DETECTED BECAUSE OF RINSATE CONTAMINATION

BMW-019-082	AMW-013-082
BMW-024-082	AMW-015-082
BMW-030-082	AMW-017-082
BMW-033-082	AMW-021-082
BMW-035-082	AMW-023-082
BMW-052-082	AMW-025-082
BMW-058-082	AMW-026-082
BMW-059-082	AMW-028-082
BMW-255-082	AMW-031-082
CMW-017-082	AMW-034-082
CMW-019-082	AMW-036-082
DMW-033-082	AMW-037-082
DMW-034-082	AMW-045-082
DMW-041-082	AMW-054-082
DMW-042-082	AMW-058-082
DMW-044-082	AMW-226-082
JH2-004-082	BMW-004-082
AMW-003-082	BMW-007-082
AMW-004-082	BMW-008-082
AMW-005-082	BMW-009-082
AMW-008-082	BMW-017-082

TABLE 26

CARBON DISULFIDE QUALIFIED IN ASSOCIATED SAMPLES AS (U) NOT-DETECTED BECAUSE OF RINSATE CONTAMINATION

SAMPLE ID
AMW-006-082
AMW-018-082
AMW-020-082
AMW-023-082
AMW-026-082
AMW-027-082
AMW-029-082
AMW-032-082
AMW-034-082
AMW-035-082
AMW-036-082
AMW-037-082
AMW-042-082
AMW-043-082
AMW-044-082
AMW-045-082
AMW-053-082
AMW-220-082
AMW-226-082
AMW-254-082
BMW-020-082
BMW-026-082
BMW-029-082
BMW-032-082-RE
BMW-036-082
BMW-042-082
BMW-043-082
BMW-044-082
BMW-045-082
BMW-046-082
DMW-032-082
DMW-035-082
DMW-036-082
DMW-043-082
DMW-044-082
DMW-246-082
IH2-003-082
IH2-604-082
JH2-001-082
JH2-003-082

TABLE 27

ANALYTES FOUND IN RINSATE SAMPLE RIN-002-082

Compound	Times Detected	Max Concentration (µg/l)
Aluminum	2	167
Calcium	1	207
Copper	1	4
Iron	1	25
Magnesium	1	43
Sodium	2	1360
Zinc	2	13

TABLE 28

ANALYTES QUALIFIED AS (U) NOT-DETECTED IN ASSOCIATED SAMPLES BECAUSE OF RINSATE CONTAMINATION

Analyte	Sample	SDG[1]	Type
Aluminum Iron Sodium Zinc	IH2-001-082	668158	TMET[2]
Aluminum Iron Sodium Zinc	IH2-002-082	668158	TMET
Aluminum	IH2-001-082	68160D	DMET[3]
Aluminum Copper Zinc	IH2-004-082	68160D	DMET
Aluminum Copper	IH2-604-082	68160D	DMET
Cooper Zinc	JH2-001-082	68160D	DMET
Aluminum	JH2-603-082	68160D	DMET

[1]SDG = Sample Data Group

[2]TMET = Total Metals

[3]DMET = Dissolved Metals

TABLE 29

TRAVEL (TRIP BLANK) SAMPLES

TRB-001-082

TRB-002-082

TRB-020-082

TRB-027-082

TRB-02I-082

TRB-02J-082

TRB-035-082

TRB-03I-082

TRB-03J-082

TRB-040-082

TRB-042-082

TRB-045-082

TRB-238-082

TRB-243-082

TRB-255-082

TRB-62I-082

TRB-62J-082

TABLE 30

COMPOUNDS FOUND IN TRIP BLANKS

Compound	Times Detected	Max Concentration (µg/L)
1,1-Dichloroethene	1	2
Methylene Chloride	13	9
Toluene	1	1
Trichloroethene	1	2
Acetone	4	10
1,1,2-Trichloroethane	1	1
1,2-Dibromoethane	1	1
1,4-Dichlorobenzene	1	1
Bromoform	1	1

TABLE 31

FIELD DUPLICATE SAMPLES

Sample	Duplicate	Matrix
AD5-005-18B	AD5-205-18B	Soil
AD5-063-06B	AD5-263-06B	Soil
ATL-063-18B	ATL-263-18B	Soil
LL1-047-17B	LL1-247-17B	Soil
MWB-031-059	MWB-231-059	Soil
MWA-040-104	MWA-240-104	Soil
AMW-020-082	AMW-220-082	Water
AMW-026-082	AMW-226-082	Water
AMW-040-082	AMW-240-082	Water
AMW-054-082	AMW-254-082	Water
BMW-033-082	BMW-233-082	Water
BMW-055-082	BMW-255-082	Water
DMW-009-082	DMW-209-082	Water
DMW-046-082	DMW-246-082	Water
H-02-J	H-22-J	Water
H-06-J	H-26-J	Water

TABLE 32

TOTAL SUSPENDED AND DISSOLVED SOLIDS OF AQUEOUS FIELD DUPLICATE SAMPLES

Sample	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)
AMW-020-082	<5	470
AMW-220-082	5	510
AMW-026-082	35	390
AMW-226-082	21	360
AMW-040-082	13	470
AMW-240-082	<5	480
AMW-054-082	5	290
AMW-254-082	<5	260
BMW-033-082	<5	280
BMW-233-082	11	290
BMW-055-082	<5	280
BMW-255-082	5	250
DMW-009-082	15	420
DMW-209-082	9	420
DMW-046-082	140	440
DMW-246-082	170	440

Table 33
Summary of Field Groundwater Duplicate Samples

Sample Point	Duplicate Sample ID	Duplicate Results	Sample ID	Results	RPD
DMET : Aluminum (ug/L)				**Average RPD :**	**71.23%**
MW-54A	AMW-254-082	81	AMW-054-082	ND	NA
MW-55B	BMW-255-082	50.8	BMW-055-082	107	71.23%
DMET : Arsenic (ug/L)				**Average RPD :**	**8.89%**
MW-55B	BMW-255-082	4.7	BMW-055-082	4.3	8.89%
DMET : Barium (ug/L)				**Average RPD :**	**0.81%**
MW-54A	AMW-254-082	220	AMW-054-082	221	0.45%
MW-55B	BMW-255-082	257	BMW-055-082	260	1.16%
DMET : Calcium (ug/L)				**Average RPD :**	**1.53%**
MW-54A	AMW-254-082	50500	AMW-054-082	51200	1.38%
MW-55B	BMW-255-082	47800	BMW-055-082	47000	1.69%
DMET : Magnesium (ug/L)				**Average RPD :**	**0.44%**
MW-54A	AMW-254-082	12200	AMW-054-082	12200	0.00%
MW-55B	BMW-255-082	11300	BMW-055-082	11200	0.89%
DMET : Manganese (ug/L)				**Average RPD :**	**6.64%**
MW-54A	AMW-254-082	5.8	AMW-054-082	6	3.39%
MW-55B	BMW-255-082	17.3	BMW-055-082	19.1	9.89%
DMET : Potassium (ug/L)				**Average RPD :**	**3.82%**
MW-54A	AMW-254-082	7050	AMW-054-082	6720	4.79%
MW-55B	BMW-255-082	7110	BMW-055-082	6910	2.85%
DMET : Sodium (ug/L)				**Average RPD :**	**2.28%**
MW-54A	AMW-254-082	20900	AMW-054-082	20500	1.93%
MW-55B	BMW-255-082	15000	BMW-055-082	15400	2.63%
DMET : Zinc (ug/L)				**Average RPD :**	**40.00%**
MW-54A	AMW-254-082	ND	AMW-054-082	4.8	NA
MW-55B	BMW-255-082	3.4	BMW-055-082	5.1	40.00%
EXPL : RDX (ug/L)				**Average RPD :**	**31.19%**
MW-33B	BMW-233-082	2.8	BMW-033-082	1.8	43.48%
MW-54A	AMW-254-082	1.1	AMW-054-082	0.91	18.91%
RAD : Gross Beta (pCi/L)				**Average RPD :**	**6.19%**
MW-54A	AMW-254-082	6.15	AMW-054-082	6.79	9.89%
MW-55B	BMW-255-082	5.31	BMW-055-082	5.18	2.48%
SVOC : Diethyl phthalate (ug/L)				**Average RPD :**	**NA**
MW-55B	BMW-255-082	1	BMW-055-082	ND	NA
SVOC : Phenol (ug/L)				**Average RPD :**	**100.00%**
MW-54A	AMW-254-082	ND	AMW-054-082	1	NA
MW-55B	BMW-255-082	3	BMW-055-082	1	100.00%

Table 33
Summary of Field Groundwater Duplicate Samples

Sample Point	Duplicate Sample ID	Duplicate Results	Sample ID	Results	RPD
SVOC : bis(2-Ethylhexyl)phthalate (ug/L)				**Average RPD :**	**100.00%**
MW-54A	AMW-254-082	1	AMW-054-082	2	66.67%
MW-55B	BMW-255-082	30	BMW-055-082	6	133.33%
TMET : Aluminum (ug/L)				**Average RPD :**	**7.64%**
MW-54A	AMW-254-082	159	AMW-054-082	149	6.49%
MW-55B	BMW-255-082	174	BMW-055-082	190	8.79%
TMET : Arsenic (ug/L)				**Average RPD :**	**NA**
MW-54A	AMW-254-082	4.2	AMW-054-082	ND	NA
TMET : Barium (ug/L)				**Average RPD :**	**3.02%**
MW-54A	AMW-254-082	211	AMW-054-082	214	1.41%
MW-55B	BMW-255-082	232	BMW-055-082	243	4.63%
TMET : Calcium (ug/L)				**Average RPD :**	**2.82%**
MW-54A	AMW-254-082	48700	AMW-054-082	49900	2.43%
MW-55B	BMW-255-082	43000	BMW-055-082	44400	3.20%
TMET : Magnesium (ug/L)				**Average RPD :**	**3.20%**
MW-54A	AMW-254-082	11600	AMW-054-082	11900	2.55%
MW-55B	BMW-255-082	10200	BMW-055-082	10600	3.85%
TMET : Manganese (ug/L)				**Average RPD :**	**0.30%**
MW-54A	AMW-254-082	7	AMW-054-082	7	0.00%
MW-55B	BMW-255-082	16.7	BMW-055-082	16.8	0.60%
TMET : Potassium (ug/L)				**Average RPD :**	**3.47%**
MW-54A	AMW-254-082	7030	AMW-054-082	6600	6.31%
MW-55B	BMW-255-082	6360	BMW-055-082	6320	0.63%
TMET : Sodium (ug/L)				**Average RPD :**	**3.80%**
MW-54A	AMW-254-082	19700	AMW-054-082	20100	2.01%
MW-55B	BMW-255-082	13900	BMW-055-082	14700	5.59%
TMET : Zinc (ug/L)				**Average RPD :**	**15.00%**
MW-54A	AMW-254-082	3.7	AMW-054-082	4.3	15.00%
MW-55B	BMW-255-082	22.6	BMW-055-082	ND	NA
VOC : Trichloroethene (ug/L)				**Average RPD :**	**2.13%**
MW-09D	DMW-209-082	230	DMW-009-082	240	4.26%
MW-40A	AMW-240-082	22	AMW-040-082	22	0.00%
VOC : Acetone (ug/L)				**Average RPD :**	**40.00%**
MW-26A	AMW-226-082	5	AMW-026-082	ND	NA
MW-55B	BMW-255-082	4	BMW-055-082	6	40.00%
VOC : Carbon disulfide (ug/L)				**Average RPD :**	**9.68%**
MW-20A	AMW-220-082	17	AMW-020-082	14	19.35%
MW-26A	AMW-226-082	0.8	AMW-026-082	0.8	0.00%
MW-46D	DMW-246-082	7	DMW-046-082	ND	NA
MW-54A	AMW-254-082	1	AMW-054-082	ND	NA

Table 33
Summary of Field Groundwater Duplicate Samples

Sample Point	Duplicate Sample ID	Duplicate Results	Sample ID	Results	RPD
VOC : Methylene chloride (ug/L)				**Average RPD :**	**36.66%**
MW-09D	DMW-209-082	3	DMW-009-082	2	40.00%
MW-20A	AMW-220-082	0.6	AMW-020-082	0.9	40.00%
MW-26A	AMW-226-082	0.9	AMW-026-082	1	10.53%
MW-33B	BMW-233-082	2	BMW-033-082	1	66.67%
MW-40A	AMW-240-082	4	AMW-040-082	5	22.22%
MW-46D	DMW-246-082	2	DMW-046-082	1	66.67%
MW-54A	AMW-254-082	0.9	AMW-054-082	1	10.53%
MW-55B	BMW-255-082	ND	BMW-055-082	0.9	NA
VOC : Toluene (ug/L)				**Average RPD :**	**35.29%**
MW-26A	AMW-226-082	0.7	AMW-026-082	1	35.29%
MW-33B	BMW-233-082	ND	BMW-033-082	0.6	NA
MW-54A	AMW-254-082	ND	AMW-054-082	0.6	NA
MW-55B	BMW-255-082	0.6	BMW-055-082	ND	NA

Notes : NA signifys that one of the results is ND, therefore RPD cannot be calculated ; ND = compound not detected
Compounds not detected in both the field duplicate and the original sample are not shown
RPD is calculated as : 2 * |Result1 - Result2| / (Result1 + Result2)*100%

Table 34
Summary of Field Soil Duplicate Samples

Sample Point	Duplicate Sample ID	Duplicate Results	Sample ID	Results	RPD
PEST : 4,4'-DDD (ug/kg)				**Average RPD :**	**3.77%**
ADS-005	ADS-205-18B	0.26	ADS-005-18B	0.27	3.77%
PEST : 4,4'-DDT (ug/kg)				**Average RPD :**	**19.78%**
ADS-005	ADS-205-18B	1	ADS-005-18B	0.82	19.78%
PEST : Aldrin (ug/kg)				**Average RPD :**	**28.07%**
ADS-005	ADS-205-18B	0.098	ADS-005-18B	0.13	28.07%
PEST : Dieldrin (ug/kg)				**Average RPD :**	**63.74%**
ADS-005	ADS-205-18B	0.31	ADS-005-18B	0.6	63.74%
PEST : Endrin (ug/kg)				**Average RPD :**	**94.34%**
ADS-005	ADS-205-18B	0.39	ADS-005-18B	0.14	94.34%
PEST : Gamma-BHC (Lindane) (ug/kg)				**Average RPD :**	**8.00%**
ADS-005	ADS-205-18B	0.13	ADS-005-18B	0.12	8.00%
PEST : Heptachlor (ug/kg)				**Average RPD :**	**12.77%**
ADS-005	ADS-205-18B	0.22	ADS-005-18B	0.25	12.77%
TMET : Aluminum (mg/kg)				**Average RPD :**	**9.05%**
ADS-005	ADS-205-18B	2110	ADS-005-18B	2310	9.05%
TMET : Arsenic (mg/kg)				**Average RPD :**	**NA**
ADS-005	ADS-205-18B	ND	ADS-005-18B	1.4	NA
TMET : Barium (mg/kg)				**Average RPD :**	**1.51%**
ADS-005	ADS-205-18B	20	ADS-005-18B	19.7	1.51%
TMET : Calcium (mg/kg)				**Average RPD :**	**9.76%**
ADS-005	ADS-205-18B	624	ADS-005-18B	688	9.76%
TMET : Chromium (mg/kg)				**Average RPD :**	**29.79%**
ADS-005	ADS-205-18B	2	ADS-005-18B	2.7	29.79%
TMET : Copper (mg/kg)				**Average RPD :**	**53.85%**
ADS-005	ADS-205-18B	1.9	ADS-005-18B	3.3	53.85%
TMET : Iron (mg/kg)				**Average RPD :**	**6.55%**
ADS-005	ADS-205-18B	2660	ADS-005-18B	2840	6.55%
TMET : Lead (mg/kg)				**Average RPD :**	**14.63%**
ADS-005	ADS-205-18B	2.2	ADS-005-18B	1.9	14.63%
TMET : Magnesium (mg/kg)				**Average RPD :**	**7.55%**
ADS-005	ADS-205-18B	599	ADS-005-18B	646	7.55%
TMET : Manganese (mg/kg)				**Average RPD :**	**0.43%**
ADS-005	ADS-205-18B	23.1	ADS-005-18B	23	0.43%

Table 34
Summary of Field Soil Duplicate Samples

Sample Point	Duplicate Sample ID	Duplicate Results	Sample ID	Results	RPD
TMET : Nickel (mg/kg)				**Average RPD :**	**3.51%**
ADS-005	ADS-205-18B	2.8	ADS-005-18B	2.9	3.51%
TMET : Potassium (mg/kg)				**Average RPD :**	**5.08%**
ADS-005	ADS-205-18B	585	ADS-005-18B	556	5.08%
TMET : Sodium (mg/kg)				**Average RPD :**	**34.83%**
ADS-005	ADS-205-18B	119	ADS-005-18B	83.7	34.83%
TMET : Vanadium (mg/kg)				**Average RPD :**	**7.69%**
ADS-005	ADS-205-18B	5	ADS-005-18B	5.4	7.69%
TMET : Zinc (mg/kg)				**Average RPD :**	**8.25%**
ADS-005	ADS-205-18B	10.1	ADS-005-18B	9.3	8.25%
TOC : Total Organic Carbon (TOC) (mg/kg)				**Average RPD :**	**77.26%**
MW-31A	MWB-231-059	68	MWB-031-059	170	85.71%
MW-40A	MWA-240-104	184	MWA-040-104	377	68.81%
VOC : 2-Butanone (ug/kg)				**Average RPD :**	**NA,**
MW-40A	MWA-240-104	6	MWA-040-104	ND	NA
VOC : Acetone (ug/kg)				**Average RPD :**	**56.49%**
ADS-005	ADS-205-18B	71	ADS-005-18B	28	86.87%
ATL-063	ATL-263-06B-RE	130	ATL-063-06B	78	50.00%
ATL-063	ATL-263-18B	56	ATL-063-18B	18	102.70%
LL1-047	LL1-247-17B	42	LL1-047-17B	42	0.00%
MW-31A	MWB-231-059	170	MWB-031-059	420	84.75%
MW-40A	MWA-240-104	95	MWA-040-104	110	14.63%
VOC : Benzene (ug/kg)				**Average RPD :**	**0.00%**
ATL-063	ATL-263-18B	ND	ATL-063-18B	2	NA
LL1-047	LL1-247-17B	2	LL1-047-17B	2	0.00%
VOC : Methylene chloride (ug/kg)				**Average RPD :**	**42.26%**
ADS-005	ADS-205-18B	45	ADS-005-18B	15	100.00%
ATL-063	ATL-263-06B-RE	37	ATL-063-06B	36	2.74%
ATL-063	ATL-263-18B	39	ATL-063-18B	15	88.89%
LL1-047	LL1-247-17B	23	LL1-047-17B	30	26.42%
MW-31A	MWB-231-059	34	MWB-031-059	47	32.10%
MW-40A	MWA-240-104	30	MWA-040-104	29	3.39%

Notes : NA signifys that one of the results is ND, therefore RPD cannot be calculated ; ND = compound not detected
Compounds not detected in both the field duplicate and the original sample are not shown
RPD is calculated as : 2 * |Result1 - Result2| / (Result1 + Result2)*100%