

Report No. A017 Archives Search Report of The Former
Unclassified Nebraska Ordnance Plant, NE July 1983

Unclassified

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SUMMARY

An archives search was conducted on the former Nebraska Ordnance Plant (NOP) to assess actual or potential contamination from past plant operations. The assessment did not include a site visit.

A contamination assessment conducted in 1959 indicated that the bomb loading lines, the bomb booster assembly area, and the demolition/burning ground areas were contaminated. The bomb loading lines were excessed to the University of Nebraska, with restrictions on uses of the property due to contamination from previous NOP operations. The demolition/burning ground areas were excessed to the University of Nebraska with no mention of possible contamination. The bomb booster assembly area was excessed to an individual, with clauses indicating potential contamination and absolving the Government from all future liability.

Records searched implied that surface soils and subsurface materials in the contaminated areas at NOP would permit the infiltration of contaminants, if any, into the shallow aquifer.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
SUMMARY	i
1.0 GENERAL	1-1
1.1 <u>PURPOSE OF ASSESSMENT</u>	1-1
1.2 <u>AUTHORITY</u>	1-1
1.3 <u>INTRODUCTION</u>	1-1
1.4 <u>HISTORY</u>	1-4
1.5 <u>PROPERTY TRANSACTIONS</u>	1-5
1.5.1 ACCESSING ACTIONS	1-5
1.5.2 EXCESSING ACTIONS	1-6
1.6 <u>ENVIRONMENTAL SETTING</u>	1-9
1.6.1 LOCATION	1-9
1.6.2 METEOROLOGY	1-9
1.6.3 GEOGRAPHY	1-9
1.6.4 GEOHYDROLOGY	1-10
1.6.5 WATER QUALITY	1-17
1.6.6 BIOTA	1-21
2.0 PAST ACTIVITY REVIEW	2-1
2.1 <u>INSTALLATION OPERATIONS</u>	2-1
2.1.1 WORLD WAR II (WWII) INDUSTRIAL OPERATIONS	2-1
2.1.2 KOREAN CONFLICT INDUSTRIAL OPERATIONS	2-5
2.1.3 OTHER OPERATIONS	2-6
2.1.4 MATERIEL PROOF AND SURVEILLANCE TESTING	2-7
2.1.5 TOXIC AND HAZARDOUS MATERIALS (HANDLING AND STORAGE)	2-9
2.2 <u>CONTAMINATION STATUS AT CLOSING</u>	2-12
2.2.1 LOADING LINES AND RELATED OPERATIONS BUILDINGS	2-12
2.2.2 AMMONIUM-NITRATE PRODUCTION AREA	2-14
2.2.3 DEMOLITION AND BURNING GROUNDS	2-17
2.2.4 CHEMICAL LABORATORY	2-17
2.2.5 STORAGE BUILDINGS	2-18
2.2.6 LAUNDRY BUILDING	2-18
2.2.7 STP	2-19
2.2.8 OTHER	2-19
2.2.9 DISCLOSURE OF CONTAMINATION	2-20

TABLE OF CONTENTS
(Continued, Page 2 of 2)

<u>Section</u>		<u>Page</u>
3.0	INSTALLATION ASSESSMENT FINDINGS	3-1
BIBLIOGRAPHY		
APPENDIXES		
	APPENDIX A—ACQUISITION TRACT REGISTER	A-1
	APPENDIX B—USAF, UNIVERSITY OF NEBRASKA, AND HOWARD RICHTER DEEDS	B-1
	APPENDIX C—CLIMATIC SUMMARY OF THE OMAHA AREA	C-1
	APPENDIX D—DRILL LOG	D-1
	APPENDIX E—WELL DATA	E-1
	APPENDIX F—BUILDING LIST FOR NOP INDICATING EXPLOSIVES CONTAMINATION, USAGE, CONDITION, AND DISPOSAL PLANS	F-1

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1.6-1	Stratigraphic Column of Midland Forster Well	1-14
2.1-1	Production Levels from Oct. 1, 1942, through Sept. 30, 1944	2-2
2.2-1	Nitrate Contamination Study at NOP	2-15

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1.1-1	Site Location--NOP	1-2
1.1-2	Site Map--NOP	1-3
1.5-1	Ownership at Final Excessing--NOP	1-7
1.5-2	Land Reassigned to USAF in 1959--NOP	1-8
1.6-1	Area Drainage Map--NOP	1-11
1.6-2	Regional Bedrock Geology--NOP	1-12
1.6-3	Soil Classifications in and Around NOP	1-15
1.6-4	Wells Located on NOP	1-18
1.6-5	Area Drainage Map Indicating STORET Surface Water Quality Locations--NOP	1-20
2.1-1	Bomb Loading Line--NOP	2-3
2.1-2	Booster Assembly Area--NOP	2-4
2.1-3	Demolition, Burning Grounds, and Fuze Testing Areas--NOP	2-8
2.1-4	Designated Areas on NOP	2-10
2.2-1	Areas of Explosives Contamination, NOP, 1959	2-13
2.2-2	Sampling Points for Nitrate Contamination Study Conducted at NOP	2-16

LIST OF ACRONYMS

AFB	Air Force Base
ARRCOM	U.S. Army Armament Materiel Readiness Command
BOD	biochemical oxygen demand
°C	degrees Celsius
cm	centimeters
COD	chemical oxygen demand
COE	U.S. Army Corps of Engineers
CSL	Chemical Systems Laboratory
DARCOM	U.S. Army Materiel Development and Readiness Command
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
ft	feet
GSA	General Services Administration
ha	hectares <i>≈ 2.47 US acres</i>
HE	high explosive
HEW	U.S. Department of Health, Education and Welfare
in	inches
km	kilometers
lb	pounds
lpm	liters per minute
m	meters
mg/l	milligrams per liter
mm	millimeters
NNRC	Nebraska Natural Resources Commission
NOAA	National Oceanic and Atmospheric Administration
NO ₃ -N	nitrate-nitrogen
NOP	Nebraska Ordnance Plant
OAC	U.S. Army Ordnance Ammunition Command
POL	petroleum, oils, and lubricants
ppm	parts per million

QA/QC	quality assurance/quality control
SOP	standing operating procedures
STP	sewage treatment plant
STORET	storage and retrieval
TNT	trinitrotoluene
USAEHA	U.S. Army Environmental Hygiene Agency
USAF	U.S. Air Force
USAR	U.S. Army Reserves
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USSCS	U.S. Soil Conservation Service
UXO	unexploded ordnance
WWII	World War II

1.0 GENERAL

1.1 PURPOSE OF ASSESSMENT

To search historical records and identify actual or possible contamination from past Army operations at the former Nebraska Ordnance Plant (NOP), Saunders County, Nebr. (see Figs. 1.1-1 and 1.1-2).

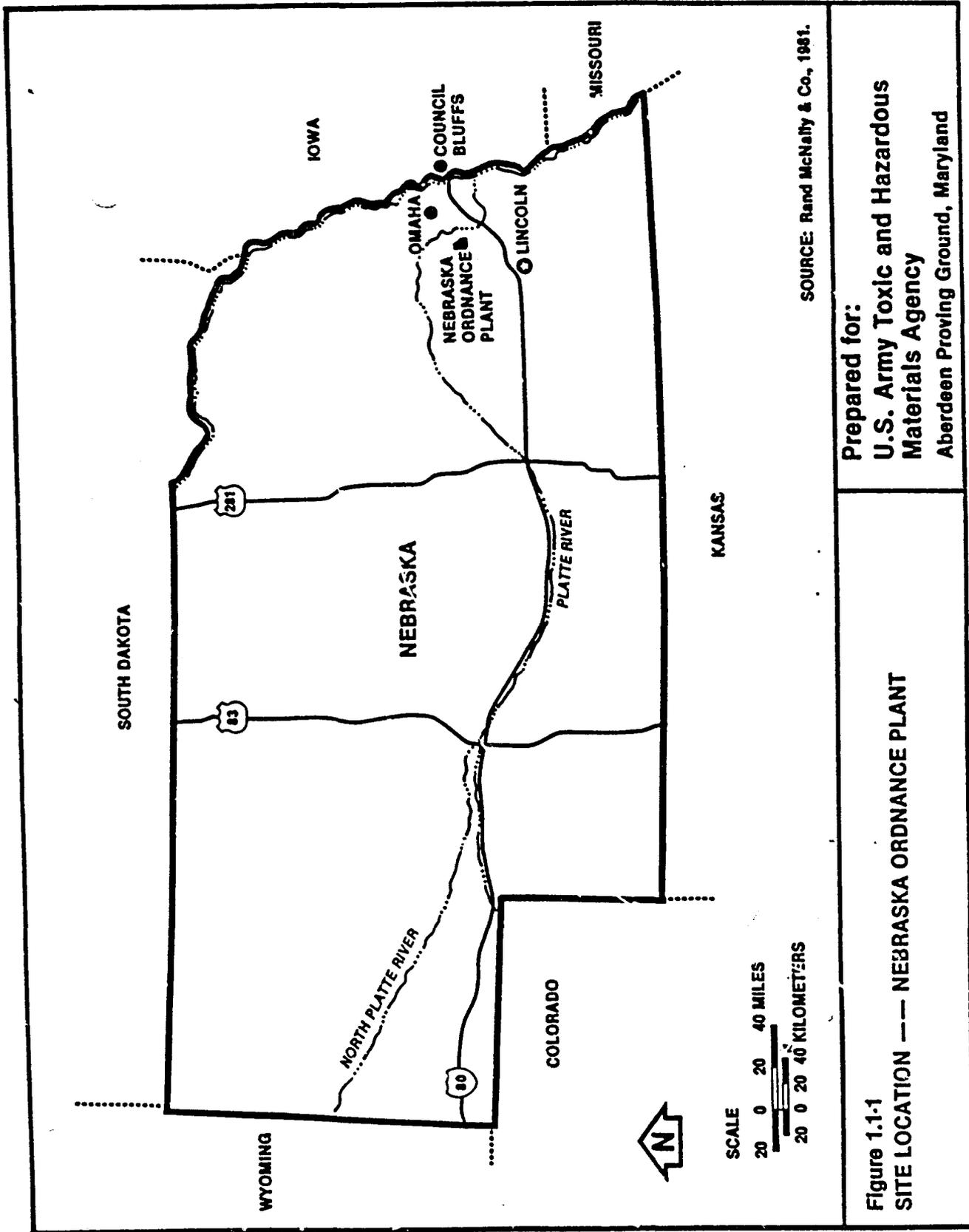
1.2 AUTHORITY

This search was performed under the auspices of the Installation Restoration program of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). The latter was tasked to conduct the search by Headquarters, U.S. Army Materiel Development and Readiness Command (DARCOM), reference letter DRCIS-A, Dec. 28, 1982.

1.3 INTRODUCTION

The historical record search was conducted by obtaining information and documentation from the following sources:

1. DARCOM, Installation and Services Activity, Rock Island, Ill.;
2. Historian, Office of Real Property, Safety Office, Headquarters, U.S. Army Armament Materiel Readiness Command (ARRCOM), Rock Island, Ill.;
3. DARCOM, Installation and Services Directorate, Alexandria, Va.;
4. Military Personnel Record Center, St. Louis, Mo.;
5. Washington National Record Center, Suitland, Md.;
6. National Archives and Record Service, Washington, D.C.;
7. Chemical Systems Laboratory (CSL), Technical Library, Aberdeen Proving Ground, Md.;
8. Office, Chief of Engineers, Washington, D.C.;
9. General Services Administration (GSA), Real Property Office, Chicago, Ill.;



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 U.S. Army Toxic and Hazardous
 Materials Agency
 Aberdeen Proving Ground, Maryland

Figure 1.1-1
 SITE LOCATION --- NEBRASKA ORDNANCE PLANT

10. U.S. Army Corps of Engineers (COE), District Real Estate Office, Omaha, Nebr.; and
11. U.S. Army Environmental Hygiene Agency (USAEHA), Aberdeen Proving Ground, Md.; and
12. U.S. Soil Conservation Service (USSCS), Salt Lake City, Utah.

Information contained in this report is based on review of currently available records and represents the best efforts to determine the status of the former NOP at the time of property transfers upon closure. This assessment did not include an onsite visit. Therefore, this report does not include any description of the current status of the former NOP.

1.4 HISTORY

Construction contracts for NOP were awarded in December 1941. The Architect-Engineer service contract was awarded to Giffels and Vallet (Contract No. W-7257-Q-1) and the construction contract (No. W-643-ENG-2593) to Metcalfe Construction Co., Hamilton Construction Co., and Kansas City Bridge Co. The Nebraska Defense Corp., a subsidiary of Firestone Tire and Rubber Co., was contracted (No. W-ORD-552) to provide consultant services during design and construction and to operate the facility (Ordnance Ammunition Center, n.d.).

The first bomb loading line became operational in October 1942, with the other lines becoming operational by January 1943. The ammonium-nitrate crystallizing plant went on line in March 1943, and production terminated in May 1943 with subsequent decontamination and placement in standby. Plant production was completely terminated in October 1945 and released to the Ordnance Department after decontamination and appropriate mothballing procedures had been accomplished (NOP, 1946; Ordnance Ammunition Center, n.d.; Nebraska Defense Corp., 1945).

In the period November 1946 to December 1949, the ammonium-nitrate plant was used for the production of grained ammonium nitrate under an

emergency fertilizer production program. The contractor was the Emergency Export Corp., a subsidiary of Spencer Chemical Co., and operated under Contract No. W-49-010-ORD-49. The production of ammonium nitrate was suspended in December 1949, and the plant was decontaminated in 1950 (Ordnance Ammunition Center, n.d.; NOP, 1946, n.d.b).

From 1946 to 1949, NOP was used for storage of large quantities of smokeless powder, Composition B, and trinitrotoluene (TNT) (NOP, 1948, 1949a, 1949b). Records indicated a significant demilitarization of detonators, boosters, and fuzes by detonation was conducted on NOP (NOP, 1946).

Records indicated the debagging of 105-mm howitzer propelling charges and recanning the bulk smokeless powder (NOP, 1949a). The burning of scrap Composition B accumulated at the laboratory from lot testing activities was also reported (NOP, 1949a).

NOP was reactivated in February 1952 under Contract No. DA-11-173-ORD-99 with the National Gypsum Co. (Ordnance Ammunition Command, 1959). Operations were somewhat different from those of the World War II period (see Sec. 2.1); however, all four bomb load lines were in operation; the booster load line was not (Dudeck, 1959). In 1956, NOP was again placed on standby status (Ordnance Ammunition Command, 1959).

In 1959, NOP was declared excess to Army needs to GSA. Subsequent history of NOP is discussed in Secs. 1.5.2 and 2.2.

1.5 PROPERTY TRANSACTIONS

1.5.1 ACCESSING ACTIONS

At the finalization of acquisition (1942), NOP consisted of 6,984 hectares (ha) held in fee. Land was acquired in 176 parcels, as shown in the Tract Register (App. A). A total of 165 parcels was obtained from private landowners, 3 from corporate entities, and the remaining 8 parcels from religious organizations or school districts

17,250.40
Acres

(NOP, 1965). The boundaries shown in Fig. 1.5-1 encompass all lands acquired by the Government in the formation of NOP.

1.5.2 EXCESSING ACTIONS

All land and improvements at NOP were initially declared excess to Army needs in 1959, with the exception of 4.8 ha and buildings being used as a Nike missile maintenance area. Property excessed prior to 1959 included 16 ha transferred to the U.S. Department of Commerce and 1.6 ha deeded to the Morningside Cemetery Association (NOP, 1958, 1965, 1972, 1973). Fig. 1.5-1 delineates current ownership at the NOP site.

In 1959, an Interim Use Permit was granted to the U.S. Air Force (USAF) for use of approximately 862 ha for development of the Offutt Air Force Base (AFB) Missile Site S-1. This permit was officially confirmed by QCD dated 1961 (see Fig. 1.5-2). In 1960, 389 ha were reassigned to the U.S. Army Reserves (USAR) for use by the USAR-Fifth Army for training purposes. The year 1962 was the major period of excessing. The University of Nebraska purchased 3,590 ha via quitclaim deed. An additional 2,125 ha were purchased by private individuals and corporations, also via quitclaim deeds. App. B contains appropriate documentation of these transactions [U.S. Department of Health, Education and Welfare (HEW), Region VII, 1971; COE, Omaha District, 1959].

In 1964, USAF declared its holding on NOP excess to Air Force needs. A total of 484 ha was reassigned (in 1969) to the U.S. Army for the Mead Army National Guard Facility. The University of Nebraska purchased 259 ha via quitclaim deed in 1964. The remaining 118.5 ha were sold in 1964 to private interests by quitclaim deeds (NOP, 1958, 1965, 1972, 1973). Currently, Army real property at NOP, including the National Guard and Army reserves, consists of approximately 878 ha, as indicated on Fig. 1.5-1.

Real property excessing by the Army involved issuance of 21 quitclaim deeds, and excessing by the Air Force involved issuance of 8 quitclaim deeds (NOP, 1958, 1965, 1972, 1973). Intergovernmental transactions

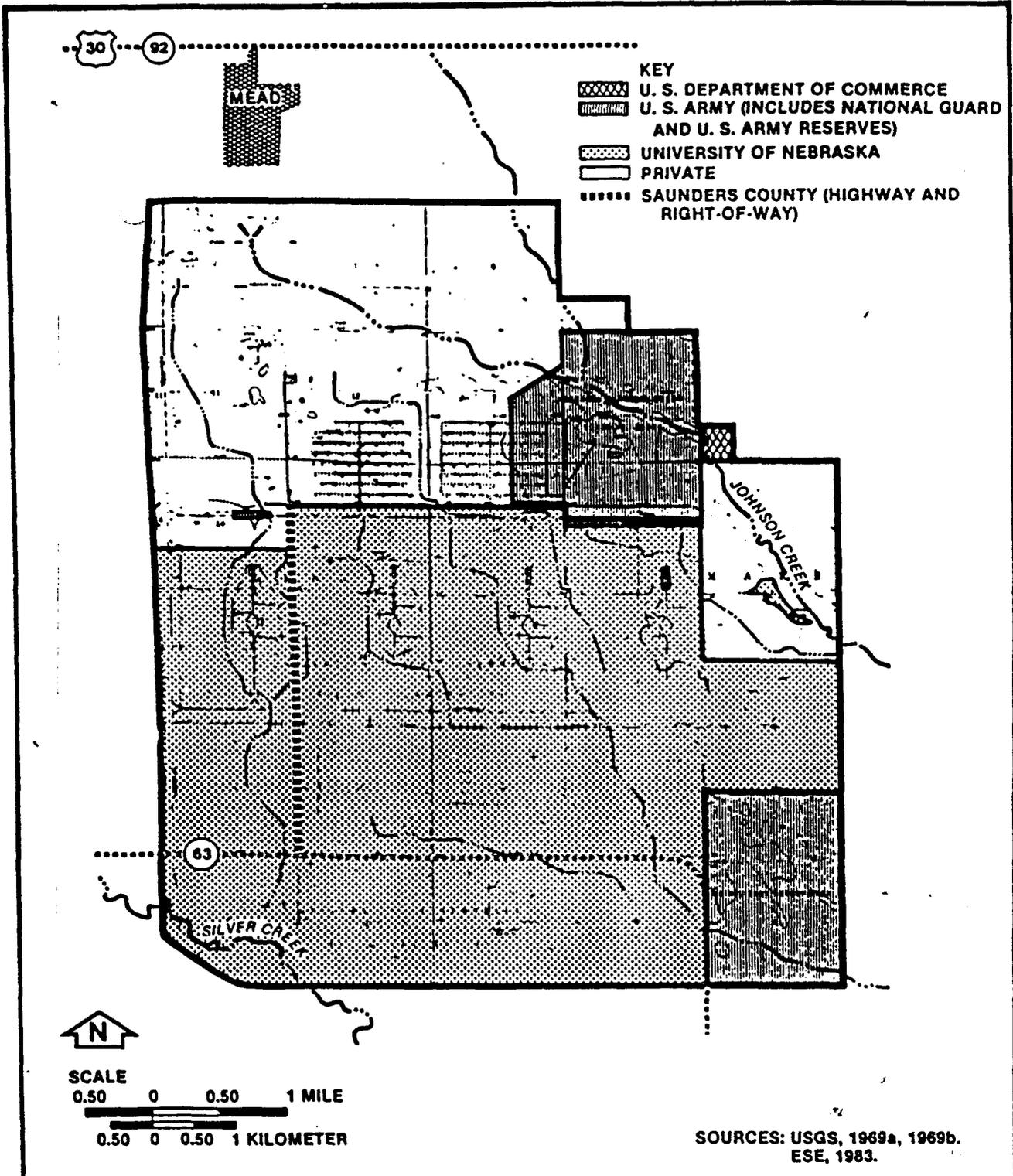


Figure 1.5-1
OWNERSHIP AT FINAL EXCESSING ---
NEBRASKA ORDNANCE PLANT

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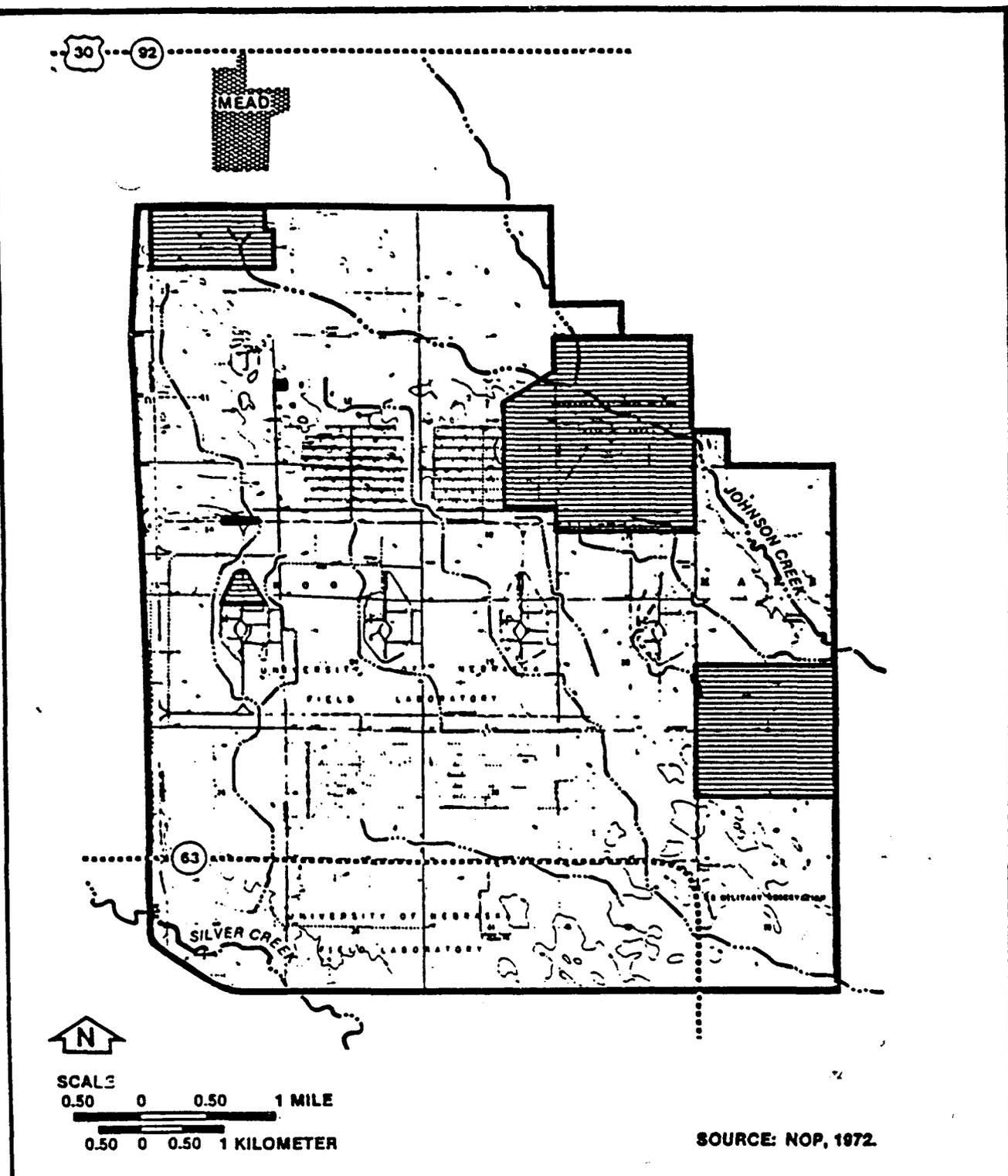


Figure 1.5-2
LAND REASSIGNED TO USAF IN 1959 —
NEBRASKA ORDNANCE PLANT

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were handled via transfers or reassignments rather than deeds. Disclosure of contamination during the excessing process is discussed in Sec. 2.2.7.

1.6 ENVIRONMENTAL SETTING

1.6.1 LOCATION

The NOP site is located in Saunders County, Nebr., about 0.8 kilometer (km) south of Mead, 48 km west of Omaha, and 56 km northeast of Lincoln, off Highways 30A and 63 (see Fig. 1.1-1).

1.6.2 METEOROLOGY

App. C provides a climatic summary of the Omaha area [National Oceanic and Atmospheric Administration (NOAA), 1981]. This area is characterized by a continental climate with warm summers and cold, dry winters. Average annual precipitation is 72 centimeters (cm), the majority occurring between April and September in the form of showers and thunderstorms. Snowfall averages 79 cm annually. January is the coldest month, with average minimum temperatures of -10.7 degrees Celsius (°C). July is the warmest month, with average maximum temperatures of 31°C. The average frost-free period is 188 days.

Prevailing winds are north-northwest during the winter and south-southeast throughout the remainder of the year. Strongest winds generally occur during the winter, except during severe spring or summer thunderstorms.

1.6.3 GEOGRAPHY

Physiography

The former NOP site is situated on the loess capped terracelands of southeast Saunders County between Silver Creek and Clear Creek. Much of the area is relatively flat with gently rolling hills, although local creeks have cut valleys along the southwest and northeast sides.

This area is located in the higher part of the rolling upland between the Platte River, on the north and northeast, and the broad,

southeastward-trending lowland area known as the Todd Valley on the west and southwest. Elevations range from 365 meters (m) in the northwest area to 335 m along Silver Creek.

Surface Hydrology

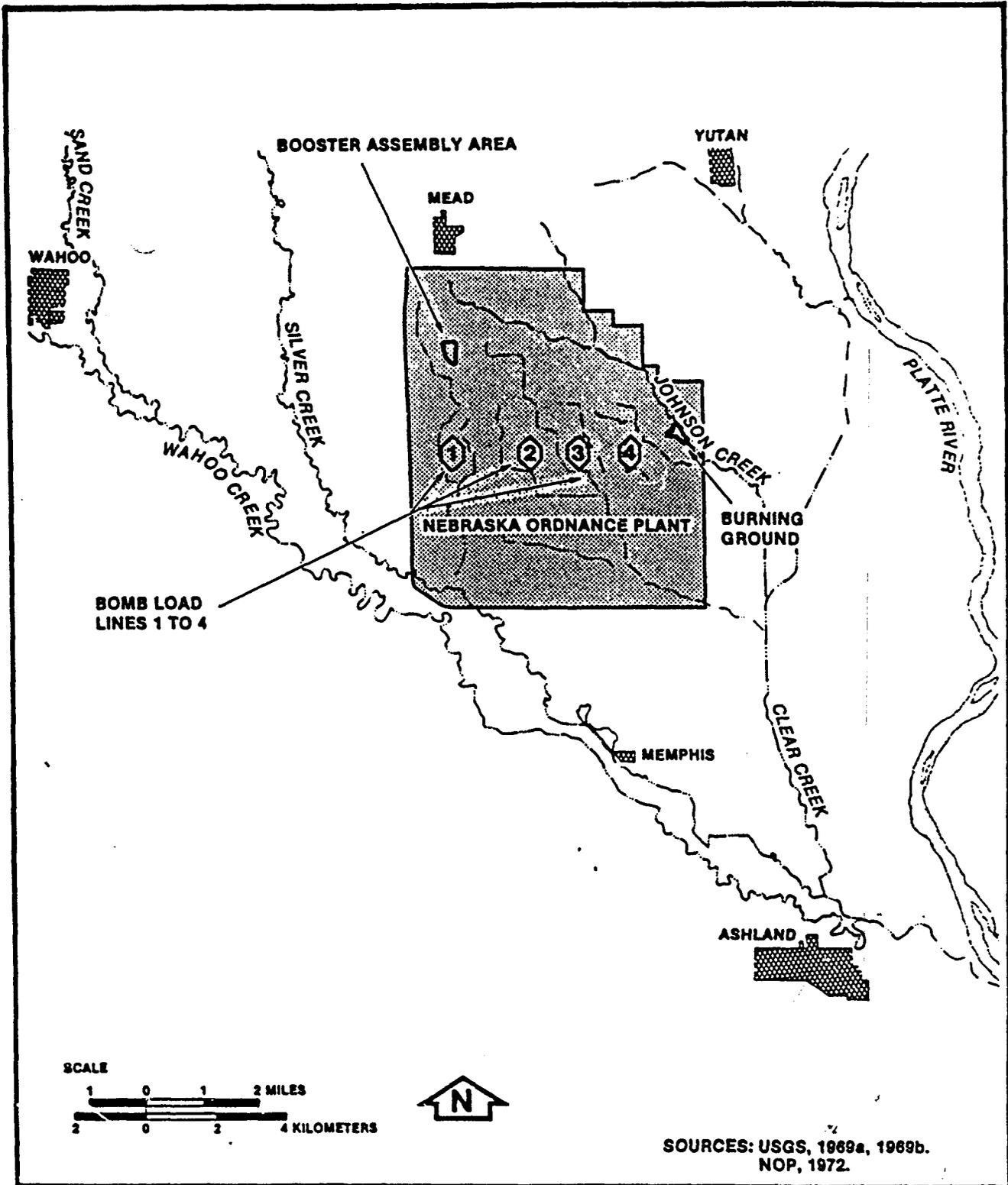
The former NOP site is drained by Johnson Creek and several smaller tributaries, which cut across the northeast corner of the site, and Silver Creek, which crosses the southwest corner. Both creeks flow southeast, and eventually the water reaches the Platte River (see Fig. 1.6-1). Surface drainage also includes several manmade ditches, which drain the areas occupied by the former bomb loading lines and booster assembly buildings. The former booster assembly area and load line 1 are drained by ditches, which enter the Silver Creek drainage on the southwest corner of the installation. Former load lines 2 and 3 drain through ditches which enter unnamed drainageways exiting the reservation on the southeast corner before entering Clear Creek. The former burning ground/demolition area and load line 4 drain through ditches which enter Johnson Creek before exiting the installation.

1.6.4 GEOHYDROLOGY

Geology

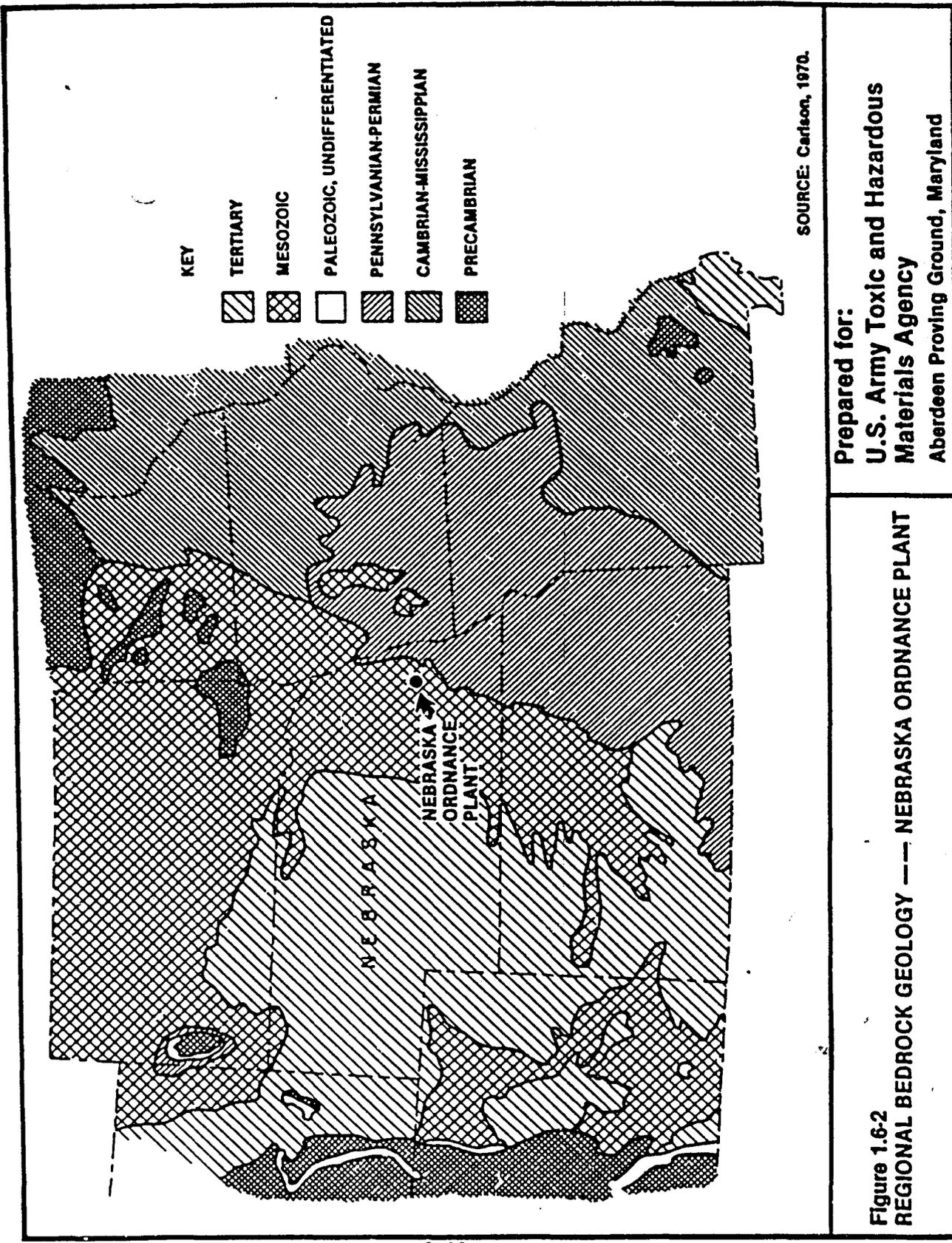
Surface materials at NOP are generally windblown loess of the Peorian Formation, which are late Pleistocene in age. These materials were deposited during a dry cycle which followed the retreat of the Iowan ice sheet (an early Wisconsin glacial substage) from northwestern Iowa and southeastern South Dakota. Recent alluvium, mostly sands and gravels, occurs in the streambeds of both Silver and Johnson Creeks. Both the loess and alluvium overlie tills of the Kansan and Nebraskan glacial periods. Thickness of the Pleistocene deposits ranges from 50 m in the northwest to 10 m in the southeast and along some streambeds.

Bedrock at the site consists of sandstones of the Dakota Group, which are early Cretaceous in age (Fig. 1.6-2). The Dakota Group in this area averages 50 to 75 m in thickness. Underlying these Cretaceous deposits



**Figure 1.6-1
AREA DRAINAGE MAP —
NEBRASKA ORDNANCE PLANT**

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KEY

- TERTIARY
- MESOZOIC
- PALEOZOIC, UNDIFFERENTIATED
- PENNSYLVANIAN-PERMIAN
- CAMBRIAN-MISSISSIPPIAN
- PRECAMBRIAN

SOURCE: Carlson, 1970.

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Figure 1.6-2
 REGIONAL BEDROCK GEOLOGY --- NEBRASKA ORDNANCE PLANT

are approximately 600 m of Paleozoic rocks. This series consists of Pennsylvanian shales and limestones; Mississippian sandstones and limestones; Devonian limestone and dolomite; Silurian dolomite; Ordovician dolomite, limestone, and sandstone; and Cambrian sandstone. These rocks were deposited when seas covered what is now the Midwest 300 to 600 million years ago. Below these deposits are the Pre-Cambrian basement rocks of sedimentary origin (Carlson, 1970). Other drill logs in Nebraska indicate deeper Pre-Cambrian rocks to be igneous and metamorphic granites, quartzites, and schist (Condra and Reed, 1959).

In general, the bedrock formations of Nebraska are nearly flat, with a low westward dip. The altitude is modified regionally by well-defined arches (anticlines), faults, and basins. No major faults exist in the NOP site area.

An oil test well was drilled to a depth of 672 m at a site 24 km northwest of NOP. A generalized stratigraphic column of the area was drawn using data obtained during drilling (Table 1.6-1). The log of this well appears in this report as App. D.

Soils

The soils at NOP can be classified into two major groups (Elder, Beesley, and McKinzie, 1965), each of which can be broken into several subgroups (see Fig. 1.6-3).

The majority of the site is covered by the Sharpsburg-Fillmore Association. Subgroups of this association found on the NOP site are:

1. Butler Series--a silty clay loam having a friable surface layer 25 to 46 cm thick and a compact, clayey subsoil. The upper subsoil is black, silty clay or blocky clay and is plastic when wet and very hard when dry. Although surface runoff is slow, these soils absorb water slowly. The subsoil is slowly permeable.

Table 1.6-1. Stratigraphic Column of Midland Forster Well

Era	System	Stratigraphic Unit	Dominant Lithology	Thickness (m)
Cenozoic	Quaternary	Peorian loess Glacial tills	Clay and silty clay	83.8
		Subglacial sand and gravel	Sand and gravel	
Mesozoic	Cretaceous	Dakota Group	Sandstone	64.3
		Lansing Group Kansas City Group	Limestone and shale	41.7
Paleozoic	Pennsylvanian	Bronson Group Marmaton Group	Limestone, shale, and sandstone	52.4
		Cherokee Shale	Shale	41.2
	Mississippian		Limestone and sandstone	21.3
	Devonian		Limestone and dolomite	129.5
	Silurian		Dolomite	70.1
	Ordovician	Trenton Group Black River Group	Dolomite Shale	44.2 21.3
		St. Peter Sandstone	Sandstone	15.2
		Prairie du Chien Group	Dolomite	75.3
	Cambrian	Jordan Sandstone	Sandstone	5.2
	Pre-Cambrian		Sandstone Granites, quartzite, and schist	

Source: Reed, 1938.

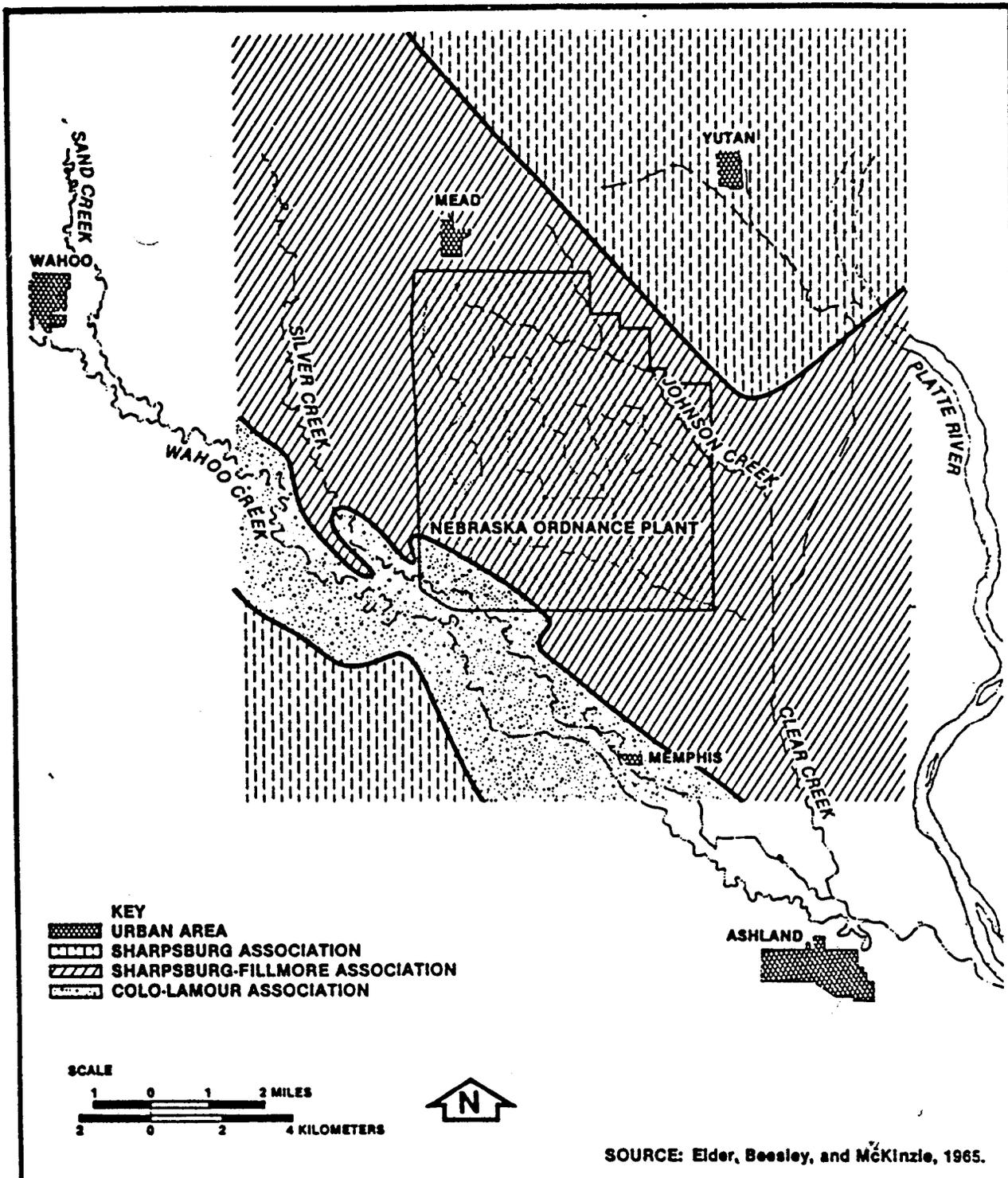


Figure 1.6-3
SOIL CLASSIFICATIONS IN AND AROUND
NEBRASKA ORDNANCE PLANT

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2. Fillmore Series--soils having a dark, friable surface layer and a compact, clayey subsoil. The surface layer is 15 to 30 cm of gray or black silt loam or silty clay loam. The subsoil is a very dark gray or black silty clay with blocky structure. These soils have poor surface drainage and take in and release water very slowly.
3. Sharpsburg Soils--well-drained soils that have developed from loess on nearly level to steeply sloping uplands. The surface is a dark brown silty clay loam with a granular structure. The subsoil has a blocky structure that is hard when dry and plastic when wet.

The soils in the southwest corner of the site belong to the Colo-Lamour Association and generally follow Sand and Silver Creeks. Subgroups of this association found on the NOP site are:

1. Colo Series--a dark, moderately well- or poorly drained soil having a silty clay loam subsoil. The surface layer is very dark gray or black, friable, granular silty clay loam. The subsoil is slightly lighter colored and is hard when dry and sticky when wet. The substratum is loam or sandy loam and is slightly permeable. These soils are subject to frequent flooding.
2. Luton Series--a dark, clayey, imperfectly drained soil which has developed on alluvial deposits and bottomland flats. The surface layer is dark gray silty clay or clay that is granular, and the subsoil is very dark gray or black silty clay or clay having a blocky structure.
3. Ortelio Series--a sandy soil developed from sandy alluvium. The surface layer is a very dark brown loam or fine sandy loam, and the subsoil is very dark grayish brown or brown sandy loam.

Ground Water

The NOP site lies within the area of glacial drift, which is underlain mainly by the Dakota sandstone. There are also valleys associated with rivers in the area which are filled with loess and alluvium. The principal water-bearing formation is the Dakota sandstone, but waters also occur among the thick sands and gravels at the base of the glacial drift. The waters in the drift are of very irregular occurrence, but they furnish supplies for many scattered wells in the county. Some waters derived from the drift may accumulate through leakage from the underlying Dakota sandstone. The sandy portion of the Mississippian yielded an abundant supply of water in an oil test well 24 km northwest of the site. Material recovered from the well also suggested the Silurian and Devonian dolomites were water bearing also. When the St. Peter sandstone was penetrated during drilling (depth 575 m), water rose to within 60 m of the surface (Reed, 1938).

Based on the configuration of the water table in 1979 (University of Nebraska, 1980), the generalized direction of ground water flow in the area is toward the southeast. Records searched indicated a total of 59 wells onsite ranging in depth from 29 to 84 m. Fourteen of these wells may be abandoned [no registration with Nebraska Natural Resources Commission (NNRC)], while the others report yields between 378 and 4,542 liters per minute (lpm) (see App. E). It is not known how many of these wells are currently being used. Additional well data are provided in App. E, and locations are shown in Fig. 1.6-4.

Although no ground water quality data were found in the NNRC Data Bank for any wells onsite or adjacent to NOP, the Army Environmental Health Laboratory (USAEHA, 1953) tested wells on the site for nitrate contamination during 1953.

1.6.5 WATER QUALITY

Surface water quality data produced by various organizations are available from the U.S. Environmental Protection Agency (EPA) Storage

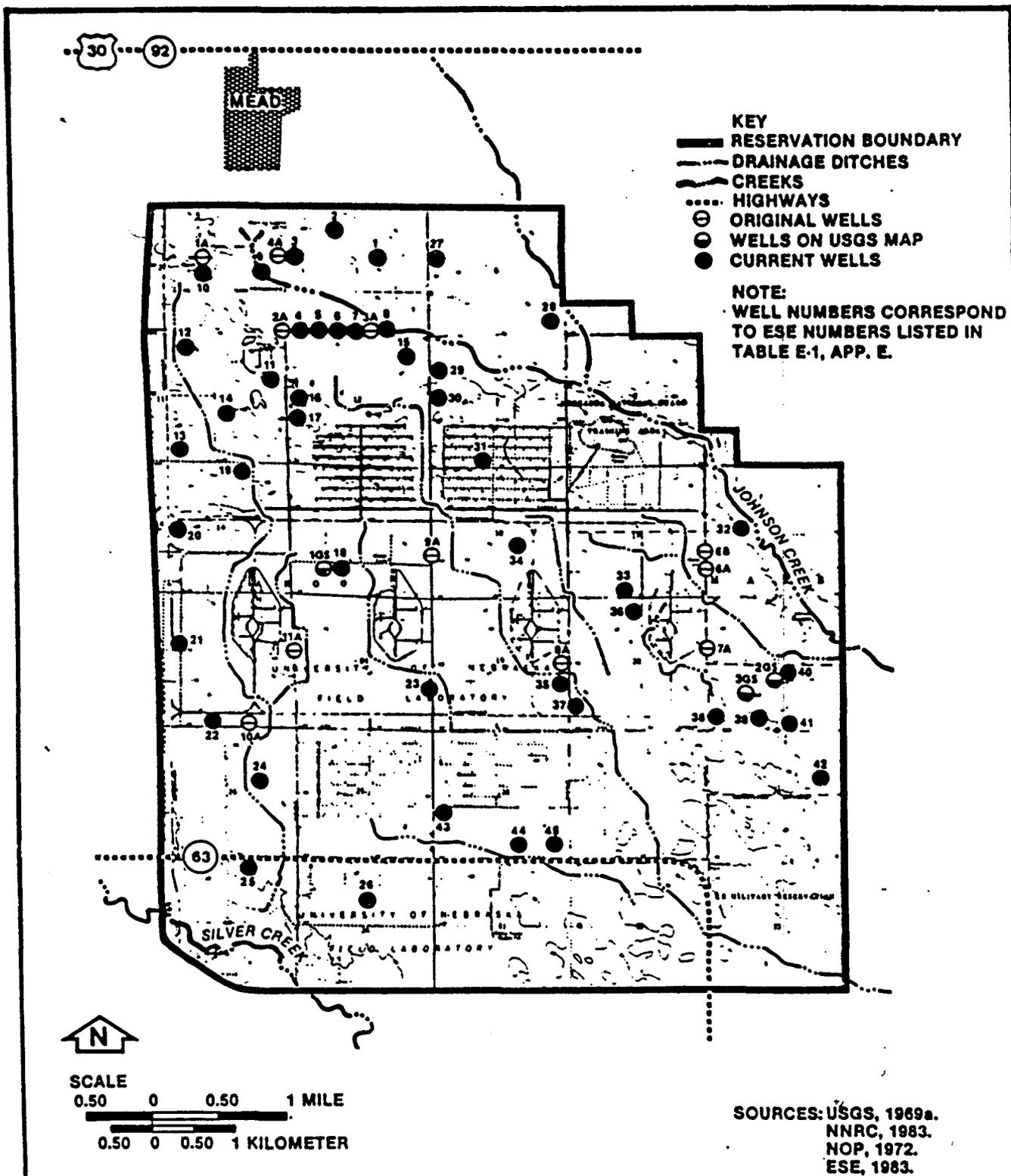


Figure 1.6-4
WELLS LOCATED ON NEBRASKA
ORDNANCE PLANT

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Aberdeen Proving Ground, Maryland

()
and Retrieval (STORET) system (EPA, 1983). Locations onsite and near NOP (see Fig. 1.6-5) are included in these data. Two locations are within NOP boundaries. A number of locations are on Silver Creek, Clear Creek, and Wahoo Creek both above and below NOP. Data are primarily from the 1972-1978 period.

For a majority of the locations, only temperature, pH, total alkalinity, and total hardness data are available. Other parameters sampled less frequently include dissolved oxygen (DO); nutrients (nitrogen and phosphorus); conductivity; chemical oxygen demand (COD)/biochemical oxygen demand (BOD); and parameters such as solids, odor, algal masses, and floating solids. Limited data on organics, pesticides, and metals are available. No explosives parameters were analyzed.

Review of the data indicates typical water quality conditions, given the stream types, geologic characteristics, and watershed land uses in the area. Data indicated violations of state of Nebraska pH standards (6.5 to 8.5) at Wahoo Creek near Ashland (Station 23), Wahoo Creek at Wahoo (Station 12), Yutan Creek near Yutan (Station 8), Station 11 (on NOP), and Silver Creek near Wahoo (Station 13).

Two locations exhibited violations of state DO standards [minimum of 5 milligrams per liter (mg/l)]--Silver Creek near Wahoo (Station 13) and Wahoo Creek near Ashland (Station 23). The conductivity standard (not to exceed 1,500 umhos) was exceeded at two locations--Wahoo Creek at Ashland (Station 23) and Hell Creek at Harrison St. (Station 9).

Analytical data for metals parameters at Station 13 indicate potential violations of the cadmium, copper, and zinc EPA criteria (EPA, 1980) for the protection of aquatic life. The criteria are dependent on water hardness and become more restrictive with decreasing hardness. The human health criteria for mercury are also exceeded in the data available for Station 13. Records searched did not indicate whether these

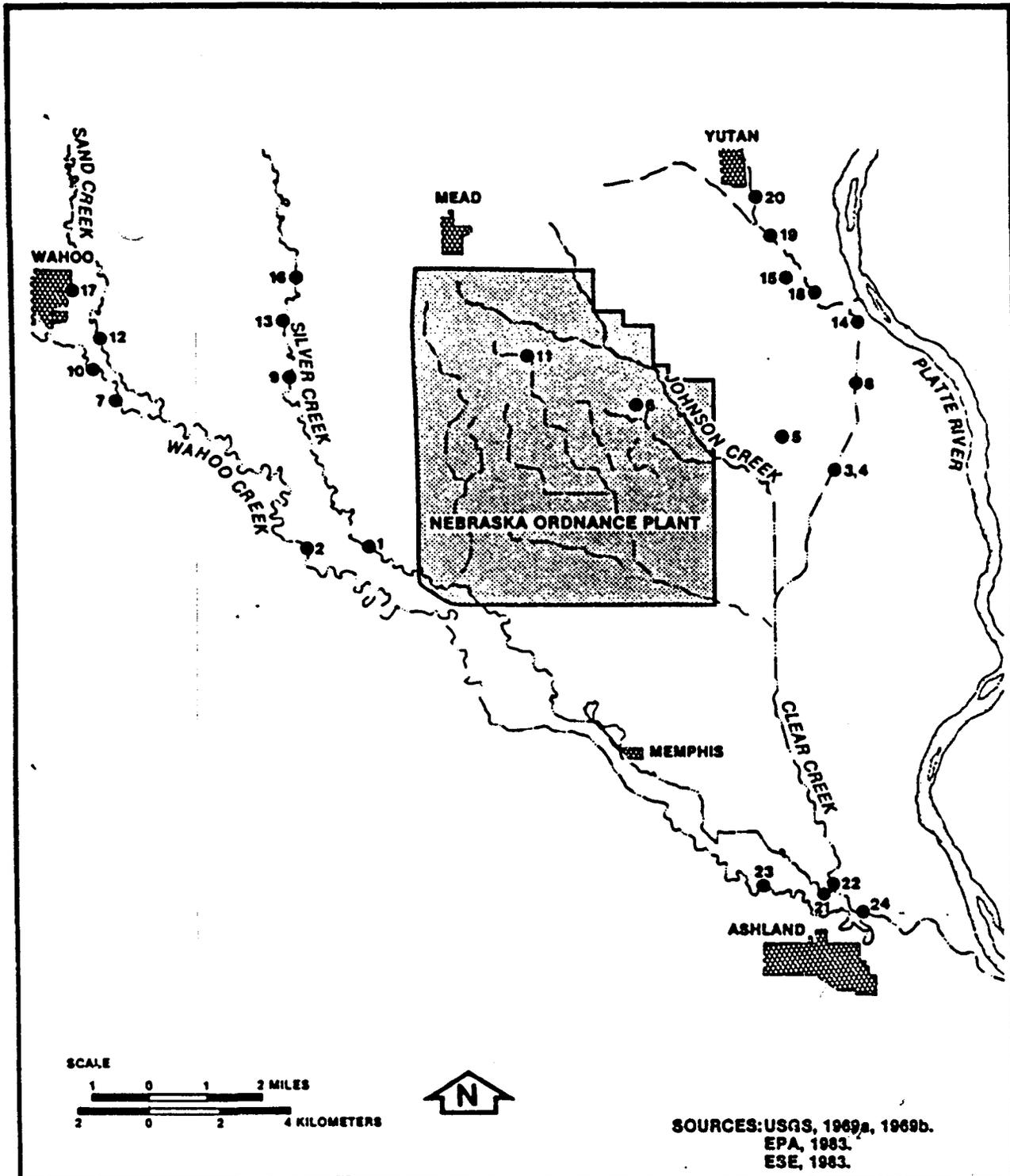


Figure 1.6-5
AREA DRAINAGE MAP INDICATING
STORET SURFACE WATER QUALITY
LOCATIONS — NEBRASKA ORDNANCE
PLANT

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potential violations were suspected to be from natural sources or could be attributed to point discharges.

Comparison of stations above and below NOP shows no significant water quality differences. Data from the two locations on NOP indicate typical water quality and exhibit no standards violations.

1.6.6 BIOTA

The major natural habitats occurring onsite would be cropland, grasslands, old field habitats, and small patches of timber along streams, fence rows, and drainageways. A large portion of the site has been, and probably still is, used for agricultural purposes (i.e., row crops, grains, and pasture). This was probably also the case during the operational period of NOP, when much of the site was leased for agricultural purposes.

Biotic communities are typical of the region and available habitats, with a variety of mammal, bird, reptile, and amphibian species common onsite.

There are no indications of any Federal threatened or endangered species occurring on the site, and the potential for their residence onsite is minimal. The Arctic peregrine falcon (Falco peregrinus tundrius) and the bald eagle (Haliaeetus leucocephalus), both Federal and state endangered species, may occur as migrants through the site. The latter species frequently winters along the Platte River in Saunders County (State of Nebraska, Game and Parks Commission, Wildlife Division, 1977). The following state-threatened species may occur on or near the site (State of Nebraska, Game and Parks Commission, Wildlife Division, 1977):

1. Interior least tern (Sterna albifrons athalassos)
2. Southern flying squirrel (Glaucomys volans)
3. Brook stickleback (Culaea inconstans)

Available records indicate that the latter species has been collected in Clear Creek near NOP (EPA, 1983).

2.0 PAST ACTIVITY REVIEW

2.1 INSTALLATION OPERATIONS

2.1.1 WORLD WAR II (WWII) INDUSTRIAL OPERATIONS

The first industrial operations activated at NOP were the four bomb loading lines, beginning with Line 1 in October 1942. The bomb booster assembly area and the ammonium nitrate crystallization plant became operational in early 1943. Due to high productivity at various bomb assembly plants located in the United States, bomb load line 4 was not needed and was inactivated in May 1943 (NOP, 1946; Ordnance Ammunition Center, n.d.).

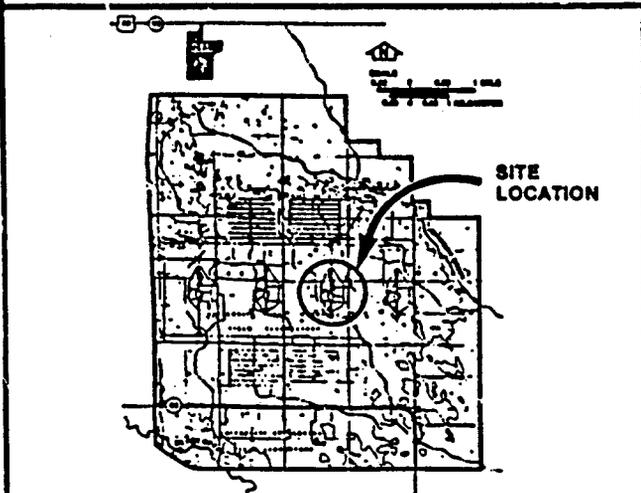
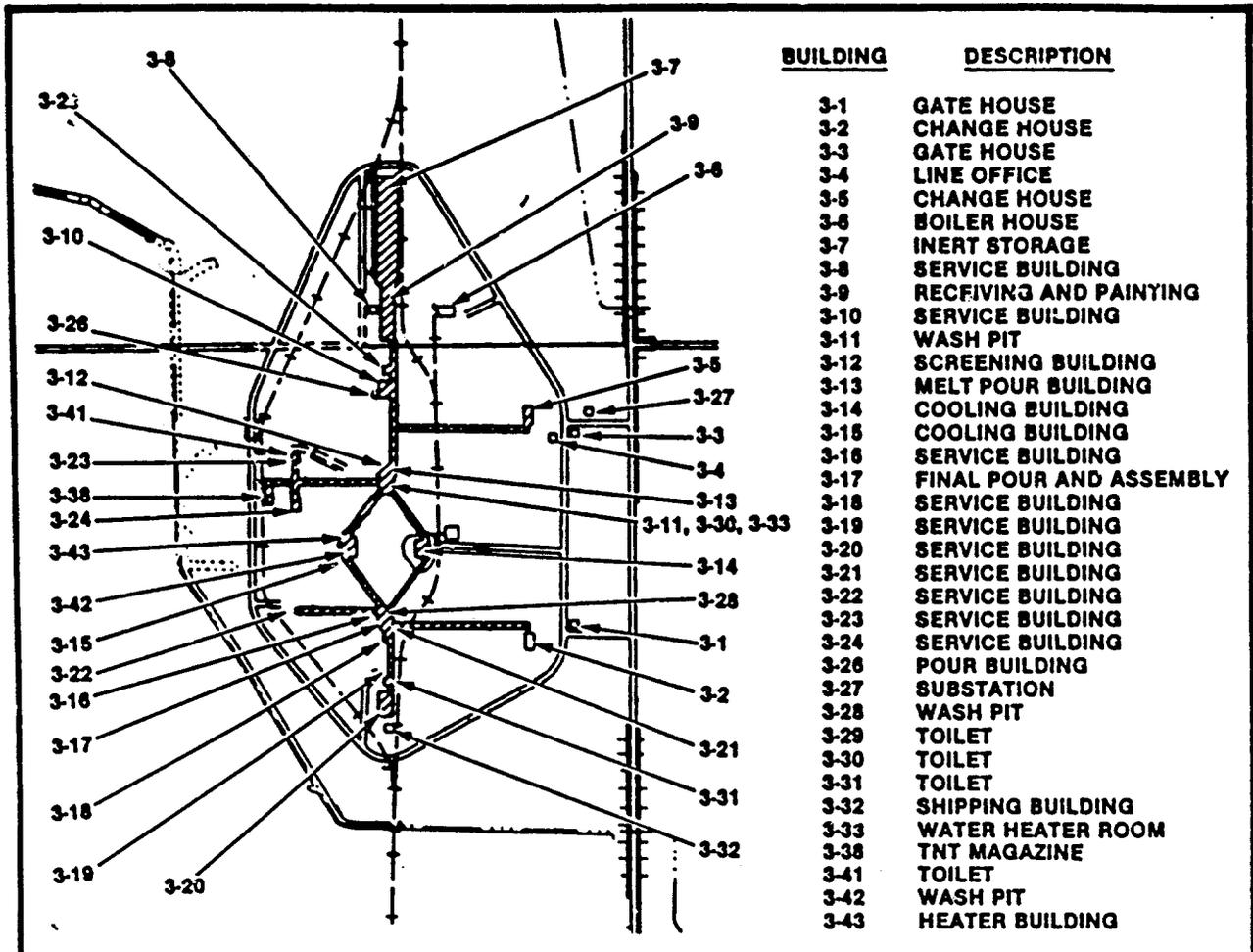
Each of the bomb loading lines (Group III) had the capacity for melt loading and assembling up to 42,000-pound (lb) bombs. During WWII, production records indicate that production extended from 90-lb to 22,000-lb bombs. Bombs were loaded with Amatol, TNT, Tritonal, and Composition B, depending upon size and type (Ordnance Ammunition Center, n.d.; Dudeck, 1959). In early 1944, load line 1 was inactivated, and load line 4 was reactivated. At this time, all loading for lines 2, 3, and 4 was with Composition B (USAEHA, 1944a). Table 2.1-1 gives production levels and bomb types for part of the WWII operational period (October 1942 to September 1944) and the type of explosives used in each. Records searched did not indicate production levels through closure of the loading lines in August 1945. Fig. 2.1-1 is a diagram of a typical loading line with description of building usage.

The bomb booster assembly area added tetryl boosters to bombs. The ammonium nitrate plant was in operation only a few months before a surplus of TNT precluded additional ammonium nitrate production and necessitated the inactivation of the plant until a post-WWII period (Ordnance Ammunition Center, n.d.). Fig. 2.1-2 is a diagram of the booster assembly area and a description of building usage.

Table 2.1-1. Production Levels from Oct. 1, 1942, through
Sept. 30, 1944

Description of Item	Number of Items Manufactured
Bomb, 500-lb AN-M64, M64A1	845,109
Bomb, 1,000-lb AN-M44	59,180
Bomb, 1,000-lb AN-M65 and M65A1	349,258
Bomb, 2,000-lb AN-M66 and M66A1	20,464
Auxiliary Booster, M104 and M104A1	5,955,736
Adapter Booster, M102 and M102A1	1,869,766
Booster, M115 and M115A1	6,425,685
Booster T-20	6,750
Booster T-22	84,880
90-lb Composition B	767,774
500-lb Composition B	451,710
500-lb Tritonal	65,749
1,000-lb Tritonal	102,979
1,000-lb Composition B	139,388
Ammonium Nitrate, pounds	3,874
Bomb, 4,000-lb M56	3,886

Source: Ordnance Ammunition Center, n.d.

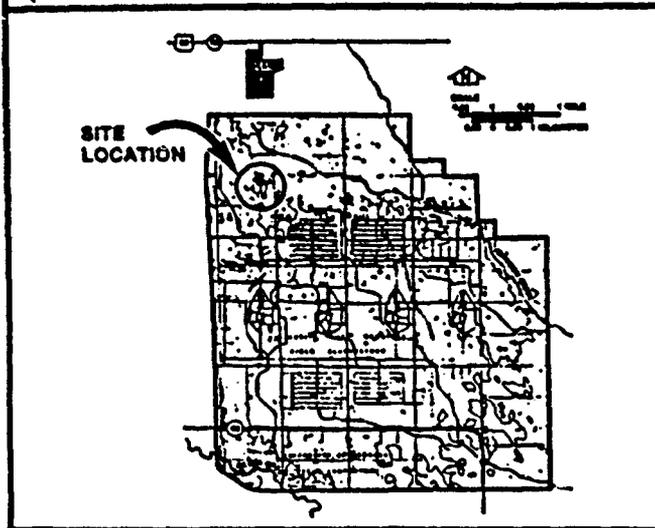
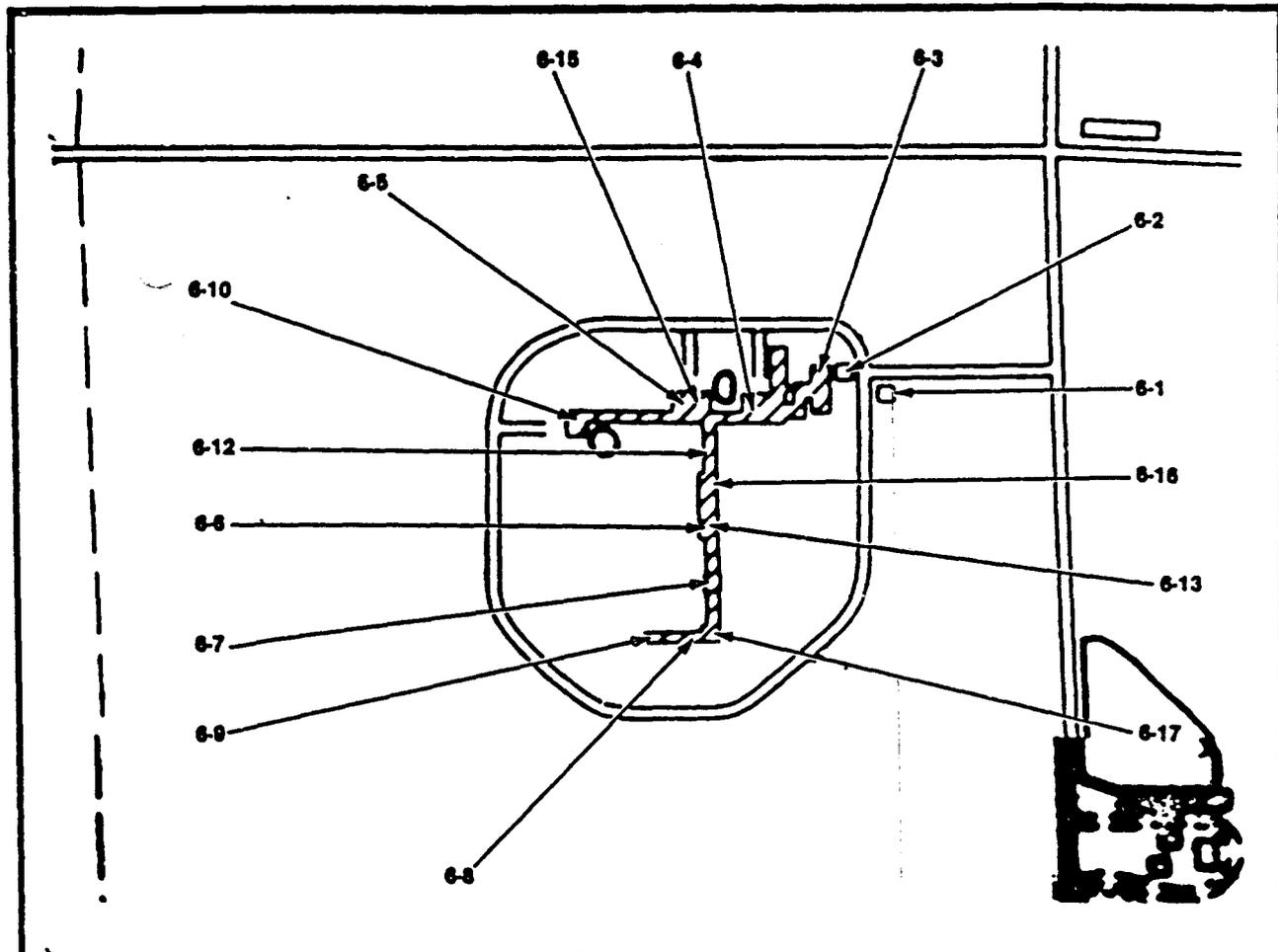


NOTE: LINE SET-UP AND BUILDING DESIGNATIONS ARE ESSENTIALLY SIMILAR FOR ALL FOUR BOMB LOADING LINES.

SOURCES: USGS, 1969a.
NOP, n.d.a., 1959.

Figure 2.1-1
BOMB LOADING LINE —
NEBRASKA ORDNANCE PLANT

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BUILDING	DESCRIPTION
6-1	GATE HOUSE
6-2	LINE OFFICE
6-3	BOILER HOUSE
6-4	INERT STORAGE
6-5	BOOSTER ASSEMBLY
6-6	TETRYL PELLETING
6-7	TETRYL REST HOUSE
6-8	SCREENING AND BLENDING
6-9	MAGAZINE
6-10	MAGAZINE
6-12	TOILET
6-13	TOILET
6-15	VACUUM CLEANER BUILDING
6-16	VACUUM CLEANER BUILDING
6-17	VACUUM CLEANER BUILDING

SOURCES: USGS, 1969a.
NOP, n.d.a., 1959.

Figure 2.1-2
BOOSTER ASSEMBLY AREA—
NEBRASKA ORDNANCE PLANT

Prepared for:
U.S. Army Toxic and Hazardous
Materials Agency
Aberdeen Proving Ground, Maryland

Ancillary WWII industrial operations included washout, cleaning, and preparation of bombs for reworking (Bldg. 1-22) and areas for painting, storing, and shipping of newly loaded and assembled bombs. Storage and handling areas for explosive components, ammonium nitrate, and finished ammunition were also in operation.

WWII operations were terminated at NOP in 1945 (Ordnance Ammunition Center, n.d.). All facilities and operations were placed on inactive status after appropriate decontamination (Nebraska Defense Corp., 1945; Anonymous, n.d.).

The ammonium nitrate plant was re-activated from 1945 to 1950 for fertilizer production as part of an emergency Army fertilizer production program. Records searched did not indicate individual production for NOP, but gave a total of 1,868,052 tons produced by plants located at NOP, Cornhusker, Illinois, Iowa, Milan, and Ravenna (Ordnance Ammunition Center, 1953).

2.1.2 KOREAN CONFLICT INDUSTRIAL OPERATIONS

Partial resumption of operations began in 1951 with the activation of the first loading line. The plant was fully operational by 1953. Operations were more diverse during the Korean Conflict, although the primary mission remained the loading and assembly of bombs. The following load lines were operated during the Korean Conflict (Dudeck, 1959):

- Line 1. Loading and assembling of 100- to 12,000-lb bombs (Tritonal), 280-millimeter (mm) shells (TNT), TNT supplemental charges, and Nike warheads with Composition B.
- Line 2. Loading 105-mm shells (Composition B); priming and loading cartridge cases with propellant bag charges (dualgrain).
- Line 3. Loading 500- to 1,000-lb bombs (Tritonal); 8-lb TNT demolition blocks.

Line 4. Loading 3.5-inch (in) rockets (practice) with stick propellant and black powder.

The ammonium nitrate plant was inactivated in December 1949 and was not brought on-line during the Korean Conflict or subsequently (Ordnance Ammunition Center, 1953). The bomb booster assembly area also was not operational during the Korean Conflict (Dudeck, 1959). Records searched did not indicate production figures for the Korean Conflict operations.

Ancillary industrial operations during the Korean period included washout and preparatory operations, painting, handling, and shipping.

2.1.3 OTHER OPERATIONS

A number of other operations active at NOP during various periods could have generated toxic and hazardous materials. Little information is available regarding these, other than building or area locations.

These operations include motor pools; equipment maintenance and repair; rail yard and locomotive maintenance shop; Nike maintenance shop; Offutt AFB Missile Site S-1; laboratories; hospital; explosive burning grounds; demolition ground; laundry; boiler houses; and chemical/petroleum, oils, and lubricants (POL) storage.

For vehicle repair and maintenance, several buildings were involved: Heavy Equipment Garage (22-1), machine shop (0-7), auto maintenance shop (0-12), and the locomotive maintenance shop (0-7). Operational information is limited, but available records indicate use of paints, solvents (stoddard, acetone, and methyl alcohol), and degreasers (carbon tetrachloride) as well as the generation of waste POL products (Anonymous, n.d.). Records searched did not indicate any information on disposal practices.

Records searched did not contain information regarding operations at the Nike maintenance shop, Offutt S-1, laboratories, hospital, boiler house,

or areas of POL/chemical storage. The laboratories included an analytical laboratory for water analyses and explosives quality assurance/quality control (QA/QC) testing and an X-ray laboratory. No records were found of any pesticide usage or storage.

At least three areas have been identified for the demolition or burning of explosives (see Fig. 2.1-3). The explosives burning areas (two), located in Secs. 16 and 21 (T14N, R9E), were used to burn waste explosives (Dudeck, 1959). The demolition ground, located in Sec. 35 (T14N, R8E), was used for demolition of tetryl boosters (Dudeck, 1959). A strip of land between the STP and the explosives burning areas was used for proof testing boosters (NOP, 1946).

2.1.4 MATERIEL PROOF AND SURVEILLANCE TESTING

Materiel testing occurred at NOP. The laboratory (Bldg. L-01) was used for QA/QC testing of small quantities of explosives, as indicated by records reviewed (NOP, 1949a).

During 1944, a testing area for caps, boosters, and fuzes was in operation in a strip (3.4 ha) between the sewage treatment plant (STP) and the explosives burning area (see Fig. 2.1-3). This area (referred to as a proving ground) was used for proof testing (Anonymous, n.d.). Records searched did not indicate the total number of years the area was in use (NOP, 1946).

Records indicate that in 1946, approximately 340,000 rounds of ammunition, including M102, M104, and M115 boosters, fuzes, and detonators were destroyed onsite. Available information indicates that demolitions were conducted in pits at three locations, but the exact areas were not recorded (NOP, 1946). Records searched did not indicate the demolition or burning of ammunition at any later dates.

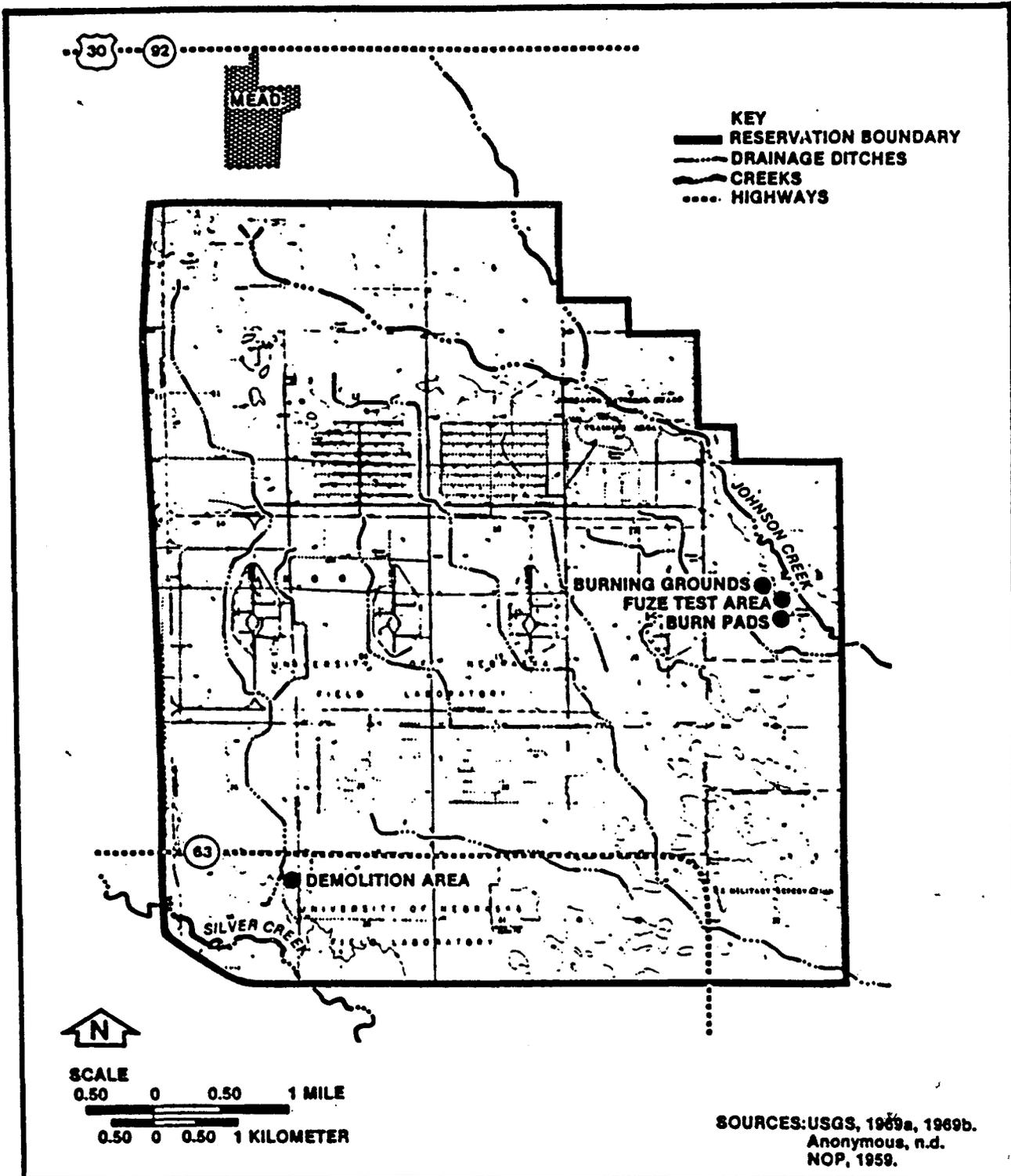


Figure 2.1-3
DEMOLITION, BURNING GROUNDS,
AND FUZE TESTING AREAS —
NEBRASKA ORDNANCE PLANT

Prepared for:
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Materials Agency
Aberdeen Proving Ground, Maryland

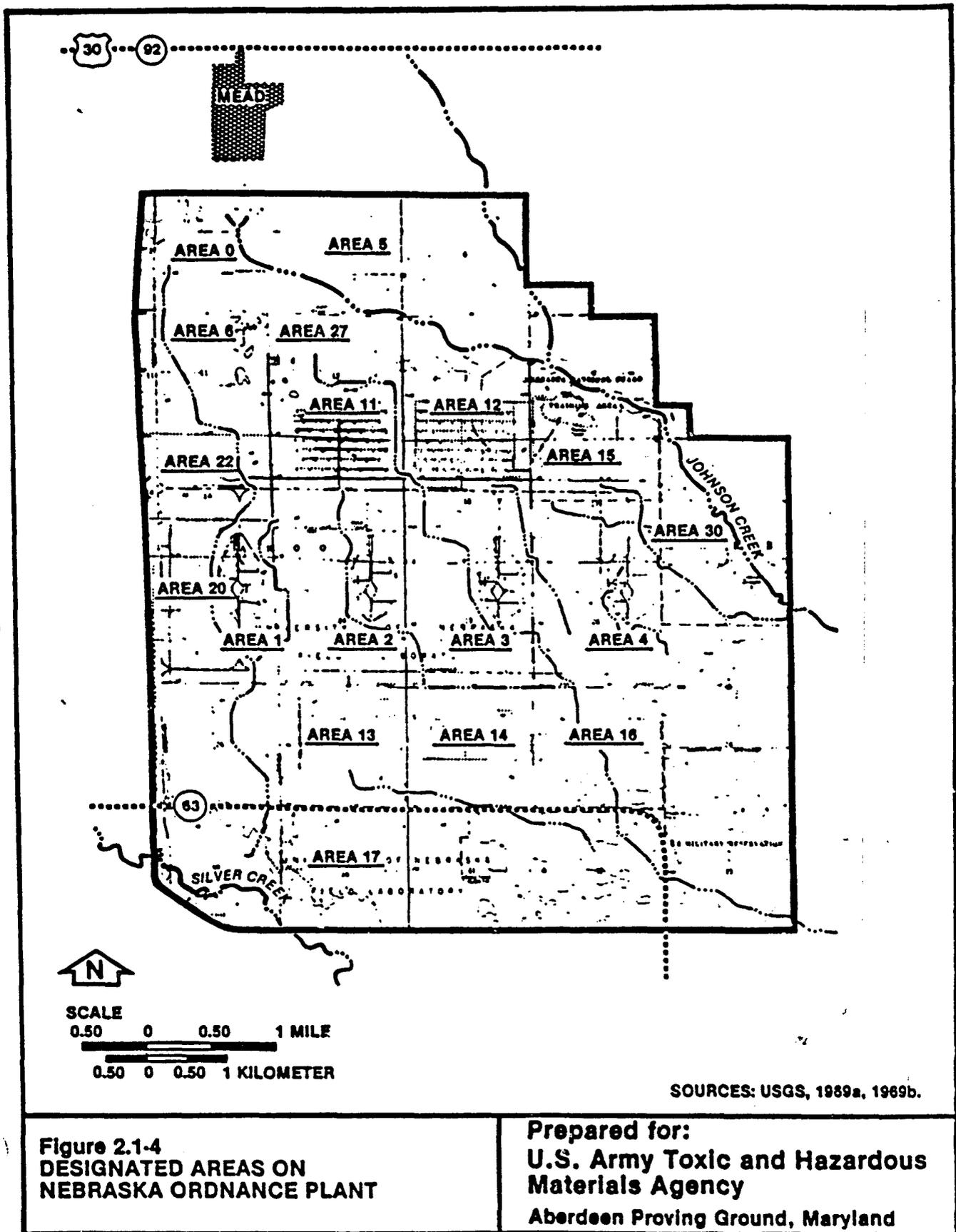
2.1.5 TOXIC AND HAZARDOUS MATERIALS (HANDLING AND STORAGE)

The major toxic and hazardous materials handled and stored at NOP were the various explosives and explosive components (TNT, Tritonal, Amatol, Tetryl, and ammonium nitrate). TNT and tetryl were not produced onsite. Primary areas of handling and/or storage (see Fig. 2.1-4) were as follows:

Area	Function
1-4	Bomb Loading Lines
5	Ammonium Nitrate Plant
6	Bomb Booster Assembly Area
11 and 12	High Explosives (HE) Storage
13 and 14	Finished Ammunition Storage
15-17	Ammonium Nitrate Storage
30	Explosive Burning Ground
0	Laboratory (L-01) and Laboratory Storage Buildings (L-02 and L-03)
20	Rail Loading Points
(see Fig. 2.1-3)	Demolition Ground

The bomb loading lines presented the most potential for contaminant (waste) production and disposal (Dudeck, 1959). Each was equipped with a building for washout of explosive material prior to loading and assembly operations. The loading process provided additional contaminant potential. Buildings and associated land areas would most likely have been contaminated by these operations (Dudeck, 1959; NOP, 1959). Records searched did not indicate specific disposal procedures for all wastes produced at NOP. Records are available which indicate the as-built specifications, including sumps, of all buildings on the installation (COE, Omaha District, 1944).

The demolition and explosives burning grounds also present a potentially significant contaminant source. Some residues most likely remained after demolition and burning. The demolition ground was to be used only for demolition of tetryl boosters, the explosives burning grounds only



for burning of scrap or excess explosive material. No ordnance items were to be disposed of at either site; therefore, no unexploded ordnance (UXO) should be present on the site. However, historical records (NOP, 1946) indicate the demilitarization of detonators, fuzes, and boosters (as well as ammunition) in 1946 at unspecified locations. Therefore, there is a potential that UXO could have resulted from these operations.

Other buildings would also have been involved in the handling or storage of potentially toxic and hazardous materials, including:

<u>Building No.*</u>	<u>Function</u>
1-2	X-Ray Laboratory
1-T-46	X-Ray Scrap Storage
22-1	Heavy Equipment Garage
30-7	STP
30-17, 18, 19	Incinerators
0-5	Hospital
0-10	Laundry
0-7	Machine Shop
0-12	Auto Maintenance Shop
0-7	Locomotive Maintenance Shop

* First number indicates area location, second number indicates building number within the area.

Records searched did not indicate any further information regarding the operations in any of these areas. Potential toxic and hazardous materials handled or disposed of could have included low-level radiation sources from the X-ray laboratory and storage building; medicines and chemicals from the hospital; POL products, solvents, and cleaners, from the machine shop, heavy equipment garage, locomotive maintenance shop, and auto maintenance shop; cleaning solvents and explosive residue wastewater from the laundry; and pathogenic and other laboratory wastes from the hospital.

2.2 CONTAMINATION STATUS AT CLOSING

The following information is primarily from a contamination survey conducted in 1959 by U.S. Army Ordnance Ammunition Command (OAC) personnel, Joliet, Ill. (Dudeck, 1959). This survey seems to have dealt only with explosives contamination, and no archival information relative to other potential contamination has been found. The 1959 survey listed certain buildings and ground areas as explosive contaminated, primarily the four bomb loading lines and the booster assembly area.

Reportedly, decontamination surveys performed in the 1950s and earlier were concerned only with contamination from munitions-type compounds. Buildings and areas included in the survey reportedly were selected by a subjective decision of the Commander.

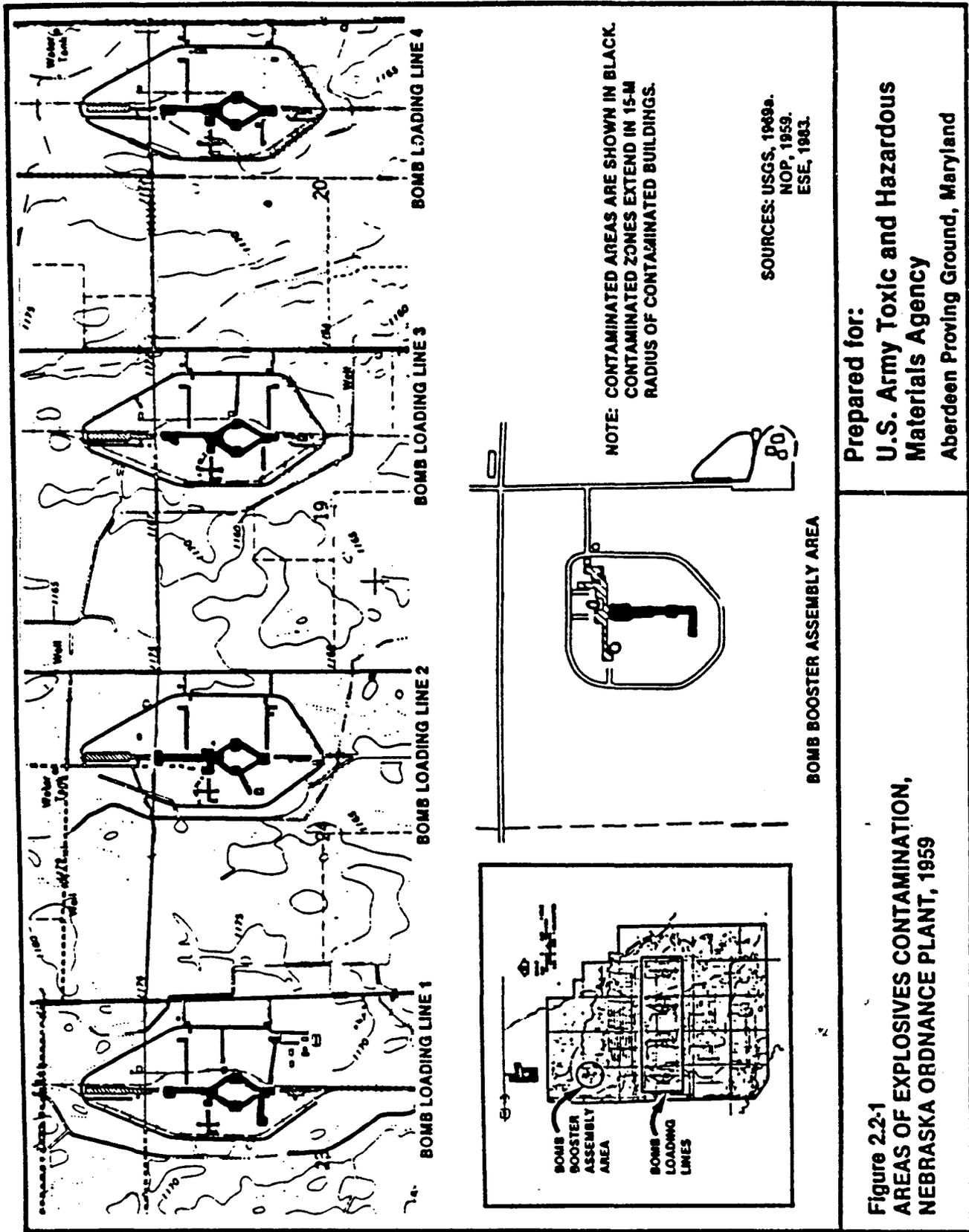
Decontamination recommendations also were made (Dudeck, 1959), but records searched did not uncover any documentation regarding if, or to what extent, any of these recommendations were implemented.

2.2.1 LOADING LINES AND RELATED OPERATIONS BUILDINGS

The areas considered contaminated in the loading lines and booster assembly area are shown in Fig. 2.2-1. The declaration of excess reports (NOP, n.d.a) for NOP listed a number of buildings and ramps as explosive contaminated (see App. F). Primary areas of contamination were found to be roofs, rafters, other wood structures, wall and floor surfaces, wooden ramps, sumps, drains, and receiving ditches.

The 1959 report also recommended the following protocols for cleanup of the contaminated areas (Dudeck, 1959):

1. All sumps should be removed.
2. Soils should be removed from ditches receiving effluent from sumps, to at least a depth of 1 foot (ft) (0.3 m) for 50 ft (15 m) from the sump (or beyond if contamination is present).
3. Buildings and ramps should be flashed to burn all wood structures and explosive residues on walls and floors.



**Figure 2.2-1
AREAS OF EXPLOSIVES CONTAMINATION,
NEBRASKA ORDNANCE PLANT, 1959**

4. A 50-ft (15-m) buffer strip around each contaminated building should be inspected and decontaminated, as appropriate.
5. If buildings and ramps in lines are to remain intact, they should be fenced and placed off-limits (this would include the 50-ft (15-m) buffer strip around each building).

A number of buildings and lines were scheduled for demolition (Dudeck, 1959) (see App. F), but records searched did not confirm whether this was accomplished.

Although the previous recommendations were made in 1959 with the intent of being accomplished prior to actual excessing, later records (Headquarters, Ordnance Ammunition Command, 1962; Stahr, 1961; Ignatius, 1961; Donaldson, 1961; U.S. Army Engineer Division, Missouri River, 1960) indicate that at least some of the contaminated buildings and lands in the loading lines and booster assembly area evidently were not decontaminated prior to excessing. Detailed information on contamination disclosure is provided in Sec. 2.2.8.

2.2.2 AMMONIUM-NITRATE PRODUCTION AREA

The ammonium-nitrate area operated only briefly in 1943 before decontamination and mothballing (Ordnance Ammunition Center, n.d.; NOP, 1946). The plant was reopened and operated from 1945 to December 1949 before final decontamination and mothballing (Ordnance Ammunition Center, n.d.; NOP, n.d.b, 1946). In 1953, the Army Environmental Health Laboratory, by request of the National Research Council, performed a study to determine any residual effects (from nitrates only) on lakes, streams, and underground waters from waste disposal practices at Army-owned ammonium-nitrate plants (USAEHA, 1953). The results of the NOP portion of this study are shown in Table 2.2-1, and the sampling locations are shown in Fig. 2.2-2. This study concluded:

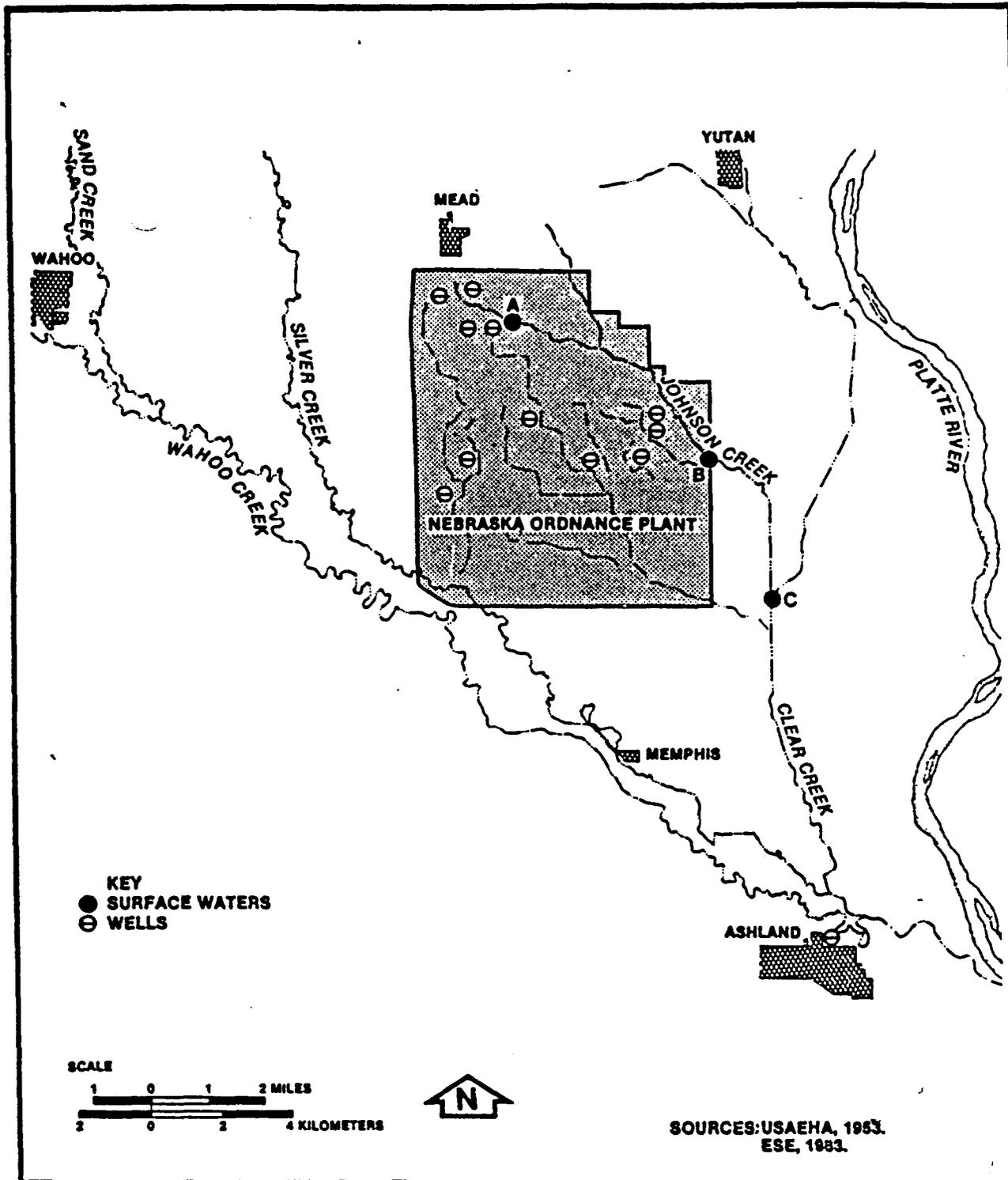
1. No residual nitrate problems exist in wells in the NOP area,
2. No significant nitrate-nitrogen ($\text{NO}_3\text{-N}$) contamination of Clear Creek exists, and

Table 2.2-1. Nitrate Contamination Study at NOP

Sample Date	Sample Location and Nitrate Concentration (expressed as ppm* nitrogen)		
	A	B	C
A. Surface Water (see Fig. 2.2-2)			
September 1952-April 1953	175	74	1.6
Apr. 13, 1953	—	20	12.4
June 8, 1953	—	32	1.5
June 15, 1953	—	6.25	0.2
June 22, 1953	—	3.5	0.1
June 29, 1953	—	0.1	0.1
B. Ground Water (see Fig. 2.2-2)			
	<u>Sample Location</u>	<u>Concentration Range NO₃-N (ppm)</u>	
1949-1950	Wells 1-11 NOP	0.9-3.0	
1949-1950	Wells offpost within 3.2 km of Johnson and Clear Creeks	0.9-3.0	
Apr. 13, 1953	2 city of Ashland wells	1.6	

* ppm = parts per million.

Source: USAEHA, 1953.



**Figure 2.2-2 ·
 SAMPLING POINTS FOR NITRATE
 CONTAMINATION STUDY CONDUCTED
 AT NEBRASKA ORDNANCE PLANT**

**Prepared for:
 U.S. Army Toxic and Hazardous
 Materials Agency
 Aberdeen Proving Ground, Maryland**

3. The elevated levels of $\text{NO}_3\text{-N}$ found at Station C during the April 13 sampling were due to runoff from spring fertilizing operations adjacent to Clear Creek.

2.2.3 DEMOLITION AND BURNING GROUNDS

The 1959 contamination survey identified both the demolition and explosive burning grounds as contaminated with explosives. The survey recommended that the areas be visually inspected and cleaned of surface debris and that subsequent use be limited to surface only (i.e., no tilling or digging).

Records available are contradictory as to whether actual ordnance was demilitarized in these areas. There are records indicating detonation of numerous rounds of ammunition at three unspecified pits (NOP, 1946). This may have produced UXOs. However, no records indicate any clearing of areas for UXO removal, and the 1959 decontamination survey indicates that there should be no UXOs present at the known explosives burning ground or the demolition ground (Dudeck, 1959).

Again, there are no indications of any decontamination of these areas. The demolition ground and explosives burning grounds were excessed to the University of Nebraska (see Sec. 1.5.2).

2.2.4 CHEMICAL LABORATORY

Three chemical laboratory buildings were identified on NOP, all in Area 0. One served as the main laboratory, while the others served primarily as laboratory storage buildings (NOP, n.d.a). Little additional information is available regarding their operation or contamination status. They are not listed as contaminated in the declaration of excess (NOP, n.d.a). These buildings were transferred in 1959 to the USAF and excessed to private owners in 1964. There are no records detailing decontamination procedures at any of the buildings,

although the 1959 contamination survey indicates that all three were decontaminated to 5X status (Dudeck, 1959). Records searched did not indicate what the buildings were used for by the USAF.

It is assumed that the main chemical laboratory functioned for the normal analyses of drinking water and surface waters as well as for QA/QC analyses of explosives. It is also assumed that scraps of explosives from lot testing (melting point and viscosity) were disposed of at the burning ground as indicated in records for 1949 (NOP, 1949a).

2.2.5 STORAGE BUILDINGS

All buildings used for storage of explosives, finished ammunition, ammonium nitrate, and the ammonium nitrate plant itself were decontaminated to the 5X level prior to the 1959 contamination survey (Dudeck, 1959). However, no other records confirmed or detailed this decontamination. None of these storage areas were listed as contaminated in the declaration of excess (NOP, n.d.a). These areas were excessed to either the private sector, the University of Nebraska, or retained by the Army.

There have been no records found regarding the presence of pesticide storage areas.

2.2.6 LAUNDRY BUILDING

No information other than the building location has been obtained relative to the laundry building. It is not listed as contaminated in either the 1959 contamination survey or the declaration of excess (NOP, n.d.a). The potential for contamination in the building itself is limited because the wastewater going to the sewer system would have carried a majority of the solvents used and the explosive residues washed from the clothing. Webster's agent was used in cleaning the explosive-contaminated clothing (NOP, 1946).

The laundry building was on the area transferred to USAF and later
excessed to the private sector.

2.2.7 STP

Records indicate that the STP consisted of Imhoff tanks, trickling
filters, final clarifiers, and sludge drying beds (USAEHA, 1944a,
1944b). The outfall was to natural or manmade drainageways, and the
effluent was chlorinated (USAEHA, 1944a, 1944b). One survey (USAEHA,
1944b) indicated that bypass of treatment facilities was common and that
TNT contamination was also found from 1942 to 1944. Other potential
contaminants included POL products, paint sludges, metals, and
solvents.

The STP was not listed as contaminated in the 1959 survey, and it was
excessed to the University of Nebraska (HEW, Region VII, 1971). Areas
of potential contamination include the plant itself, the sludge drying
beds, and any areas used for disposal of sludges pumped from the Imhoff
tanks. An industrial hygiene survey conducted in 1944 (USAEHA, 1944b)
recommended the disposal of TNT-contaminated sewage by surface
irrigation on plowed ground, although no records were located indicating
that this was done.

2.2.8 OTHER

Equipment Maintenance Shops/Garages/Machine Shop

None of these buildings were listed as contaminated in the 1959
contamination survey nor in the declaration of excess (NOP, n.d.a;
Dudeck, 1959). There were no records found indicating operations,
disposal practices, or decontamination activities for these areas.

The potential contaminants from these areas would primarily include
paints, POL products, and cleaning solvents. Usage quantities and
disposal practices are unknown. Industrial hygiene surveys indicated
that use of large quantities of carbon tetrachloride in the locomotive
shop should be discontinued (USAEHA, 1944a). No confirmation of

subsequent action was recorded. The above areas were excessed to the private sector or retained by the Army.

X-Ray Laboratory and X-Ray Storage

Again, these buildings were not listed as contaminated in either the 1959 contamination survey or the declaration of excess (NOP, n.d.a; Dudeck, 1959). There were no records found indicating operations, waste generation and disposal, or decontamination activities for these areas. Potential contamination would include chemicals used in film development. These areas were excessed to the private sector after transferal to USAF.

Hospital

The hospital was not listed as contaminated in either the 1959 contamination survey or the declaration of excess (NOP, n.d.a; Dudeck, 1959). It is located in the area transferred to USAF and later excessed to the private sector. No records were found indicating operations, laboratories, waste generation (pathogenic and chemical), or disposal activities for the hospital. Contamination potential of the hospital itself is slight.

2.2.9 DISCLOSURE OF CONTAMINATION

As previously indicated, the areas with the highest potential for residual contamination include the bomb booster assembly area (Area 6), the bomb loading lines (Areas 1-4), and the demolition/burning ground areas (Area 30) (NOP, n.d.c; Dudeck, 1959). The quitclaim deeds covering the excessing of the parcels of land containing these areas are found in App. B.

The bomb loading lines were excessed to the University of Nebraska under quitclaim deed No. D-Nebr-438C, dated Apr. 10, 1962. This deed recognizes the areas determined to be contaminated in the 1959 survey and informs the grantee of certain conditions as follows:

Grantee understands and acknowledges that the property hereby conveyed has been used as a part of the Nebraska Ordnance Plant for

the manufacture of ammunition and portions of the area are contaminated with explosives. By the acceptance of this deed and as a further consideration for this conveyance, Grantee, its successors and assigns hereby covenants with Grantor and agrees to the following restrictive conditions of transfer.

- a. That the Grantee will isolate, fence and post the contaminated areas;
- b. That the use of the contaminated areas will be limited to grazing purposes;
- c. That no structures will be erected within the contaminated areas;
- d. That neither the said Grantee nor its successors and assigns, nor the University of Nebraska will dispose of the contaminated areas until they have been decontaminated; and,
- e. That the decontamination, either to permit disposal or to remove the limitations on use, will be accomplished at no cost to the Grantor, and under the technical supervision of, and in accordance with, procedures prescribed by the Army and on a reimbursable basis.

Records searched do not indicate if the University of Nebraska has been or is in compliance with the restrictive conditions placed on the contaminated areas. The quitclaim deed contains no liability indemnity.

The demolition/burning ground area was excecised to the University of Nebraska under quitclaim deed No. SA-VII-14 dated Sept. 11, 1968, as amended Mar. 24, 1970. This quitclaim deed does not disclose any potential contaminants, nor does it contain any liability indemnity.

The bomb booster assembly area was excecised to Mr. Howard Richter under quitclaim deed No. D-NEBR-438C, Parcel 23, dated Feb. 20, 1982. The quitclaim deed referenced the contamination potential based on the former use of the area and also contained a clause waiving Government responsibility or liability (see App. B).

3.0 INSTALLATION ASSESSMENT FINDINGS

1. The 1959 contamination survey of NOP indicated that all bomb loading lines and corresponding buffer areas existing up to 15 m from the buildings, the demolition/burning ground areas, and the bomb booster assembly area were considered contaminated.
2. Records searched did not indicate whether the University of Nebraska has been or is in compliance with the stipulations imposed by the Government as a condition in the transfer of the contaminated areas (bomb loading lines).
3. The quitclaim deed to Mr. Howard Richter covering the booster assembly area references possible contamination and contains a waiver of liability clause.
4. The soils and subsurface materials at NOP would permit the infiltration of soluble contaminants, if any, into the shallow aquifer.

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APPENDIX A
ACQUISITION TRACT REGISTER

Source: NOP, 1972

6 TH PRINCIPAL MERIDIAN

R-8-E
R-9-E

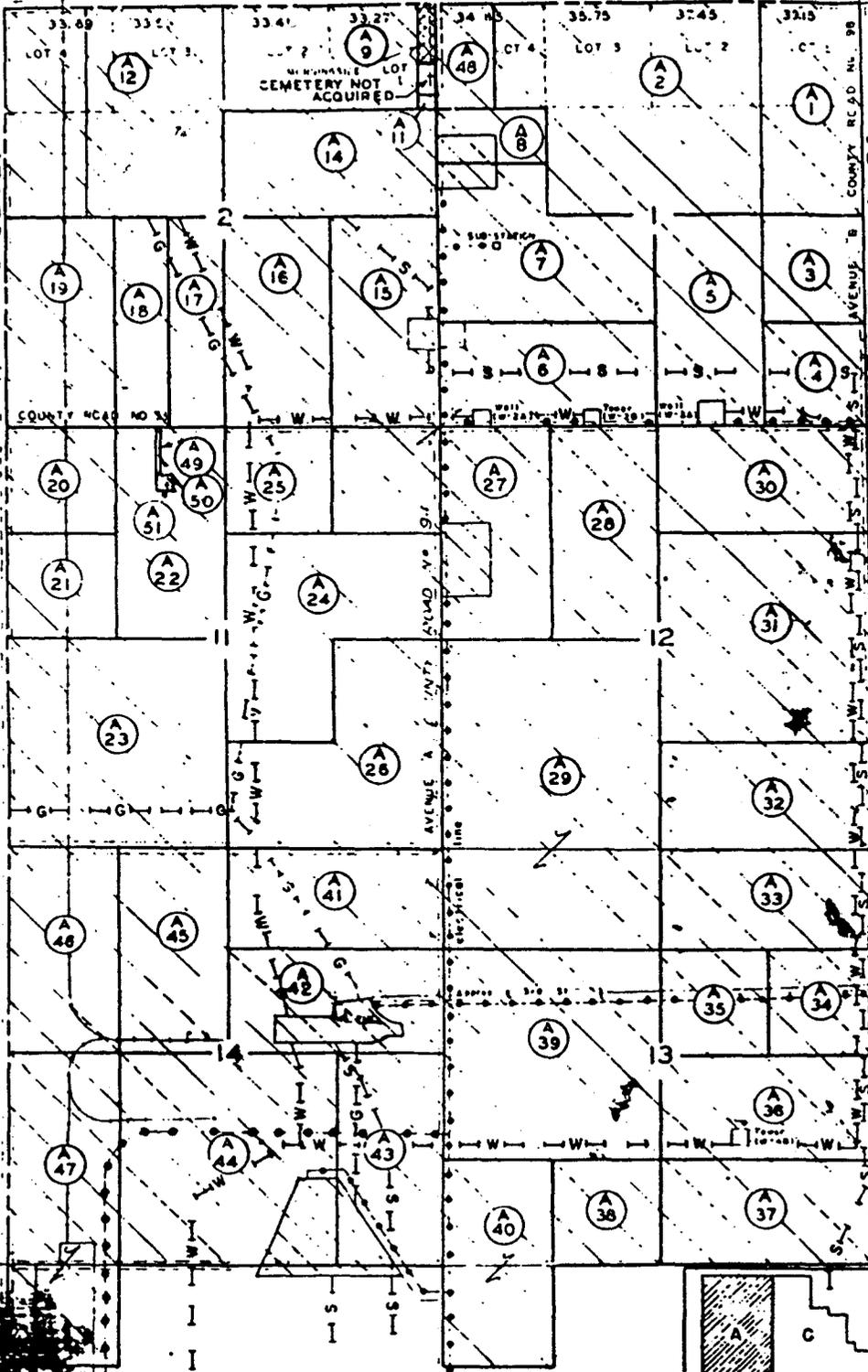
NEBRASKA

PROJECT SITE

T-15-N

T-14-N

STATE 1



ACQUISITION TRACT		
TRACT NO.	LAND OWNER	ACREAGE
A1	John E. Bengston, et al	79.15
A2	Fred J. Swanson, et ux	167.20
A3	William Paulson, et ux	40.00
A4	Charles & Andrew Larson	40.00
A5	Edward & Clara M. Larson	80.00
A6	Mrs. D. W. Johnson, et al	120.00
A7	John J. Gustafson, et ux	100.00
A8	David & Selma K. Gustafson	20.00
A9	David Peterson	4.033
A10	David Peterson	0.828
A11	Golfred Swanson, et al	207.034
A12	Norman D. Gustafson, et ux	80.00'
A13	Bankers Life Ins. Co. of Neb	80.00
A14	Carl Henry Gustafson, et ux	80.00
A15	Anna Ida Davis	40.00
A16	Derbe B. Railback	40.00
A17	Amandus Johnson, et ux	80.00
A18	Charles Carlson & Emma Turner	48.00
A19	Ida Pearson, et vir	40.00
A20	Rose Vybiral Storm, et vir	78.343
A21	James O'Donnell, et ux	160.00
A22	Harry G. Pearson, et ux	120.00
A23	Ethel Ruth Erickson, et al	40.00
A24	Golfred Swanson, et ux	120.00
A25	John V. Anderson Estate et al	80.00
A26	Josephine Johnson	80.00
A27	Arthur E. Swanson	240.00
A28	Anton Cuda et ux	80.00
A29	Amandus Johnson, et ux	160.00
A30	Fred J. Stamp	80.00
A31	Lizzie C. Segerl, et vir	80.00
A32	Fred A. Josephine Forgette	40.00
A33	Josephine Forgette	40.00
A34	Emma Speckmann, et vir	80.00
A35	John Speckmann, et ux	80.00
A36	Hulda Udd et al	40.00
A37	George G. Lundgren, et ux	160.00
A38	Otto B. Tegelberg	80.00
A39	Karoline Hanson, et vir	80.00
A40	Henry Ostenberg Estate	80.00
A41	Otto B. Tegelberg	80.00
A42	Nels Peterson	160.00
A43	Henry Erickson	80.00
A44	John E. Benson, et ux	80.00
A45	Josephine Carlson	120.00
A46	John S. Gustafson, et al	20.05
A47	Swedish Evangelical Mission Soren Church	124
A48	J.P. Hanson Estate, et al	8.00

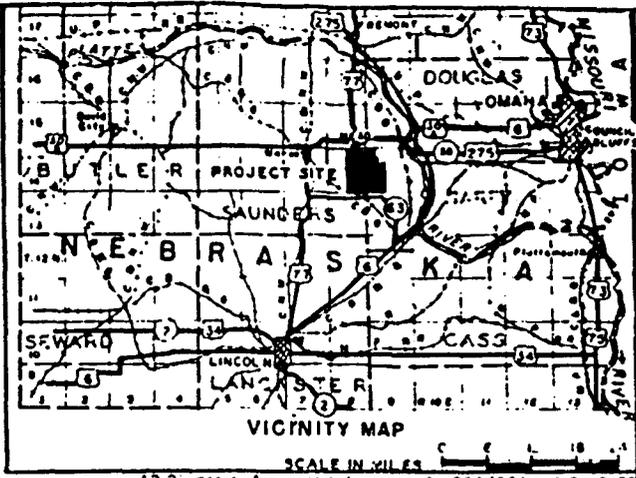
23

KEY SEGMENT MAP

A-1



PROJECT REGISTER	
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450 acres, fee, reported access to G 2 (SP 118) 3-10-54 and transferred to the Corps of Engineers as a Transfer Agent for a fee to Dept of Commerce and Geodetic Survey on Eng Form 290, dated 3-9-57

4 725 acres, fee, reported access to G 5 A (SP 118) 1-7-10-57 as corrected in June 1958, who conveyed by QCD dtd 1-29-58 to Morrishide Cemetery Assn of Mead, Nebraska

15,084 794 acres, reported access to G 5 A (SP 118) 3-23-60

960 00 acres, fee, withdrawn from access to G 5 A April 1960

960 00 acres, fee, reassigning by Dept of Army to the U S Army 71 Corps 16 March 1960

2,129 639 acres transferred to Dept of Air Force by letter dated 31 July 1961, 1,469 634 acres for Offutt AFB AF Facility 3-1, B 6400' ac for Offutt Communication Annex No 1, Globecom

4,192 324 acres, fee, reported access to G 5 A (SP 118) 23 March 1960, (subject to an easement for rights of way and facilities for operation and maintenance of necessary utilities reserved to Government) and disposed as follows by conveying two QCD dtd 18 January 1962

609 30 acres to Arthur and Irene M Gifford

158 87 acres to Clarence Storm

Three QCD dated 26 January 1962

229 82 acres to Thurston F. Mangels, et al

163 61 acres to Milford S and Leta H Johnson

203 94 acres to Wilbur H Boschult

QCD dtd 19 February 1962

270 82 acres to J E and Vivian M Quinn

Five QCD dated 20 February 1962

161 80 acres to Reuben R and Ada B Rustelton

427 18 acres to Harry E and Evelyn A Stevens

323 10 acres to Warner auto and Home Supply Co, Inc

84 85 acres to Geraldine Junkin Schurer

33 23 acres to Howard Richter

QCD dated 28 February 1962

244 05 acres to Bernard Pat and Virgil Gottsch

Two QCD dated 15 March 1962

186 92 acres to Mead Alfalfa Milling Co, Inc

1,261 94 acres to Skyline Mills, Inc

Three QCD dated 16 April 1962

426 57 acres to Skyline Mills, Inc

164 20 acres to Arthur Gifford

300 88 acres to Mead Alfalfa Milling Co, Inc

QCD dated 10 April 1962

454 91 acres to The Board of Regents, University of Nebraska

8,527 54 acres assigned to M E & W 1 Sept 1961, who conveyed to the Board of Regents, University of Nebraska by QCD dated 12 April 1967

Reserving to the United States easements as follows:

Railroads over 36 31 acres

Water Lines over 38 15 acres

Sewer Lines over 22 15 acres

Gas Lines over 7 64 acres

Electrical Lines over 31 11 acres

135 36 acres, easements, reserved in fee disposal for Offutt AFB AF Facility 3-1

79 27 (22 83) acres, fee conveyed by Dept of M E W to the Board of Regents University of Nebraska by QCD dtd 29 Jun 71

3.22 acres, fee to W C Folley by QCD dtd 8 Dec 69.

FINAL PROJECT OWNERSHIP (TYPE OF MAP)

STATE NEBRASKA

COUNTY SAUNDERS

DIVISION MISSOURI RIVER

DISTRICT OMAHA

FIFTH ARMY AREA

LOCATION OF PROJECT

0.5 MILE S.E. OF MEAD

30 MILES W. OF OMAHA

TRANSPORTATION FACILITIES

U.R. C.B. & Q. RAILROAD

38, 63 STATE ROAD

77-275, 30A & B FEDERAL ROAD

AIRLINE

ACQUISITION

TOTAL ACRES ACQUIRED 17,258 466

ACRES FEE 17,258 466

ACRES TRANS'D. TO WAR DEPT.

ACRES LEASED TO WAR DEPT.

ACRES LESSER INTERESTS:

DISPOSAL

TOTAL ACRES DISPOSED OF 17,258 466

ACRES SOLD BY WAR DEPT.

ACRES FEE TO G.S.A. 1,161 882

ACRES TRANS'D. DEPT. OF AIR FORCE 2,129 639

ACRES REASSIGNED 960 000

LEGEND

RESERVATION LINE	[Symbol]
STATE OR PROVINCE LINE	[Symbol]
COUNTY LINE	[Symbol]
CIVIL DISTRICT PRECINCT	[Symbol]
LAND-GRANT LINE	[Symbol]
CITY, VILLAGE, OR BOROUGH	[Symbol]
CEMETERY, SMALL PARK, ETC.	[Symbol]
TOWNSHIP LINE	[Symbol]
SECTION LINE	[Symbol]

SCALE IN FEET

1320' 2640'

WAB DEPARTMENT

OFFICE OF THE BRANCH CHIEF

MISSOURI RIVER DIVISION

REAL ESTATE

NEBRASKA ORDINANCE FUND

MILITARY RESERVATION

RECOMMENDED: [Signature]

APPROVED: [Signature]

DATE: [Date]

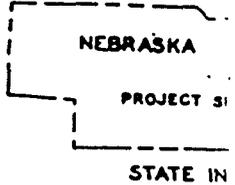
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RE-D. 453 DATED 5 NOV 1941

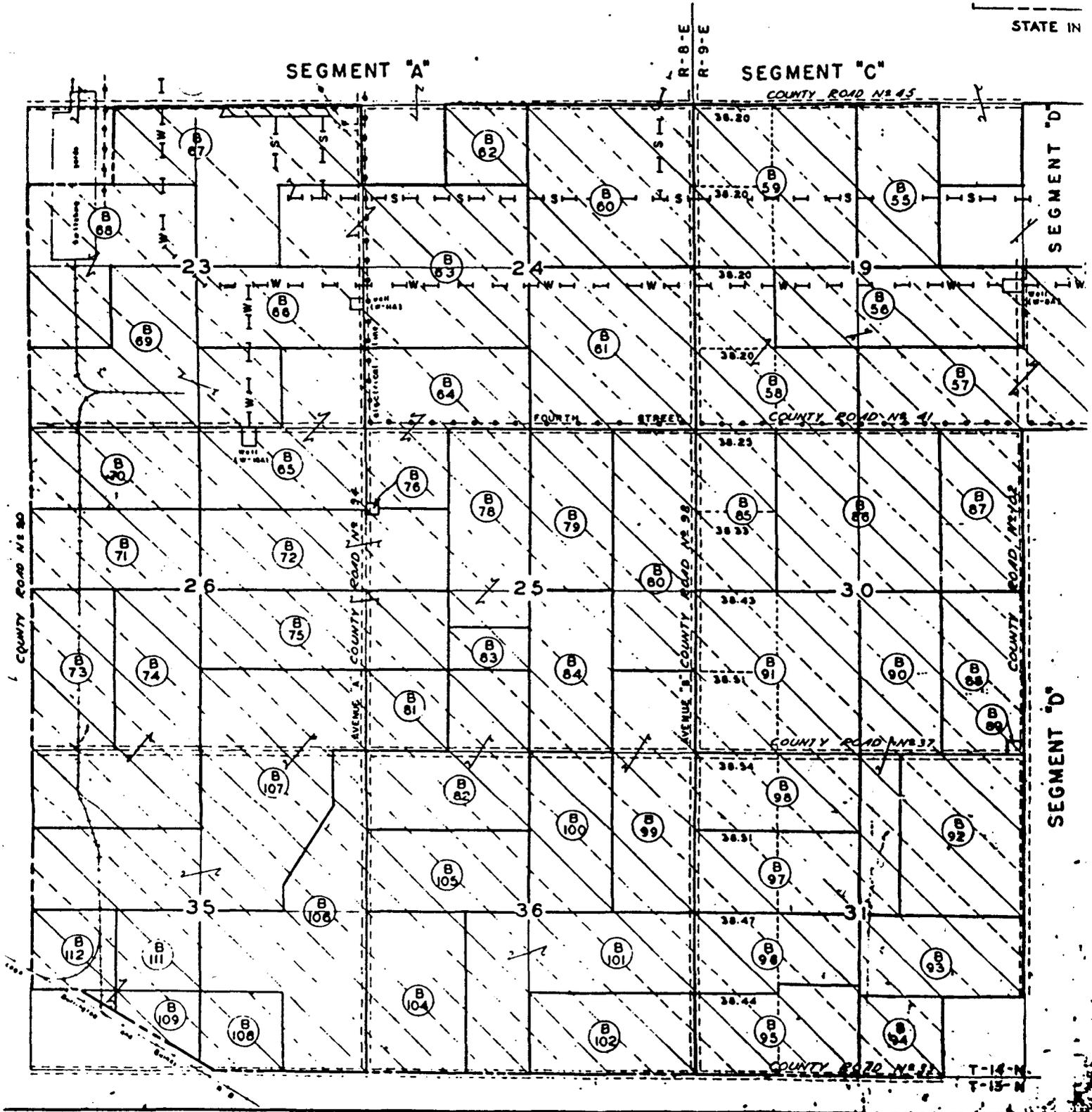
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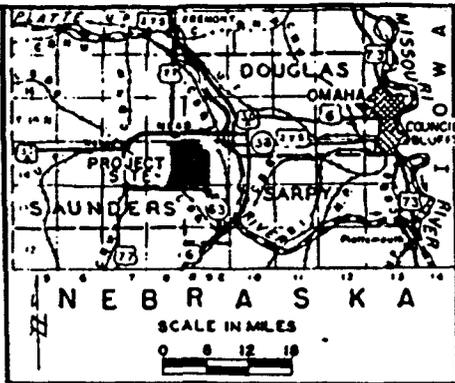
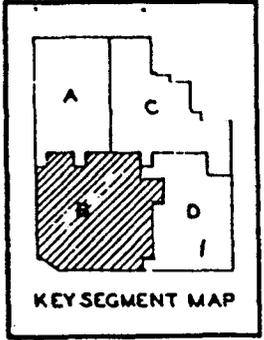
583 acres transferred to Dept. of Air Force by letter dated 31 July 1961 for Offutt AFB AF Facility S-1 (5,384,354)
 14,325,354 acres, fee, reported excess to GSA (SF 118) 23 March 1960, (subject to an easement for rights-of-way and facilities for operation and maintenance of necessary utilities reserved to Government) who conveyed 242.79 acres to The Board of Regents, University of Nebraska by QCD 4-10-62
 8,337.84 acres assigned to H.E.B.W. 1-3-61 1971, who conveyed 5,272.34 acres to The Board of Regents, University of Nebraska by QCD dated 12 April 1947
 23,222 Acres conveyed by Dept of H.E.W. to the Board of Regents, University of Nebraska by QCD dtd 29 June 71



6TH PRINCIPAL MERIDIAN



A-2



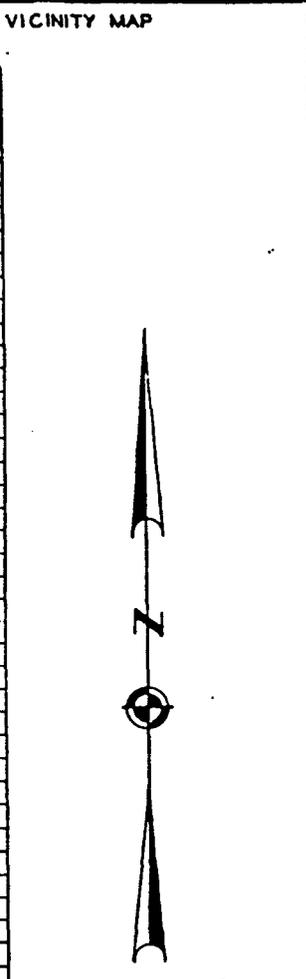
FINAL PROJECT OWNERSHIP
TYPE OF MAP

STATE NEBRASKA
COUNTY SAUNDERS
DIVISION MISSOURI RIVER
DISTRICT OMAHA
FIFTH ARMY AREA

LOCATION OF PROJECT
0.5 MILE S.E. OF MEAD
30 MILES W. OF OMAHA

TRANSPORTATION FACILITIES
U.P. C.B. & Q. RAILROAD
28.63 STATE ROAD
77-275-30A & B FEDERAL ROAD
AIRLINE

ACQUISITION TRACT REGISTER			
TRACT NO.	LAND OWNER	ACREAGE	
		LAND	FEE
055	Dora Lindercomp, et vir	80.00	
056	Elmer R. Hanson, et ux	120.00	
057	May M. Kucera, et vir	160.00	
058	Julius Berlin	116.40	
059	John R. Webster Company	156.40	
060	Gus & A. Gustafson, et ux	160.00	
061	Fred E. Stamp	160.00	
062	William J. Cords, et ux	40.00	
063	Dora Widman	200.00	
064	Ernest J. Treptow, et ux	119.75	
065	August Wender Estate	120.00	
066	Henry Ostenberg Estate	80.00	
067	Hulda Udd, et al	160.00	
068	John J. Tesar, et ux	120.00	
069	Herman Treptow	160.00	
070	Angela M. Bobb	80.00	
071	C. R. Sanford Estate, et al	80.00	
072	Carl T. Charling, et ux	119.50	
073	William Endres, et ux	80.00	
074	Connecticut Mutual Life Ins. Co.	160.00	
075	Laura B. Mayer	120.00	Remarks: See 075(1)
076	School District No. 30	0.75	
078	C. W. Maline, et ux	100.00	
079	Andrew G. Erickson	80.00	
080	Edward J. Charling	120.00	
081	Laura Charling & Vivian Mollen	80.00	
082	John W. Charling	120.00	
083	Eben Maline	20.00	
084	Albert A. Robbins, et al	80.00	
085	Anna L. Powers	76.58	
086	Wes J. Martinson, et ux	160.00	
087	Mattie Hanson, et al	80.00	
088	Lillie Wagner	79.00	
089	School District No. 47	1.00	
090	Frank Semenc, et ux	120.00	
091	George Laudenschlager	156.94	
092	George Semenc	160.00	
093	Robert R. Cemer, et ux	80.00	
094	O. W. Ecklund, et ux	40.00	
095	George Jacobs	80.44	
096	Mary T. Charling, et vir	76.47	
097	George H. Jacobs, et ux	78.51	
098	Louis R. Jacobs, et ux	78.54	
099	A. C. Schiefelbusch, et ux	120.00	
100	Edna Meyer	80.00	
101	Arnold J. ...	160.00	Formerly known as ...
102	...	80.00	
103	Magdalena McEnrath	160.00	
104	Laura Charling & Vivian Mollen	80.00	
105	John J. Tesar, et ux	177.18	
106	...	262.84	



ACQUISITION

TOTAL ACRES ACQUIRED _____

ACRES FEE _____

ACRES TRANS'D TO WAR DEPT _____

ACRES LEASED TO WAR DEPT _____

ACRES LESSER INTERESTS _____

DISPOSAL

TOTAL ACRES DISPOSED OF _____

ACRES SOLD BY WAR DEPT _____

ACRES FEE TO GSA _____

ACRES TRANS'D } _____

ACRES REASSIGNED _____

LEGEND

COUNTY LINE _____

TOWNSHIP LINE _____

SECTION LINE _____

PROPERTY LINE _____

STREAMS _____

RAILROADS _____

POWER LINES _____

TELEPHONE LINES _____

IMPROVED ROADS _____

UNIMPROVED ROADS _____

SCALE IN FEET

ACQUISITION AUTHORIZATION

RE-D-433 DATED 5 NOV 41

RE-D-433A (GEN) DATED 12 JUNE 42

APPROVED 2043

WAR DEPARTMENT
OFFICE OF THE ENGINEER
MISSOURI RIVER DISTRICT

REAL ESTATE

NEBRASKA ORDINANCE

MILITARY RESERVATION

RECOMMENDED BY _____

APPROVED BY _____

6TH PRINCIPAL MERIDIAN

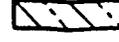
R-8-E
R-9-E

T-15-N

T-14-N



40.00 acres, fee, reported access to GSA (S F 118) Corps of Engineers as a Transfer Agent for GSA to Geodetic Survey) on Eng Form 280, dated 3-5-57



1,185.00 acres transferred to Dept of Air Force by T-



(2,829.19) 14,124.794 acres, fee, reported access to GSA (subject to an easement for rights-of-way and for maintenance of necessary utilities reserved to Go by conveying two QCD deeds dated 18 January 1962: 100.87 acres to Coronado State; 509.38 acres to Arthur and Irene W. Gifford; QCD dated 19 February 1962; 270.82 acres to J E and Violet W. Quinn; QCD dtd 20 February 1962; 377.10 acres to Weinger Auto & Home Supply Co.; QCD dated 21 February 1962; QCD dated 28 February 1962; 244.05 acres to Bernard Pal and Virgil Gottsch; QCD dated 15 March 1962; 67.50 acres to Saylone Mills, Inc; QCD dated 10 April 1962; 82.69 acres to The Board of Regents, University of Nebraska; 8,337.84 acres assigned to M E & W 1 Sept 1961; The Board of Regents, University of Nebraska by QCD dated 16 April 1962; 300.68 acres to Mead Alfalfa Milling Company; 32.30 Acres conveyed by Dept. of H E W. to the Board of Regents by QCD dtd 28 June 71

5

9

SEGMENT A
COUNTY ROAD NO. 99

COUNTY ROAD NO. 53

COUNTY ROAD NO. 102

AVENUE D
COUNTY ROAD NO. 105

COUNTY ROAD NO. 43

COUNTY ROAD NO. 45

SEGMENT "B"

SEGMENT "D"

19

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TRACT NO.	AC
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SP 118) 9-10-58 and transferred by the
S.A. to Dept of Commerce (Coast and
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co by its dtd 7-31-61 for Offutt AFB APP
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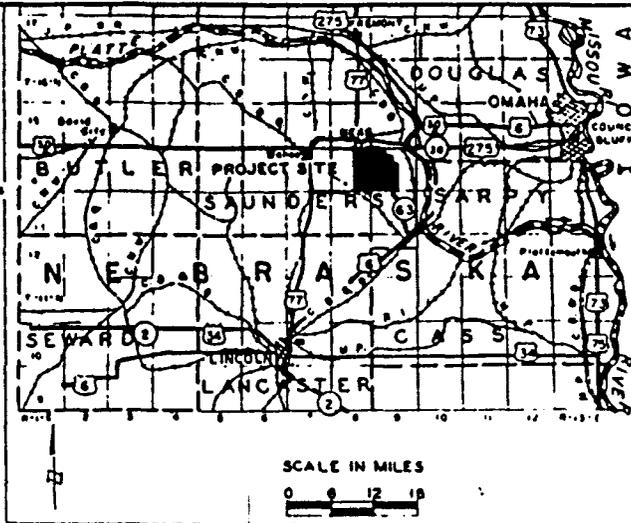
GSA (SP 118) 23 March 1960,
and facilities for operation and
to Government) who disposed as follow
ary 1962

City Co., Inc

Co's Inc

Acquiescence of Nebraska
at 1961, who conveyed TUC 67 acres to
to by GCD dated 12 April 1962

Moody, Inc
of Republic, University of Missouri.

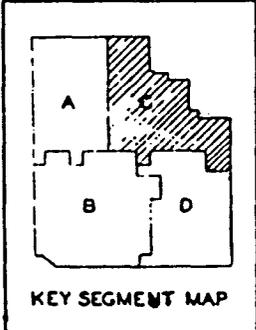
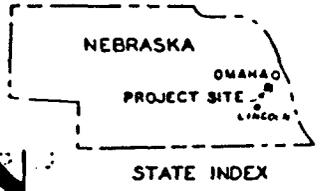


VICINITY MAP

ACQUISITION TRACT REGISTER

TRACT NO.	LANDOWNER	ACREAGE FEE	REMARKS
C121	Grant Morris, et ux	3.00	
C122	Virginia Benson	40.00	
C124	George Storm, et ux	158.91	
C125	Mable Phelan, et vir	120.00	
C126	Ben S. Nelson, et ux	79.22	
C127	Agnes R. Hansen, et vir	79.54	
C128	John Anderson, et ux	117.56	
C129	William Paulson, et ux	114.04	
C130	Anton Cuda, et ux	154.99	
C132	Rosa Lehr	155.21	
C133	Cecelia Klatz	40.00	
C134	School District No 37	1.50	
C135	Elzie F. Lehr	120.00	
C136	Frank Brabec, et ux	120.00	
C137	Herman Reed Estate	200.00	
C138	Frank Karloff, et ux	160.00	
C139	Enok Larson, et vir	120.00	
C140	Irene D. Peters	80.00	
C141	Dora Linderkamp, et vir	80.00	
C142	George Kuhn, et ux	80.00	
C144	Fred H. Jacobs, et ux	40.00	
C147	Elmer Anderson, et ux	120.00	
C148	John Bromm, et ux	120.00	
C149	Neve L. Peters, et vir	240.00	
C150	William Prins, et ux	160.00	
C151	Henry L. Wille, et ux	160.00	
C152	F.W. Deerson, et ux	160.00	
C153	Frank Brabec, et ux	80.00	
C154	Homar J. Ruppert	160.00	
C155	Frank Karloff, et ux	78.00	
C156	School District No. 34	400	
C157	Anna Brabec, et vir	60.00	
C158	Anna Karloff, et ux	240.00	
C159	Frederick A. Forstette	115.50	
C160	Frank Karloff, et ux	40.00	
C161	John Sparrow, et ux	78.00	
C162	Thelma Forstette	60.00	
C163	Frank Karloff, et ux	34.15	
C164	Rosa Phelan	120.00	
C165	Frank Karloff, et ux	120.00	

COUNTY ROAD NO. 110



ACQUISITION AUTHORIZATION

RE-D.433 DATED 9 NOV 41
RE-D.433 (GEN) DATED 15 JUNE 43

2048
AUDITED

FINAL PROJECT OWNERSHIP

TYPE OF MAP

STATE NEBRASKA
COUNTY SAUNDERS
DIVISION MISSOURI RIVER
DISTRICT OMAHA
FIFTH ARMY AREA

— LOCATION OF PROJECT —
0.5 MILE S.E. OF MEAD
30 MILES W. OF OMAHA

— TRANSPORTATION FACILITIES —
U.P. C.B. & Q. RAIL ROAD
38.63 STATE ROAD
77-275-39A.A. FEDERAL ROAD
AIRLINE

— ACQUISITION —
TOTAL ACRES ACQUIRED _____

ACRES FEE _____
ACRES TRANSFD. TO WAR DEPT. _____
ACRES LEASED TO WAR DEPT. _____
ACRES LESSER INTERESTS _____

— DISPOSAL —
TOTAL ACRES DISPOSED OF _____
ACRES SOLD BY WAR DEPT. _____
ACRES FEE TO G.S.A. _____
ACRES TRANSF'D. _____
ACRES REASSIGNED _____

— LEGEND —
COUNTY LINE _____
TOWNSHIP LINE _____
SECTION LINE _____
PROPERTY LINE _____
STREAMS _____
RAILROADS _____
POWER LINES _____
TELEPHONE LINES _____
IMPROVED ROADS _____
UNIMPROVED ROADS _____

— SCALE —
IN FEET
0 1320' 2640' 3960'

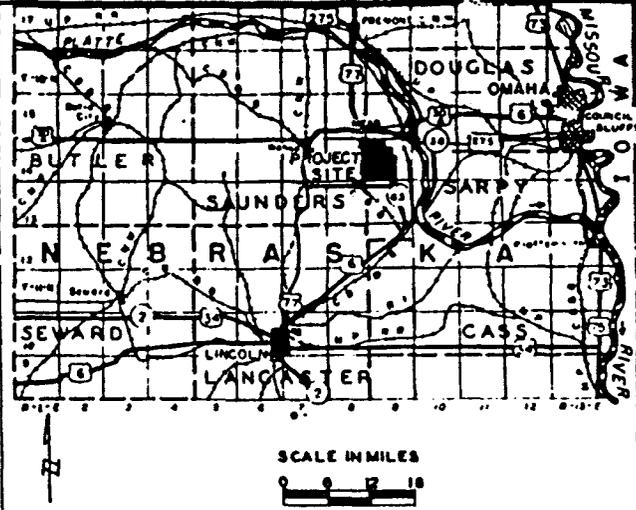
WAR DEPARTMENT
OFFICE OF THE DIVISION ENGINEER
MISSOURI RIVER DIVISION
REAL ESTATE

NEBRASKA ORDNANCE PLANT

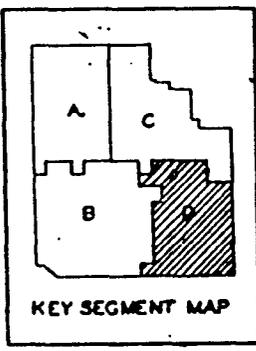
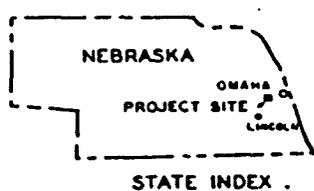
MILITARY RESERVATION
RECOMMENDED BY _____
APPROVED BY _____

2048
APPROVED BY _____
DATE _____

CT REGISTER	
AGE	REMARKS
10.00	
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970.00	
980.00	
990.00	
1000.00	



VICINITY MAP



KEY SEGMENT MAP

FINAL
PROJECT OWNERSHIP
TYPE OF MAP

STATE NEBRASKA
COUNTY SAUNDERS
DIVISION MISSOURI RIVER
DISTRICT OMAHA
FIFTH ARMY AREA

LOCATION OF PROJECT
0.5 MILE SE. OF MEAD
30 MILES W. OF OMAHA

TRANSPORTATION FACILITIES

U.R. C.B. & Q. RAILROAD
38, 63 STATE ROAD
77-275-39A & B FEDERAL ROAD
AIRLINE

ACQUISITION
TOTAL ACRES ACQUIRED

ACRES FEE
ACRES TRANS'D TO WAR DEPT.
ACRES LEASED TO WAR DEPT.
ACRES LESSER INTERESTS

DISPOSAL
TOTAL ACRES DISPOSED OF
ACRES SOLD BY WAR DEPT.
ACRES FEE TO GSA

ACRES TRANS'D }
ACRES REASSIGNED

LEGEND

COUNTY LINE
TOWNSHIP LINE
SECTION LINE
PROPERTY LINE
STREAMS
RAILROADS
POWER LINES
TELEPHONE LINES
IMPROVED ROADS
UNIMPROVED ROADS

SCALE
IN FEET
0 1000 2000

Assigned by Dept. of Army to 5th U.S. 1960.

Assigned to Department of Air Force by letter dated 1/15/61, GLOBECON.

Reported access to GSA (SP 118) 23 March 1961. All rights-of-way and facilities shown or necessary utilities reserved to the Government by conveying.

Conveyed to the University of Nebraska by GCO on 1 Sept 1961, who conveyed 1,707.64 acres to the University of Nebraska by GCO.

ACQUISITION AUTHORIZATION

RE-D-432 DATED 12 JUL 61
RE-D-333 (AGEN) DATED 18 JUNE 62

NEBRASKA DEPARTMENT OF LAND AND WATER

2045

APPENDIX B
USAF, UNIVERSITY OF NEBRASKA, AND
HOWARD RICHTER DEEDS

Sources: COE, Omaha District, 1959.
NOP, 1962.
HEW, Region VII, 1971.
GSA, Real Property Division, 1962.

DEPARTMENT OF THE ARMY
PERMIT TO OTHER FEDERAL GOVERNMENT DEPARTMENT OR AGENCY
TO USE PROPERTY ON
NEBRASKA ORDNANCE PLANT, NEBRASKA

CONTRACT NO. DA-25-066-ENG-5704

THE DEPARTMENT OF THE AIR FORCE is hereby granted an interim permit, pending the ultimate transfer of the property hereinafter described, for a term of five (5) years beginning 26 July 1959 and ending 25 July 1964, but revocable at will by the Secretary of the Army, to use and occupy certain lands, buildings, improvements and utilities, including the right-of-ways necessary for the operation and maintenance of the utilities, within the Nebraska Ordnance Plant Reservation, Nebraska, substantially as shown on the map of said Reservation, designated Exhibit "A", attached hereto and made a part hereof, and described as follows:

ADMINISTRATION AREA

A tract of land situated in the N $\frac{1}{2}$ of Section 2 and the NW $\frac{1}{4}$ of Section 1, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, more particularly described as follows: Lot 1 of Section 2 (excepting therefrom the following described lands owned by the Morningside Cemetery commencing at a point 132.1 feet more or less North of the SE corner of said Lot 1, thence West along the South side of the Morningside Cemetery a distance of 273 feet to the SW corner of said Cemetery thence North parallel to the East line of said Section to a point on the North line of Lot 1, thence East 273 feet to the NE corner of Section 2, thence South along the East line of said Section to the point of beginning); Lots 2 and 3; the East 330.00 feet of Lot 4; the SE $\frac{1}{4}$ of Section 2; the East 330.00 feet of the SW $\frac{1}{4}$ of Section 2; the S $\frac{1}{2}$ NE $\frac{1}{4}$ all in Section 2; the S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 1, containing 241.59 acres, more or less. Crosshatched red on Exhibit "A".

LAUNCHER AREA

All of Section 8 and the N $\frac{1}{2}$ of Section 17; also that part of the E $\frac{1}{2}$ of Section 7 and the NE $\frac{1}{4}$ of Section 18; beginning at the NE corner of the SE $\frac{1}{4}$ NE $\frac{1}{4}$; thence Southerly along the East line of said Section 7 and 18 for a distance of 5610.00 feet; thence Westerly parallel to the North line of said Section 18 for a distance of 1980.00 feet; thence Northerly parallel to the said East line of Sections 7 and 18 for a distance of 4290.00 feet; thence Northeasterly to the said point of beginning; all in Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, containing 1185.00 acres, more or less. Crosshatched blue on Exhibit "A".

COMMUNICATIONS AREA

S $\frac{1}{2}$ of Section 21 and the N $\frac{1}{2}$ of Section 28, Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, containing 640.00 acres, more or less. Crosshatched orange on Exhibit "A".

AFBND TECH AREA

A tract of land situated in SE $\frac{1}{4}$ of Section 14 and the North 165 feet of the NE $\frac{1}{4}$ of Section 23, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, described as follows: Commencing at the SE corner of Section 14, thence Southerly along the East line of Section 23 for a distance of 165 feet; thence Westerly parallel to the North line of said Section 23 to the point of intersection of said described line; with the existing fence line on the Northeast side of Load Line No. 1, being the true point of beginning of said tract of land; thence Northwesterly along said existing fence line to the corner of the North fence line of said Load Line No. 1; thence Westerly along said existing North line of Load Line No. 1 to the corner of the Northwest fence line of said Load Line No. 1; thence Southwesterly along the said existing Northwest fence line to a point, said point being 165 feet Southerly, measured at right angles, from the North line of said Section 23; thence Easterly parallel to the said North line of said Section 23 to the said point of beginning, containing 34.03 acres, more or less. Crosshatched green on Exhibit "A".

HINE AREA

A tract of land situated in the NE $\frac{1}{4}$ of Section 14, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, more particularly described as follows: Beginning at a point on the South edge of Bldg. No. 22-2, said point being 160.00 feet West of the SE corner of said Bldg.; thence South 100 feet; thence East 590.00 feet; thence in a North-easterly direction for a distance of 80.00 feet to a point 55.00 feet South of a line extended due East from the SE corner of Bldg. No. 22-1; thence North 30.00 feet; thence East 150.00 feet, more or less, to a point on the West bank of Ditch No. 5; thence Northerly and Northwesterly parallel to and along the Southwesterly edge of Ditch No. 5 for a total distance of 580.00 feet; more or less, to a point 272.00 feet North and approximately 10 feet East of the Northeast corner of Bldg. No. 22-1; thence West 60.00 feet; thence Northwesterly at right angles to the existing entrance road for a distance of 30.00 feet; thence West-Southwest a distance of 100.00 feet to a point approximately 256.00 feet North and 44 feet West of the Northwest corner of Bldg. No. 22-1; thence West-Southwest a distance of 270.00 feet; more or less, to a point 326.50 feet due North of the point of beginning; thence South for a distance of 125.00 feet; thence West at right angles for a distance of 750.00 feet; thence South at right angles for a distance of 300.00 feet; thence East at right angles for a distance of 750.00 feet, more or less, to a point due South from the point of beginning; thence North to the point of beginning, containing 11.97 acres, more or less. Crosshatched brown on Exhibit "A".

THE RIGHT-OF-WAYS AND FACILITIES FOR OPERATION AND MAINTENANCE OF THE NECESSARY UTILITIES TO SUPPORT THE ABOVE-DESCRIBED AREAS ARE AS FOLLOWS:

BURNING PIT AREA

A tract of land situated in the SW of Section 16, Township 14 North, Range 9 East of the Sixth Principal Meridian, more particularly described as follows: Beginning at the SE corner of SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 16; thence Easterly along the South line of said Section 16 for a distance of 1650 feet; thence Northerly at right angles for a distance of 660 feet; thence Westerly at right angles for a distance of 660 feet; thence Southwesterly to the said point of beginning, containing 17.50 acres, more or less. Crosshatched yellow on Exhibit "A".

Alphabetical

WELLS AND WATER TOWERS (Solid red on Exhibit "A") Each site being described as follows:

W-2A (Well)

Beginning at a point 400 feet Easterly from the SW corner of Section 1 along the South line of said Section 1, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence North 200 feet; thence East 200 feet; thence South 200 feet; thence West 200 feet to the said point of beginning. Containing 0.92 acres, more or less.

W-2B (Tower)

Beginning at a point 140 feet Easterly from the SW corner of Section 1, along the South line of said Section 1, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence North 200 feet; thence East 200 feet; thence South 200 feet; thence West 200 feet to the said point of beginning. Containing 0.92 acres, more or less.

W-3A (Well)

Beginning at a point 220 feet Westerly from the Southwest corner of Section 1, along the South line of said Section 1, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence North 300 feet; thence West 200 feet, thence South 300 feet; thence East 200 feet to the said point of beginning. Containing 1.38 acres, more or less.

W-11A (Well)

Beginning at a point 190 feet Northerly from the Southeast corner of Section 23, along the East line of said Section 23, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, thence Westerly 200 feet, thence Northerly 200 feet; thence Easterly 200 feet; thence Southerly 200 feet to the said point of beginning. Containing 0.92 acres, more or less.

W-9A (Well)

Beginning at a point 1400 feet Northerly from the Southwest corner of Section 18, along the West line of said Section, Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, thence East 200 feet; thence North 200 feet; thence West 200 feet; thence Southerly 200 feet to the said point of beginning. Containing 0.92 acres, more or less.

W-4B (Tower)

Beginning at a point 1500 feet North and 1500 feet West from the Southeast corner of Section 13, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, thence North 200 feet; thence West 200 feet; thence South 200 feet; thence East 200 feet to the said point of beginning. Containing 0.92 acres, more or less.

W-8A (Well)

Beginning at a point 240 feet North from the Southeast corner of Section 19, along the East line of said Section 19, Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence West 300 feet; thence South 200 feet; thence East 300 feet; thence North 200 feet to the said point of beginning. Containing 1.38 acres, more or less.

W-6B (Tower) and W-6A (Well)

Beginning at a point 1200 feet Northerly from the Southeast corner of Section 17, along the East line of said Section 17, Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence West 200 feet; thence North 300 feet; thence East 200 feet; thence South 300 feet to the point of beginning. Containing 1.38 acres, more or less.

W-7A (Well)

Beginning at a point 240 feet Southerly from the NE corner of Section 20, along the East line of said Section 20; thence West 200 feet; thence North 300 feet; thence East 200 feet; thence South 300 feet to the said point of beginning. Containing 1.38 acres, more or less.

W-10A (Well)

Beginning at a point 2000.00 feet West of the NE corner of Section 26, Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska; thence South at right angles 330.00 feet; thence East at right angles for a distance of 200 feet; thence North at right angles for a distance of 330.00 feet to a point on the North line of said Section 26; thence West along the said North line for a distance of 200 feet to the said point of beginning. Containing 1.47 acres, more or less.

WATER LINES

A 20 foot strip of land over and across the following described area and delineated by a rose colored line on Exhibit "A", in Township 14 North, Ranges 8 and 9 East of the 6th Principal Meridian, Saunders County, Nebraska, described as the South 300 feet of Section 1, SE $\frac{1}{4}$, E $\frac{1}{2}$ W $\frac{1}{2}$, S $\frac{1}{2}$ N $\frac{1}{2}$, Section 2, W $\frac{1}{2}$ E $\frac{1}{2}$ Section 11, East 300 feet Section 12, East 300 feet of NE $\frac{1}{4}$, S $\frac{1}{2}$ Section 13, E $\frac{1}{2}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, Section 14, E $\frac{1}{2}$ W $\frac{1}{2}$, and E $\frac{1}{2}$ of Section 23, N $\frac{1}{2}$ S $\frac{1}{2}$, Section 24, Township 14 North, Range 8 East, S $\frac{1}{2}$ Section 17, S $\frac{1}{2}$ Section 18, N $\frac{1}{2}$ S $\frac{1}{2}$ Section 19, N $\frac{1}{2}$ S $\frac{1}{2}$ NE $\frac{1}{4}$ Section 20, N $\frac{1}{2}$ Section 21, containing 38.15 acres, more or less.

ROADS

All roads and streets running over and across the following described land and delineated by a light green line on Exhibit "A" in Township 14 North, Ranges 8 and 9 East of the 6th Principal Meridian, Saunders County, Nebraska, described as that part of Avenue A running between Sections 1 and 2, 11 & 12, 13 & 14, 23 & 24; that part of Second Street running between Section 12 and Section 1 to Well Site 3A, and that part of Third Street starting at the Nike Area and running across the NE $\frac{1}{4}$ Section 14, the N $\frac{1}{2}$ Section 13 and N $\frac{1}{2}$ Section 18; that part of Fourth Street running between the SE $\frac{1}{4}$ Section 23 and the NE $\frac{1}{4}$ Section 26, between Sections 24 and 25; Sections 19 and 30; Sections 20 and 29. Also an access road into the AFBMD Tech Area across the NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 23 including the right to use Gate House No. 1-3. That part of Avenue B South from Third Street to electric sub-station No. 2-27. That part of Avenue C North from Fourth Street to Well Site 8A. That part of Avenue D running between Sections 20 and 21, 16 and 17. The access road to the Burning Pit area and the Sewer Disposal Plant between Sections 16 and 21 into the N $\frac{1}{2}$ Section 21, containing in all 96.28 acres, more or less.

RAILROADS

All railroads spur tracks, and switching yards running over and across the following described lands and delineated by a light blue line on Exhibit "A". The W $\frac{1}{2}$ W $\frac{1}{2}$ of Section 2; the W $\frac{1}{2}$ W $\frac{1}{2}$ of Section 11; the NW $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ of Section 14, W $\frac{1}{2}$ Section 23; W $\frac{1}{2}$ W $\frac{1}{2}$ of Section 26; W $\frac{1}{2}$ of Section 35, in Township 14 North, Range 9 East, Saunders County, Nebraska, containing 77.76 acres, more or less.

SEWER LINES

A 20 foot strip of land over and across the following described area and delineated on Exhibit "A" by a yellow line: The S $\frac{1}{2}$ S $\frac{1}{2}$, Section 1; E $\frac{1}{2}$ Section 2, East 300 feet of Section 12, E $\frac{1}{2}$ E $\frac{1}{2}$ Section 13; SE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$ Section 14, NE $\frac{1}{4}$ Section 23; N $\frac{1}{2}$ Section 24; Township 14 North, Range 8 East, also N $\frac{1}{2}$, Section 19; N $\frac{1}{2}$ Section 20; N $\frac{1}{2}$ Section 21; Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, containing 22.15 acres, more or less.

SEWER DISPOSAL PLANT

A tract of land situated in the NE $\frac{1}{4}$ of Section 21, Township 14 North, Range 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, more particularly described as follows: Commencing at the N $\frac{1}{2}$ corner of Section 21, thence Easterly along the North line of said Section 21 for a distance of 990.00 feet; thence Southerly at right angles for a distance of 1320.00 feet, to the point of beginning of the tract of land to be described; thence continuing Southerly along said line for a distance of 660.00 feet; thence Easterly at right angles for a distance of 825.00 feet; thence Northerly at right angles for a distance of 660.00 feet; thence Westerly at right angles for a distance of 825.00 feet to the said point of beginning, containing 12.50 acres, more or less. Crosshatched purple on Exhibit "A".

GAS LINES

A 20 foot strip of land over and across the following described area and delineated by a lavender line on Exhibit "A". The SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, of Section 2, the W $\frac{1}{2}$ E $\frac{1}{2}$, S $\frac{1}{2}$ SW $\frac{1}{4}$ of Section 11; the E $\frac{1}{2}$ of Section 14; all in Township 14 North, Range 8 East of the Sixth Principal Meridian, Saunders County, Nebraska, containing 7.64 acres, more or less.

ELECTRICAL LINES

The right to use Sub-stations Nos. 1-27 and 2-27 with other necessary electrical facilities together with a 20.00 foot strip of land over and across the following described area in Township 14 North, Ranges 8 and 9 East of the Sixth Principal Meridian, Saunders County, Nebraska, and delineated by a light colored orange line on Exhibit "A". The W $\frac{1}{2}$ W $\frac{1}{2}$ and the South 300.00 feet of Section 1; the West 300.00 feet of Section 12; the West 300.00 feet of the SW $\frac{1}{4}$, N $\frac{1}{2}$ of Section 13; the West 300.00 feet, South 300.00 feet of Section 24, the S $\frac{1}{2}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 14; the W $\frac{1}{2}$ NW $\frac{1}{4}$ of Section 23; all in Township 14 North, Range 8 East, also the SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 6; the West 300.00 feet of Section 7; the West 300.00 feet of NW $\frac{1}{4}$, S $\frac{1}{2}$ N $\frac{1}{2}$ of Section 18, the South 300.00 feet of Section 19; the South 300.00 feet of Section 20; N $\frac{1}{2}$ of Section 21; the West 300.00 feet of Section 16, containing 31.11 acres, more or less.

THIS PERMIT is granted subject to the following conditions:

1. That the use and occupation of the said premises shall be without cost or expense to the Department of the Army, under the general supervision and subject to the approval of the officer having immediate jurisdiction over the premises, and subject also to such rules and regulations as he may from time to time prescribe.
2. That the permittee shall, at its own expense and without cost or expense to the Department of the Army, maintain and keep in good repair, and condition the premises herein authorized to be used.
3. That any interference with or damage to property under control of the Department of the Army incident to the exercise of the privileges herein granted shall be promptly corrected by the permittee to the satisfaction of the said officer.
4. That the permittee shall pay the cost, as determined by the said officer, of producing and/or supplying any utilities and other services furnished by the Department of the Army or through Department of the Army facilities for the use of the permittee.
5. That no additions to or alterations of the premises shall be made without the prior consent of the said officer.

6. That if for any reason it should be deemed necessary or expedient for the Department of the Army to perform functions and/or render services which are the responsibility of the permittee, the said officer may, in lieu of reimbursement, require the permittee to furnish the personnel and/or materials required for the performance of said functions and/or for the rendering of said services. In addition to furnishing personnel and/or materials, the permittee shall reimburse the Department of the Army for any costs incurred by the Department of the Army in connection with said functions and/or services. Selection of such personnel will be subject to the approval of the said officer.

7. That on or before the date of expiration of this permit or its relinquishment by the permittee, the permittee shall vacate the said premises, remove its property therefrom, and restore the premises to a condition satisfactory to the said officer, ordinary wear and tear and damage beyond the control of the permittee excepted. If, however, this permit is revoked, the permittee shall vacate the premises, remove its property therefrom, and restore the premises as aforesaid within such time as the Secretary of the Army may designate.

8. That it is to be understood that the requirements of this permit pertaining to maintenance, repair and restoration of the premises and reimbursement for utilities and other services, shall be effective only insofar as they do not conflict with any agreement, pertaining to such matters, made between local representatives of the permittor and permittee in accordance with existing regulations.

9. That the use of the property herein described is subject to the following reservation, permits and leases:

- A. Reserving to the Ordnance Corps the right to occupy a minimum of 250 square feet of office space in the Administration Building No. O-1 pending disposal of the balance of the Nebraska Ordnance Plant.
- B. Permit dated 27 February 1956 granted to the Department of Agriculture (Soil Conservation Service) Permit dated 3 December 1958 granted to the Department of Agriculture (Agriculture Research Service).
- C. Agricultural grazing leases as follows:

<u>Lease No.</u>	<u>Lessee</u>
DA-25-066-ENG-4548 ✓	Gifford & Richter
" 4559 ✓	Art Gifford
" 4606 ✓	Art Gifford
" 4779 ✓	M. B. & Q. Farms
" 4731 ✓	M. B. & Q. Farms
" 4646 ✓	M. B. & Q. Farms
" 4022 ✓	Dr. J. P. Little
" 4431 ✓	Gifford & Richter
" 4728 ✓	M. B. & Q. Farms
" 4655 ✓	Elwyn D. Johnson
" 4657 ✓	Ernest Calka
" 4734 ✓	Raymond W. & Dan A. Hass
" 4650 ✓	Jay DeGroff
" 4649 ✓	Leonard T. Hanks
" 4660 ✓	Gifford & Son Farms

DA-25-066-ENG-4654
" 4749
" 4653
" 4656
" 4732
" 4777
" 4658

Joe & Fern Haba
Harvey Munsterman
Kenneth Carlson
O. B. Liliedahl
Milford Johnson
Art Lamprecht
Wm. O. H. Munsterman

10. This permit supersedes permit dated 23 May 1956, No. (Unnumbered), granting the Department of the Air Force the use of lands for the operation and maintenance of Global Communication Facilities also permit dated 23 January 1959, No. DA-25-066-ENG-5258 granting the Department of the Air Force the use of 960 acres of lands for construction purposes.

IN WITNESS WHEREOF I have hereunto set my hand by authority of the Secretary of the Army this 22nd day of July 1959.

Dale Kent

DALE KENT
Chief, Real Estate Division
U. S. Army Engineer District, Omaha
Contracting Officer

B-1