US Army Corps of Engineers ®
Omaha District

FINAL SITE INSPECTION REPORT
Pocatello Bombing Range No. 3

Bingham County, Idaho

FUDS Property No. F10ID0128

Site Inspections at Multiple Sites, NWO Region
Formerly Used Defense Sites
Military Munitions Response Program

Contract No. W912DY-04-D-0010
Delivery Order No. 003

July 2012

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as official Department of the Army position, policy, or decision, unless so designated by other documentation.

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Military Munitions Response Program

July 2012

Submitted to:

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Table of Contents

List of Figures iii
List of Tables iv
List of Appendices v
List of Acronyms and Abbreviations vi
Glossary of Terms viii

Executive Summary ES-1
1.0 Introduction 1-1
1.1 Project Authorization 1-1
1.2 Site Name and Location 1-1
1.3 Purpose, Scope, and Objectives of the Site Inspection 1-2
1.4 Munitions Response Site Prioritization Protocol 1-3
2.0 Property Description and History 2-1
2.1 Historical Military Use 2-1
2.2 Munitions Information 2-2
2.3 Ownership History 2-3
2.4 Physical Setting 2-4
2.4.1 Topography and Vegetation 2-4
2.4.2 Surface Water 2-4
2.4.3 Sensitive Environments 2-4
2.4.4 Climate 2-5
2.4.5 Geologic and Hydrogeologic Setting 2-6
2.4.5.1 Bedrock Geology 2-6
2.4.5.2 Overburden Soils 2-6
2.4.5.3 Hydrogeology 2-7
2.5 Population and Land Use 2-8
2.5.1 Nearby Population 2-8
2.5.2 Land Use 2-8
2.5.3 Area Water Supply 2-8
2.6 Previous Investigations for MC and MEC 2-9
2.6.1 Inventory Project Report (USACE, 1988) 2-9
2.6.2 Archives Search Report (USACE, 2003) 2-9
2.6.3 ASR Supplement (USACE, 2004a) 2-9
2.7 Other Land Uses that May Have Contributed to Contamination 2-10
2.8 Past Regulatory Activities 2-10
2.9 Previous MEC Finds 2-10
3.0 Site Inspection Tasks 3-1
3.1 Technical Project Planning 3-1
3.2 Additional Records Research 3-4
3.2.1 Coordination with State Historic Preservation Office 3-4
3.2.2 Coordination with Natural Resources Offices 3-4
3.2.3 Historical Aerial Photographs 3-4
3.2.4 Environmental Database Search 3-4

Table of Contents (Cont.)

3.2.5 Rights-of-Entry ... 3-5
3.3 Field Work ... 3-5
3.4 Sampling and Analysis ... 3-5
3.5 Laboratory Analysis and Data Quality Review ... 3-6
3.6 Screening Values ... 3-7
3.6.1 Background Data ... 3-8
3.6.2 Human Health Screening ... 3-9
3.6.3 Ecological Screening ... 3-9
3.7 Variances from the SSWP ... 3-9
3.8 Second TPP Meeting ... 3-10
3.9 Public Notice ... 3-10
4.0 Bombing Range No. 3 MRS ... 4-1
4.1 History and Land Use ... 4-1
4.2 Previous Investigations ... 4-2
4.3 MEC Evaluation ... 4-2
4.3.1 Preliminary Conceptual Site Model Summary for MEC ... 4-2
4.3.2 Field Observations and Evidence of MEC ... 4-3
4.3.2.1 Evidence of MEC ... 4-3
4.3.2.2 General Field Observations ... 4-5
4.3.3 MEC Risk Assessment ... 4-6
4.4 Munitions Constituents Evaluation ... 4-9
4.4.1 Preliminary Conceptual Site Model Summary for Munitions Constituents ... 4-9
4.4.2 Soil Exposure Pathway ... 4-9
4.4.2.1 Comparison to Background Data ... 4-10
4.4.2.2 Comparison to Human Health Screening Values ... 4-10
4.4.2.3 Comparison to Ecological Screening Values ... 4-10
4.4.3 Surface Water Pathway ... 4-10
4.4.3.1 Comparison to Background Data ... 4-11
4.4.3.2 Comparison to Human Health Screening Levels ... 4-11
4.4.3.3 Comparison to Ecological Screening Levels ... 4-11
4.4.4 Groundwater Pathway ... 4-11
4.4.5 Air Pathway ... 4-11
5.0 Summary and Conclusions ... 5-1
5.1 MEC Evaluation ... 5-1
5.2 MC Evaluation ... 5-1
6.0 Recommendations ... 6-1
6.1 Bombing Range No. 3 ... 6-1
6.2 Munitions Response Site ... 6-1
7.0 References ... 7-1

List of Figures

Figure 1-1 Site Location
Figure 1-2 1952 Aerial Photograph
Figure 1-3 2010 Aerial Photograph

Figure 2-1 Parcel Ownership
Figure 2-2 Topographic Map
Figure 2-3 Regional Surface Water Drainage within a 15-Mile Radius
Figure 2-4 Sensitive Receptor Locations within a 4-Mile Radius
Figure 2-5 Census Data within a 4-Mile Radius
Figure 2-6 Groundwater Well Locations within a 4-Mile Radius

Figure 3-1 Sampling Units and Sediment Sample Locations

Figure 4-1 Site Inspection Reconnaissance and Downgradient Sediment Sample Location
Figure 4-2 Central Target Area Reconnaissance
Figure 4-3 Sampling Unit 1 Reconnaissance and IS Locations
Figure 4-4 Sampling Unit 2 Reconnaissance and IS Locations
Figure 4-5 Sampling Unit 3 Reconnaissance and IS Locations
Figure 4-6 Sampling Unit 4 Reconnaissance and IS Locations
Figure 4-7 Sampling Unit 5 Reconnaissance and IS Locations
Figure 4-8 Ad Hoc Sampling Unit Reconnaissance and IS Locations

Figure 6-1 Site Inspection Munitions Response Site

List of Tables

Table 2-1 Munitions Information
Table 2-2 Army Checklist for Important Ecological Places

Table 3-1 Summary of Samples Collected and Sample Tracking Information
Table 3-2 Background Screening Levels for Soil and Sediment
Table 3-3 Human Health Screening Criteria for Soil and Sediment
Table 3-4 Ecological Screening Criteria for Soil
Table 3-5 Ecological Screening Criteria for Sediment

Table 4-1 Comparison of Bombing Range No. 3 MRS Soil Results to Site Inspection Screening Levels
Table 4-2 Comparison of Bombing Range No. 3 MRS Sediment Results to Site Inspection Screening Levels

List of Appendices

Appendix A Performance Work Statement *(Electronic Only)*
Appendix B Technical Project Planning Session Documentation/Meeting Minutes *(Electronic Only)*
Appendix C Interview Documentation
Appendix D Field Notes and Field Forms
Appendix E Photodocumentation Log
Appendix F Analytical Data *(Electronic Only)*
Appendix G Analytical Data QA/QC Report
Appendix H Geographic Information Systems Data
Appendix I Geophysical Data *(Not Used)*
Appendix J Conceptual Site Model
Appendix K Munitions Response Site Prioritization Protocol Evaluations
Appendix L Reference Copies

List of Acronyms and Abbreviations

°F	degrees Fahrenheit
Amatol	mixture of ammonium nitrate and 2,4,6-trinitrotoluene (TNT)
amsl	above mean sea level
ASR	*Archives Search Report*
ASTM	ASTM International
bgs	below ground surface
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Composition B	59.5 percent RDX, 39.5 percent 2,4,6-trinitrotoluent (TNT), and 1 percent wax
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DMM	discarded military munitions
DoD	Department of Defense
DQO	data quality objective
EDR	Environmental Data Resources, Inc.
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
ESRI	Environmental Systems Research Institute
FR	Federal Register
ft	foot or feet
FUDS	Formerly Used Defense Sites
FUDSMIS	Formerly Used Defense Site Management Information System
GIS	Geographic Information System
GP	general purpose
GPS	Global Positioning System
HE	high explosive
HRS	Hazard Ranking System
HTRW	hazardous, toxic, or radioactive wastes
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDTL	Initial Default Target Level
IDWR	Idaho Department of Water Resources
IEP	Important Ecological Place
INL	Idaho National Laboratory
INPR	Inventory Project Report
IS	incremental sampling
LANL	Los Alamos National Laboratory
lb	pound(s)
MC	munitions constituents
MD	munitions debris
MDC	maximum detected concentration

MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MMRP	Military Munitions Response Program
mph	miles per hour
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	No Department of Defense Action Indicated
NWO	Northwestern Division Omaha District
ODEQ	Oregon Department of Environmental Quality
QA/QC	Quality Assurance/Quality Control
RAC	Risk Assessment Code
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RI/FS	Remedial Investigation/Feasibility Study
ROE	right-of-entry
RSL	Regional Screening Level
Shaw	Shaw Environmental, Inc.
SHPO	State Historic Preservation Office
SI	Site Inspection
SLERA	screening-level ecological risk assessment
SSWP	*Site-Specific Work Plan*
SVOC	semivolatile organic compound
tetryl	2,4,6-trinitrophenyl-N-methylnitramine
TPP	Technical Project Planning
TNT	2,4,6-trinitrotoluene
Tritonal	80 percent 2,4,6-trinitrotoluene (TNT) and 20 percent aluminum powder
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	unexploded ordnance
Work Plan	*Final Type I Work Plan*

Glossary of Terms

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) – Also known as "Superfund," this congressionally enacted legislation provides the methodology for the removal of hazardous substances resultant from past / former operations. Response actions must be performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (U.S. Environmental Protection Agency [EPA], 2012a). CERCLA was codified as 42 USC 9601 et seq., on December 11, 1980, and amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986.

Defense Sites – Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense (DoD). The term does not include any operational range, operating storage, or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions (10 USC 2710(e)(1)).

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed consistent with applicable environmental laws and regulations (10 USC 2710(e)(2)).

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration (10 USC 2710(e)(2)).

Formerly Used Defense Site (FUDS) – Real property that was formerly owned by, leased by, possessed by, or otherwise under the jurisdiction of the Secretary of Defense or the components, including organizations that predate DoD. Some FUDS properties include areas formerly used as military ranges (10 USC 2710(e)(2)).

Military Munitions – Ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunitions, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components of the above.

The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of

nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) have been completed (10 USC 101(e)(4)(A) through (C)).

Munitions Constituents (MC) – Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 USC 2710(e)(3)).

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (10 USC 2710(e)(2)).

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 USC 101(e)(5); (B) Discarded military munitions (DMM), as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard (10 USC 2710(e)(2)).

Munitions Response Area (MRA) – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples are former ranges and munitions burial areas. An MRA comprises one or more munitions response sites (32 CFR§179.3).

Munitions Response Site (MRS) – A discrete location within an MRA that is known to require a munitions response (32 CFR§179.3).

Munitions Response Site Prioritization Protocol (MRSPP) – The MRSPP was published as a rule on October 5, 2005. This rule implements the requirement established in section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the Department of Defense (DoD) to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC). The DoD adopted the MRSPP under the authority of 10 USC 2710(b). Provisions of 10 USC 2710(b) require that the Department assign to each defense site in the inventory required by 10 USC 2710(a) a relative priority for response activities based on the overall conditions at each location and taking into consideration various factors related to safety and environmental hazards (70 FR 58016).

Range – A designated land or water area that is set aside, managed, and used for range activities of the Department of Defense. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas. The term also includes airspace areas designated for

military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration (10 USC 101(e)(1)(A) and (B)).

Range Activities – Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems (10 USC 101(e)(2)(A) and (B)).

Risk Assessment Code (RAC) – An interim risk assessment procedure developed by the U.S. Army Engineering and Support Center, Huntsville (USAESCH), Ordnance and Explosives Directorate (CEHNC-OE) to address explosives safety hazards related to munitions. The RAC score was formerly used by the USACE to prioritize response actions at FUDS. The RAC procedure, which does not address environmental hazards associated with munitions constituents, has been superseded by the MRSPP.

Unexploded Ordnance (UXO) – Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause (10 USC 101(e)(5)(A) through (C)).

Executive Summary

The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at Formerly Used Defense Sites (FUDS) for the Army, DoD's Executive Agent for the FUDS program. Shaw Environmental, Inc. (Shaw) is responsible for conducting Site Inspections (SIs) at FUDS in the northwest region managed by the Omaha District Military Munitions Design Center.

SI Objectives and Scope

The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The SI collects the minimum amount of information necessary to make this determination, as well as it (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (EPA); and (iii) collects data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study. An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

The scope of the SI reported herein is restricted to evaluation of the presence of MEC or MC related to historical use of the FUDS prior to transfer. Potential releases of hazardous, toxic, or radioactive wastes are not addressed within the current scope. The intent of the SI is to confirm the presence or absence of MEC and/or associated MC.

Pocatello Bombing Range No. 3

This report presents the results of an SI conducted at Pocatello Bombing Range No. 3, FUDS Property Number F10ID0128, located approximately 25 miles northwest of Blackfoot, Idaho, in Bingham County. Pocatello Bombing Range No. 3 was used as a demolition (high explosive [HE]) and incendiary bombing range. The land for the range was acquired on October 7, 1943. The range may have been in use as early as October 7, 1943, until as late as May 1, 1947. DoD usage was officially revoked by Public Land Order 969, dated June 4, 1954.

Technical Project Planning

The approach for the SI was developed by Shaw in consultation with site stakeholders. A Technical Project Planning meeting conducted in December 2010 was attended by representatives from the USACE – NWO Military Munitions Design Center, USACE Seattle District, and USACE Kansas City District; Idaho Department of Environmental Quality; Bureau

of Land Management (BLM) Salmon Field Office; and Shaw. The stakeholders agreed to the approach and identified one munitions response site (MRS), Bombing Range No. 3.

SI Field Activities

SI field activities, conducted in August 2011, included site reconnaissance to look for evidence of MEC and to collect samples from surface soil and sediment. MD was observed from M38A2 100-lb practice bombs with M1A1, M3, or possibly M5 spotting charges; AN-M30 general purpose (GP) HE bombs; AN-M54 and possibly AN-M50 incendiary bombs; and .50-caliber small arms ammunition. Craters and wood debris were also observed. Confirmed MEC consisting of unexploded AN-M54 incendiary bombs was observed in five locations throughout the MRS. An Explosive Ordnance Disposal (EOD) team from Mountain Home Air Force Base responded to the site and destroyed the MEC at a location off the FUDS approved by the BLM. Possible MEC, consisting of AN-M54 or AN-M50 tail fins protruding from the ground, was also observed in six locations. Because the field team was unable to determine whether the fins were attached to the incendiary portion of the devices, the BLM representatives on site opted to have the items addressed by the EOD team. Results of surface soil and sediment sampling indicate an MC release has not been established at the MRS. Although aluminum and barium were detected in MRS samples above their respective background concentrations, because the detections did not exceed three times the background concentrations, a release was not established. Anthracene, hexachloroethane, and explosives were not detected in the MRS samples.

SI Recommendations

Results of the SI provide the basis for conclusions and/or recommendations for further actions at the Bombing Range No. 3 MRS.

Based on historical evidence and results from the SI field activities, MEC (AN-M54 incendiary bombs) is present at the Bombing Range No. 3 MRS. Evidence of MEC (AN-M30 GP HE bombs and M1A1 or M3 spotting charges used with M38A2 practice bombs) is also present at the MRS. Therefore, further investigation relative to MEC is recommended. It is further recommended that consideration be given to a removal action due to the likely presence of additional AN-M54 incendiary bombs not found by the SI field team and the potential for exposure to BLM workers, cattle ranchers, firefighters, and hunters.

Based on the results of sampling conducted during the SI field activities, an MC release has not been established at the Bombing Range No. 3 MRS. Therefore, no further investigation relative to MC is recommended. A removal action relative to MC is not required.

1.0 Introduction

This Site Inspection (SI) Report presents the results of an SI conducted at the Pocatello Bombing Range No. 3 Formerly Used Defense Site (FUDS) located near Blackfoot, Idaho. Shaw Environmental, Inc. (Shaw) has prepared this report for the U.S. Army Corps of Engineers (USACE) in accordance with Task Order 003, issued under USACE Contract No. W912DY-04-D-0010. Shaw is responsible for conducting SIs at FUDS in the northwest region managed by the USACE Northwestern Division Omaha District (NWO) Military Munitions Design Center as directed by the Performance Work Statement (Appendix A).

The technical approach is based on the *Final Type I Work Plan, Site Inspections at Multiple Sites, NWO Region* (Work Plan; Shaw, 2006) and the *Formerly Used Defense Sites, Military Munitions Response Program, Site Inspections, Program Management Plan* (USACE, 2005).

1.1 Project Authorization

The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the USACE is conducting environmental response activities at FUDS for the Army, DoD's Executive Agent for the FUDS program.

Pursuant to USACE's Engineer Regulation (ER) 200-3-1 (USACE, 2004b) and the *Management Guidance for the Defense Environmental Restoration Program* (DERP) (Office of the Deputy Under Secretary of Defense [Installations and Environment], September 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 USC 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). As such, USACE is conducting remedial SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

While not all MEC/MC constitute CERCLA hazardous substances, pollutants, or contaminants, the DERP statute provides DoD the authority to respond to releases of MEC/MC, and DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

1.2 Site Name and Location

The Pocatello Bombing Range No. 3, FUDS Property Number F10ID0128, is located approximately 25 miles northwest of Blackfoot and approximately 8 miles due south of Atomic City in Bingham County, Idaho (Figure 1-1). The FUDS is located in Sections 22, 23, 26, 27, 34, and 35 of Township 1 South, Range 31 East.

Pocatello Bombing Range No. 3 is included in the MRS Inventory in the *Defense Environmental Programs Annual Report to Congress Fiscal Year 2010* (DoD, 2010) under Federal Facility Identification Number ID09799F303300, with the following information:

Site ID	MRSPP Score	Nearest City	County	Landowner Name	MRS Acreage	Land Use Restrictions	Land Use Access Controls
01OEW	Evaluation Pending	Taber	Bingham County	No Data Available	649	Unrestricted Public Access	No Controls

The FUDS is included in the FUDS Management Information System (FUDSMIS) Project General Information Database with Federal Facility Identification Number FFID9799F3033. The coordinates and acreage of the MRS in FUDSMIS correspond with those provided in the *ASR Supplement* (USACE, 2004a) as follows:

Range Name	Range Identification	Acreage	UTM Coordinates (meters)*
Bombing Range No. 3	F10ID012801R01	649	N 4796796.95; E 353041.85

* Coordinates for the range are in Universal Transverse Mercator (UTM) Zone 12N, North American Datum 83.

One MRS, the Bombing Range No. 3, has been identified at the Pocatello Bombing Range No. 3. The MRS boundary is based on a 3,000-foot (ft) radius safety zone for the range, which equates to an area of 649 acres. The MRS location is based on the known location of a target ring, visible in a 1952 aerial photograph. The boundaries of the MRS and FUDS are shown on a 1952 aerial photograph (Figure 1-2) and a 2010 aerial photograph (Figure 1-3). These figures also denote a rectangular area that was identified as an impact area in a real estate map (dated January 1944 and revised in May 1956) obtained during preparation of the *Archives Search Report* (ASR) (USACE, 2003). The area of the FUDS is 3,840 acres.

1.3 Purpose, Scope, and Objectives of the Site Inspection

The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under CERCLA or not. The SI collects the minimum amount of information necessary to make this determination, as well as it (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (EPA); and (iii) collects data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study (RI/FS). An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

The scope of the SI reported herein is restricted to evaluation of the presence of MEC or MC related to historical use of the FUDS prior to transfer. Potential releases of hazardous, toxic, or radioactive wastes (HTRW) are not addressed within the current scope. The intent of the SI is to confirm the presence or absence of contamination from MEC and/or MC. The general approach for each SI is to conduct records review and site reconnaissance to evaluate the presence or absence of MEC, and to collect samples at locations where MC might be expected based on the conceptual site model (CSM). The following decision rules are used to evaluate the results of the SI:

Is No DoD Action Indicated (NDAI)? An NDAI recommendation may be made if:

- There is no indication of MEC; and
- MC contamination does not exceed screening levels determined from Technical Project Planning (TPP).

Is an RI/FS warranted? An RI/FS may be recommended if:

- There is evidence of MEC hazard. MEC hazard may be indicated by direct observation of MEC during the SI, by indirect evidence (e.g., a crater potentially caused by impact of unexploded ordnance [UXO]), or by a report of MEC being found in the past without record that the area was subsequently cleared; or
- MC contamination exceeds screening levels determined from TPP.

Is a removal action warranted? A removal action may be needed if:

- High MEC hazard is identified. Shaw will immediately report any MEC findings so that USACE can determine the hazard. An example of a high hazard would be finding sensitive MEC at the surface in a populated area with no barriers to restrict access; or
- Elevated MC risk is identified. Identification of an imminent threat to human health, safety, or the environment (e.g., confirming MC concentrations above health-based risk standards in a well used as a source of drinking water) would trigger notification of affected stakeholders. Data would be presented at a second TPP meeting regarding the possible need for a removal action.

For purposes of applying these decision rules, USACE has provided guidance that evidence of MEC will generally be a basis of recommending RI/FS. Evidence of MEC may include confirmed presence of MEC from historical sources or SI field work, or presence of munitions debris (MD).

1.4 Munitions Response Site Prioritization Protocol

The MRSPP was published as a rule on October 5, 2005 (70 FR 58028). This rule implements the requirement established in section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing UXO, discarded military munitions, or MC (70 FR 58016).

This report includes draft MRSPP scoring sheets for the munitions response sites identified in this SI Report (Appendix K). The MRSPP scoring will remain draft after this SI Report is finalized, pending Army MRSPP Quality Assurance Panel review. The scoring will be reviewed on an annual basis and reapplied as necessary to incorporate new information.

2.0 Property Description and History

Unless otherwise referenced, the following historical and physical setting information in Sections 2.1 and 2.2 is taken from the *Inventory Project Report* (INPR) (USACE, 1988), the ASR (USACE, 2003) and the *ASR Supplement* (USACE, 2004a) for Pocatello Bombing Range No. 3.

2.1 Historical Military Use

Pocatello Bombing Range No. 3, also known as Pocatello Precision Bombing Range No. 3 and the Pocatello Demolition and Incendiary Bombing Range, was built and used as a demolition (high explosive [HE]) and incendiary bombing range by the Pocatello Army Air Base. The Commanding General of the Second Air Force requested the construction of the range on April 21, 1943, and the boundaries were submitted to the Interdepartmental Air Traffic Control Board on April 24, 1943. The land for the range was acquired on October 7, 1943. The range may have been in use as early as October 7, 1943, until as late as May 1, 1947. DoD usage was officially revoked by Public Land Order 969, dated June 4, 1954.

During 1943 and 1944, the 19th, 96th, 308th, 382nd, 453rd, and 464th Bombardment Groups were stationed at the Pocatello Army Air Base. The 76th Fighter Group and 362nd Fighter Squadron were also stationed at Pocatello, and all of these groups and squadrons had potential use of Pocatello Bombing Range No. 3 (USACE, 2003).

Improvements made to the target included five frame pyramid targets, which were left on the property. This suggests one target area with five smaller targets in that area. A 400-ft diameter target ring is visible in the 1952 aerial photograph of the range (Figure 1-2). Other unspecified improvements made to the range were removed. There is no indication in the available historical documentation or historical aerial photograph review that the range was used for night bombing. According to the ASR, conventional ordnance, including practice bombs with spotting charges, general purpose (GP) HE bombs, and incendiary bombs, was utilized at Pocatello Bombing Range No. 3 (USACE, 2003). Evidence of the use of .50-caliber small arms ammunition was also found during the SI. The total number of bombs dropped on this range during its period of usage is not specified in any of the reviewed documentation. The ASR does state that “during September 1943, the 382nd Bombardment Group, stationed at Pocatello Army Air Base dropped 1,706 practice bombs and 95 demolition bombs,” and that “The quantity of bomb craters is consistent with high explosive demolition bombs used in training by Bombardment Groups for the Pocatello Bombing Range No. 3” (USACE, 2003). In addition, a Certificate of Clearance, dated October 27, 1948, makes reference to “scrap from hundreds of practice bombs” (USACE, 2003). The Certificate of Clearance was completed for the rectangular “impact area” consisting of 183 acres, as shown on a real estate map dated January 1944 and revised in May 1956 (shown on Figures 1-2 and 1-3). There is no documentation of a clearance of the remainder of the MRS.

The *ASR Supplement* cites Army studies and reports on bombing analysis and accuracy completed in 1942 indicating that 99 percent of bombs dropped from 25,000 ft or less, at speeds up to 250 miles per hour (mph), would be expected to fall within 3,000 ft of the target, with 95 percent within 2,000 ft (USACE, 2004a). The *ASR Supplement* also provides a range description for "Bombing Target, Live (aka: PBR, Precision Bombing Target, Bombing Range)" indicating a circle with a 3,000 foot radius and probable munitions type of "Bomb, High Explosive." The range description for "Bombing Target, Practice (aka: PBR, Precision Bombing Range, Bombing Target)" provides the same specifications for a circular MRS boundary with a radius of 3,000 ft, with probable munitions type "Bomb, Practice." This was the basis for establishing an MRS range boundary with a radius of 3,000 ft from the target center as defined in the *ASR Supplement* and the MRS Inventory (DoD, 2010).

Although .50-caliber small arms ammunition was used at Pocatello Bombing Range No. 3, target areas or machine gun range features have not been identified. The FUDS is approximately 2 miles by 3 miles, which is too small to accommodate a typical air-to-ground gunnery range of 2 by 6 miles. Likewise, the reported "impact area" is approximately 1,955 ft by 3,945 ft, which is not consistent with a typical air-to-ground gunnery range.

Although chemical warfare training was conducted at Pocatello Army Air Base, "the archive search team found no indication that any Army Air Corps personnel conducted CWM training, storage or disposal activities at Pocatello Bombing Range No. 3…All training would have occurred at the main field. Furthermore, the archive search found no indication of chemical spray missions occurring at Pocatello Precision Bombing Range No. 3" (USACE, 2003).

2.2 Munitions Information

Based on historical information and observations made during the SI reconnaissance, the munitions used at Pocatello Bombing Range No. 3 included:

- M38A2 Practice Bomb, 100 pounds (lb);
- M1A1 and M3 Spotting Charge;
- M5 Spotting Charge (limited evidence);
- AN-M30 GP Bomb, 100 lb;
- AN-M54 Incendiary Bomb, 4 lb;
- AN-M50 Incendiary Bomb, 4 lb; and
- .50-Caliber Small Arms Ammunition (not reported, but observed during the SI).

The M38A2 100-lb practice bomb simulated a GP bomb of the same size. It was constructed of light sheet metal, approximately 22-gauge steel, formed by rolling a rectangular sheet of metal into the form of a cylinder approximately 8 inches in diameter and spot-welding the seam. The rounded nose was pressed from the same metal, as was the tail, which was formed in the shape of

a cone. The spotting charge was assembled in a sleeve at the tail end of the bomb, within the fin box. Authorized spotting charges were the M1A1, M3, and M5. It is possible that the M3 spotting charge was used in addition to the M1A1, given that the MRS would have been snow-covered during the winter months. There is no historical evidence indicating the use of the M5 spotting charge; however, one object appearing to be the base of an M5 glass bottle spotting charge was observed during the SI field activities.

The old-series GP bomb used during the World War II time period, such as the AN-M30 100-lb bomb, was a relatively thin-cased HE bomb with parallel sidewalls and a tapered aft section. Nose and tail fuzes were used either separately or in combination for a majority of operations. Approximately 50 percent of the complete weight of the round was its explosive filler, which typically consisted of Amatol (comprised of a mixture of ammonium nitrate and 2,4,6-trinitrotoluene [TNT]), TNT, Tritonal (80 percent TNT, 20 percent aluminum powder), or Composition B (59.5 percent hexahydro-1,3,5-trinitro-1,3,5-triazine [RDX], 39.5 percent TNT, and 1 percent wax).

The AN-M30 GP bomb was typically fuzed in the nose with the AN-M103 fuze or in the tail with the AN-M100A2 fuze. The alternate nose fuzes that were used as substitutes or for special purposes were the M103, M118, or M119. The alternate tail fuzes that were used were the M112, M100, M106 or its modifications, or the AN-M100A1. The SI field team observed MD from 100-series tail fuzes.

The AN-M50 and AN-M54 incendiary bombs were four-lb bombs (actual weight was 3.5 lb) delivered in a cluster consisting of a cluster adapter and 34 bombs. The assembly was considered a 100-lb cluster bomb, despite the fact that its weight was actually greater than 100 lb. The AN-M50 contained a firing assembly (essentially a shotshell primer), approximately 20 grams of first fire mixture, a 1-inch diameter core of thermate, and a magnesium body weighing 1.25 lb. The AN-M54 was constructed of sheet metal and contained a firing assembly (essentially a shotshell primer), approximately 20 grams of first fire mixture, and a filler core of 22 ounces of thermate. Approximately 20 percent of the bombs in the cluster were designed to have a delayed detonation and may have contained either black powder or a small 2,4,6-trinitrophenyl-N-methylnitramine (tetryl) explosive charge.

Table 2-1 contains a list of the munitions used at the Bombing Range No. 3 MRS and associated MC.

2.3 Ownership History

Prior to military acquisition, the Pocatello Bombing Range No. 3 property was under the jurisdiction of the Bureau of Land Management (BLM). The land was acquired by the War Department through Public Land Order 185 on October 7, 1943. The Pocatello Army Air Base and all its facilities were declared surplus to the Second Air Force on January 18, 1945. Pocatello Army Air Base then reported all “its auxiliaries, facilities and bombing ranges” excess

to its needs by a letter to the Headquarters Strategic Air Command, U.S. Air Force, subject "Report of Excess" dated May 1, 1947. Pocatello Bombing Range No. 3 then fell under the jurisdiction of the USACE, who relinquished the property to the Department of the Interior on October 23. The entire FUDS is currently federal land managed by the BLM. Current property ownership of the FUDS is shown in Figure 2-1.

2.4 Physical Setting

2.4.1 Topography and Vegetation

The topography of Pocatello Bombing Range No. 3 and the MRS is characterized by topographically high basalt lava flows around a lake valley. There is approximately 120 ft of relief throughout the FUDS. The lowest elevation of approximately 4,780 ft above mean sea level (amsl) occurs in the southeast corner of the FUDS. The highest elevation of approximately 4,900 ft amsl occurs in the northwest corner of the FUDS (Figure 2-2). The ground surface is very uneven where basalt lava flows are exposed, with large fractures, cliffs, and natural craters that are difficult to navigate (Appendix E, Photographs 21, 22, and 23). The areas of exposed basalt are visible on aerial photographs and labeled in Figure 1-3.

The MRS is located in a sagebrush steppe. Vegetation consists mainly of sagebrush and grasses, with patches of bare ground between plants. Approximately 55 percent of the MRS consists of exposed basalt lava flows, and vegetation is very sparse in these areas. Small trees grow in some fractures in the basalt.

2.4.2 Surface Water

Pocatello Bombing Range No. 3 is located within the Eastern Snake River Basin. There are several canals present along the Snake River, approximately 15 miles southeast of the FUDS. All other surface water features within a 15-mile radius of the FUDS are intermittent and appear to infiltrate into the ground before reaching the Snake River. Locally, surface water within the MRS is intermittent. Even when streams flow in the spring, the water typically infiltrates into fractures in the exposed basalt bedrock and disappears. There is one such intermittent stream mapped in the southwest corner of the FUDS. The two lakes within the FUDS, Wood Road Lake and Grover Lake Reservoir, are small, shallow depressions that contain water only intermittently. Wood Road Lake is located within the MRS, near the central target area. Grover Lake Reservoir is located to the south of the MRS. These two lakes are created by man-made structures that appear to either collect drifts in the winter or block wind and sun exposure (Appendix E, Photographs 26, 27, and 28). Surface runoff from the MRS does not contribute to any regional drainage systems. Regional surface water drainage is shown in Figure 2-3.

2.4.3 Sensitive Environments

The U.S. Fish and Wildlife Service (USFWS) and the Idaho Department of Fish and Game's (IDFG) Idaho Conservation Data Center databases were reviewed regarding the presence of any

threatened or endangered species within the project area. There are three federal candidate species and one federal threatened species that occur within Bingham County (USFWS, 2011a). These four species, shown in the chart below, are also listed by the Idaho Conservation Data Center (IDFG, 2011).

Class	Status	Common Name	Scientific Name
Federal	Threatened	Ute ladies'-tresses	*Spiranthes diluvialis*
Federal	Candidate	Greater sage-grouse	*Centrocercus urophasianus*
Federal	Candidate	Yellow-billed cuckoo	*Coccyzus americanus*
Federal	Candidate	Wolverine	*Gulo gulo luscus*

The MRS does not provide the wet habitat typical of the Ute ladies'-tresses (USFWS, 2009) or the riparian habitat typical of the Western Yellow-billed cuckoo (USFWS, 2008). Greater sage-grouse are found at elevations ranging from 4,000 to over 9,000 ft and are highly dependent on sagebrush for cover and food (USFWS, 2011a). Wolverines are expected to occur statewide. Reproduction in Idaho occurs in boulder talus in subalpine cirque basins, but adult females have home ranges of 148 square miles on average (USFWS, 2011c). The MRS may provide habitat suitable for the greater sage-grouse and wolverine, but correspondence from IDFG states "The Department has no records of any federally listed endangered or threatened species, state sensitive species, or critical habitat within or immediately adjacent to, the Pocatello Bombing Range No. 3" (IDFG, 2010). USFWS provided the list of federally listed species for Bingham County as shown above, but did not indicate the known presence of any listed species within the MRS.

As shown in Figure 2-4, a portion of the Bombing Range No. 3 MRS is managed for ecological purposes as part of the Cedar Butte Wilderness Study Area. The BLM is required to manage the area to maintain its wilderness qualities. In 1991, the BLM made a recommendation for the area "to not designate the area as wilderness and release all 35,700 acres for other uses" (BLM, 1991). However, the area remains a Wilderness Study Area. Most activities that could impact wilderness qualities, such as cross-country travel by off-highway vehicle, are not allowed (BLM, 2011). The MRS also contains an Important Ecological Place (IEP) or Sensitive Environment as defined by USACE (2006) or EPA (1997) and shown in Table 2-2, based on the presence of a mapped wetlands area located at Wood Road Lake.

2.4.4 Climate

The closest climate data is provided by a weather service station approximately 30 miles south-southeast of this site at the Pocatello Municipal Airport.

The climate in this area is characterized by highly variable weather. Winter weather alternates between periods of persistent southwesterly winds that result in mild weather and periods when

the temperature stays below freezing for several days on end. During cold periods, snow occasionally accumulates to a depth of 1 ft or more. Winters are generally cloudy with measureable amounts of precipitation occurring on about one-third of the days. Temperatures warm gradually during the spring months. Springs are the wettest and windiest season, often with consistent winds of 20 to 30 mph. The maximum wind gust on record as of 2002 was 78 mph from the west in December 1981. Summers are mild, with long periods of extremely hot weather being uncommon. Precipitation generally falls as local showers, accompanied often by thunderstorms and occasionally by hail. Autumn brings pleasant weather with short periods of cloudy and unsettled weather and more general rains. The first cold wave may appear during late November, but usually not until late December (USACE, 2003).

The coldest month of the year on average is January, with a mean minimum temperature of 16.3 degrees Fahrenheit (˚F). The warmest month is July, with a mean maximum temperature of 87.5˚F. The mean annual precipitation is 12.58 inches, with the most precipitation falling in the months of March through May (1.18 to 1.51 inches). The extreme maximum and minimum temperatures on record as of 2000 are 104˚F (August 1990 and July 2000) and -33˚F (February 1985), respectively (National Oceanic and Atmospheric Administration, 2004).

2.4.5 Geologic and Hydrogeologic Setting

2.4.5.1 Bedrock Geology

The former Pocatello Bombing Range No. 3 is located north of the Snake River in the Eastern Snake River Plain. The geology in this region is characterized by extrusive igneous activity and faulting resulting from crustal extension. The dominant geologic structures in the region are collapsed Tertiary and Quaternary rhyolite calderas formed and collapsed in separate distinct cycles. The site is underlain mostly by tertiary rhyolite issued from the calderas, covered by a thin layer of Quaternary flood basalts. Weathered horizons, thin contact metamorphosed soil layers, and erosional surfaces are locally present between the deposits of rhyolite and basalt extrusive rock. Surficial geology in the region is modified by the erosional and depositional activity of the Snake River and its tributary drainages, Pleistocene alpine glaciation, and deposition of loessal soils (USACE, 2003 and Henry, 2007). The uppermost layer of the site consists of Quaternary alluvial and loessal deposits, with areas of exposed basalt lava flows. According to the U.S. Department of Agriculture (USDA) soil survey, the depth to bedrock within the FUDS property boundary ranges from 0 to greater than 80 inches, with the majority of the property having exposed or shallow bedrock (USDA, 2008).

2.4.5.2 Overburden Soils

Approximately 70 percent of the FUDS property is overlain by the Lava flows-Pingree complex, with exposed basalt bedrock interspersed with gravelly or cobbly silt loam to a depth of approximately 9 inches. The remaining 30 percent of the property is overlain by soils of the Coffee-Nargon-Atom complex, which consists mostly of silt loam and silty clay loam with a

depth ranging from 22 to greater than 80 inches below ground surface (bgs). Soils within the project area have a moderately high to high capacity to transmit water, and very low to moderate available water capacity (USDA, 2008).

2.4.5.3 Hydrogeology

The site is located in the Eastern Snake River Plain, where the regional aquifer system consists mostly of Pliocene and younger basaltic rocks with some overlying and interbedded unconsolidated deposits. Hydraulic properties of Pliocene and younger basaltic-rock aquifers in the eastern plain are highly variable and, in most places, poorly defined. The most detailed subsurface investigations have been made at the Idaho National Laboratory (INL) site in the central part of the eastern plain, where a 10,000-ft exploratory hole was drilled during the late 1970s. The INL is approximately 10 miles north of Pocatello Bombing Range No. 3. The most permeable section is the upper 1,200 ft in Pliocene and younger basaltic rocks. The next 1,100- and 7,700-ft sections consist of Miocene basaltic rocks and undifferentiated volcanic and sedimentary rocks, respectively, of low permeability. The hole bottomed in silicic volcanic rocks (Whitehead, 1994).

Aquifer tests and computer simulation indicate that the transmissivity of the upper 200 ft of the Pliocene and younger basaltic-rock aquifers ranges from 104,000 to 1.8 million square ft per day. Yields of wells completed in the Pliocene and younger basaltic-rock aquifers are among the largest in the nation. Irrigation wells open to less than 100 ft of the aquifers yield as much as 7,000 gallons per minute with only a few feet of drawdown. Well yields that range from 2,000 to 3,000 gallons per minute are common. The Pliocene and younger basaltic-rock aquifers generally yield much more water than do the interbedded unconsolidated-deposit aquifers. In places where the Pliocene and younger basaltic-rock aquifers consist primarily of dense basalt; however, well yields are extremely small (Whitehead, 1994).

Along the eastern side of the Snake River and near the river on the western side in the Fort Hall-Blackfoot area of Bannock and Bingham Counties, domestic and stock wells are fed by unconsolidated-deposit aquifers that consist of coarse sand and gravel, while most irrigation wells are drilled to the underlying Pliocene and younger basaltic-rock aquifers (Whitehead, 1994). The direction of groundwater flow within the FUDS is toward the southwest (Ackerman, 2006). From well completion details within 4 miles of the FUDS, it appears that the depth to groundwater in the area ranges from less than 65 to greater than 400 ft bgs (Idaho Department of Water Resources [IDWR], 2011). This indicates that wells are likely completed in both unconsolidated deposit and basaltic rock aquifers.

Much of the recharge in the Eastern Snake River Plain originates as precipitation on the highlands adjacent to the plain, chiefly on the northern side. Precipitation falling on the plain itself accounts for less than 10 percent of the total recharge. Rainfall and snowmelt on the plain

infiltrate quickly to the water table because of many surface or near-surface openings in the Pliocene and younger basaltic rocks (Whitehead, 1994).

2.5 Population and Land Use

2.5.1 Nearby Population

According to the 2000 U.S. Census, there are no individuals residing within a 4-mile radius of the MRS or FUDS (Figure 2-5) (Environmental Systems Research Institute [ESRI], 2006). Aerial photograph review and field observations confirm that there are no inhabited structures located within the MRS or FUDS. The town closest to the former Pocatello Bombing Range No. 3 is Blackfoot, Idaho, located 25 miles to the southeast with a 2010 population of 11,899. The nearest major population center is Pocatello, at a distance of about 35 miles south-southwest of the MRS, with a 2010 population of 54,255. The former range is located in Bingham County, which in 2005 had a population density of 20.2 persons per square mile (U.S. Census, 2010). The census block in which the MRS is located has a population density of 2.4 persons per square mile (ESRI, 2006).

2.5.2 Land Use

All of the land within the Pocatello Bombing Range No. 3 FUDS and the Bombing Range No. 3 MRS is federal land managed by the BLM. A portion of the MRS is managed as part of the BLM's Cedar Butte Wilderness Study Area. The remainder of the land within the MRS is used for cattle grazing. The land may also be used for hunting, as evidenced by hunters observed in the surrounding area during the SI reconnaissance, but recreational use is reportedly low in the area near the MRS (BLM, 1991). The MRS is located in a region that experiences grass fires and may periodically burn. One game watering station and one stone structure associated with Wood Road Lake have been constructed within the MRS. The remainder of the land has been undisturbed since military use. There are no residences or other structures within the FUDS or MRS. Land surrounding the MRS also consists of mostly undisturbed sagebrush steppe rangeland and basalt flows of the Cedar Butte Wilderness Study Area. Cultivated cropland is present approximately 4 miles east of the MRS. A two-track road runs through the MRS, passing to the west of the central target area and turning west at the edge of the exposed basalt lava flows near Wood Road Lake (Figure 2-2). Agricultural fencing was not observed within the MRS but is present in the surrounding area. There is no barrier in place preventing human access to the MRS. Land use is expected to remain the same in the foreseeable future.

2.5.3 Area Water Supply

No wells have been identified by the IDWR within the FUDS property boundary (IDWR, 2010), and none were observed during the SI reconnaissance. Six wells have been identified within a 4-mile radius of the FUDS. These wells are completed to total depths ranging from 65 to 453 ft bgs in both unconsolidated deposit and basalt bedrock aquifers. The deepest well at 453 ft bgs has a static water level of 26 ft bgs. The remaining wells have static water levels ranging from

37 to 370 ft bgs. The closest registered downgradient groundwater well is approximately 2 miles southwest of the target center (IDWR, 2010). Wells in the surrounding area are shown to be primarily for domestic and irrigation use (Figure 2-6).

There are 76 public water systems in Bingham County, but none within the 4-mile radius of the FUDS. The primary water source type for all public water systems in the county is groundwater (EPA, 2011). Pocatello Bombing Range No. 3 is in the Bingham Groundwater District.

2.6 Previous Investigations for MC and MEC

2.6.1 Inventory Project Report (USACE, 1988)

A DERP-FUDS INPR for the Pocatello Bombing Range No. 3 was completed in 1988. The findings determined that the site had been formerly used by the DoD and was therefore eligible under the DERP program for FUDS. The INPR stated that Pocatello Bombing Range No. 3 "was formerly used as a demolition and incendiary bombing range." A site inspection was performed by Walla Walla District personnel on September 11, 1986. The INPR stated that during the site visit "numerous bomb craters and bomb fragments were observed" (USACE, 1988).

2.6.2 Archives Search Report (USACE, 2003)

USACE completed an ASR in April 2003 to assess the presence or absence of contamination from military munitions activities at Pocatello Bombing Range No. 3. The ASR included a visit to the site on September 11, 2002. The field team reported: "Numerous craters from the use of demolition bombs were found. Surface ordnance consisted of expended M38A2 Practice Bombs, M-30 Demolition Bombs (100#) and one incendiary device." The team also identified a possible target marker. No UXO was found (USACE, 2003). The ASR figures show a 183-acre rectangular "impact area" as depicted on a real estate map dated January 1944 and revised in May 1956. An explanation of the origin of this boundary is not provided in the historical documents obtained during preparation of the ASR; however, this is the area reported to be cleared of explosive items in the Certificate of Clearance.

2.6.3 ASR Supplement (USACE, 2004a)

An *ASR Supplement* was completed in November 2004. The supplement confirmed historical documentation of the use of practice, demolition, and incendiary bombs at Pocatello Bombing Range No. 3. The document listed the AN-M30 100-lb GP bomb, the AN-M50 four-lb incendiary bomb, the M38A2 100-lb practice bomb, and the M1A1 spotting charge as the munitions used at the site, and included munitions data sheets and general range information. The *ASR Supplement* included a ranking for the Bombing Range No. 3 MRS according to the Risk Assessment Code (RAC) procedures to address explosives safety hazards. Possible scores range from 5 (lowest risk category) to 1 (highest risk category). The Bombing Range No. 3 MRS was assigned a RAC score of 4 (USACE, 2004a).

2.7 Other Land Uses that May Have Contributed to Contamination

There are no other known land uses that may have contributed to contamination within the MRS. The site is in a remote location and has been used only for wilderness study, cattle grazing, and limited hunting following military use.

2.8 Past Regulatory Activities

There have been no regulatory actions, with respect to MEC or MC, reported for the site.

2.9 Previous MEC Finds

One possible MEC find had been reported prior to the SI at Pocatello Bombing Range No. 3. The report was made by a hunter, and, as reported by BLM representatives at the TPP Meeting, was not confirmed by law enforcement or Explosive Ordnance Disposal (EOD) personnel.

3.0 Site Inspection Tasks

SI tasks conducted for this FUDS property began with compiling and reviewing historical reports and information to lay the framework for developing a path forward. A TPP meeting was held to coordinate with site stakeholders, and a *TPP Memorandum* was issued following the meeting to document known site information, data quality objectives (DQOs), data gaps, and stakeholder decisions. Following issuance of the *TPP Memorandum*, a *Site-Specific Work Plan* (SSWP) was prepared to define the SI field activities required to collect the information needed to address the data gaps and achieve the DQOs. Field work was conducted at the site in August 2011.

3.1 Technical Project Planning

The TPP meeting for the former Pocatello Bombing Range No. 3 was conducted on December 15, 2010, at the Idaho Department of Environmental Quality (IDEQ) offices located in Boise, Idaho. Representatives from the USACE – NWO Military Munitions Design Center, USACE Seattle District, and USACE Kansas City District; IDEQ; BLM Salmon Field Office; and Shaw were in attendance.

The TPP meeting was initiated by Mr. John Miller (USACE), who provided an overview of the MRSPP and FUDS SI process. Mr. William Burns (Shaw) facilitated the remainder of the meeting by presenting site-specific information, summarizing the CSM, identifying the MRS, discussing potential MEC and associated MC, and presenting proposed MEC reconnaissance and MC sampling. DQOs were reviewed and discussed.

The following issues, agreements, and items for further review were discussed at the meeting or through subsequent TPP interaction.

Stakeholders – The stakeholders identified at the TPP meeting are the BLM, IDEQ, and USACE.

Munitions Response Site – One MRS, Bombing Range No. 3, was identified, consisting of 649 acres centered on a target ring visible in a 1952 historical aerial photograph. The meeting participants also discussed the 183-acre rectangular "impact area" depicted on a real estate map dated January 1944 and revised in May 1956. Shaw agreed to focus reconnaissance in this area in addition to the central target area.

Land Uses – Land uses identified at the MRS were cattle grazing and management of the BLM's Cedar Butte Wilderness Study Area. It was noted that reconnaissance in the Cedar Butte Wilderness Study Area should be limited to walking only.

Important Ecological Place (IEP) – Two IEPs were identified within the MRS. These IEPs are the wetlands at Wood Road Lake and the BLM wilderness study area, which is managed for ecological purposes.

MEC Hazard – Based on information available prior to the SI field activities, the TPP team identified practice bombs with spotting charges, GP HE bombs, and incendiary bombs as the munitions potentially present at the MRS. The BLM representatives who attended TPP noted that there has been one possible MEC find reported in the vicinity of Pocatello Bombing Range No. 3 in the past. A hunter reported having found an unexploded ordnance item, but the find was never confirmed by law enforcement or EOD personnel.

MC/Sampling for MC – The MC of concern identified during TPP were explosives from GP bombs that contained HE filler, metals (aluminum and barium) from incendiary bombs, and semivolatile organic compounds (SVOCs) (anthracene and hexachloroethane) from M3 spotting charges used with M38A2 100-lb practice bombs. It was decided that surface soil and sediment samples would be collected and analyzed for these MC. Because incremental sampling (IS) techniques had been used to evaluate surface soil at other bombing ranges previously addressed under DERP-FUDS in Idaho, it was decided that IS would be used to collect the surface soil samples at the Bombing Range No. 3 MRS. Sediment samples were to be collected as discrete samples.

Background Sampling – It was decided that surface soil and sediment background samples would be collected and analyzed for metals (aluminum and barium) and SVOCs (anthracene and hexachloroethane). Meeting participants agreed background samples would not be analyzed for explosive compounds, because these compounds are not naturally occurring, and any detection in site media samples is considered a release.

Human Health Screening Criteria – It was agreed that the human health screening levels to be used would be the lower of IDEQ Initial Default Target Levels (IDTLs) and EPA Regional Screening Levels (RSLs) as discussed in Section 3.6.2.

Ecological Screening Criteria – It was agreed that because IDEQ does not have state-specific ecological screening levels, the screening levels would be selected according to the hierarchies for soil and sediment used for previous Idaho FUDS and discussed in Section 3.6.3.

Conceptual Site Model – Meeting attendees were in general agreement with the CSM. The CSM is provided in Appendix J.

Data Quality Objectives – The collection of sediment samples was added to the proposed DQOs and decision rules.

TPP Meeting results were documented in the *TPP Memorandum* (Shaw, 2011a), which was issued final in May 2011 after incorporating comments from the stakeholders. The proposed technical approach was defined in the SSWP (Shaw, 2011b), which was issued final in August 2011 after incorporating comments from the stakeholders.

A more complete discussion of the TPP meeting is contained in Appendix B. As discussed during the TPP meeting and documented in the *TPP Memorandum* (Shaw, 2011a), the following project objectives and DQOs were developed.

Objective 1: Determine if the site requires additional investigation or can be recommended for NDAI based on the presence or absence of MEC.

DQO No. 1 – Using trained UXO personnel and a handheld magnetometer or all-metal detector, a visual reconnaissance of the Bombing Range No. 3 MRS will be conducted searching for physical evidence to indicate the presence of MEC (e.g., craters, MEC on the surface, MD, and soil discoloration indicative of explosives). The visual reconnaissance will be conducted along a meandering path in accessible areas. The following decision rules will apply:

- If no evidence of a MEC hazard is found, the MRS will be recommended for no further investigation relative to MEC.
- If evidence of a significant MEC hazard is confirmed, the MRS will be recommended for additional investigation relative to MEC.
- If there is indication of an imminent MEC hazard, the site may be recommended for a removal action.

Objective 2: Determine if the site requires additional investigation or can be recommended for NDAI based on the presence or absence of MC above screening values.

DQO No. 2 – Soil and sediment samples will be collected and analyzed. Analytical results will be compared to screening values for human health and ecological risk assessment, and to background values for naturally occurring substances. The following decision rules will apply:

- If sample results do not exceed background, the MRS will be recommended for no further investigation relative to MC.
- If sample results exceed background but are less than human health and ecological screening values, the MRS will be recommended for no further investigation relative to MC.
- If sample results exceed both human health screening values and background values, the MRS will be recommended for additional investigation relative to MC.
- If sample results do not exceed human health screening values but do exceed both ecological screening values and background values, additional evaluation of the data will be conducted in conjunction with the stakeholders to determine if additional investigation relative to MC is warranted.

If no further investigation is recommended relative to both MEC and MC, then a recommendation of NDAI will be made for the MRS.

3.2 Additional Records Research

3.2.1 Coordination with State Historic Preservation Office

The Idaho State Historic Preservation Office (SHPO) was contacted regarding the presence of sites on the National Register of Historic Places or of any archaeological resources within the project area. The SHPO responded on March 21, 2011, indicating "no additional investigations are recommended; project can proceed as planned" (SHPO, 2011). The SHPO identified two unevaluated properties (a historic rock alignment/trash scatter and a lithic scatter) that should be avoided. The historic rock alignment/trash scatter is located within the MRS, near the central target area. The lithic scatter is located outside the MRS. Based on this feedback from the SHPO, cultural resources are present within the MRS. The request for information and SHPO response letter are provided in Appendix C.

3.2.2 Coordination with Natural Resources Offices

Shaw contacted the USFWS and IDFG in June 2010 concerning the potential presence of threatened or endangered species at the FUDS. The IDFG responded on August 2, 2010, stating "The Department has no records of any federally listed endangered or threatened species, state sensitive species, or critical habitat within or immediately adjacent to, the Pocatello Bombing Range No. 3" (IDFG, 2010). USFWS responded on July 6, 2010, and provided the list of federally listed species for Bingham County as shown in Section 2.4.3, but did not indicate the known presence of any listed species within the FUDS or MRS (USFWS, 2010). The requests for information and USFWS and IDFG response letters are provided in Appendix C.

3.2.3 Historical Aerial Photographs

A review of recent (2010) and historical (1952) aerial photographs of the FUDS was completed prior to the SI field activities. The 1952 aerial photograph depicts a faint target ring on the MRS. This target ring is not visible in the 2010 aerial photograph. Additional photographs dated 1971, 1980, 1987, 1992, and 1998 were obtained from Environmental Data Resources, Inc. (EDR) and reviewed; range features are not visible. The EDR photographs are included in Appendix L.

3.2.4 Environmental Database Search

A search of available environmental records was conducted by EDR as a part of general background information gathering for this FUDS. The EDR report was designed to meet the search requirements of EPA's *Innocent Landowners, Standards for Conducting an Appropriate Inquiry* (40 CFR Part 312) and the ASTM International (ASTM) *Standard Practice for Environmental Site Assessments* (E 1527-05) (ASTM, 2007). Shaw uses the report to further evaluate potential environmental risks associated with the FUDS.

A review of the databases provided in the EDR report did not result in the discovery of land uses on the subject property (or immediately adjacent properties) that may have contributed to release of metals, SVOCs or explosives on the MRS (EDR, 2010). Additional information on the

databases searched and the results for surrounding properties is included in the EDR report found in Appendix L.

3.2.5 Rights-of-Entry

Prior to mobilizing to the site, the Project Manager for the USACE Seattle District office obtained an access agreement from the BLM for the property where the SI field activities were performed. Permission for access to the entire MRS was obtained.

3.3 Field Work

SI field activities, conducted on August 17 through 20, 2011, included site reconnaissance and collection of surface soil and sediment samples at the Bombing Range No. 3 MRS. The following conditions were recorded in the field logbook (Appendix D) and/or by digital photographs (Appendix E):

- Weather conditions;
- Land use;
- Vegetative cover;
- Wildlife;
- Surface water features;
- Evidence of the use of surface water;
- General physical setting and topography;
- Presence or absence of evidence of MEC, including MD; and
- Changes, if any, in sample location because of field constraints.

3.4 Sampling and Analysis

Sampling included collection of surface soil and sediment samples at the Bombing Range No. 3 MRS. Samples were collected and analyzed in accordance with IS protocols and the SSWP (Shaw, 2011b) using the standard operating procedures from the Work Plan where applicable (Shaw, 2006).

Surface soil samples were collected from five pre-planned sampling units located within and surrounding the target area. The pre-planned sampling unit locations were selected to cover the area with accessible soil within and surrounding the central area, avoiding areas with known exposed basalt lava flows. One additional surface soil sample was collected from a sampling unit selecting during the SI field activities, surrounding a cluster of unexploded AN-M54 incendiary bombs. The sampling unit locations are shown on Figure 3-1. A summary of samples collected is presented in Table 3-1.

Reconnaissance was conducted prior to the collection of incremental samples. One incremental sample was collected within each sampling unit, with the exception of Sampling Unit 1 where three separate incremental samples were collected for quality control purposes. IS protocol

indicates that at least 30 and up to 100 increment samples be collected from each sampling unit. Sampling Units 1 through 5 and the background sampling unit were approximately 11.2 acres each. Fifty increments were collected from each of these pre-planned sampling units, with the exception of Sampling Unit 3 from which 55 increments were collected due to a miscalculation by the sampling team. The additional sampling unit located near the AN-M54 cluster was approximately 0.5 acre; 30 increments were collected from this, and were focused in a smaller area around the munitions item.

Incremental samples were randomly collected within the boundaries of the sampling unit area. The sampling team started at a corner of each sampling unit, collecting an increment of surface soil after a certain number of steps along a meandering path that traversed the sampling unit. The reconnaissance path and individual increment soil sample locations were recorded using a Global Positioning System (GPS) unit. The sampling team consisted of three members including a qualified UXO technician. One team member operated the sampling tool while another held the sample container (clean polyethylene bag) and recorded the number and location of soil increments collected. The UXO technician cleared each sample location before collection. In general, the sampling team began the site reconnaissance and IS in one corner of the sampling unit area, and proceeded to collect subsequent soil increments at random intervals along approximate north to south paths throughout the unit. Each soil increment was collected at a depth of 0 to 2 inches. The combined weight of the incremental soil sample was at least 2.0 kilograms to meet soil preparation and analytical requirements. Samples were double-bagged to maintain sample integrity during shipment.

Sediment samples were collected from the upper 2 inches of sediment using a discrete sampling method as described in the Work Plan (Shaw, 2006). One sediment sample was collected from the dry pond (Wood Road Lake) within the MRS. A duplicate sample was collected from the same location for quality control purposes.

3.5 Laboratory Analysis and Data Quality Review

Laboratory analysis was performed by Test America of Denver, Colorado, using the following methods as defined in the SSWP:

- Explosives (surface soil collected using the IS technique) – EPA SW-846 Method 8330B;
- Explosives (sediment and rinsate) – EPA SW-846 Method 8330 (Modified);
- Metals (surface soil collected using the IS technique, sediment, and rinsate) – EPA SW-846 Method 6010B for aluminum and EPA SW-846 Method 6020 for barium; and
- SVOCs (surface soil collected using the IS technique, sediment, and rinsate) – EPA SW-846 Method 8270C for anthracene and hexachloroethane.

Upon receipt at the laboratory, the IS soil sample was air dried for a minimum of 24 hours followed by sieving through a 10-mesh sieve (< 2 millimeter particle size). Once the IS sample had been sieved through a 10-mesh sieve, the sample was evenly distributed across a clean surface. Thirty or more randomly located increments were removed from the sample to form two 10-gram sub-samples for metals analysis and two 40-gram sub-samples for SVOC analysis. This process was repeated to collect a duplicate sub-sample should re-digestion or re-extraction be necessary. For metals analysis, one 10-gram sub-sample was digested per the laboratory's preparation method SW-846 3050B, and one 30-gram sub-sample was extracted per the laboratory's preparation method SW-846 3550B (ultrasonic extraction) standard operating procedure.

Once the metals and SVOC fractions had been sub-sampled, the remaining IS sample portion underwent sample preparation for explosives analysis as follows. To minimize sub-sampling error, the laboratory ground the sieved material per SW-846 Method 8330B guidelines to a particle size of < 75 microns (EPA, 2006c). The entire ground sample was then mixed and spread out on a clean surface, and 30 or more randomly located increments were removed from the sample to form a 10-gram sub-sample. The 10-gram sub-sample of soil was extracted with 20 milliliters of acetonitrile. The extract was analyzed by high-performance liquid chromatography equipped with a dual wavelength detector or a diode array detector.

Analytical results are provided in Appendix F.

One hundred percent of the analytical data has been reviewed based on EPA *Contract Laboratory Program (CLP): National Functional Guidelines for Superfund Organic Methods Data Review*, June 2008, and EPA CLP *National Functional Guidelines for Inorganic Superfund Data Review*, January 2010. ADR software (version 8.1) was used to assist in the data validation process for all areas with the exception of initial calibration blanks, continuing calibration blanks, interference check standards, serial dilutions, internal standards, instrument tuning standards, and second-column confirmation. Data were evaluated against specific criteria to verify the achievement of all precision, accuracy, representativeness, completeness, comparability, and sensitivity goals established to meet the project DQOs.

The overall quality of the data collected is discussed in the Analytical Data QA/QC [Quality Assurance/Quality Control] Report (Appendix G). Results of the analyses suggest that representative samples were collected and analyzed, and the results are indicative of the media analyzed. Some results were qualified as described in the report. No data were qualified "R" as unusable. Overall, the data reflect expected site conditions and they are fully usable for their intended purpose.

3.6 Screening Values

The following subsections describe the development of screening values for this SI.

3.6.1 Background Data

One background surface soil sample was collected from a location approximately 4,250 ft southwest of the MRS that did not appear to be impacted by munitions use (Figure 3-1). The background soil sample was collected from the upper 2 inches of surface soil using IS techniques. One background sediment sample was collected from an intermittent drainage approximately 6,000 ft southwest of the MRS, which would not have been impacted by surface runoff from the range (Figure 3-1). The drainage was poorly defined and contained no water at the time of the sample collection. The background sediment sample was collected from the upper 2 inches of sediment using a discrete sampling method as described in the Work Plan (Shaw, 2006).

The background soil and sediment samples were analyzed for metals (aluminum and barium) and SVOCs (anthracene and hexachloroethane) using the methods specified in Section 3.5. Energetic compounds used in military explosives and propellants are synthetic, manufactured organic compounds. Numerous studies, including Stucki (2004), Walsh et al. (2004), and Jenkins et al. (2005), have addressed the presence of these compounds in soil and other media in the vicinity of active and former ranges and other settings. None of these studies have suggested that the presence of energetic compounds may be attributed to natural sources. For this reason, background samples were not analyzed for explosives.

Site-to-background comparisons for the soil and sediment data were conducted according to EPA guidance for SI activities and HRS scoring. An MC release was identified if a given detection in an MRS sample was "significantly above the background level" according to the following HRS criteria (EPA, 1990):

1. If the sample measurement is less than or equal to the sample quantitation limit, no observed release is established.
2. If the sample measurement is greater than or equal to the sample quantitation limit, then:
   - If the background concentration is not detected, an observed release is established when the sample equals or exceeds the sample quantitation limit.
   - If the background concentration equals or exceeds the detection limit, an observed release is established when the sample result is three times or more above the background concentration.

Because aluminum and barium were detected in the background samples, an MC release was identified if the detected concentration exceeded three times the detected background concentration for these metals. Because anthracene and hexachloroethane were not detected in the background samples, an MC release was established if the detected concentration exceeded the sample quantitation limit, or practical quantitation limit, for the analytical method for these SVOCs.

The background screening levels for surface soil and sediment are presented in Table 3-2. Shaw compared reported analytical results in site media samples to these background screening levels.

3.6.2 Human Health Screening

Part of the MRS falls within the Cedar Butte Wilderness Study Area, and the remainder is used for agricultural purposes (cattle grazing). Land use is expected to remain the same in the foreseeable future. However, residential risk-based standards were used for screening purposes to evaluate the most conservative case where land use controls would not be required.

Sample results exceeding background screening levels were to be compared to human health screening levels. The human health screening levels used for the SI were the lower of IDEQ IDTLs and EPA RSLs. The selected human health screening levels are provided in Table 3-3.

3.6.3 Ecological Screening

According to the *Screening-Level Ecological Risk Assessment* (SLERA) *Guidance for FUDS MMRP Site Inspections* (USACE, 2006), only sites that are considered to contain Important Ecological Places or are managed for ecological purposes require a SLERA. As shown in Table 2-2, portions of the MRS are managed for ecological purposes as part of the Cedar Butte Wilderness Study Area, and the MRS contains an IEP based on the presence of a mapped wetlands area located at Wood Road Lake.

Because the MRS is managed for ecological purposes and contains an IEP, sample results exceeding background screening levels were to be compared to ecological screening criteria. IDEQ does not have state-specific ecological screening levels. The ecological screening levels were therefore selected according to the following hierarchies:

Soil:

1. Ecological Soil Screening Level Values Developed by the EPA (2005).
2. Oregon Department of Environmental Quality (ODEQ) Values (2001).
3. Lower of Talmage et al. (1999) or Los Alamos National Laboratory (LANL) (2010) Values.

Sediment:

1. ODEQ Values (2001).
2. EPA Region 10 Recommended Values (MacDonald Consensus Values [2000] or Oak Ridge National Laboratory Efroymson Values [1997]).
3. Lower of Talmage et al. (1999) or LANL (2010) Values.

The ecological screening levels used for the SI are provided in Tables 3-4 and 3-5.

3.7 Variances from the SSWP

Field activities were conducted in accordance with the SSWP (Shaw, 2011b). Although field work following the MEC find was limited to that necessary to collect samples, the field team was

still able to reach reconnaissance goals and collect all required samples. No variances were required for the field work conducted at the Bombing Range No. 3 MRS.

3.8 Second TPP Meeting

A second TPP meeting was held on July 24, 2012, via conference call. Representatives from USACE Kansas City District, IDEQ, BLM, and Shaw were in attendance. Shaw summarized the SI process, SI results and recommendations, and MRSPP score for the Bombing Range No. 3 MRS. All TPP meeting attendees indicated concurrence with the recommendations and MRSPP scoring as presented in the Draft Final SI Report for Pocatello Bombing Range No. 3. Meeting attendees also discussed the recommendation for a removal action at the site, and the Cedar Butte Wilderness Study Area wildfire that occurred in July 2012. Minutes from the meeting are provided in Appendix B.

3.9 Public Notice

Prior to finalizing the SSWP, a public notice was placed in the *Idaho State Journal* and the *Post Register* of Idaho Falls on December 19, 2010, and in *The Morning News* of Blackfoot on December 17, 2010, with a request for additional historical information about the FUDS. The public notice included a request for responses to be directed to the Seattle District USACE. No responses to the public notice were received by the Seattle District. The affidavits of publication for the public notice are provided in Appendix C.

4.0 Bombing Range No. 3 MRS

4.1 History and Land Use

Pocatello Bombing Range No. 3, also known as Pocatello Precision Bombing Range No. 3 and the Pocatello Demolition and Incendiary Bombing Range, was built and used as a demolition and incendiary bombing range by the Pocatello Army Air Base. The range may have been in use as early as October 7, 1943, until as late as May 1, 1947. Practice bombs, GP bombs containing HE filler, incendiary bombs, and .50-caliber small arms ammunition were used at the range.

Improvements made to the target included five frame pyramid targets, which were left on the property. This suggests one target area with five smaller targets in that area. A target ring is visible in the 1952 aerial photograph of the range (Figure 1-2). Other unspecified improvements made to the range were removed. There is no indication in the available historical documentation or historical aerial photograph review that the range was used for night bombing. According to the ASR, conventional ordnance including practice bombs with spotting charges, GP HE bombs, and incendiary bombs were utilized at Pocatello Bombing Range No. 3 (USACE, 2003). Evidence of the use of .50-caliber small arms ammunition was also found during the SI. The total number of bombs dropped on this range during its period of usage is not specified in any of the reviewed documentation. The ASR does state that "during September 1943, the 382nd Bombardment Group, stationed at Pocatello Army Air Base dropped 1,706 practice bombs and 95 demolition bombs," and that "The quantity of bomb craters is consistent with high explosive demolition bombs used in training by Bombardment Groups for the Pocatello Bombing Range No. 3" (USACE, 2003). In addition, a Certificate of Clearance, dated October 27, 1948, makes reference to "scrap from hundreds of practice bombs" (USACE, 2003). The Certificate of Clearance was completed for the rectangular "impact area" consisting of 183 acres, as shown on a real estate map dated January 1944 and revised in May 1956 (shown on Figures 1-2 and 1-3).

The *ASR Supplement* cites Army studies and reports on bombing analysis and accuracy completed in 1942 indicating that 99 percent of bombs dropped from 25,000 ft or less, at speeds up to 250 mph, would be expected to fall within 3,000 ft of the target, with 95 percent within 2,000 ft (USACE, 2004a). The *ASR Supplement* also provides a range description for "Bombing Target, Live (aka: PBR, Precision Bombing Target, Bombing Range)" indicating a circle with a 3,000 foot radius and probable munitions type of "Bomb, High Explosive." The range description for "Bombing Target, Practice (aka: PBR, Precision Bombing Range, Bombing Target)" provides the same specifications for a circular MRS boundary with a radius of 3,000 ft, with probable munitions type "Bomb, Practice." This was the basis for establishing an MRS range boundary with a radius of 3,000 ft from the target center as defined in the *ASR Supplement* and the MRS Inventory (DoD, 2010).

Although .50-caliber small arms ammunition was used at Pocatello Bombing Range No. 3, target areas or machine gun range features have not been identified. The FUDS is approximately 2 miles by 3 miles, which is too small to accommodate a typical air-to-ground gunnery range of 2 miles by 6 miles. Likewise, the reported "impact area" is approximately 1,955 ft by 3,945 ft, which is not consistent with a typical air-to-ground gunnery range.

The entire MRS is managed by the BLM. Portions of the MRS are managed as part of the Cedar Butte Wilderness Study Area, and the remainder is leased for cattle grazing. The MRS may also be used for hunting, although there is no indication of significant recreational use in the area. The MRS is located in a region that experiences grass fires and may periodically burn. The MRS has been mostly undisturbed following military use of the range. There are no barriers in place preventing human access to the range, although the rough terrain of the basalt lava flows in the Cedar Butte Wilderness Study Area may discourage access to that portion of the range. Land use is expected to remain the same in the foreseeable future.

4.2 Previous Investigations

A DERP-FUDS INPR for the Pocatello Bombing Range No. 3 was completed in 1988. The INPR stated that Pocatello Bombing Range No. 3 "was formerly used as a demolition and incendiary bombing range." A site inspection was performed by Walla Walla District personnel on September 11, 1986. The INPR stated that during the site visit "numerous bomb craters and bomb fragments were observed" (USACE, 1988). An ASR was completed in April 2003. The ASR included a visit to the site on September 11, 2002, during which time the field team observed "numerous craters from the use of demolitions bombs" as well as MD from M38A2 practice bombs, M-30 demolition bombs, and one incendiary device. The team also identified a possible target marker. No UXO was found (USACE, 2003). An *ASR Supplement* was completed in November 2004. The document listed the AN-M30 100-lb GP bomb, the AN-M50 four-lb incendiary bomb, the M38A2 100-lb practice bomb, and the M1A1 spotting charge as the munitions used at the site, and included munitions data sheets and general range information. The *ASR Supplement* included a RAC score of 4 for the Bombing Range No. 3 MRS (USACE, 2004a).

4.3 MEC Evaluation

4.3.1 Preliminary Conceptual Site Model Summary for MEC

The preliminary CSM developed for the Bombing Range No. 3 MRS identified a potentially complete pathway for human exposure to MEC. Potential MEC identified at the MRS were unexploded M1A1 or M3 spotting charges used with M38A2 100-lb practice bombs, unexploded AN-M30 GP HE bombs, and unexploded AN-M50 or AN-M54 incendiary bombs. Surface soil and subsurface soil were identified as potential pathways of human exposure to MEC. BLM workers, cattle ranchers, and hunters were identified as potential human receptors, with direct contact as the potential route of human exposure. A revised CSM based on the SI findings at the

MRS is presented in Appendix J. Revisions to the CSM included the addition of BLM firefighters as potential human receptors at the MRS.

4.3.2 Field Observations and Evidence of MEC

SI field activities were conducted at the Bombing Range No. 3 MRS on August 17 through 20, 2011. The field team was accompanied by two representatives from the BLM Salmon Office on August 18 and 19. A visual reconnaissance of the MRS was conducted to identify evidence of former range activities (e.g., MD, craters, target remains). The reconnaissance team documented conditions with respect to evidence of munitions use, topography, vegetative cover, presence or absence of water, wildlife, and land use. Field notes are included in Appendix D. The visual reconnaissance was supplemented with the use of a Schonstedt fluxgate magnetometer and White's all-metals detector. Reconnaissance was focused on the central target area of the MRS and on the rectangular area marked as an "impact area" on a real estate map dated January 1944 and revised in May 1956. The path walked during the visual reconnaissance was recorded using a hand-held Global Positioning System (GPS) unit (Figures 4-1 and 4-2). The total distance walked within the MRS was approximately 76,725 ft (14.5 miles). A log of waypoints collected using the GPS unit is included in Appendix H. Digital photographs were taken to document site conditions and are provided in Appendix E. Photograph locations are shown in Figures 4-1 and 4-2.

4.3.2.1 Evidence of MEC

The field team observed ample evidence of former military munitions use at the MRS. Well-defined craters were observed throughout the central target area (Appendix E, Photographs 2 and 9), some up to approximately 20 ft in diameter and 4 ft in depth. Near the target center, the craters were closely spaced. Wood debris that may have been associated with targets was observed on the ground surface throughout the MRS. MD was identified from M38A2 practice bombs (Appendix E, Photographs 4, 6, and 41) with M1A1 or M3 spotting charges (Appendix E, Photographs 6 and 13); AN-M30 GP HE bombs (Appendix E, Photographs 3, 12, and 19) and associated fuzes (tail fuzes, 100 series and M123A1, M124A1, or M125A1) (Appendix E, Photographs 15, 20, and 42); and AN-M50 or AN-M54 incendiary bombs (Appendix E, Photographs 5, 7, 10, 14, 16, and 17) with cluster adapter components (Appendix E, Photographs 8, 11, and 32). Collectively, hundreds of pieces of MD from these munitions were observed. MD from these munitions was observed throughout the MRS, with a density of up to 30 pieces on the ground surface within a 10-ft radius near the target center. One other area with a high density of MD from the munitions noted above (approximately 20 pieces within a 10-ft radius) was observed just northeast of the central target area (Appendix E, Photograph 24). One object that may be MD from an M5 spotting charge was observed. The object was the bottom of a glass bottle, approximately 3 inches in diameter, marked with the number 297 (Appendix E, Photograph 29). Debris from .50-caliber small arms cartridges was also observed throughout the MRS (Appendix E, Photographs 30, 31, and 38). In total, two projectiles, approximately

10 cartridge cases, and more than 40 links from .50-caliber ammunition were observed. The MD from .50-caliber small arms ammunition was interspersed with MD from the practice, HE, and incendiary bombs, and was broadly scattered. The field team did not identify any areas with concentrated .50-caliber MD indicative of target areas from air-to-ground gunnery, and did not identify any berms indicative of a machine gun range. Evidence of the use of practice, HE, and incendiary bombs was concentrated around the target circle identified during historical aerial photograph review. There was no indication of another target, such as a high concentration of MD or craters, observed in the reported "impact area." MD from all munitions items observed at the MRS was found outside the central target area, but was widely dispersed in the outer portions of the range.

MEC in the form of unexploded AN-M54 four-lb incendiary bombs was observed by the field team. The first MEC items were observed on August 18 near the MRS boundary in the southwest portion of the MRS. The initial find consisted of a group of AN-M54 bombs from a cluster that apparently never deployed (Appendix E, Photographs 35, 36, and 37). The UXO technician on site counted eight unexploded AN-M54 bombs on the ground surface within an approximate 5-ft radius. After documenting the find, the field team returned to the vehicle to initiate notifications. The field team then proceeded with sampling activities, conducting avoidance. During the sampling effort, the field team identified single unexploded AN-M54 bombs on the ground surface in four additional locations (Appendix E, Photographs 39, 40, 43, 45, and 46). The field team also observed five sets of AN-M54 tail fins protruding from the ground that may have been attached to the incendiary portion of the bombs, but the team was unable to determine from visual observation whether the incendiary portions of the bombs were intact (Photographs 44 and 47). Because the Shaw field team was unable to make this determination, the BLM representatives who were on site elected to have these possible MEC items addressed during the response by the EOD team.

The BLM representatives, who were on site at the time of the MEC finds on August 18, contacted the BLM supervisor responsible for the geographic region in which the range is located. The BLM supervisor then coordinated a response by EOD personnel from Mountain Home Air Force Base in Mountain Home, Idaho. EOD personnel arrived on-site on August 19 at approximately 1100 hours. After initial coordination between the EOD team and BLM representatives, Shaw assisted the EOD personnel in locating the MEC and possible MEC items that had previously been identified before continuing with sample collection. Because there was a high fire danger at the time of the field activities and EOD response, the MEC items were transported to a location approximately 6.5 miles east southeast of the MRS that had recently burned in a grass fire (Appendix E, Photographs 55, 56, and 57). The items were detonated by EOD personnel at approximately 1830 hours at this off-site location. A total of 37 unexploded AN-M54 incendiary bombs were recovered and disposed by the EOD team.

The possible MEC items, where the field team observed AN-M54 tail fins protruding from the ground as described above, were addressed by the EOD personnel using a remote pull technique. When pulled, the tail fins broke free where the steel had been weakened by rust. The EOD team did not conduct an intrusive investigation to determine whether the incendiary portions of the devices were intact underground; however, all portions of the devices that had been above the ground surface were removed.

The State Communications Transcript prepared by the EOD personnel who conducted the MEC response is provided in Appendix C. It should be noted that a BLM firefighting crew also attended the MEC response. The members of the BLM firefighting crew respond to grass fires in the region surrounding the Bombing Range No. 3 MRS and were unaware of the presence of the former military range and associated munitions.

4.3.2.2 General Field Observations

The MRS was observed to be in a region of mostly flat to rolling topography with exposed basalt features. Rhyolite domes were visible in the distance, the most prominent of which was Big Southern Butte (Appendix E, Photograph 49). The field team observed that the topography varies throughout the MRS. The topography within the central target area most of the southern and western portions of the MRS is characteristic of a sagebrush steppe. This area is mostly flat to rolling with vegetation consisting of sagebrush, other low shrubs, and grasses, with patches of bare ground between the plants (Appendix E, Photograph 1). The soils are silty, with basalt gravel and cobble and some outcroppings of basalt lava flows. The remainder of the MRS falls within the basalt lava flows of the Cedar Butte Wilderness Study Area on the outskirts of a lava field known as “Hell’s Half Acre” (Appendix E, Photograph 23). This area is characterized by exposed basalt with large fractures, cliffs, and natural craters that make navigation very difficult (Appendix E, Photograph 21, 22, 33, and 34). The ground surface is mostly bare of vegetation, except where soil has formed within fractures and depressions. Small trees and sparse vegetation were observed growing in fractures in the basalt (Appendix E, Photograph 22). The division between these two ground surface types is clearly visible in the 2010 aerial photograph (Figures 1-3 and 4-1), where the basalt lava flows are darker in color than the surrounding steppe. Basalt rocks are present throughout the MRS, even where bedrock is not exposed. Because the basalt is highly ferrous, its magnetic signature was picked up by the Schonstedt magnetometer. The White’s Classic V ID all-metal detector was used for the majority of the reconnaissance.

No surface water and no defined drainage features were observed within or in proximity to the MRS. The one mapped surface water feature, an intermittent pond named “Wood Road Lake,” was observed within the MRS (Appendix E, Photograph 27). The feature appears to be man-made, and consists of a shallow depression with a rock structure that appears to impact the collection of surface water in that location (Appendix E, Photographs 26 and 28). The field team deduced that the structure is likely intended to either collect snow drifts or block wind from

evaporating the water supply. The pond did not contain water during the field activities, but contained dried mud (Appendix E, Photograph 50). Two other similar structures with associated dry ponds were observed along the road that leads to the MRS. The field team also observed within the MRS a wildlife watering system called a "guzzler" that was reportedly put in place by the BLM (Appendix E, Photograph 18). Wildlife and evidence of wildlife observed at the site included horned toads, rabbits, elk antlers, mountain lion tracks in Wood Road Lake (Appendix E, Photographs 51 and 52), and rattlesnake skins. The BLM fire crew indicated the area has a large rattlesnake population.

The field team determined that the site is approximately 1 hour's driving time from the city of Blackfoot, Idaho. The site was reached by taking a maintained, dirt BLM road west from the agricultural fields on the outskirts of Blackfoot. From the BLM road, an unmaintained dirt road leads north to the central target area of the MRS. Hunters were observed along the BLM road but were not observed along the road to the MRS or within the MRS. One modern shotgun shell was observed outside the MRS near the background sample locations. Evidence of cattle ranching included a large steel tub (Appendix E, Photograph 25), a stock tank just outside the MRS (Appendix E, Photograph 53), agricultural fencing in the surrounding area, and a corral at the turn-off from the main BLM road (Appendix E, Photograph 54). No residences were observed within the MRS or surrounding area.

4.3.3 MEC Risk Assessment

The following section presents a qualitative assessment of the risk associated with potential MEC at the Bombing Range No. 3 MRS. This assessment is based on historical documentation, prior investigation, and the visual inspection conducted during this SI. A MEC assessment is provided to convey relative risk on a scale from low to high and is not intended to be a thorough risk assessment as would be conducted for an RI/FS.

Shaw completed a magnetometer-assisted visual reconnaissance of the Bombing Range No. 3 MRS on August 17 through 20, 2012. MEC consisting of AN-M54 incendiary bombs was observed on the ground surface. Evidence of MEC consisted of craters and MD from M1A1 or M3 spotting charges used with M38A2 100-lb practice bombs; AN-M30 GP HE bombs and associated M-100 series fuzes; and AN-M50 or AN-M54 incendiary bombs. Debris from .50-caliber small arms ammunition was also observed; however, because small arms ammunition does not pose a significant explosive hazard, these munitions are not further discussed in the MEC evaluation. Figures 4-1 and 4-2 show the GPS pathways, photograph locations, and MEC locations identified during the SI reconnaissance.

The M38A2 100-lb practice bomb was 47.5 inches long, filled with sand, and designed to simulate a GP bomb of the same size. Although the practice bomb itself was inert, a spotting charge was attached to the tail section of the practice bomb and was designed to ignite on impact, marking the location of the practice bomb on the target range. M1A1 and M3 spotting charges

contained a 28-gauge blank shotgun shell as a primer and 3 lb of black powder. Upon impact, an inertia weight drove a firing pin into the primer, igniting the spotting charge.

Although it is probable that some spotting charges did not detonate upon impact as intended, the likelihood of a spotting charge retaining explosive power after more than 55 years is remote. To remain operable, an unexploded spotting charge would have to have be relatively undamaged by impact, and the thin metal container would have to remain intact, without rusting, to keep the black powder inside sealed from the elements.

Incidental contact would not be likely to ignite an unexploded spotting charge, if encountered. If struck and ignited by a vehicle or farm machinery, it is unlikely a spotting charge would seriously injure the operator. Tampering with an intact spotting charge, however, could cause the material to burn as a result of shock, heat, or friction, potentially resulting in burns, blinding, or other injury.

The M30 demolition bomb contained 53.3 lb of 50/50 Amatol (a mixture of equal parts of TNT and ammonium nitrate) or 54 lb of TNT. The AN-M103 nose fuze and AN-M100A2 tail fuze contained minute quantities of lead azide, lead styphnate, mercury-fulminate, black powder, and a tetryl booster charge. The initiation of the igniters and fuzes in these munitions was caused by impact or impact inertia, requiring a force to drive the firing pin into a primer/detonator. The bomb fuzes can have a delay function.

Incidental contact would not be likely to ignite the fuzes used with the AN-M30 GP HE bomb, if encountered. If ignited, for example by being struck by intrusive apparatus (e.g., farming equipment) or tampered with, an M103 or M100A2 bomb fuze could cause the GP HE bomb to detonate causing death, severe injury, blinding, and/or severe property damage.

The AN-M50 incendiaries function on target impact when a firing pin strikes the percussion primer, igniting the first fire mixture. The burning of the first fire mixture ignites the thermate core, which burns and ignites the magnesium bomb body. In the AN-M50XA1, the thermate and magnesium burn down to the black powder capsule, which detonates causing burning magnesium to be dispersed over a wide area. The AN-M50XA2 functions similarly to the AN-M50XA1, except that when the thermate burns down to a specific point, a delay detonator is activated. This ignites the tetryl explosive charge, fragmenting the nose weight between 60 and 240 seconds after impact.

The AN-M54 four-lb incendiary bomb consists of a steel cylinder with a firing assembly (essentially a shotshell primer), approximately 20 grams of first fire mixture, and a filler core of 22 ounces of thermate. The AN-M54X and AN-M54XA1 are designed to have a delayed detonation. In the AN-M54X, a portion of the thermate is replaced with a capsule containing 170 grains of black powder. In the AN-M54XA1, some of the thermate mixture is replaced with a magnesium disk and a steel capsule containing a tetryl explosive charge. A delay detonator is ignited by the burning magnesium.

The AN-M54 functions on target impact when the firing pin strikes the percussion primer, igniting the first fire mixture. The burning first fire mixture ignites the thermate core, which melts the steel cylinder. In the AN-M54X, the thermate burns down to the black powder capsule, which detonates causing molten steel to be dispersed over a wide area. The AN-M54XA1 is similar to the AN-M54X, except that when the thermate burns down to the magnesium disk, the delay detonator is heated by the burning magnesium and ignited. After a delay, the tetryl explosive charge is detonated, fragmenting the capsule and scattering the fragments and molten metal.

M3 clusters containing 34 AN-M50 and AN-M54 four-lb bombs may have been loaded with 80 percent regular munitions and 20 percent delayed detonation munitions (AN-M50XA1, AN-M50XA2, AN-M54X and AN-M54XA1). AN-M50 and AN-M54 four-lb incendiary bombs would pose little risk of injury if stepped on or driven over. Tampering with or attempting to disassemble an incendiary bomb could cause ignition, potentially resulting in death, blindness, or severe injury from the burning fire mixture (i.e., thermate or magnesium). In the case of the delayed detonation versions, a detonation may occur, potentially causing death, blindness, or severe injury. A grass fire within the range would be unlikely to ignite an AN-M50 or AN-M54 incendiary bomb.

The MRS is located in a remote area that is managed by the BLM. Portions of the MRS are managed for ecological purposes as part of the Cedar Butte Wilderness Study Area. The remainder of the MRS is primarily used for cattle grazing. The area might also be used by hunters. There are no access restrictions in place. The region in which the MRS is located occasionally experiences grass fires. The BLM firefighters who attended the EOD response during the SI field activities were unaware of the potential munitions in the area and the potential risks associated with the use of water to extinguish incendiary munitions. Human receptors include BLM workers, cattle ranchers, firefighters, and hunters. Intrusive work is not expected at the MRS; however, land users may be exposed to MEC on the ground surface.

MEC has been reported on one occasion in the past at the MRS, but the past report was not confirmed by trained personnel. MEC was observed on the ground surface during the SI reconnaissance. Although the confirmed MEC items observed were removed by an EOD team, the fact that multiple MEC items were discovered over the course of a limited reconnaissance indicates that MEC is likely still present on the ground surface at the MRS. In addition, MEC may be present near the ground surface in the locations of the possible MEC identified during the SI reconnaissance and described in Section 4.3.2.1.

The MEC risk for this area is considered to be moderate to high based on the following:

- MEC consisting of AN-M54 incendiary bombs has been observed on the ground surface;
- Evidence of MEC consisting of craters and MD from GP HE bombs has been observed at the MRS;

- The MRS was intended for use with demolition and incendiary bombs;
- There are no access restrictions in place; and
- There is a fire risk in the area, and firefighters may be exposed to explosive hazards if a fire occurs in the target area.

The MEC risk is classified as moderate to high rather than high because the munitions present are not considered to be sensitive as defined in the MRSPP Primer (DoD, 2007) and because of the remote location.

4.4 Munitions Constituents Evaluation

4.4.1 Preliminary Conceptual Site Model Summary for Munitions Constituents

The preliminary CSM developed for the Bombing Range No. 3 MRS identified metals (aluminum and barium), explosives, and SVOCs (anthracene and hexachloroethane) as the MC of concern associated with munitions known to have been used at the MRS. The surface soil and surface water/sediment pathways for human and ecological exposure to MC were identified as potentially complete. The groundwater pathway was identified as incomplete due to the distance to the nearest downgradient well and the depth to groundwater. Air was not identified as a pathway of concern because inhalation of MC in vapor form will not occur for non-volatile or semivolatile MC under normal environmental conditions, and potential inhalation of soil particulates is considered in the development of health-based screening levels for soil. Human receptors identified in the preliminary CSM were BLM workers, cattle ranchers, and hunters. Ecological receptors identified were wildlife associated with the Cedar Butte Wilderness Study Area and Wood Road Lake.

Surface soil and sediment samples were collected and analyzed for aluminum, barium, explosives, anthracene, and hexachloroethane. An updated CSM based on the SI findings is presented in Appendix J.

4.4.2 Soil Exposure Pathway

Surface soil samples were collected to evaluate the soil exposure pathway for MC. Soil was the primary medium of concern because of the presence of MD in surface soils and the fact that soil is the medium directly impacted by the dropping of munitions on the ground surface. Surface soil also serves as a secondary source of potential contamination that could migrate to other pathways. The potential routes of human exposure to contaminated soils include incidental ingestion and dermal contact with contaminated media, as well as inhalation of soil particulates.

Six incremental soil samples were collected from the MRS. Five samples were collected from pre-planned sampling units within and surrounding the central target area. One sample was collected from a location near the MRS boundary where the field team observed multiple unexploded AN-M54 incendiary bombs from a cluster that apparently did not deploy. All surface soil samples were analyzed for metals (aluminum and barium), explosives, and SVOCs

(anthracene and hexachloroethane). A triplicate sample was collected from Sampling Unit 1. Soil samples were collected from a depth of 0 to 2 inches. Table 4-1 shows the soil sample results compared to the established background, human health, and ecological screening levels. Sample unit locations are shown on Figure 4-1. Individual soil increment locations are shown on Figures 4-3 through 4-8. Aluminum and barium were detected in all six soil samples with maximum detected concentrations (MDCs) of 16,100 milligrams per kilogram (mg/kg) and 223 mg/kg, respectively. Anthracene, hexachloroethane, and explosives were not detected in any surface soil samples. As discussed below, sample results indicate no MC release at the MRS.

4.4.2.1 Comparison to Background Data

The MDCs of aluminum and barium were compared to background as described in Section 3.6.1. The MDC of aluminum (16,100 mg/kg) did exceed the background concentration of 10,400 mg/kg; however, because it did not exceed three times the background concentration (31,200 mg/kg), a release of aluminum was not established in surface soil. Likewise, the MDC of barium (223 mg/kg) did exceed the background concentration of 205 mg/kg; however, because it did not exceed three times the background concentration (615 mg/kg), a release of barium was not established in surface soil. SVOCs and explosives were not detected in surface soil samples. Therefore, an MC release was not established in surface soil at the MRS.

4.4.2.2 Comparison to Human Health Screening Values

Because no MC release was established at the MRS, surface soil sample results were not compared to human health screening levels. The surface soil pathway for human exposure to MC is incomplete.

4.4.2.3 Comparison to Ecological Screening Values

Because no MC release was established at the MRS, surface soil sample results were not compared to ecological screening levels. The surface soil pathway for ecological exposure to MC is incomplete.

4.4.3 Surface Water Pathway

A sediment sample was collected to evaluate the surface water/sediment exposure pathway for MC. The surface water/sediment pathway was identified as a secondary pathway that could be impacted by the migration of surface soils, if contaminated. The potential routes of human exposure to sediment include incidental ingestion and dermal contact by BLM workers, cattle ranchers, firefighters, and hunters.

One sediment sample was collected from Wood Road Lake, which is located near the central target area within the MRS. The lake did not contain water at the time of the sample collected, but contained dried sediment (Appendix E, Photograph 50). The sediment sample was collected as a discrete sample from a depth of 0 to 2 inches bgs and analyzed for metals (aluminum and barium), explosives, and SVOCs (anthracene and hexachloroethane). Table 4-2 shows the

sediment sample results compared to the established background, human health, and ecological screening levels. The sample location is shown on Figure 4-1. Aluminum and barium were detected in the sediment sample with concentrations of 23,700 mg/kg and 272 mg/kg, respectively. SVOCs and explosives were not detected in the sediment sample. As discussed below, an MC release was not established in sediment at the MRS.

4.4.3.1 Comparison to Background Data

The MDCs of aluminum and barium were compared to background as described in Section 3.6.1. The concentration of aluminum (23,700 mg/kg) did exceed the background concentration of 15,900 mg/kg; however, because it did not exceed three times the background concentration (47,700 mg/kg), a release of aluminum was not established in sediment. Likewise, the concentration of barium (272 mg/kg) did exceed the background concentration of 212 mg/kg; however, because it did not exceed three times the background concentration (636 mg/kg), a release of barium was not established in sediment. SVOCs and explosives were not detected in the sediment sample. Therefore, an MC release was not established in sediment at the MRS.

4.4.3.2 Comparison to Human Health Screening Levels

Because no MC release was established in sediment at the MRS, sediment sample results were not compared to human health screening levels. The surface water/sediment pathway for human exposure to MC is incomplete.

4.4.3.3 Comparison to Ecological Screening Levels

Because no MC release was established in sediment at the MRS, sediment sample results were not compared to ecological screening levels. The surface water/sediment pathway for ecological exposure to MC is incomplete.

4.4.4 Groundwater Pathway

The nearest downgradient groundwater well is approximately 4 miles from the target center. This well is completed to a depth of 150 ft in basalt interbedded with clay deposits (IDWR, 2010 and 2011), and is listed as a domestic well but does not appear to support a residential structure. In addition, SI results indicate an MC release that could migrate to groundwater has not been established in surface soils or sediment at the MRS. Based on these factors, the groundwater pathway for human exposure to MC is incomplete. Groundwater samples were not collected during the SI.

4.4.5 Air Pathway

Air is not a pathway of concern because inhalation of MC in vapor form will not occur for non-volatile or semivolatile MC under normal environmental conditions. Potential inhalation of soil particulates is considered in the development of health-based screening levels for soil. Air samples were not collected during the SI.

5.0 Summary and Conclusions

The summary and conclusions of the SI are presented in this section. Recommendations for further action are presented in Section 6.0.

Pocatello Bombing Range No. 3 is included in the MRS Inventory and FUDSMIS with one MRS identified as Bombing Range No. 3. The Bombing Range No. 3 MRS was used as an incendiary and demolition bombing range by crews stationed at Pocatello Army Air Base from as early as October 7, 1943, until as late as May 1, 1947. SI field activities, which included a site reconnaissance to look for evidence of MEC as well as surface soil and sediment sampling, were conducted on August 17 through 20, 2011.

5.1 MEC Evaluation

Based on historical documentation and visual observation, the munitions used on the range included M38A2 100-lb practice bombs with M1A1 or M3 spotting charges; AN-M30 GP HE bombs; AN-M54 and possibly AN-M50 incendiary bombs; and .50-caliber small arms ammunition. MD from all of these munitions was observed during the SI reconnaissance, in addition to craters and wood debris. Confirmed MEC consisting of unexploded AN-M54 incendiary bombs was observed in five locations throughout the MRS. Therefore, a MEC hazard is present at the MRS.

The overall risk of injury from MEC and potential MEC at this site is considered to be moderate to high, based on confirmed MEC consisting of incendiary munitions; potential MEC consisting of HE munitions; no access restrictions; and exposure to BLM firefighters.

5.2 MC Evaluation

Five surface soil samples were collected from sampling units within and surrounding the central target area of the MRS, and one surface soil sample was collected from a sampling unit containing a cluster of unexploded AN-M54 incendiary bombs near the MRS boundary. One sediment sample was collected from Wood Road Lake, near the central target area of the MRS. Samples were analyzed for metals (aluminum and barium), explosives, and SVOCs (anthracene and hexachloroethane). Aluminum and barium were detected in all site media samples. The MDCs of aluminum and barium in surface soil and sediment exceeded the respective background concentrations; however, because they did not exceed three times the respective background concentrations, a release of aluminum and barium was not established at the MRS. SVOCs and explosives were not detected in site media samples. Based on these results, an MC release has not occurred at the MRS. All MC exposure pathways are incomplete.

6.0 Recommendations

Results of the SI provide the basis for conclusions and/or recommendations for further actions at the MRS.

6.1 Bombing Range No. 3

Based on historical evidence and results from the SI field activities, MEC (AN-M54 incendiary bombs) is present at the Bombing Range No. 3 MRS. Evidence of MEC (AN-M30 GP HE bombs and M1A1 or M3 spotting charges used with M38A2 practice bombs) is also present at the MRS. Therefore, further investigation relative to MEC is recommended. It is further recommended that consideration be given to a removal action due to the likely presence of additional AN-M54 incendiary bombs not found by the SI field team and the potential for exposure to BLM workers, cattle ranchers, firefighters, and hunters.

Based on the results of sampling conducted during the SI field activities, an MC release has not been established at the Bombing Range No. 3 MRS. Therefore, no further investigation relative to MC is recommended. A removal action relative to MC is not required.

6.2 Munitions Response Site

Results of the SI field activities provide the basis for identifying MRSs and for scoring an MRS using MRSPP (Appendix K).

Based on the use and physical distribution of the bombing range at Pocatello Bombing Range No. 3, one MRS is identified (Figure 6-1):

- Bombing Range No. 3.

The MRS is a bombing range with a radius of 3,000 ft and an area of approximately 649 acres. Observations made during the SI do not provide a basis for recommending a revised MRS boundary; therefore, the area and location of the MRS are consistent with the area and coordinates of the range identified in the *ASR Supplement*, MRS Inventory, and FUDSMIS.

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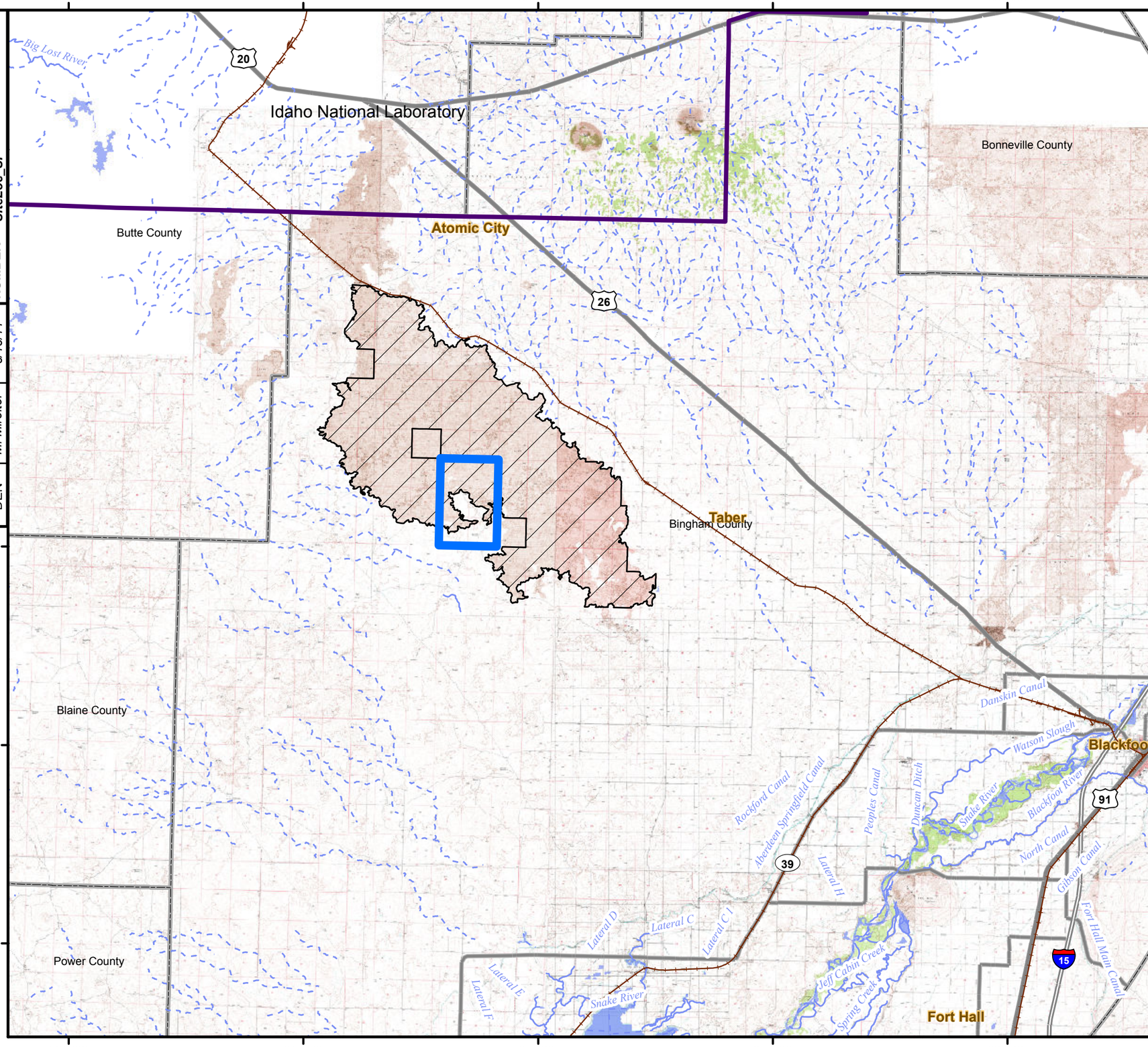
Figures



Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Idaho National Laboratory Boundary
- Cedar Butte Wilderness Study Area

NOTES:

1) FUDS property boundary was obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Cedar Butte Wilderness Study Area boundaries were obtained from the Idaho GIS Data website: http://cloud.insideidaho.org/index.html.
3) Topographic maps (Bingham, Butte, and Blaine Counties) were obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.

N

0 1.75 3.5 7 Miles

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 1-1

SITE LOCATION

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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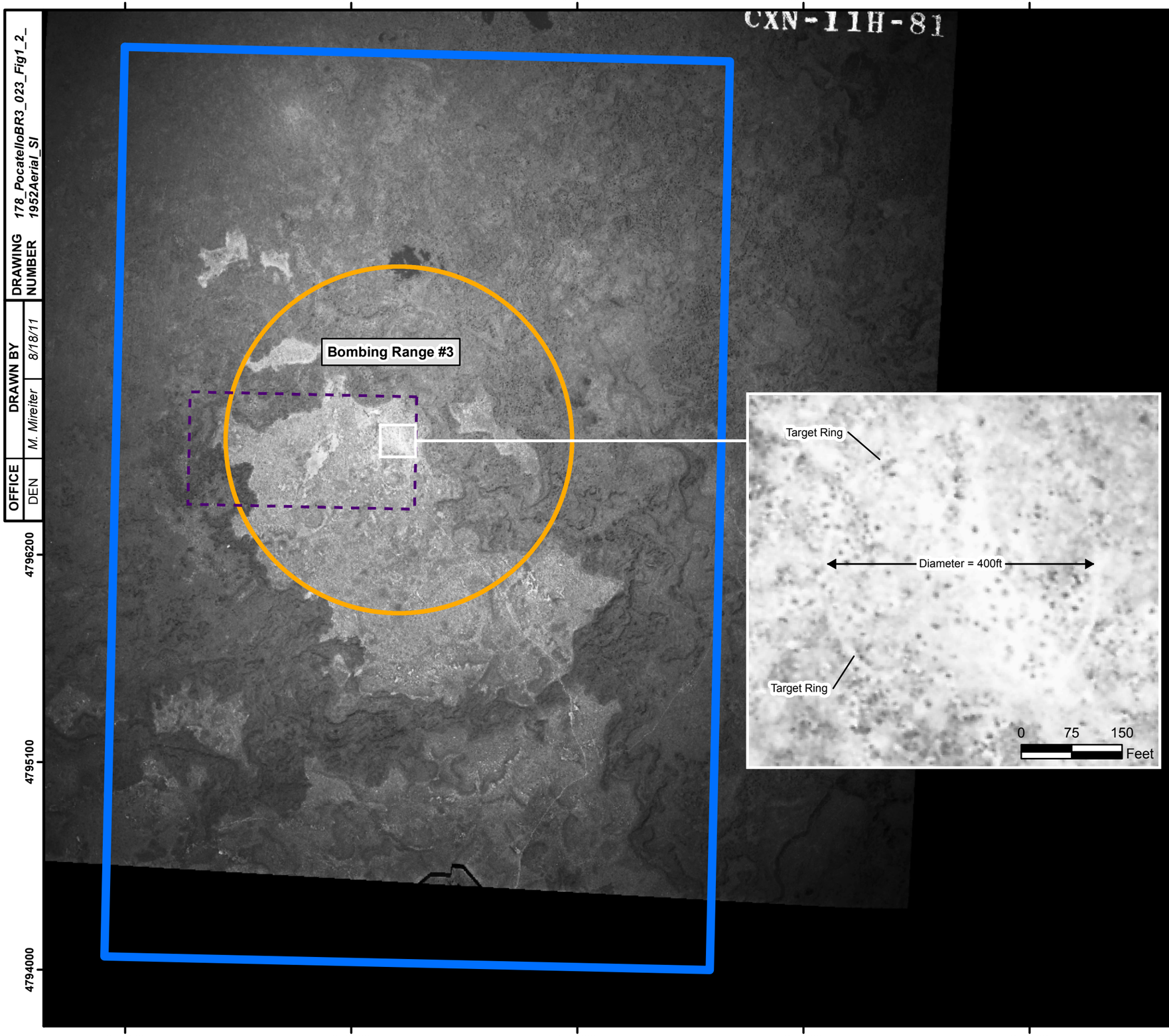
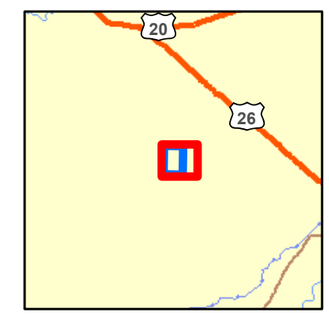
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_022_Fig1_1_SiteLoc_SI



Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Approximate Impact Area (As Shown in the ASR)

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph was obtained from the National Archives and Records Administration and is dated June 13, 1952.



N

0 875 1,750 3,500
Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 1-2

1952 AERIAL PHOTOGRAPH

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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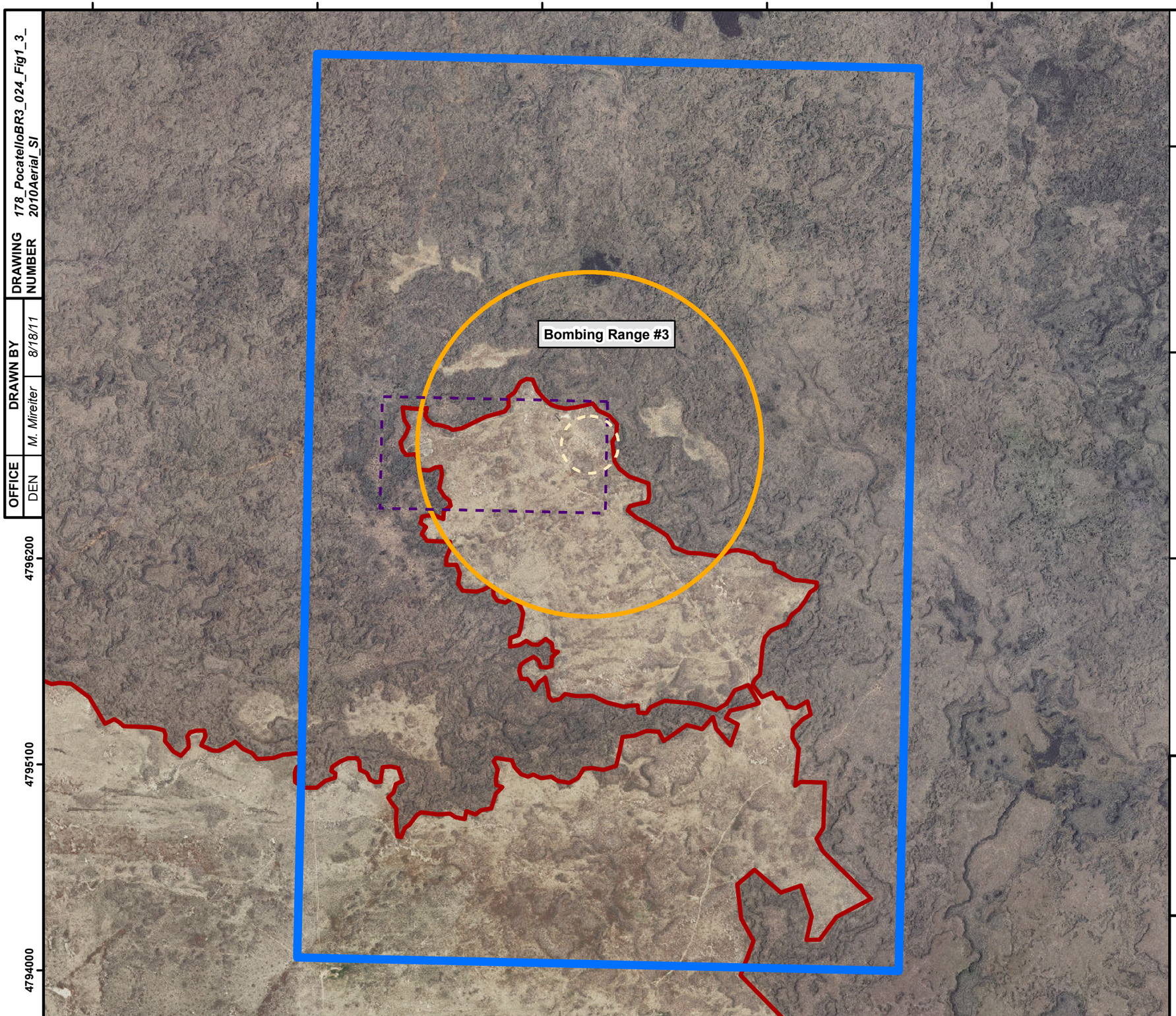
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_023_Fig1_2_ 1952Aerial_SI



DRAWING NUMBER 178_PocatelloBR3_024_Fig1_3_2010Aerial_SI

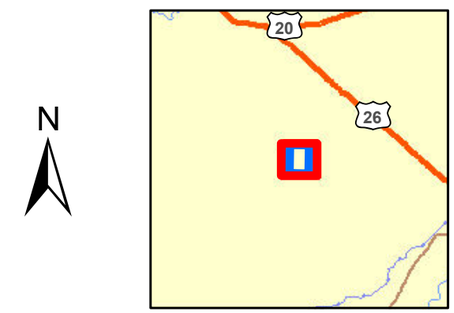
DRAWN BY M. Mireiter 8/18/11

OFFICE DEN

Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Central Target Area
- Approximate Impact Area (As Shown in the ASR)
- Exposed Basalt Lava Flow (Dark Brown Area)

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



0 875 1,750 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 1-3

2010 AERIAL PHOTOGRAPH

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

US Army Corps of Engineers®
Omaha District

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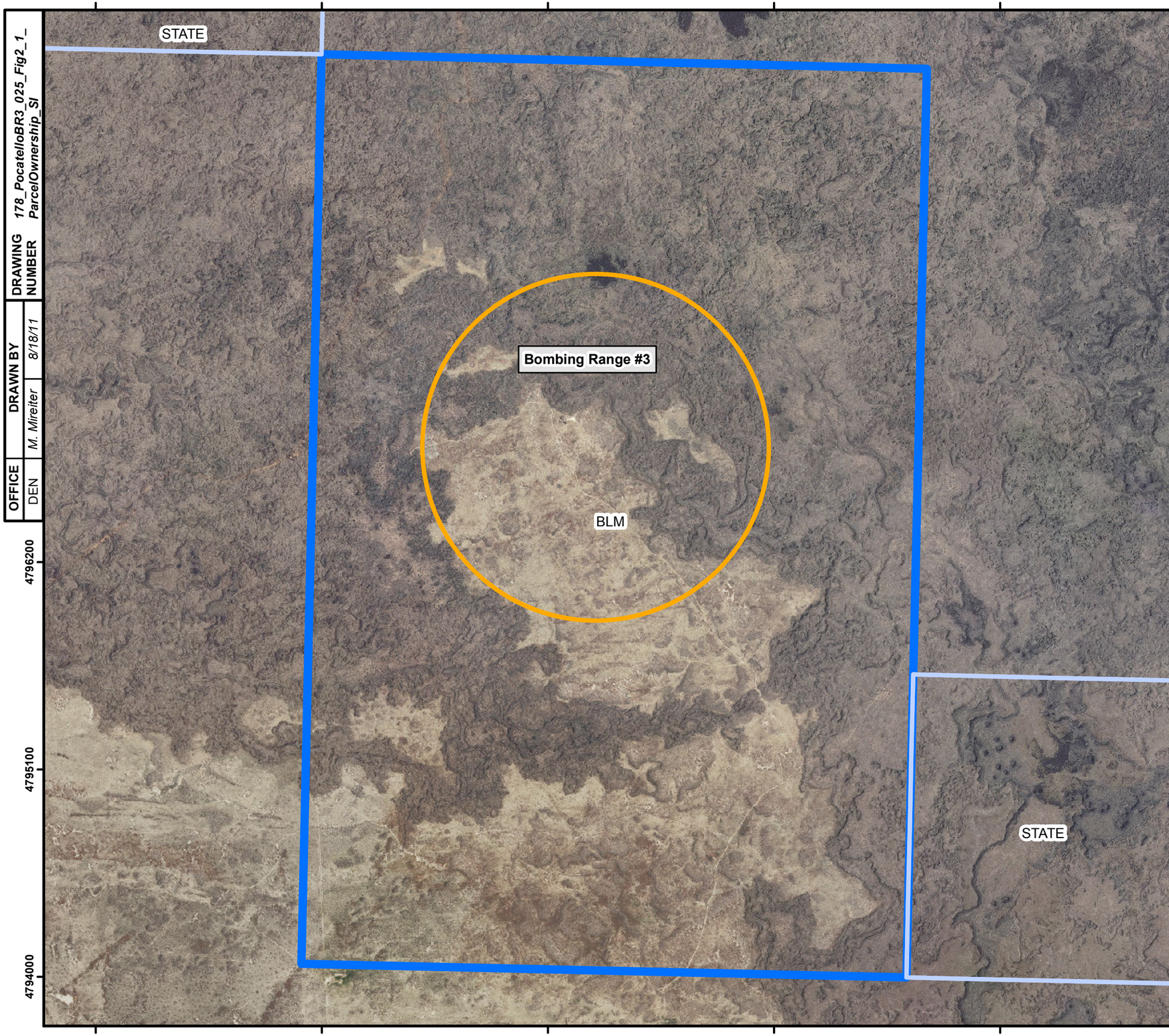
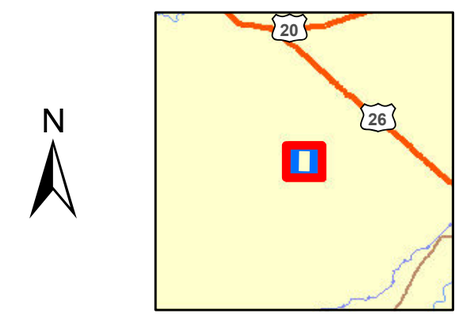


DRAWING NUMBER	178_PocatelloBR3_025_Fig2_1_ ParcelOwnership_SI
DRAWN BY	M. Mireiter 8/18/11
OFFICE	DEN

Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Land Ownership Boundary

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Land ownership data was obtained from the Idaho GIS Data website: http;//insideidaho.org/asp/geodata.asp.
3) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



N

0 875 1,750 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-1

PARCEL OWNERSHIP

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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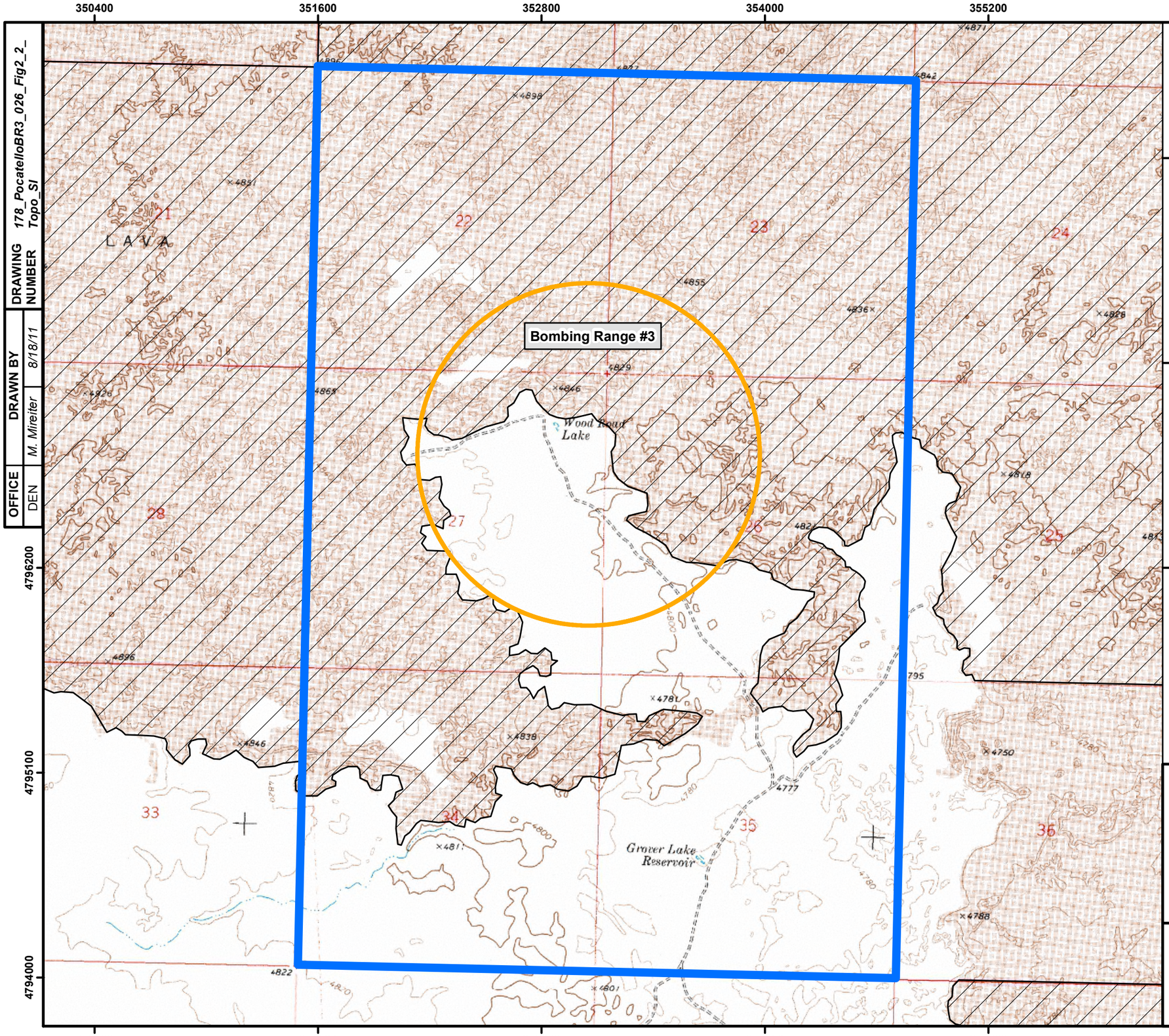
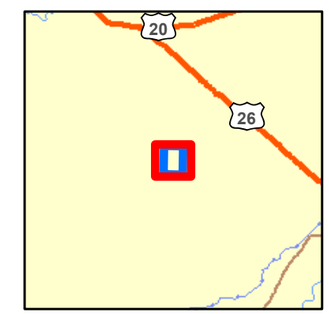


Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Cedar Butte Wilderness Study Area

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Cedar Butte Wilderness Study Area boundaries were obtained from the Idaho GIS Data Website: http://cloud.insideidaho.org/index.html.
3) Topographic map (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.



N

0 875 1,750 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-2

TOPOGRAPHIC MAP

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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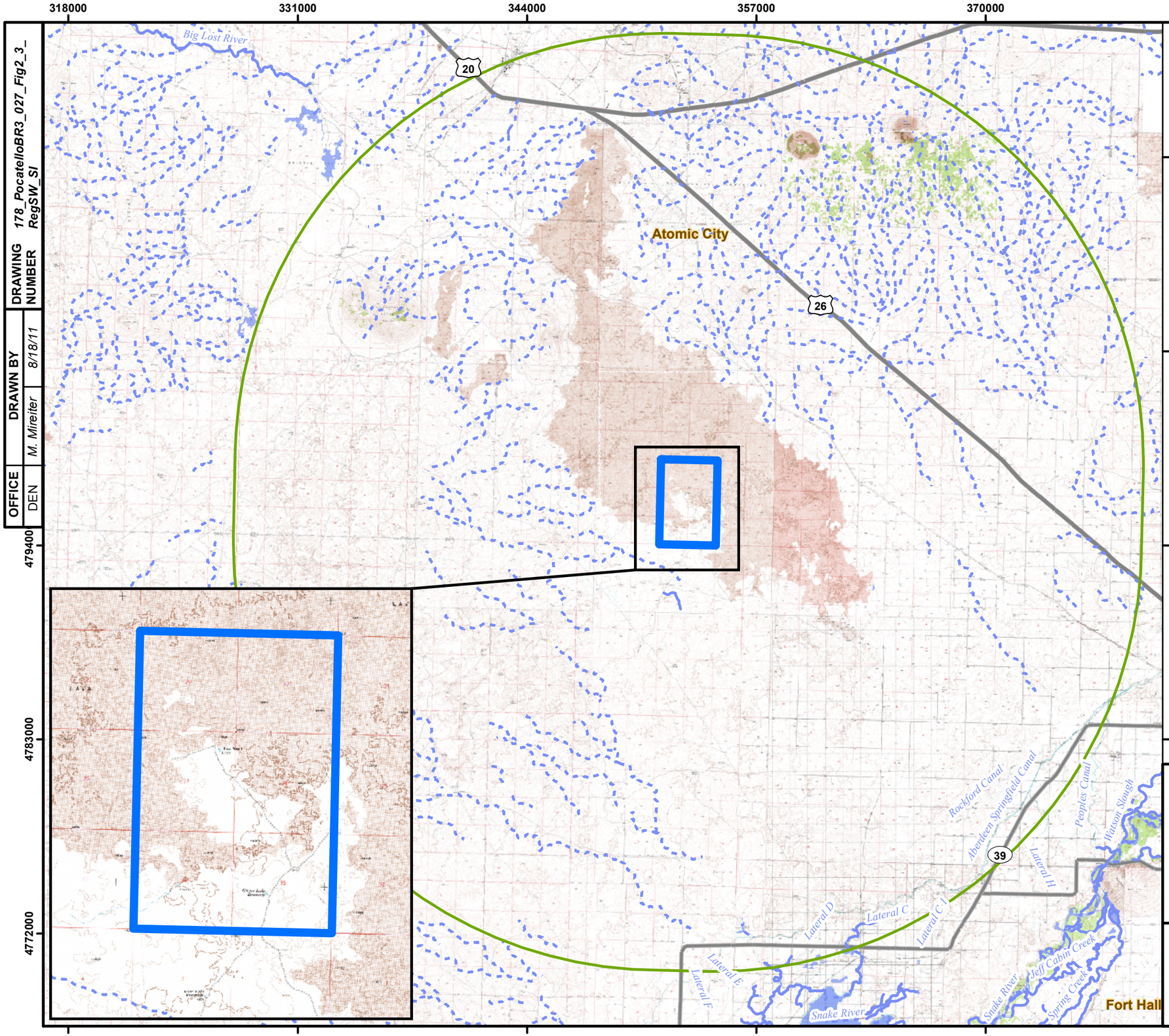
DRAWING NUMBER	DRAWN BY		OFFICE
178_PocatelloBR3_026_Fig2_2_ Topo_SI	M. Mireiter	8/18/11	DEN

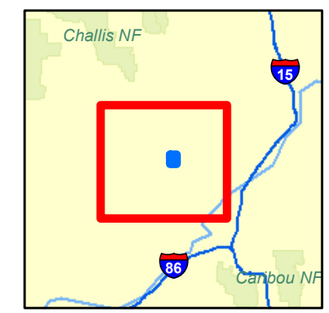


Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- 15-Mile Radius from FUDS Boundary
- Intermittent Stream
- Perennial Stream

NOTES:
1) FUDS property boundary was obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Topographic maps (Bingham, Butte, and Blaine Counties) were obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.

N



0 1.75 3.5 7 Miles

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-3

REGIONAL SURFACE WATER DRAINAGE WITHIN A 15-MILE RADIUS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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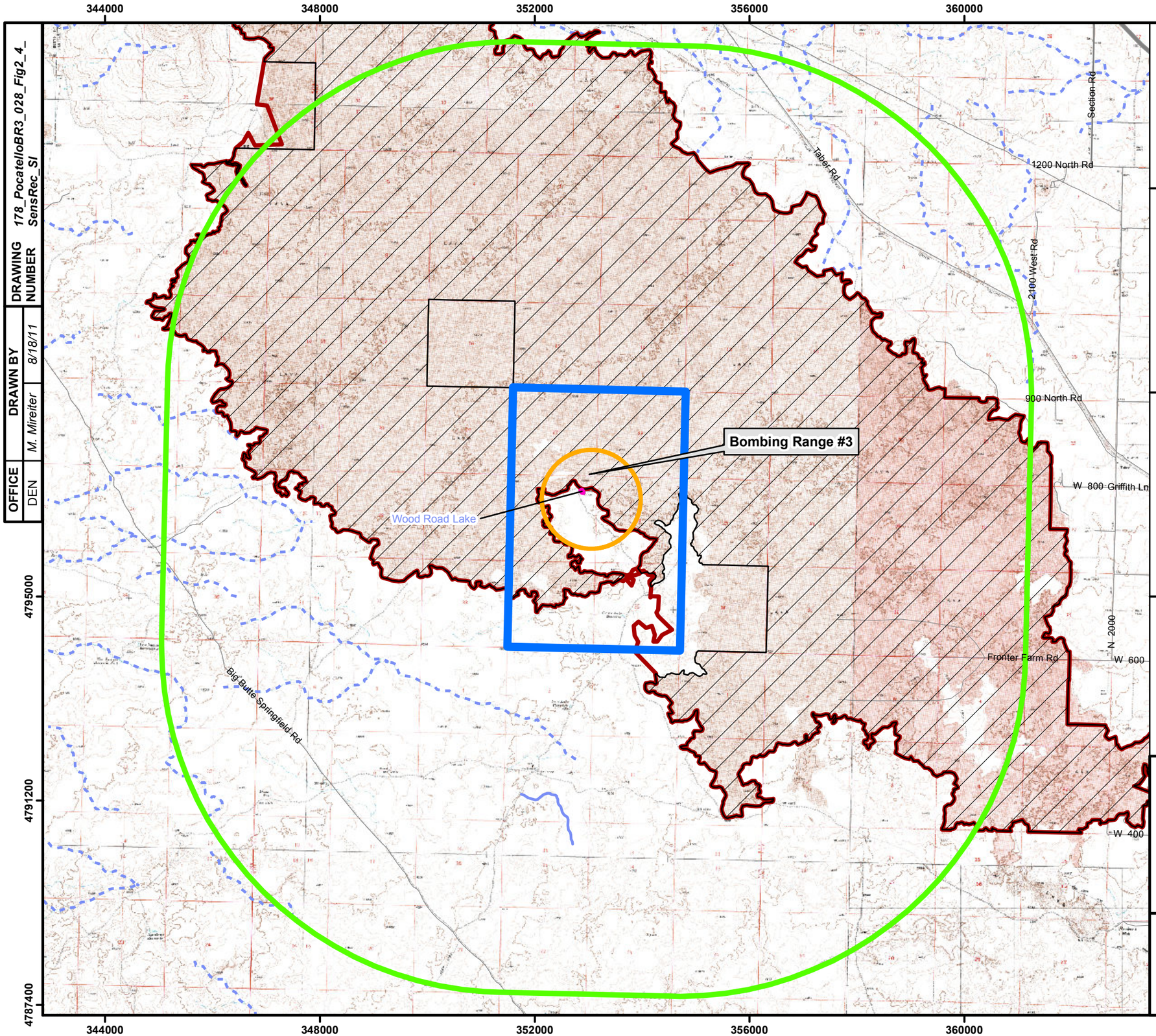
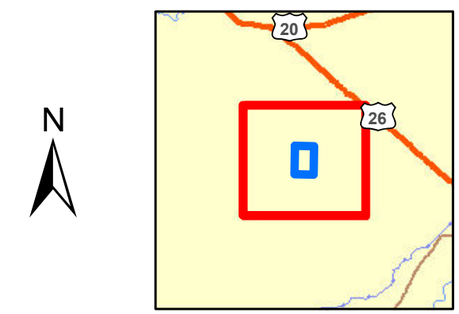
DRAWING NUMBER	178_PocatelloBR3_027_Fig2_3_RegSW_SI
DRAWN BY	M. Mireiter 8/18/11
OFFICE	DEN



Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- 4-Mile Radius from FUDS Boundary
- Munitions Response Site
- Cedar Butte Wilderness Study Area
- Exposed Basalt Lava Flow
- Wetland Area

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Wetlands data is not available electronically for this area.
3) Cedar Butte Wilderness Study Area boundaries were obtained from the Idaho GIS Data Website: http://cloud.insideidaho.org/index.html.
3) Topographic map (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.



0 3,000 6,000 12,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-4

SENSITIVE RECEPTOR LOCATIONS WITHIN A 4-MILE RADIUS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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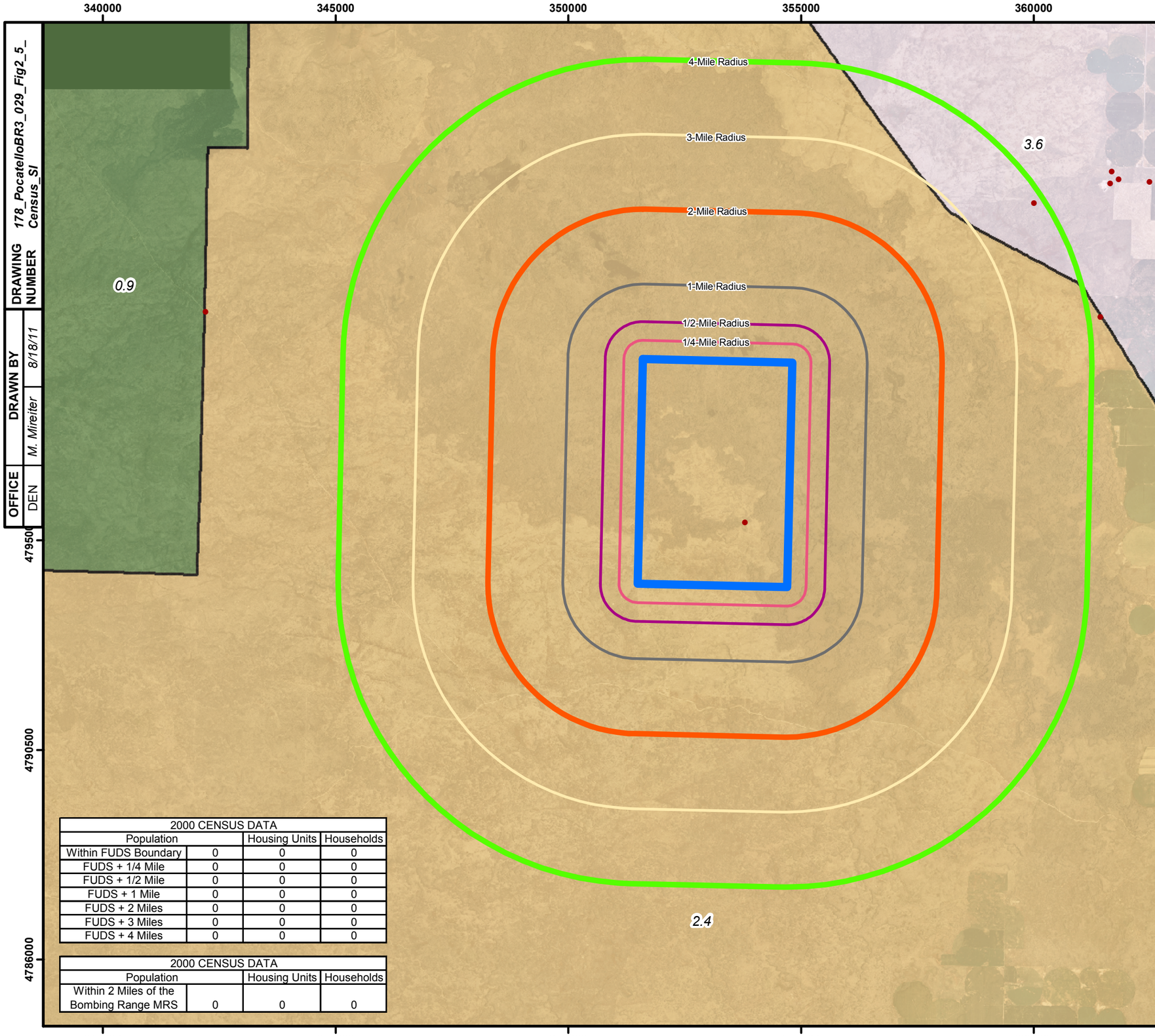
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_028_Fig2_4_SensRec_SI



2000 CENSUS DATA			
Population		Housing Units	Households
Within FUDS Boundary	0	0	0
FUDS + 1/4 Mile	0	0	0
FUDS + 1/2 Mile	0	0	0
FUDS + 1 Mile	0	0	0
FUDS + 2 Miles	0	0	0
FUDS + 3 Miles	0	0	0
FUDS + 4 Miles	0	0	0

2000 CENSUS DATA			
Population		Housing Units	Households
Within 2 Miles of the Bombing Range MRS	0	0	0

Legend

Pocatello Bombing Range No. 3 FUDS Boundary

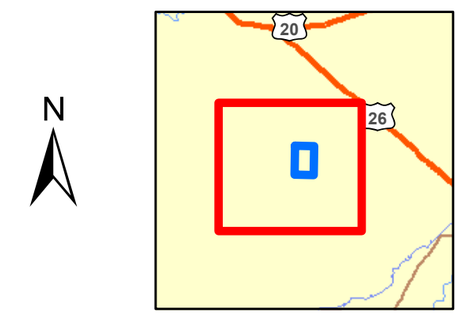
2005 Census Block Group Population

- 560
- 1260
- 1629

Census Block Centroid Unit

XX Number of People Per Square Mile Within Census Block Group

NOTES:
1) FUDS property boundary was obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Census data was obtained from StreetMap (ESRI, 2006).
3) The 2005 population of Bingham County was 20.2 people per square mile.
4) The Census Block Centroid Units represent centroids of the smallest entities for which the Census Bureau tabulates census information, bounded on all sides by visible features such as streets, streams, and railroad tracks, and/or invisible boundaries such as city, town, and county limits. The population assigned to a centroid unit may be a positive integer or zero. The centroid populations were summed within defined distances from the FUDS boundary to generate population totals presented on the inset table.
5) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



0 3,500 7,000 14,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-5

CENSUS DATA WITHIN A 4-MILE RADIUS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

US Army Corps of Engineers®
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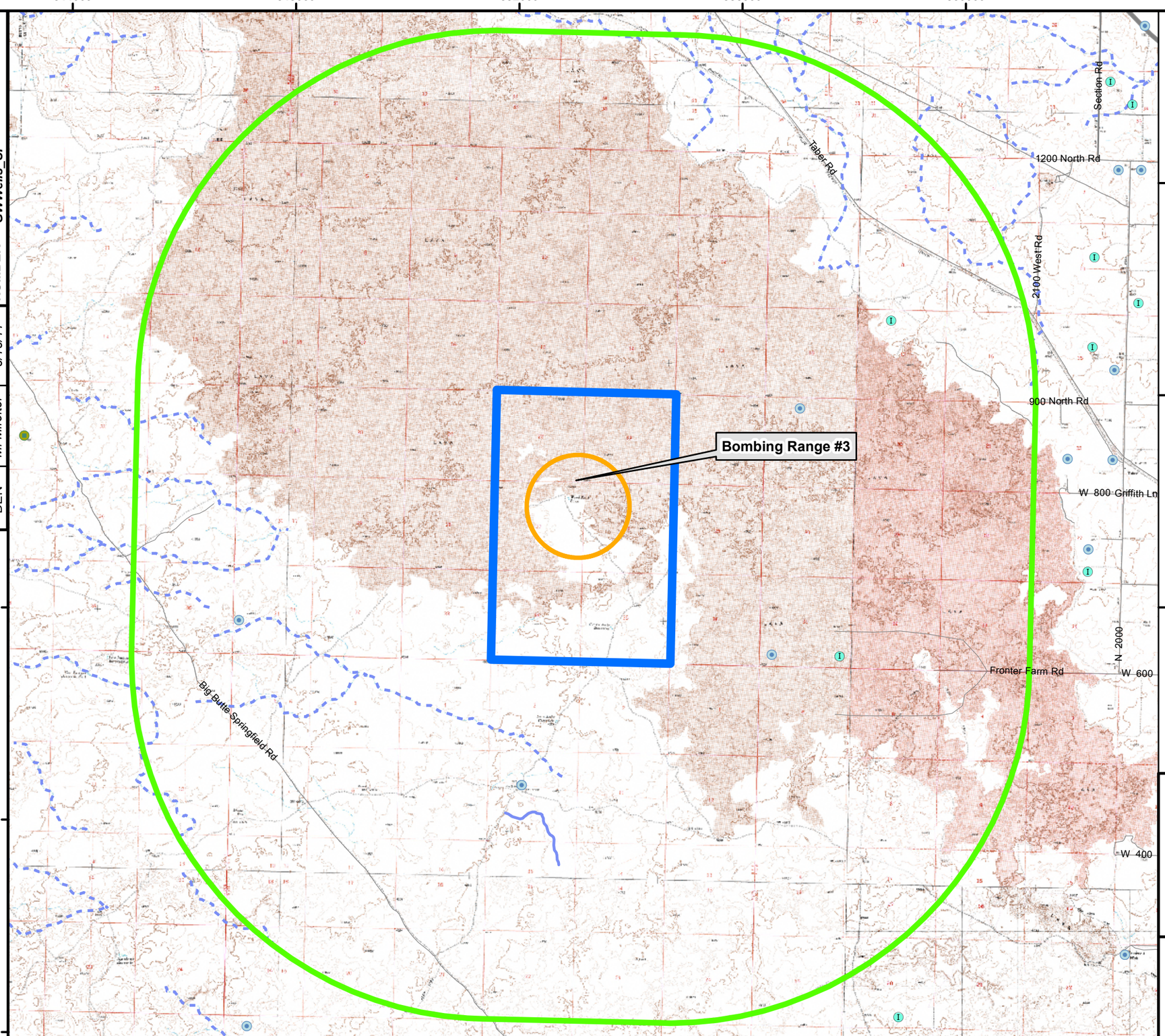
DRAWING NUMBER	178_PocatelloBR3_029_Fig2_5_Census_SI
DRAWN BY	M. Mireiter 8/18/11
OFFICE	DEN



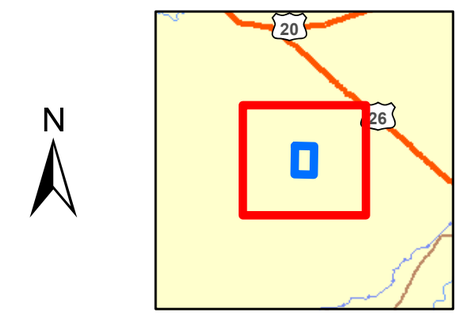
Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- 4-Mile Radius from FUDS Boundary
- Munitions Response Site

Groundwater Well Type

- Domestic
- Irrigation
- Stockwater

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Groundwater well data was obtained from the Idaho Department of Water Resources GIS Data website: http;//www.idwr.idaho.gov/gisdata/gis_data.htm.
3) Topographic map (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies, 1999.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 2-6

GROUNDWATER WELL LOCATIONS WITHIN A 4-MILE RADIUS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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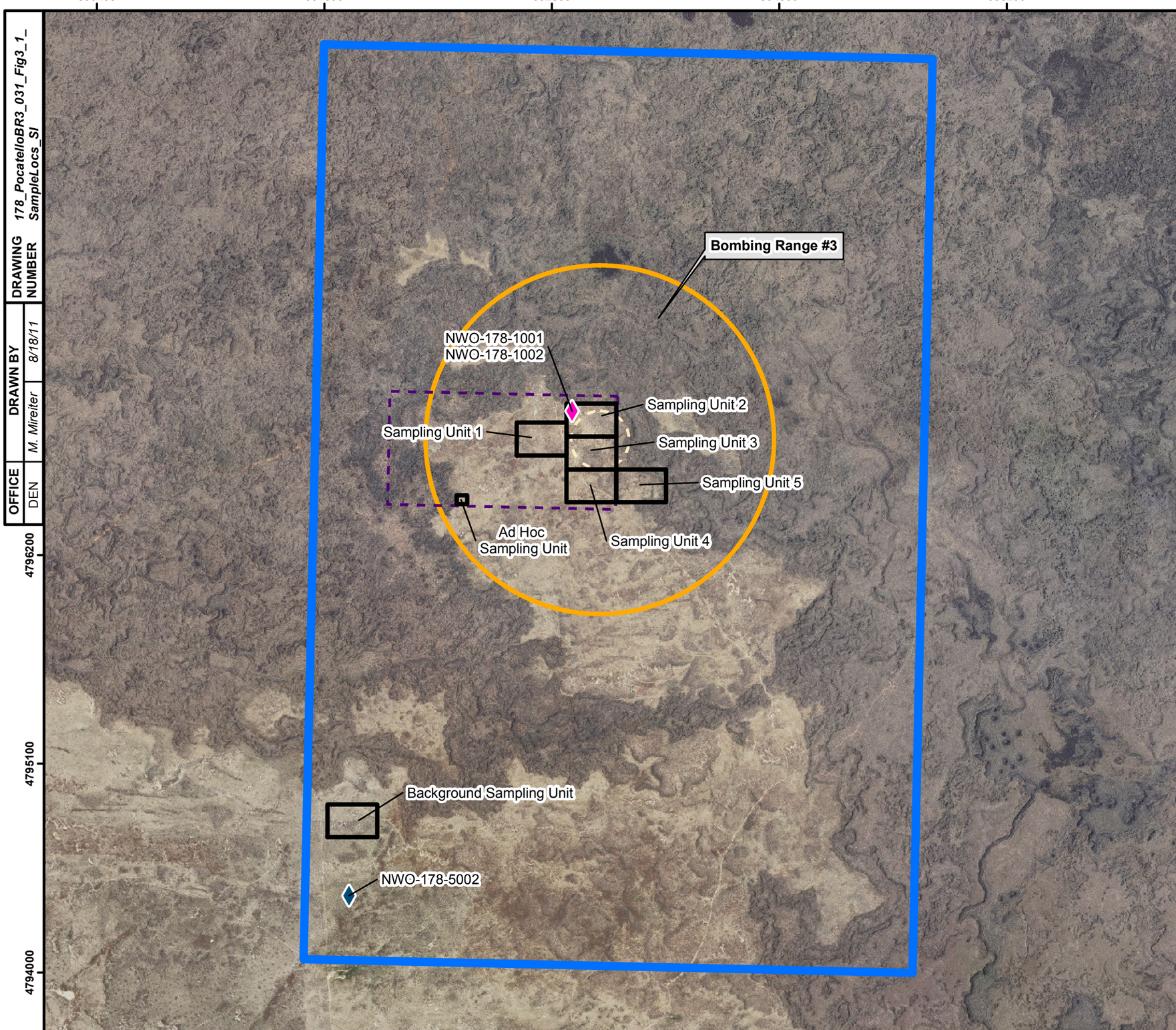
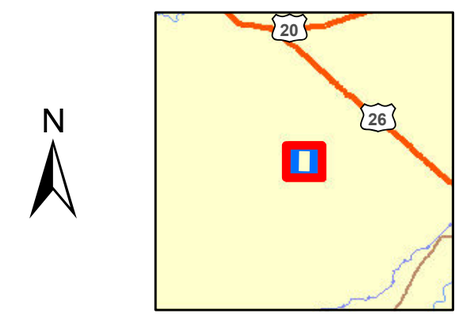
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_030_Fig2_6_GWWells_SI



Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Central Target Area
- Approximate Impact Area (As Shown in the ASR)
- Sampling Unit
- Downgradient Sediment Sample Location
- Upgradient Sediment Sample Location

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



N

0 875 1,750 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 3-1

SAMPLING UNITS AND SEDIMENT SAMPLE LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

US Army Corps of Engineers®
Omaha District

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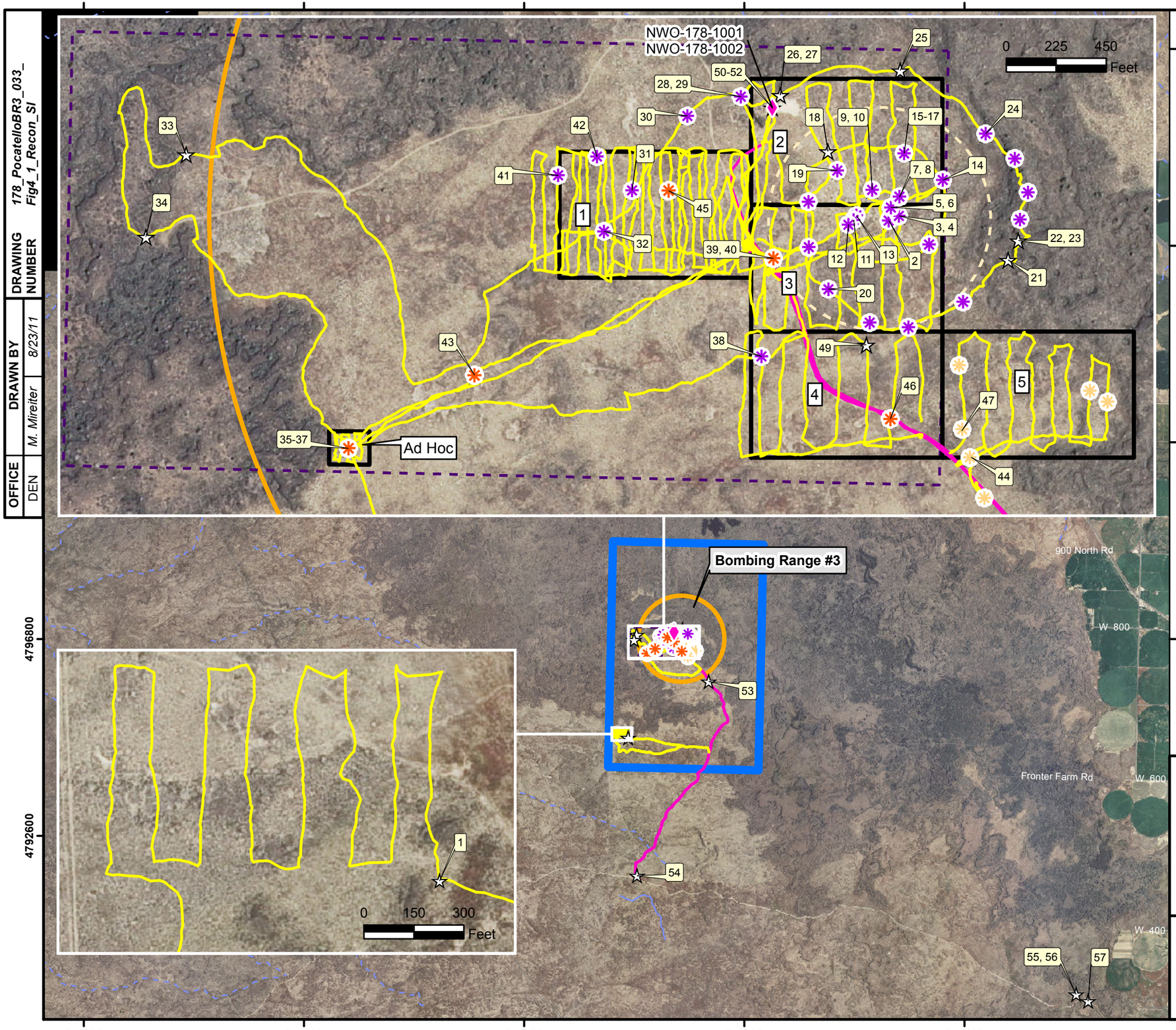
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_031_Fig3_1_SampleLocs_SI



DRAWING NUMBER 178_PocatelloBR3_033_Fig4_1_Recon_SI

DRAWN BY M. Mireiter 8/23/11

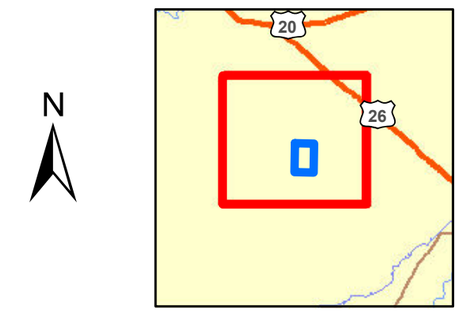
OFFICE DEN

Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site
- Central Target Area
- Approximate Impact Area (As Shown in the ASR)
- Sampling Unit
- Reconnaissance Path Driven
- Reconnaissance Path Walked
- MEC Identified
- Probable MEC Identified
- Munitions Debris Identified
- Photograph Location
- Downgradient Sediment Sample Location

NOTES:

1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



N

0 3,500 7,000 14,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

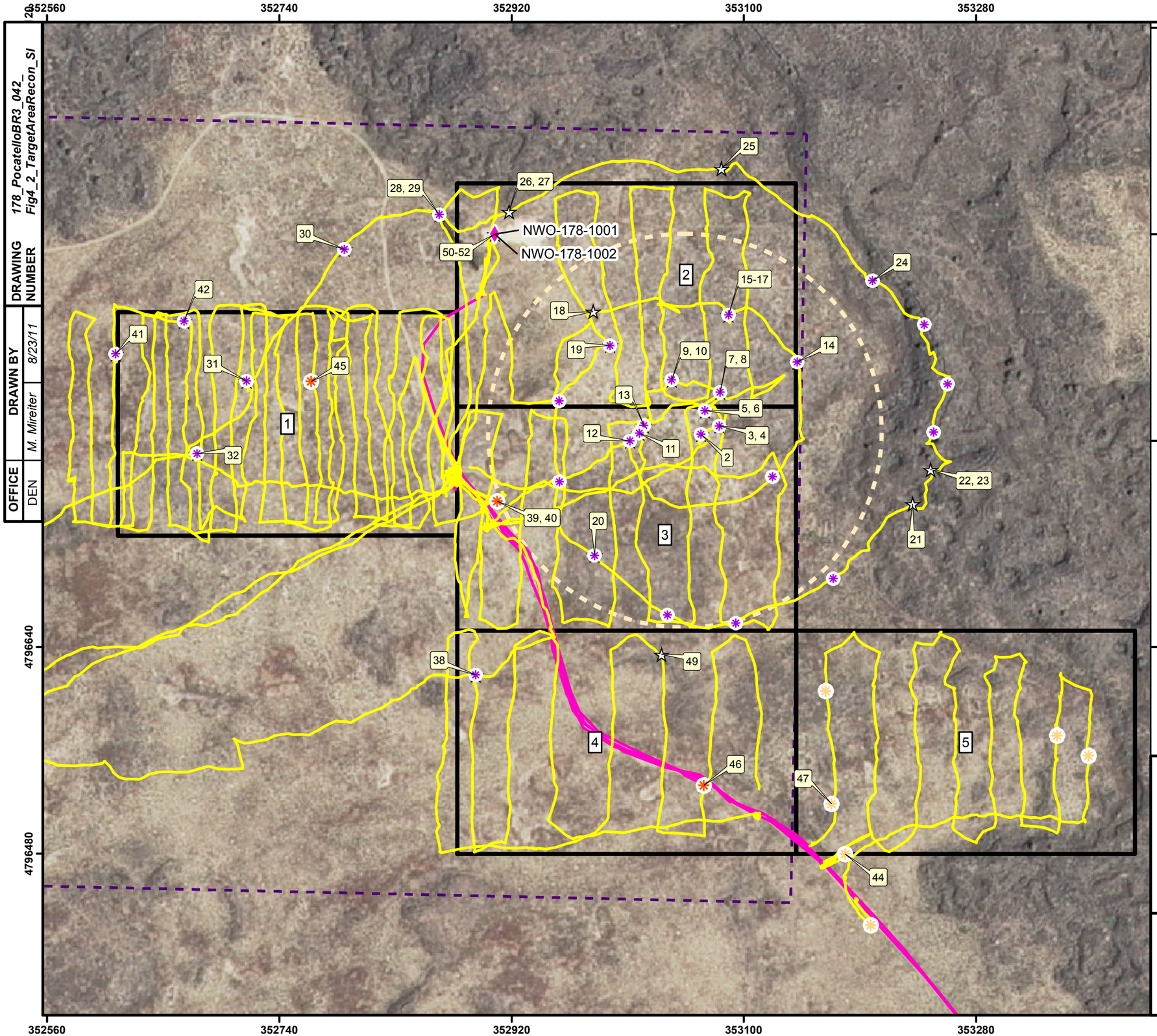
FIGURE 4-1

SITE INSPECTION RECONNAISSANCE AND DOWNGRADIENT SEDIMENT SAMPLE LOCATION

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

US Army Corps of Engineers®
Omaha District

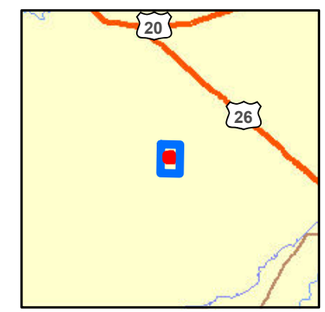
Shaw®



Legend

- Central Target Area
- Approximate Impact Area (As Shown in the ASR)
- Sampling Unit
- Reconnaissance Path Driven
- Reconnaissance Path Walked
- MEC Identified
- Possible MEC Identified
- Munitions Debris Identified
- Photograph Location
- Downgradient Sediment Sample Location

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



N

0 125 250 500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-2

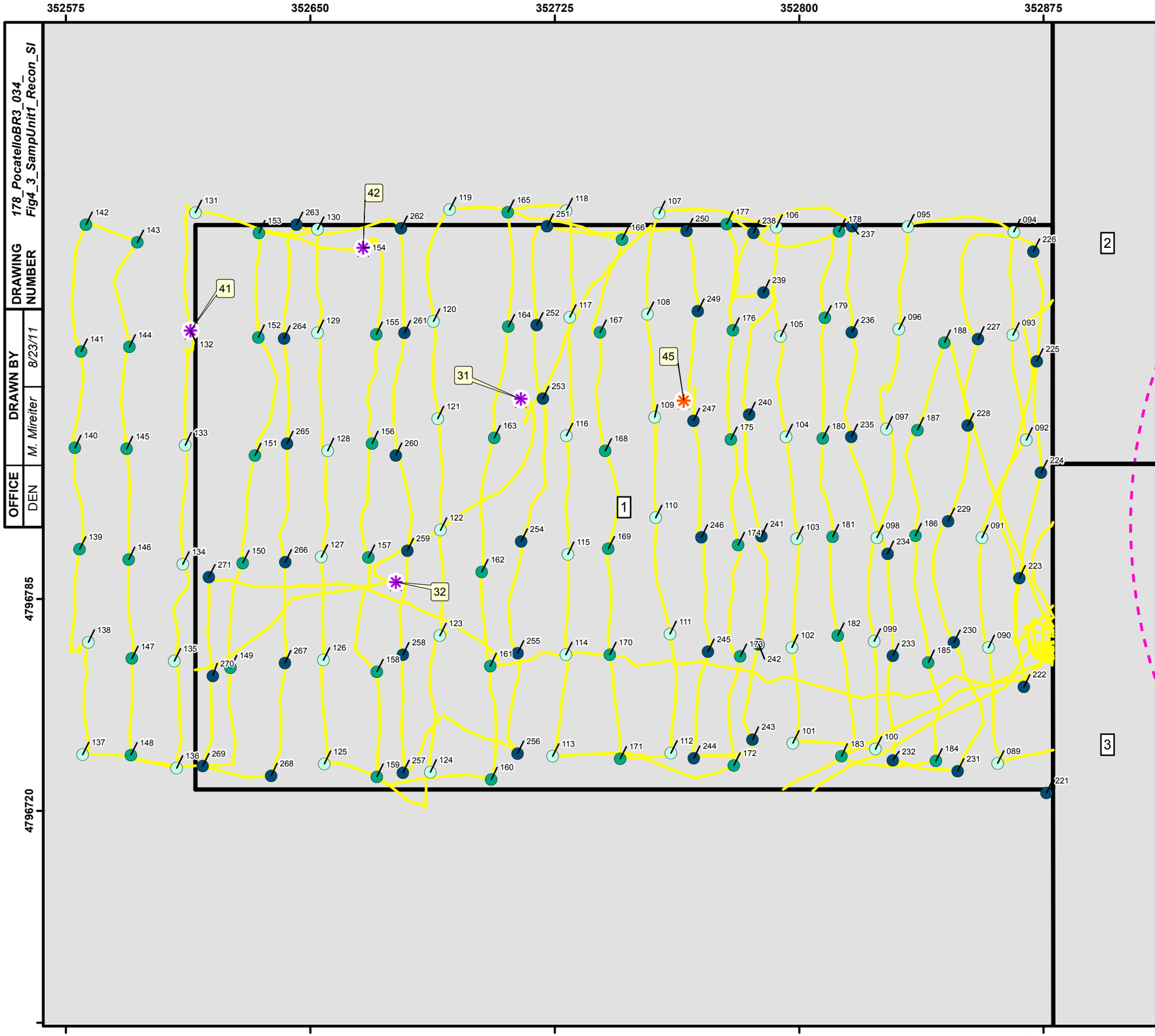
CENTRAL TARGET AREA RECONNAISSANCE

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

US Army Corps of Engineers®
Omaha District

Shaw®

OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/23/11	178_PocatelloBR3_042_ Fig4_2_TargetAreaRecon_SI

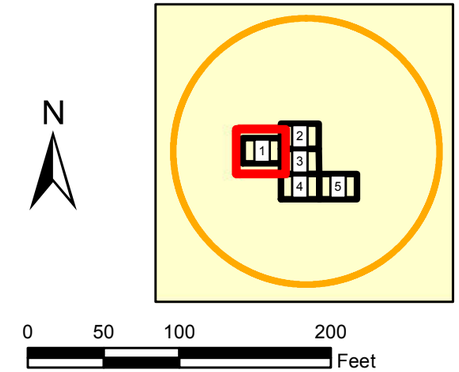


Legend

- Sampling Unit
- Central Target Area
- Reconnaissance Path Walked
- MEC Identified
- Munitions Debris Identified
- Photograph Location
- Waypoint/IS Sample Location (NWO-178-0001)
- Waypoint/IS Sample Location (NWO-178-0009)
- Waypoint/IS Sample Location (NWO-178-0010)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0001	50
NWO-178-0009	50
NWO-178-0010	50

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-3

SAMPLING UNIT 1
RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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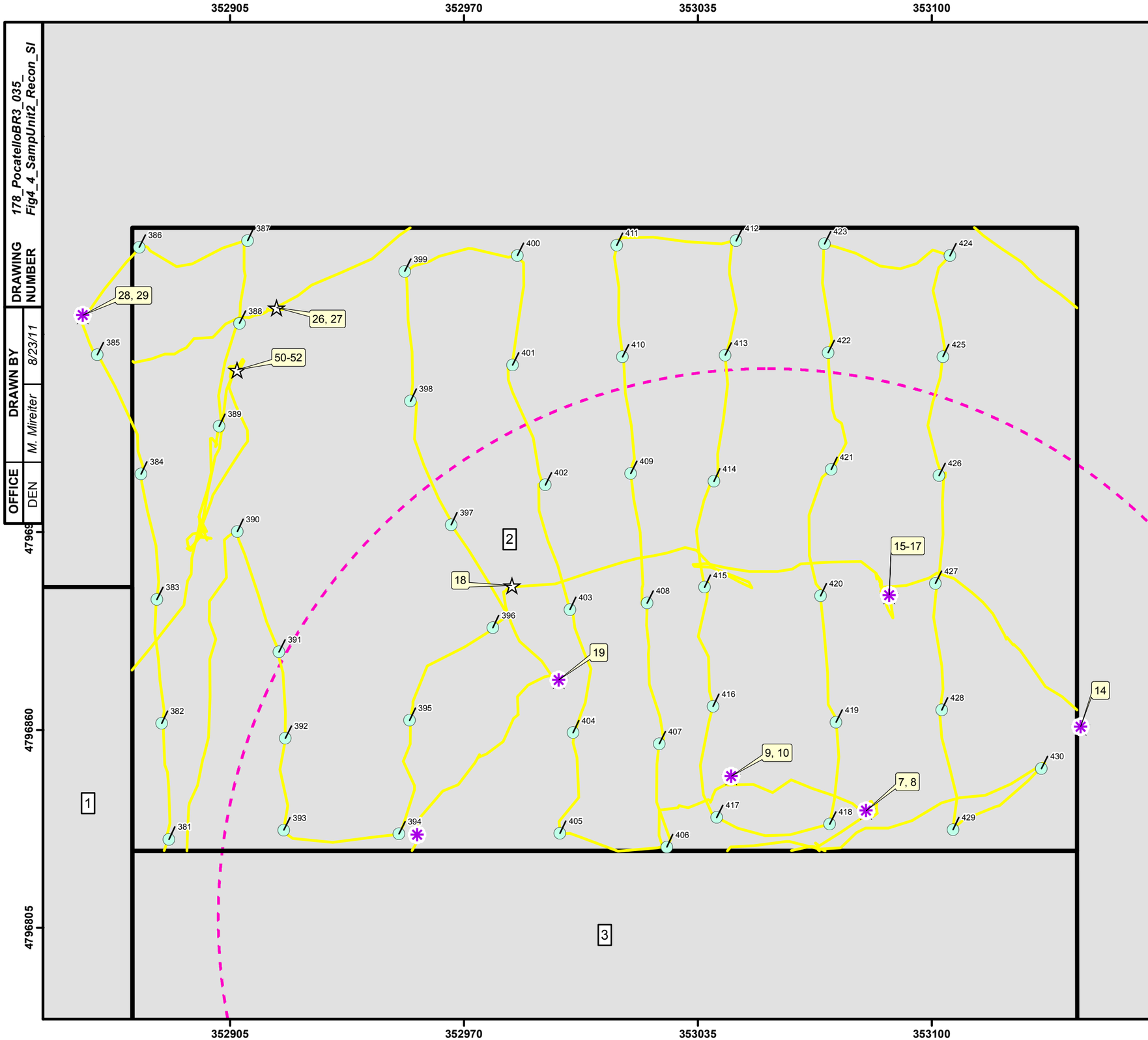
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/23/11	178_PocatelloBR3_034_ Fig4_3_SampUnit1_Recon_SI



OFFICE: DEN

DRAWN BY: M. Mireiter 8/23/11

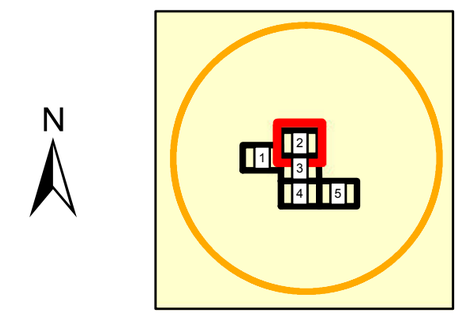
DRAWING NUMBER: 178_PocatelloBR3_035_ Fig4_4_SampUnit2_Recon_SI

Legend

- Sampling Unit
- Central Target Area
- Reconnaissance Path Walked
- MEC Identified
- Munitions Debris Identified
- Photograph Location
- Waypoint/IS Sample Location (NWO-178-0002)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0002	50

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-4

SAMPLING UNIT 2
RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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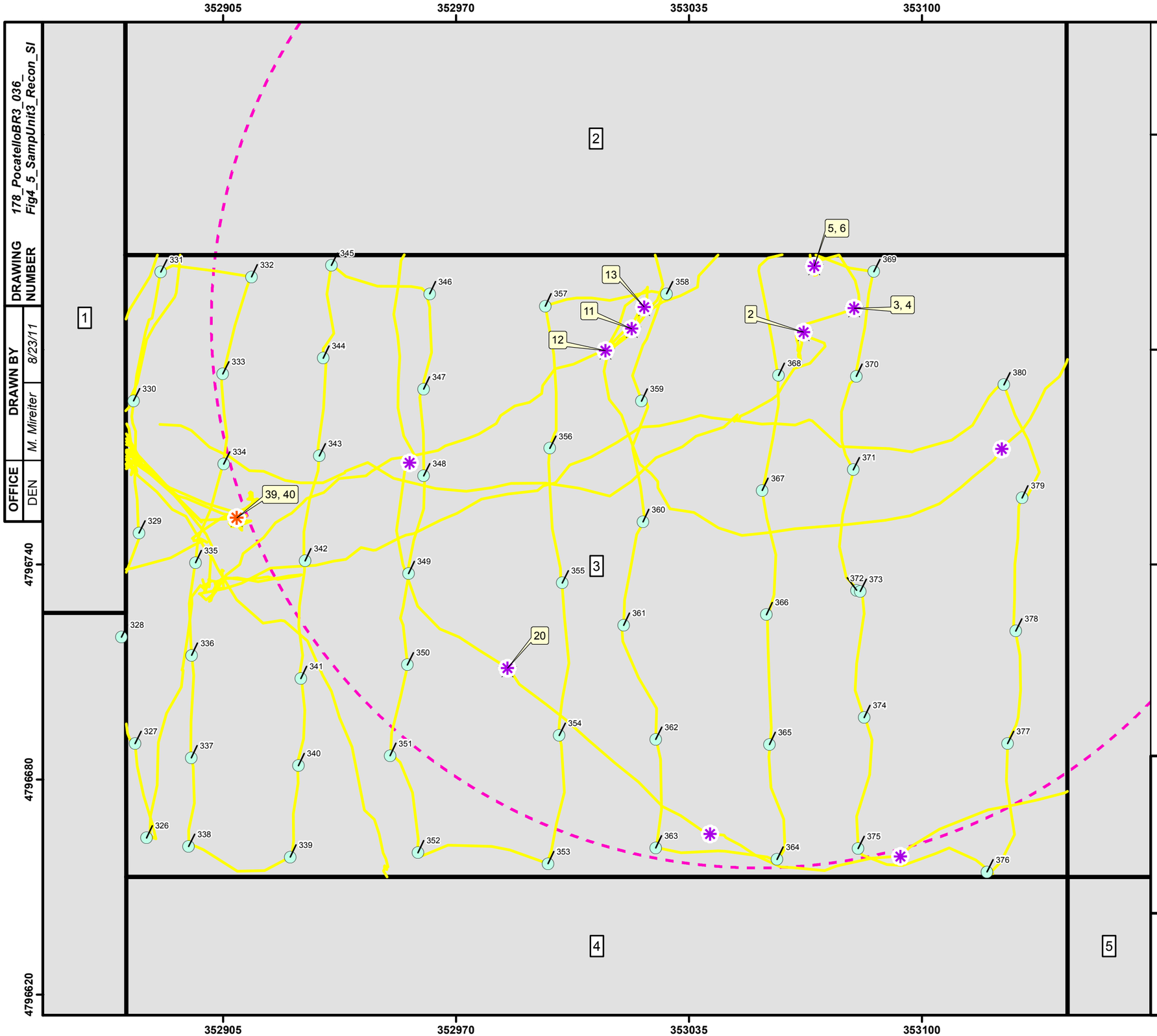


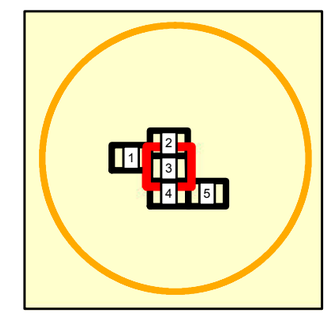
Legend

- Sampling Unit
- Central Target Area
- Reconnaissance Path Walked
- MEC Identified
- Munitions Debris Identified
- Photograph Location
- Waypoint/IS Sample Location (NWO-178-0003)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0003	55

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.

N



0 45 90 180 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-5

SAMPLING UNIT 3
RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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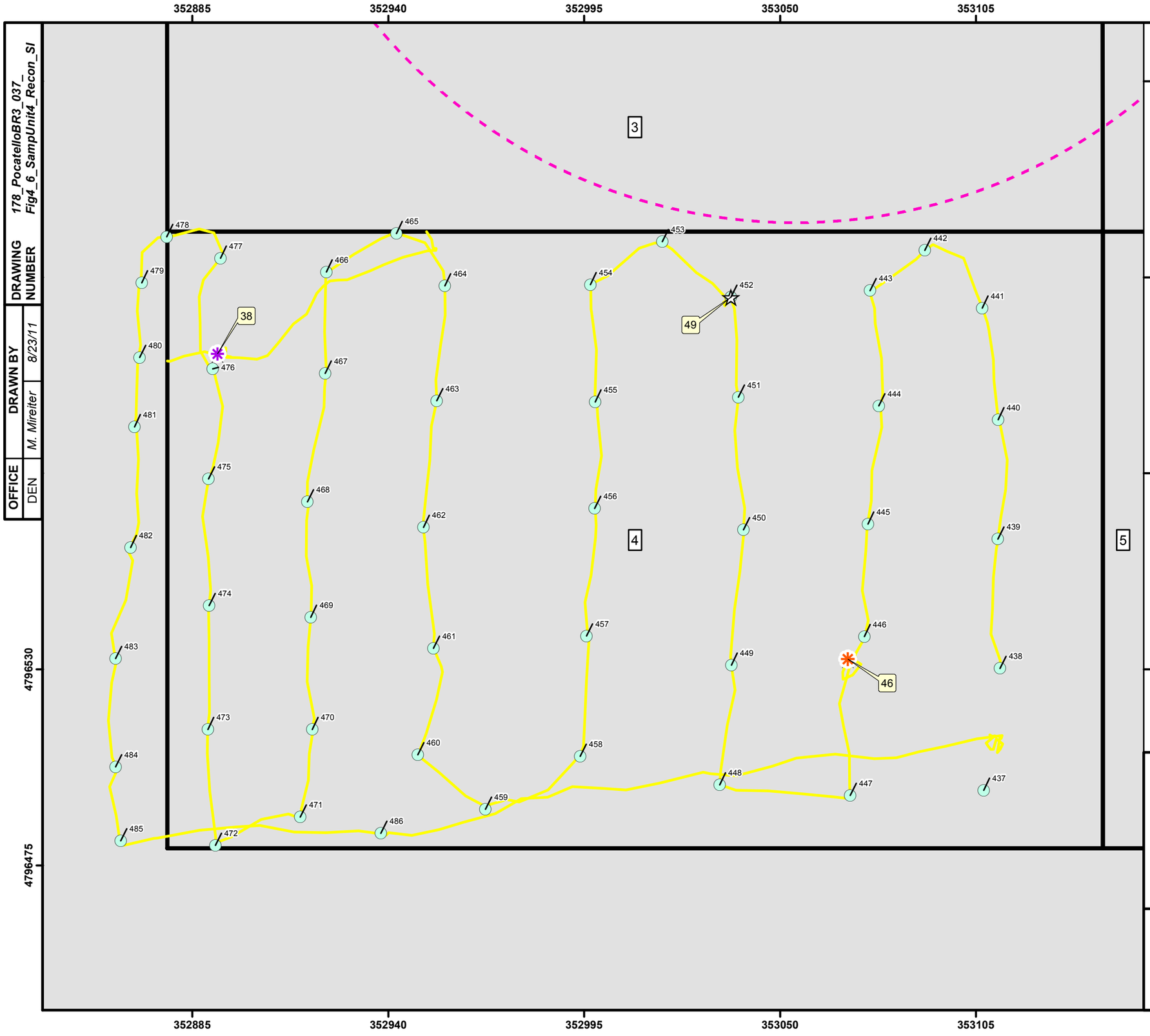
DRAWING NUMBER	178_PocatelloBR3_036_ Fig4_5_SampUnit3_Recon_SI
DRAWN BY	M. Mireiter 8/23/11
OFFICE	DEN

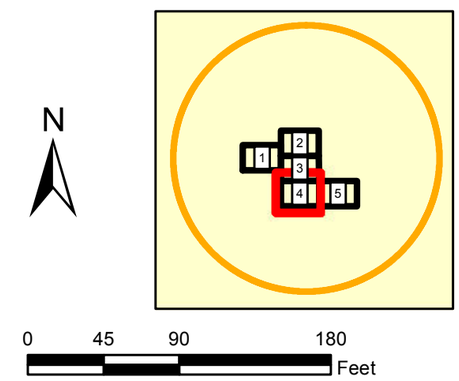


Legend

- Central Target Area
- Sampling Unit
- Reconnaissance Path Walked
- MEC Identified
- Munitions Debris Identified
- Photograph Location
- Waypoint/IS Sample Location (NWO-178-0004)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0004	50

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-6

SAMPLING UNIT 4
RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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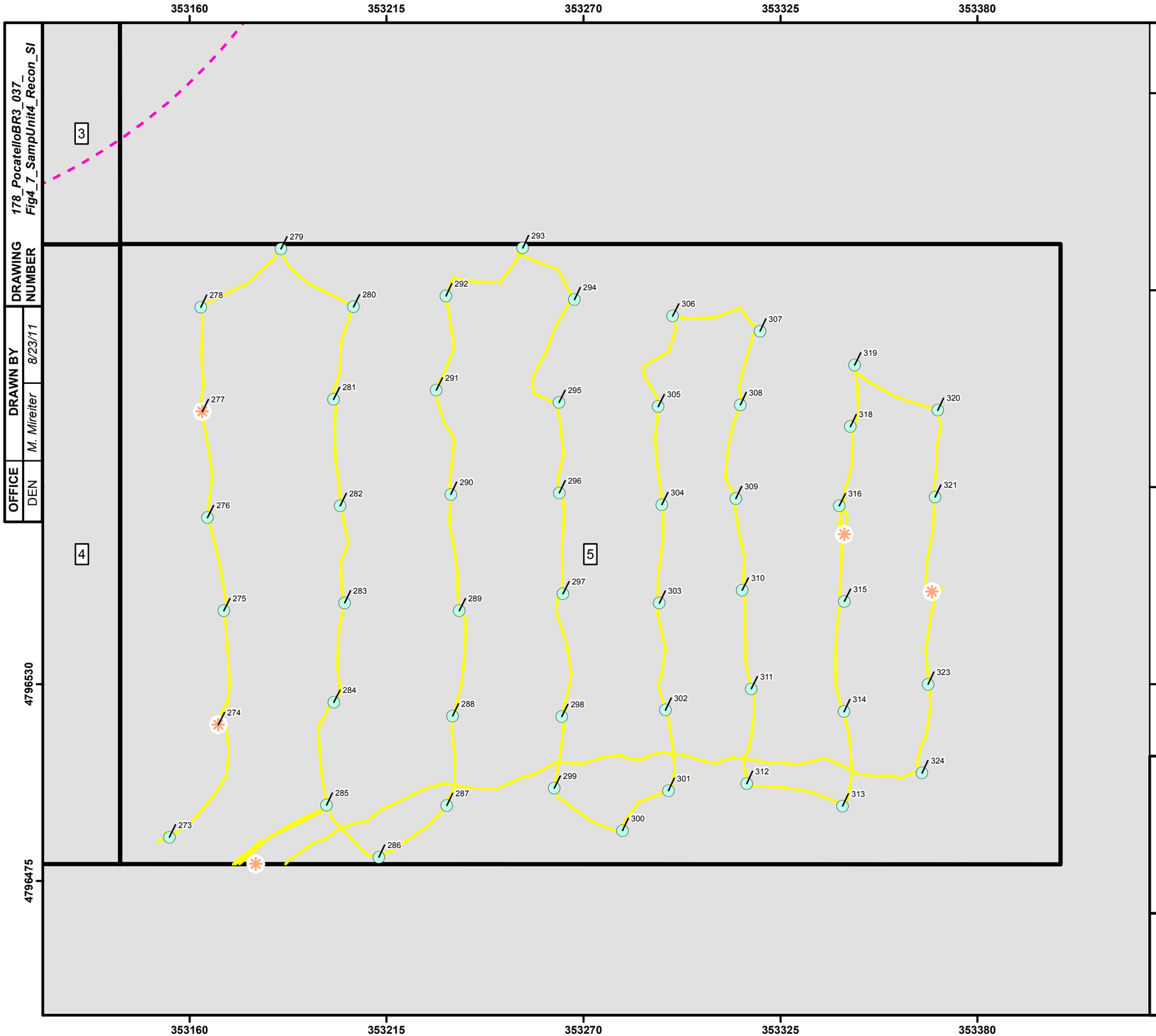
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/23/11	178_PocatelloBR3_037_ Fig4_6_SampUnit4_Recon_SI

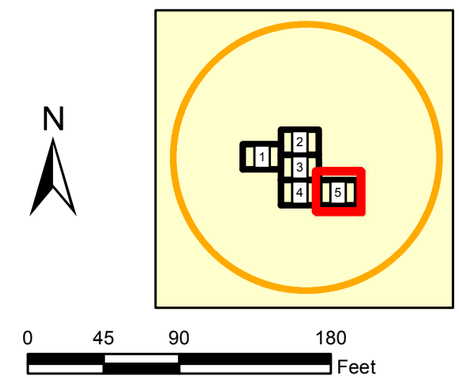


Legend

- Central Target Area
- Sampling Unit
- Reconnaissance Path Walked
- Possible MEC Identified
- Waypoint/IS Sample Location (NWO-178-0005)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0005	50

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-7

SAMPLING UNIT 5 RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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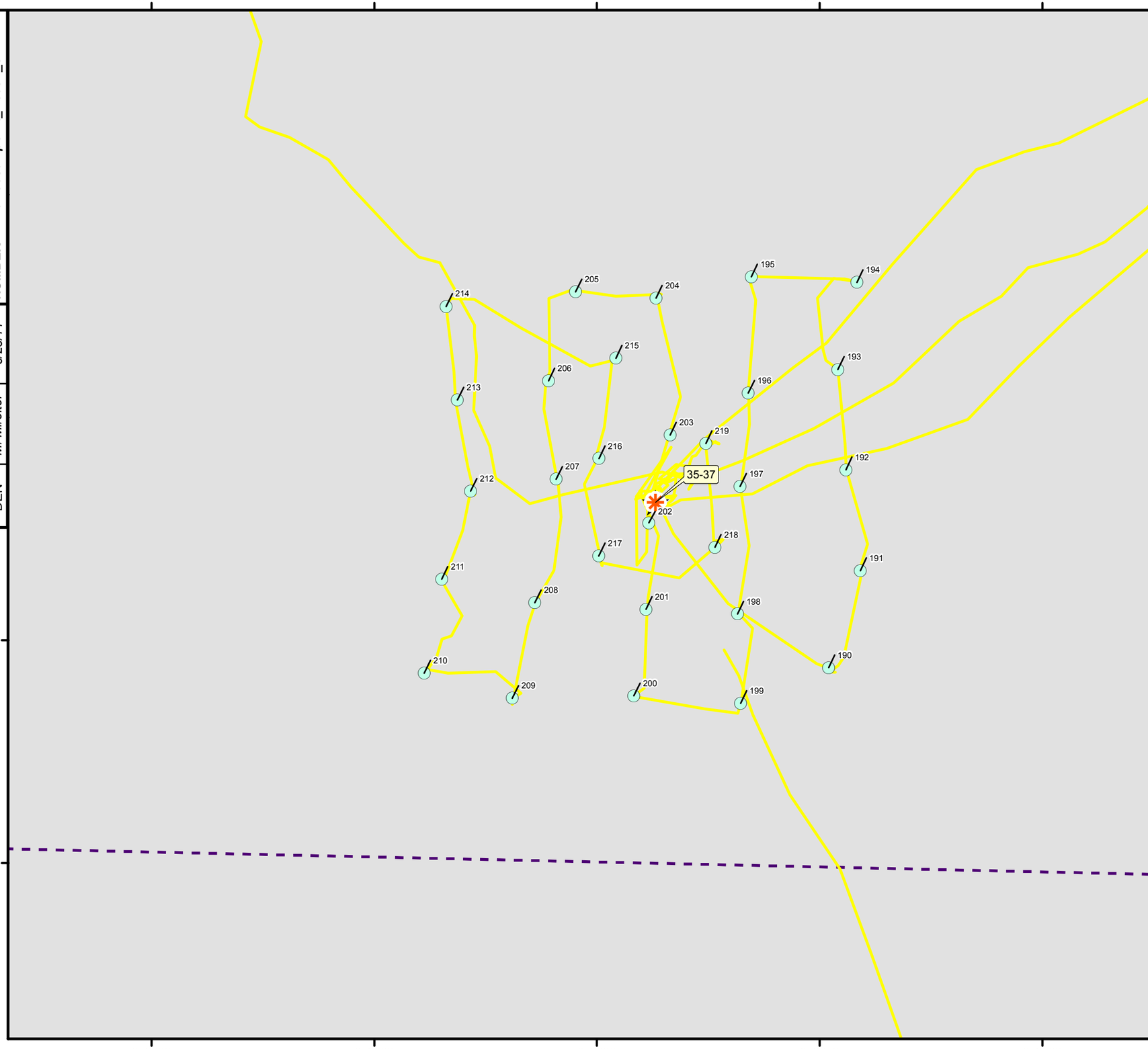
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/23/11	178_PocatelloBR3_037_ Fig4_7_SampUnit4_Recon_SI

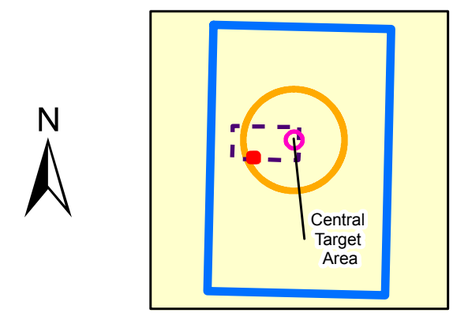


Legend

- Munitions Response Site
- Approximate Impact Area (As Shown in the ASR)
- Reconnaissance Path Walked
- MEC Identified
- Munitions Debris Identified
- Photograph Location
- Waypoint/IS Sample Location (NWO-178-0006)

Sampling Unit Sample Number	Number of IS Locations
NWO-178-0006	30

NOTES:
1) There were no detections of either explosives or SVOCs and metals results were less than background screening values.



REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 4-8

AD HOC SAMPLING UNIT RECONNAISSANCE AND IS LOCATIONS

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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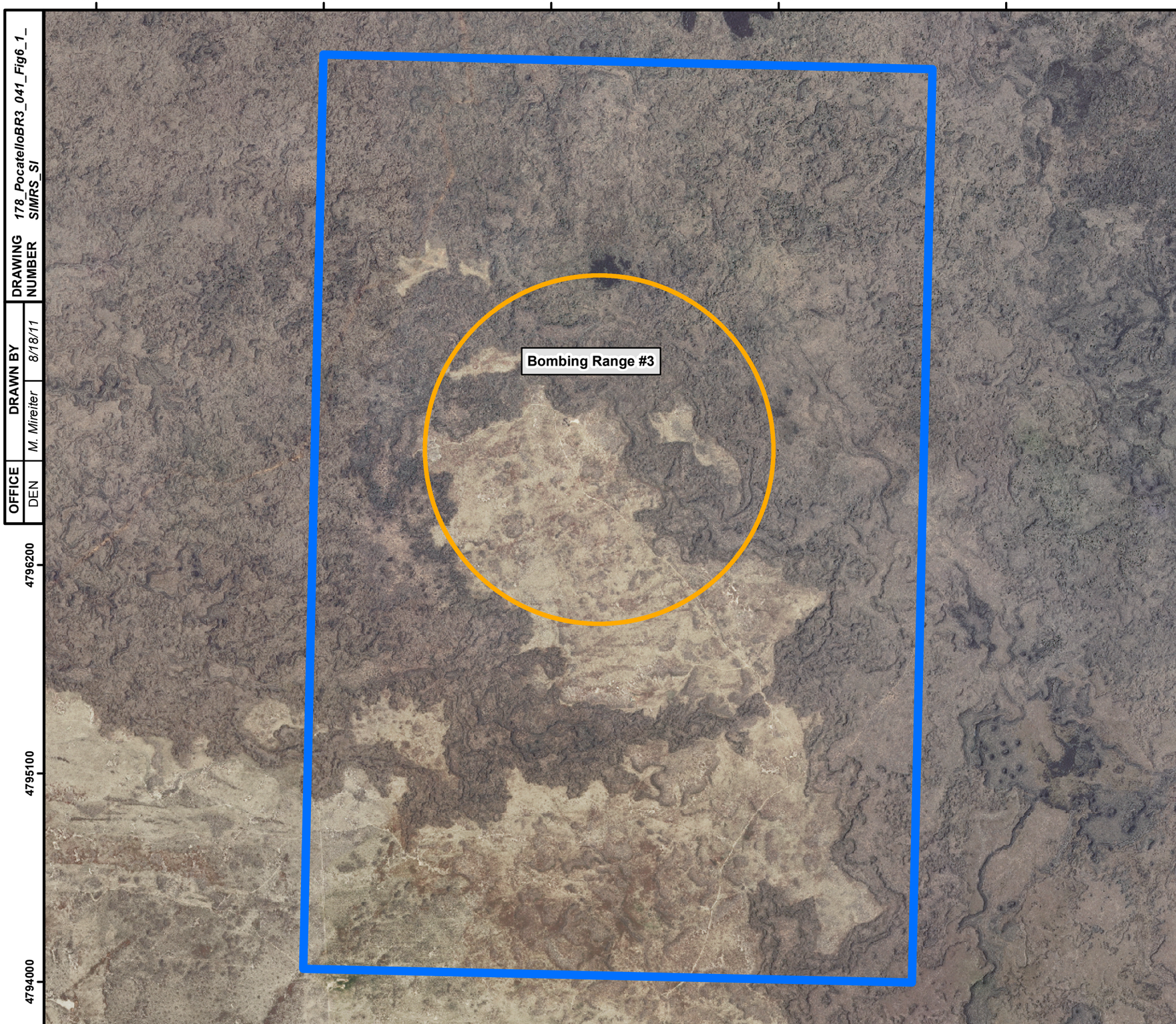
OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/23/11	178_PocatelloBR3_039_Fig4_8_AdHocSampUnit_Recon_SI

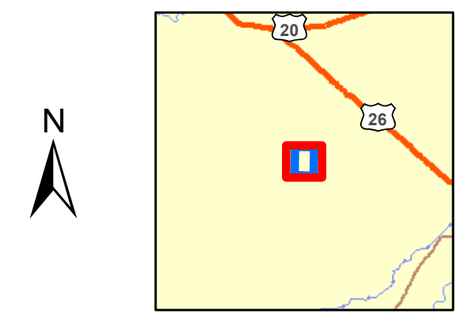


OFFICE	DRAWN BY		DRAWING NUMBER
DEN	M. Mireiter	8/18/11	178_PocatelloBR3_041_Fig6_1_ SIMRS_SI

Legend

- Pocatello Bombing Range No. 3 FUDS Boundary
- Munitions Response Site

NOTES:
1) FUDS property and range boundaries were obtained from the Pocatello Bombing Range No. 3 ASR Supplement (USACE, 2004a).
2) Aerial photograph (Bingham County) was obtained from the U.S. Department of Agriculture, Service Center Agencies; photograph is from the USDA-APFO National Agriculture Imagery Program (NAIP), 2010.



0 875 1,750 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 12N

FIGURE 6-1

SITE INSPECTION
MUNITIONS RESPONSE SITE

POCATELLO BOMBING RANGE NO. 3
FUDS PROPERTY NUMBER F10ID0128

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Tables

Table 2-1
Munitions Information
Pocatello Bombing Range No. 3

Ordnance	Description	Components and Munitions Constituents	Site Inspection Analytes[a]
100-lb Practice Bomb (M38A2)	Light sheet metal (approximately 22-gauge), with sand and spotting charge.	Casing: Steel sheet metal Filler: Sand	None
Spotting Charge (M1A1, M3)	Large can, 11.18 inches long by 3.43 inches diameter; 28-gauge blank shotgun shell primer.	Casing: Steel sheet metal Filler: 3 lb black powder (potassium nitrate, sulfur, charcoal) M3 also contained minute quantities of anthracene and hexachloroethane	Anthracene (M3) Hexachloroethane (M3)
Spotting Charge (M5)	Glass bottle, 7.37 inches long by 2.95 inches in diameter, sealed with ordinary bottle cap, 2.54 lbs.	Container: Glass Filler: FS smoke mixture (sulfur trioxide and chlorosulfonic acid)	None
Incendiary Bomb (AN-M50, AN-M54)	4-lb bomb, 21.35 inches long by 1.69 inches in diameter. Delayed detonation versions were the AN-M50XA1, AN-M50XA2, AN-M54X, and AN-M54XA1.	Casing: Steel sheet metal or magnesium alloy Filler: First fire mixture (magnesium powder, barium chromate); Thermate (iron oxide, aluminum powder, barium nitrate, sulfur) Explosive charge: Black powder or Tetryl (three pellets in AN-M50XA2 and 36 grams in AN-M54XA1)	Aluminum Barium Tetryl
100-lb GP Bomb (AN-M30)	Old-series GP HE bomb. Relatively thin-cased bomb with parallel sidewalls and tapered aft section. Both nose and tail fuzes were used for the majority of operations.	Casing: Steel Filler: TNT, 50/50 Amatol and TNT, Amatol, Tritonal, or Composition B (RDX); approximately 50% of the complete weight of the round consists of explosives	TNT Amatol Tritonal RDX
Bomb Tail Fuze, (AN-M100 series)	Located in tail section of GP HE bomb. Initiation of igniters and fuzes results from impact inertia requiring a force to cause the firing pin to strike a primer/detonator.	Minute quantities of perchlorate, lead azide, lead thiocyanate, lead styphnate, mercury-fulminate, black powder, lead chromate, silicon, barium, manganese, sulfur, red lead oxide	None
Bomb Nose Fuze (AN-M103A1)	Located in nose section of GP HE bomb. Initiation of igniters and fuzes results from impact inertia requiring a force to cause the firing pin to strike a primer/detonator.	Minute quantities of perchlorate, lead azide, lead thiocyanate, lead styphnate, mercury-fulminate, black powder, lead chromate, silicon, barium, manganese, sulfur, red lead oxide	

Table 2-1 (Cont.)
Munitions Information
Pocatello Bombing Range No. 3

Ordnance	Description	Components and Munitions Constituents	Site Inspection Analytes[a]
Small Arms Ammunition (.50-caliber)	Small arms cartridge consisting of projectile and cartridge case with igniter, propellant, and primer compositions. Some .50-caliber cartridges also contained tracer compositions.	Projectile: Lead, antimony, copper, zinc, nickel, iron Cartridge Case (brass): Copper, zinc Tracer and Igniter: Barium, calcium, magnesium, strontium, zinc, potassium perchlorate Propellant: Nitrocellulose, nitroglycerin, 2,4-dinitrotoluene Primer: Potassium, lead, antimony, barium, calcium, PETN	None[b]

Notes:

[a] This table identifies various MC that may have been present in munitions used at the MRS. Many of these constituents are not considered MC of potential concern for this SI because of one or more of the following reasons: nonhazardous properties, naturally occurring materials, limited mobility, limited quantities, and nature of munitions use. The conceptual site model, presented in Appendix J, explains the rationale.

[b] There is no historical documentation of the use of .50-caliber small arms ammunition at the Bombing Range No. 3 MRS. These munitions were observed during SI field activities; however, the field team did not identify a target or any significant accumulation of MD from these munitions that would indicate the potential for an MC release. Therefore, MC from these munitions were not included in the SI analytical suite.

Amatol = ammonium nitrate and TNT mixture
Composition B = 59.5% RDX, 39.5% TNT, and 1% wax
FUDS = Formerly Used Defense Site
GP = general purpose
HE = high explosive
lb = pound(s)
MD = munitions debris
MC = munitions constituents
MRS = munitions response site
PETN = pentaerythritol tetranitrate
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
SI = Site Inspection
TNT = 2,4,6-trinitrotoluene
Tritonal = TNT and aluminum powder mixture

Table 2-2
Army Checklist for Important Ecological Places [a]
Pocatello Bombing Range No. 3

		Yes / No	Comments
1	Locally important ecological place identified by the Integrated Natural Resource Management Plan, BRAC Cleanup Plan or Redevelopment Plan, or other official land management plans	☐ / ☒	
2	Critical habitat for Federal designated endangered or threatened species	☐ / ☒	
3	Marine Sanctuary	☐ / ☒	
4	National Park	☐ / ☒	
5	Designated Federal Wilderness Area	☐ / ☒	
6	Areas identified under the Coastal Zone Management Act	☐ / ☒	
7	Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program	☐ / ☒	
8	Critical areas identified under the Clean Lakes Program	☐ / ☒	
9	National Monument	☐ / ☒	
10	National Seashore Recreational Area	☐ / ☒	
11	National Lakeshore Recreational Area	☐ / ☒	
12	Habitat known to be used by Federal designated or proposed endangered or threatened species	☐ / ☒	
13	National preserve	☐ / ☒	
14	National or State Wildlife Refuge	☐ / ☒	
15	Unit of Coastal Barrier Resources System	☐ / ☒	
16	Coastal Barrier (undeveloped)	☐ / ☒	
17	Federal land designated for protection of natural ecosystems	☐ / ☒	
18	Administratively Proposed Federal Wilderness Area	☒ / ☐	Part of the MRS is in the Cedar Butte Wilderness Study Area.
19	Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters	☐ / ☒	
20	Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time	☐ / ☒	
21	Terrestrial areas utilized for breeding by large or dense aggregations of animals	☐ / ☒	

Table 2-2 (Cont.)
Army Checklist for Important Ecological Places [a]
Pocatello Bombing Range No. 3

		Yes / No	Comments
22	National river reach designated as Recreational	☐ / ☒	
23	Habitat known to be used by state designated endangered or threatened species	☐ / ☒	
24	Habitat known to be used by species under review as to its Federal endangered or threatened status	☐ / ☒	
25	Coastal Barrier (partially developed)	☐ / ☒	
26	Federally designated Scenic or Wild River	☐ / ☒	
27	State land designated for wildlife or game management	☐ / ☒	
28	State-designated Scenic or Wild River	☐ / ☒	
29	State-designated Natural Areas	☐ / ☒	
30	Particular areas, relatively small in size, important to maintenance of unique biotic communities	☐ / ☒	
31	State-designated areas for protection or maintenance of aquatic life	☐ / ☒	
32	Wetlands	☒ / ☐	Wood Road Lake is located within the MRS, and is included in the National Wetlands Inventory.
33	Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes	☐ / ☒	

a – Based on EPA, 1990, 55 FR 51624, Table 4-23 – Sensitive Environments Rating Values, Dec. 14, 1990; EPA, 1997, ERAGS, Exhibit 1-1 List of Sensitive Environments.

MRS = munitions response site

Table 3-1
Summary of Samples Collected and Sample Tracking Information
Pocatello Bombing Range No. 3

Location ID	Sample Number	Sample Purpose	Sample Type	Sample Date	Start Depth (ft bgs)	End Depth (ft bgs)	Laboratory Sample ID	Anthracene and Hexachloroethane by SW846 8270C	Explosives by SW846 8330B	Explosives by SW846 8330 (Modified)	Aluminum by SW846 6010B	Barium by SW846 6020
Bombing Range No. 3 MRS												
178A001	NWO-178-0001	REG	IS	18-Aug-11	0	0.17	280-19386-1	X	X		X	X
	NWO-178-0009	TF	IS	18-Aug-11	0	0.17	280-19386-7	X	X		X	X
	NWO-178-0010	TF	IS	19-Aug-11	0	0.17	280-19386-8	X	X		X	X
178A002	NWO-178-0002	REG	IS	19-Aug-11	0	0.17	280-19386-2	X	X		X	X
178A003	NWO-178-0003	REG	IS	19-Aug-11	0	0.17	280-19386-3	X	X		X	X
	NWO-178-0003-MS	MS	IS	19-Aug-11	0	0.17	280-19386-3MS	X	X		X	X
	NWO-178-0003-MSD	MSD	IS	19-Aug-11	0	0.17	280-19386-3MSD	X	X		X	X
178A004	NWO-178-0004	REG	IS	20-Aug-11	0	0.17	280-19386-4	X	X		X	X
178A005	NWO-178-0005	REG	IS	19-Aug-11	0	0.17	280-19386-5	X	X		X	X
178A006	NWO-178-0006	REG	IS	18-Aug-11	0	0.17	280-19386-6	X	X		X	X
178A009	NWO-178-1001	REG	SD	20-Aug-11	0	0.17	280-19387-1	X		X	X	X
	NWO-178-1002	FD	SD	20-Aug-11	0	0.17	280-19387-2	X		X	X	X
Background												
178A010	NWO-178-5001	REG	IS	17-Aug-11	0	0.17	280-19386-9	X			X	X
178A011	NWO-178-5002	REG	SD	17-Aug-11	0	0.33	280-19387-3	X			X	X
	NWO-178-5002-MS	MS	SD	17-Aug-11	0	0.33	280-19387-3MS	X			X	X
	NWO-178-5002-MSD	MSD	SD	17-Aug-11	0	0.33	280-19387-3MSD	X			X	X
Field QC												
FIELDQC	NWO-178-8001	ER	BW	20-Aug-11	---	---	280-19385-1	X	X		X	X

Notes:
X - Indicates a sample was collected and analyzed for the given parameter

ID - identification
ft bgs - feet below ground surface
REG - regular field sample
FD - field duplicate sample
TF - field triplicate sample
MS - matrix spike
MSD - matrix spike duplicate
ER - equipment rinsate
IS - incremental sample (<0.5 ft bgs)
SD - sediment
BW - blank water

Table 3-2
Background Screening Levels for Soil and Sediment
Pocatello Bombing Range No. 3

Analyte	Soil Background Screening Level [a, b, c] (mg/kg)	Sediment Background Screening Level [a, b, c] (mg/kg)
1,3,5-Trinitrobenzene	NA	NA
1,3-Dinitrobenzene	NA	NA
2,4,6-Trinitrotoluene	NA	NA
2,4-Dinitrotoluene	NA	NA
2,6-Dinitrotoluene	NA	NA
2-Amino-4,6-dinitrotoluene	NA	NA
2-Nitrotoluene	NA	NA
3-Nitrotoluene	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA
4-Nitrotoluene	NA	NA
HMX	NA	NA
Nitrobenzene	NA	NA
Nitroglycerin	NA	NA
PETN	NA	NA
RDX	NA	NA
Tetryl	NA	NA
Aluminum	31,200	47,700
Barium	615	636
Anthracene	PQL	PQL
Hexacholoroethane	PQL	PQL

[a] Because explosives are not naturally occurring, any detection of explosives is considered an MC release.

[b] For aluminum and barium, a release is established when the MDC in site media samples is three times the detected background concentration. The value shown is equivalent to three times the background concentration determined from SI sampling.

[c] Because SVOCs were not detected in background soil or sediment samples, the background values are established at the laboratory's practical quantitation limit.

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
mg/kg = milligrams per kilogram
MC = munitions constituents
MDC = maximum detection concentration
NA = not applicable
PETN = pentaerythritol tetranitrate
PQL = practical quantitation limit
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
SI = Site Investigation
SVOC = semivolatile organic compound
Tetryl = 2,4,6-trinitrophenyl-N-methylnitramine

Table 3-3
Human Health Screening Criteria for Soil and Sediment[a]
Pocatello Bombing Range No. 3

Analyte	CAS No.	EPA RSLs		Idaho IDTL for Soil[c] (mg/kg)	Proposed Screening Level (mg/kg)[a]
		Residential RSL[b] (mg/kg)	Industrial RSL[b] (mg/kg)		
Explosives					
1,3,5-Trinitrobenzene	99-35-4	2,200	27,000	NVA	2,200
1,3-Dinitrobenzene	99-65-0	6.1	62	NVA	6.1
2,4,6-Trinitrotoluene	118-96-7	19	79	0.0134	**0.0134**
2,4-Dinitrotoluene[d]	121-14-2	0.72	2.5	0.00029	**0.00029**
2,6-Dinitrotoluene[d]	606-20-2	0.72	2.5	0.00021	**0.00021**
2-Amino-4,6-dinitrotoluene	35572-78-2	150	2,000	NVA	150
2-Nitrotoluene	88-72-2	2.9	13	NVA	2.9
3-Nitrotoluene	99-08-1	6.1	62	NVA	6.1
4-Amino-2,6-dinitrotoluene	19406-51-0	150	1,900	NVA	150
4-Nitrotoluene	99-99-0	30	110	NVA	30
HMX	2691-41-0	3,800	49,000	NVA	3,800
Nitrobenzene	98-95-3	4.8	24	0.0218	**0.0218**
Nitroglycerin	55-63-0	6.1	62	NVA	6.1
PETN	78-11-5	120	430	NVA	120
RDX	121-82-4	5.6	24	NVA	5.6
Tetryl	479-45-8	240	2,500	NVA	240
Metals					
Aluminum	7429-90-5	77,000	990,000	NVA	77,000
Barium	7440-39-3	15,000	190,000	896	896
SVOCs					
Anthracene	120-12-7	17,000	170,000	1,040	1,040
Hexachloroethane	67-72-1	12	43	0.138	0.138

Abbreviations and Acronyms:

EPA = U.S. Environmental Protection Agency
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IDEQ = Idaho Department of Environmental Quality
IDTL = initial default target level
MDL = method detection limit
mg/kg = milligrams per kilogram
NVA = no value available
PETN = pentaerythritol tetranitrate
PQL = practical quantitation limit
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
RSL = regional screening level
SVOCs = semivolatile organic compounds
Tetryl = 2,4,6-trinitrophenyl-N-methylnitramine

Table 3-3 (Cont.)
Human Health Screening Criteria for Soil and Sediment[a]
Pocatello Bombing Range No. 3

Notes:

[a] Proposed screening levels were selected using the lower of IDEQ Initial Default Target Levels (IDTLs) and U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs). If laboratory cannot meet any of the practical quantitation limits (PQLs) with routine SW-846 methodology (as supported by method detection limits [MDLs] that are no greater than 1/3 PQL), laboratory's PQI must be identified in laboratory submittal as failing to meet the PQL. Some screening values cannot be obtained with routine methodology to the PQL. In those cases, the PQL achievable with a routine SW-846 methodology would be accepted. **BOLD** indicates PQL exceeds the selected screening value.

[b] EPA *Regional Screening Levels for Chemical Contaminants at Superfund Sites* (May 2012). Based on single chemical.

[c] IDTLs for Soil from *Idaho Risk Evaluation Manual,* Appendix A, dated July 2004, based on single chemical (IDEQ, 2004). In addition, values are based on groundwater protection via soils leaching to groundwater unless otherwise noted.

[d] Based on values for 2,4/2,6-dinitrotoluene mixture.

Table 3-4
Ecological Screening Criteria for Soil
Pocatello Bombing Range No. 3

Analyte	CAS No.	SSLs (EPA, 2005) [a]	ODEQ Level II Screening Level [b]	Other Values: Talmage et al. (1999)[c] or LANL (2010)[d] (mg/kg)		Potential Bioaccumulative Constituent?[e]	Site Inspection Ecological Screening Value Soil [f] (mg/kg)
		Lowest Value for Plants/Invertebrates, Mammals and Birds (mg/kg)					
Explosives							
1,3,5-Trinitrobenzene	99-35-4	NVA	NVA	6.6	LANL	—	6.6
1,3-Dinitrobenzene	99-65-0	NVA	NVA	0.073	LANL	—	0.073
2,4,6-Trinitrotoluene	118-96-7	NVA	NVA	6.4	LANL	—	6.4
2,4-Dinitrotoluene	121-14-2	NVA	NVA	0.52	LANL	—	0.52
2,6-Dinitrotoluene	606-20-2	NVA	NVA	0.37	LANL	—	0.37
2-Amino-4,6-Dinitrotoluene	35572-78-2	NVA	NVA	2.1	LANL	—	2.1
2-Nitrotoluene	88-72-2	NVA	NVA	2.0	LANL	—	2.0
3-Nitrotoluene	99-08-1	NVA	NVA	2.4	LANL	—	2.4
4-Amino-2,6-Dinitrotoluene	19406-51-0	NVA	NVA	0.73	LANL	—	0.73
4-Nitrotoluene	99-99-0	NVA	NVA	4.4	LANL	—	4.4
HMX	2691-41-0	NVA	NVA	27	LANL	—	27
Nitrobenzene	98-95-3	NVA	8	2.2	LANL	—	2.2
Nitroglycerin	55-63-0	NVA	NVA	71	LANL	—	71
PETN	78-11-5	NVA	NVA	8600	LANL	—	8600
RDX	121-82-4	NVA	NVA	7.5	LANL	—	7.5
Tetryl	479-45-8	NVA	NVA	0.99	LANL	—	0.99
Metals/Inorganics							
Aluminum	7429-90-5	Narrative pH<5.5	50	pH < 5.5	LANL	—	pH < 5.5
Barium	7440-39-3	330	85	110	LANL	—	330
SVOCs							
Anthracene	120-12-7	29	NVA	6.8	LANL	Yes	29
Hexachloroethane	62-72-1	NVA	NVA	NVA	—	No	NVA

Abbreviations and Acronyms:

CAS = Chemical Abstracts Service
EcoSSL = Ecological Soil Screening Level
EPA-R4 = EPA Region 4
EQSLV = Ecological Screening Level Value
ESL = Ecological Screening Level
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
LANL = Los Alamos National Laboratory
MDL = method detection limit
mg/kg = milligrams per kilogram
NA = not applicable
NVA = no value available
PETN = pentaerythritol tetranitrate
ODEQ = Oregon Department of Environmental Quality
ORNL = Oak Ridge National Laboratory
PQL = practical quantitation limit
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
SSL = EPA Eco Soil Screening Level
SVOC = semivolatile organic compound
Tetryl = 2,4,6-trinitrophenyl-N-methylnitramine

Table 3-4 (Cont.)
Ecological Screening Criteria for Soil
Pocatello Bombing Range No. 3

Notes:

[a] U.S. Environmental Protection Agency (EPA). 2005. *Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs)* . Office of Solid Waste and Emergency Response. Website version last updated October 20, 2010: http://www.epa.gov/ecotox/ecossl.

[b] Oregon Department of Environmental Quality (ODEQ) Screening Level Values (December 2001).

[c] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel. 1999. "Nitroaromatic Munition Compounds: Environmental Effects and Screening Values." Rev. Environ. Contam. Toxicol.

[d] Los Alamos National Laboratory (LANL). Eco Risk Database, Release 2.5, October 2010.

[e] Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation. Potential bioaccumulative potential from: Bioaccumulation Testing and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs (EPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

[f] Final Screening Value selected using the following hierarchy for Idaho sites (Jeff Fromm, Idaho Department of Environmental Quality, personal communication 2/27/2007):

1. SSL Values Developed by EPA (2005) (Website last updated October 20, 2010)
2. Oregon (2001) Values
3. Lower of Talmage et al. or LANL

Note: No Idaho Ecological Screening Values available for soil.

Other References:

Efroymson, R.A., Suter II, G.W., Sample, B.E. and Jones, D.S., 1997. *Preliminary Remediation Goals for Ecological Endpoints* . Lockheed Martin Energy Systems, Inc. (ORNL) ES/ER/TM-162/R2.

Dutch Intervention Values:

Swartjes, F.A. 1999. *Risk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency* . Risk Analysis 19(6): 1235-1249.

The Netherlands Ministry of Housing, Spatial Planning and Environment's Circular on *Target Values and Intervention Values for Soil Remediatio n* http://www2.minvrom.nl/Docs/internationaal/S_I2000.pdf and *A nnex A:* Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination http://www2.minvrom.nl/Docs/internationaal/annexS_I2000.pdf were also consulted.

Table 3-5
Ecological Screening Criteria for Sediment
Pocatello Bombing Range No. 3

Parameter	CAS No.	ODEQ Screening Levels [a] (mg/kg) Freshwater	EPA Region 10 [b] (mg/kg)		Other Ecological Screening Levels [c] (mg/kg)		Potential Bioaccumulative Constituent?[d]	Site Inspection Ecological Screening Level Sediment [e] (mg/kg)
Explosives								
1,3,5-Trinitrobenzene	99-35-4	NVA	NVA	—	2.40E-02	TAL	No	2.40E-02
1,3-Dinitrobenzene	99-65-0	NVA	NVA	—	6.70E-02	TAL	No	6.70E-02
2,4,6-Trinitrotoluene	118-96-7	NVA	NVA	—	9.20E-01	TAL	No	9.20E-01
2,4-Dinitrotoluene	121-14-2	NVA	NVA	—	2.90E-01	LANL	No	2.90E-01
2,6-Dinitrotoluene	606-20-2	NVA	NVA	—	1.90E+00	LANL	No	1.90E+00
2-Amino-4,6,-Dintrotoluene	35572-78-2	NVA	NVA	—	7.00E+00	LANL	No	7.00E+00
2-Nitrotoluene	88-72-2	NVA	NVA	—	5.60E+00	LANL	No	5.60E+00
3-Nitrotoluene	99-08-1	NVA	NVA	—	4.90E+00	LANL	No	4.90E+00
4-Amino-2,6,-Dintrotoluene	19406-51-0	NVA	NVA	—	1.90E+00	LANL	No	1.90E+00
4-Nitrotoluene	99-99-0	NVA	NVA	—	1.00E+01	LANL	No	1.00E+01
HMX	2691-41-0	NVA	NVA	—	4.70E-02	TAL	No	4.70E-02
Nitrobenzene	98-95-3	NVA	NVA	—	3.20E+01	LANL	No	3.20E+01
Nitroglycerin	55-63-0	NVA	NVA	—	1.70E+03	LANL	No	1.70E+03
PETN	78-11-5	NVA	NVA	—	1.20E+05	LANL	No	1.20E+05
RDX	121-82-4	NVA	NVA	—	1.30E-01	TAL	No	1.30E-01
Tetryl	479-45-8	NVA	NVA	—	1.00E+02	LANL	No	1.00E+02
Metals/Inorganics								
Aluminum	7429-90-5	NVA	NVA	—	2.80E+02	LANL	No	2.80E+02
Barium	7440-39-3	NVA	NVA	—	4.80E+01	LANL	No	4.80E+01
SVOCs								
Anthracene	120-12-7	5.70E+01	5.72E-02	MAC	3.90E-04	LANL	Yes	5.70E+01
Hexachloroethane	62-72-1	NVA	NVA	—	NVA	—	No	NVA

Abbreviations and Acronyms:

CCME = Canadian Council of Ministers of the Environment
EPA = U.S. Environmental Protection Agency
EQSLV = Environmental Quality Screening Level Value
ESL = Ecological Screening Level
HMX = octohydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
ISQGs=Canadian Interim Sediment Quality
LANL = Los Alamos National Laboratory
MAC = MacDonald Consensus Values
mg/kg = milligrams per kilogram
NVA = no value available
ODEQ = Oregon Department of Environmental Quality
ORNL = Oak Ridge National Laboratory
PETN = pentaerythritol tetranitrate
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
SVOCs = semivolatile organic compounds
TAL = Talmage et al.
Tetryl = 2,4,6-trinitrophenyl-N-methylnitramine
TNT = 2,4,6-trinitrotoluene

Table 3-5 (Cont.)
Ecological Screening Criteria for Sediment
Pocatello Bombing Range No. 3

Notes:

[a] Oregon Department of Environmental Quality Screening Level Values (December 2001).

[b] EPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy; therefore, values from the EPA Region 7 Approach were used. Catherine Wooster-Brown (Eco Risk Assessor, EPA Region 7) recommendsthe following hierarchy: MacDonald Consensus Values (MacDonald, 2000); ORNL Efroymson Values (ORNL, 1997).

[c] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel (TAL). 1999. *Nitroaromatic Munition Compounds: Environmental Effects and Screening Values* . Rev. Environ. Contam. Toxicol. or Los Alamos National Laboratory (LANL). Eco Risk Database, Release 2.5, October 2010.

[d] Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation. Potential bioaccumulative from: Bioaccumulation Testing and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs (EPA, 2000) and Oregon Department of Environmental Quality (ODEQ) EQSLVs (ODEQ, 2001).

[e] Final Screening Value selected using the following hierarchy:

1. No Idaho Values available; values developed by Oregon recommended (Bruce Wicherski, Idaho Deptartment of Environmental Quality, personal communication 2/23/2007).
2. EPA Region 10 recommended values (MacDonald Consensus Values or ORNL Efroymson Values).
3. Lower of Talmage et al. (TAL) (1999) or LANL (2010) values.

Note: The Talmage [TAL] screening values assume 10 percent organic carbon in the sediment.

Other References:

Canadian Council of Ministers of the Environment (CCME). 2003. Canadian Interim Sediment Quality Guidelines (ISQGs) Summary Table. December 2003.

Efroymson, R.A., et al. 1997. *Preliminary Remediation Goals for Ecological Endpoints.* ORNL, ES/ER/TM-162/R2.

MacDonald, D.D, C.G. Ingersoll and T.A. Berger. 2000. *Development and Evaluation of Consensus-Based Sediment Quality Criteria for Freshwater Ecosystems* . Archives of Environmental Contamination and Toxicology 39:20-31.

Table 4-1
Comparison of Bombing Range No. 3 MRS Soil Results to Site Inspection Screening Levels
Pocatello Bombing Range No. 3

Location						**178A001**				**178A002**				**178A003**			
Sample Number						**NWO-178-0001**				**NWO-178-0002**				**NWO-178-0003**			
Sample Date						**18-Aug-11**				**19-Aug-11**				**19-Aug-11**			
Sample Depth (ft bgs)						**0 to 0.17**				**0 to 0.17**				**0 to 0.17**			
Sample Purpose						**REG**				**REG**				**REG**			
Fraction	**Parameter**	**Units**	**Background Threshold Level**	**Site Inspection Ecological Screening Level**	**Site Inspection Human Health Screening Level**	**Result**	**PQL**	**MDL**	**VQ**	**Result**	**PQL**	**MDL**	**VQ**	**Result**	**PQL**	**MDL**	**VQ**
Explosives	1,3,5-Trinitrobenzene	mg/kg	No criteria	6.6	2200	< 0.0130	0.0943	0.013	U	< 0.0130	0.0943	0.013	U	< 0.0136	0.0989	0.0136	U
Explosives	1,3-Dinitrobenzene	mg/kg	No criteria	0.073	6.1	< 0.0156	0.0943	0.0156	U	< 0.0157	0.0943	0.0157	U	< 0.0164	0.0989	0.0164	U
Explosives	2,4,6-Trinitrotoluene	mg/kg	No criteria	6.4	0.0134	< 0.0289	0.0943	0.0289	U	< 0.0290	0.0943	0.029	U	< 0.0304	0.0989	0.0304	U
Explosives	2,4-Dinitrotoluene	mg/kg	No criteria	0.52	0.00029	< 0.0139	0.0943	0.0139	U	< 0.0139	0.0943	0.0139	U	< 0.0145	0.0989	0.0145	U
Explosives	2,6-Dinitrotoluene	mg/kg	No criteria	0.37	0.00021	< 0.0180	0.0943	0.018	U	< 0.0180	0.0943	0.018	U	< 0.0189	0.0989	0.0189	U
Explosives	2-Amino-4,6-dinitrotoluene	mg/kg	No criteria	2.1	150	< 0.0310	0.0943	0.031	U	< 0.0310	0.0943	0.031	U	< 0.0325	0.0989	0.0325	UJ
Explosives	2-Nitrotoluene	mg/kg	No criteria	2.0	2.9	< 0.0445	0.189	0.0445	U	< 0.0445	0.189	0.0445	U	< 0.0467	0.198	0.0467	U
Explosives	3-Nitrotoluene	mg/kg	No criteria	2.4	6.1	< 0.0603	0.189	0.0603	U	< 0.0604	0.189	0.0604	U	< 0.0633	0.198	0.0633	U
Explosives	4-Amino-2,6-dinitrotoluene	mg/kg	No criteria	0.73	150	< 0.0282	0.0943	0.0282	U	< 0.0282	0.0943	0.0282	U	< 0.0296	0.0989	0.0296	UJ
Explosives	4-Nitrotoluene	mg/kg	No criteria	4.4	30	< 0.0344	0.189	0.0344	U	< 0.0344	0.189	0.0344	U	< 0.0361	0.198	0.0361	U
Explosives	HMX	mg/kg	No criteria	27	3800	< 0.0214	0.0943	0.0214	U	< 0.0214	0.0943	0.0214	U	< 0.0225	0.0989	0.0225	U
Explosives	Nitrobenzene	mg/kg	No criteria	2.2	0.0218	< 0.0801	0.283	0.0801	U	< 0.0802	0.283	0.0802	U	< 0.0841	0.297	0.0841	U
Explosives	Nitroglycerine	mg/kg	No criteria	71	6.1	< 0.203	1.89	0.203	U	< 0.203	1.89	0.203	U	< 0.213	1.98	0.213	U
Explosives	PETN	mg/kg	No criteria	8600	120	< 0.465	1.89	0.465	U	< 0.465	1.89	0.465	U	< 0.488	1.98	0.488	U
Explosives	RDX	mg/kg	No criteria	7.5	5.5	< 0.0405	0.189	0.0405	U	< 0.0406	0.189	0.0406	U	< 0.0425	0.198	0.0425	U
Explosives	Tetryl	mg/kg	No criteria	0.99	240	< 0.0414	0.189	0.0414	U	< 0.0414	0.189	0.0414	U	< 0.0434	0.198	0.0434	U
Metals	Aluminum	mg/kg	31200 [a]	No criteria	77000	15300	245	7.59		12300	48.4	1.5		11900	47.3	1.47	J
Metals	Barium	mg/kg	615 [a]	330	896	174	0.229	0.0323		187	0.24	0.0338		181	0.249	0.035	
SVOC	Anthracene	mg/kg	0.33 [b]	29	1040	< .0165	0.319	0.0165	U	< .0169	0.328	0.0169	U	< .0155	0.3	0.0155	U
SVOC	Hexachloroethane	mg/kg	0.33 [b]	No criteria	0.138	< .0206	0.319	0.0206	U	< .0212	0.328	0.0212	U	< .0194	0.3	0.0194	U

Notes:

[**Bold Face**] - Result exceeds Background Threshold Level.

[*Italicized*] - Result exceeds Site Inspection Ecological Screening Level.

[Underlined] - Result exceeds Site Inspection Human Health Screening Level.

[a] - Background Threshold Level established at three times the analyte concentration detected in the background soil sample.

[b] - Background Threshold Level established at the laboratory's PQL

ft bgs = feet below ground surface
PQL = practical quantitation limit
MDL = method detection limit
REG = regular field sample
TF = field triplicate sample
VQ = validation qualifier

mg/kg = milligrams per kilogram
SVOC = semivolatile organic compound
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
PETN = pentaerythritol tetranitrate
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
Tetryl = methyl-2,4,6-trinitrophenylnitramine

Validation Qualifier Definitions

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated method detection limit.

J - The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

R - The reported sample results are rejected due to the following: 1) Severe deficiencies in the supporting quality control data, 2) Anomalies noted in the sampling and/or analysis process which could affect the validity of the reported data, 3) The presence or absence of the constituent cannot be verified based on the data provided, and 4) To indicate not to use a particular result in the event of a reanalysis.

UJ - The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the reporting limit may be inaccurate or imprecise. The nondetect result should be estimated.

Table 4-1 (Cont.)
Comparison of Bombing Range No. 3 MRS Soil Results to Site Inspection Screening Levels
Pocatello Bombing Range No. 3

Location						**178A004**				**178A005**				**178A006**			
Sample Number						**NWO-178-0004**				**NWO-178-0005**				**NWO-178-0006**			
Sample Date						**20-Aug-11**				**19-Aug-11**				**18-Aug-11**			
Sample Depth (ft bgs)						**0 to 0.17**				**0 to 0.17**				**0 to 0.17**			
Sample Purpose						**REG**				**REG**				**REG**			
Fraction	**Parameter**	**Units**	**Background Threshold Level**	**Site Inspection Ecological Screening Level**	**Site Inspection Human Health Screening Level**	**Result**	**PQL**	**MDL**	**VQ**	**Result**	**PQL**	**MDL**	**VQ**	**Result**	**PQL**	**MDL**	**VQ**
Explosives	1,3,5-Trinitrobenzene	mg/kg	No criteria	6.6	2200	< 0.0132	0.0955	0.0132	U	< 0.0130	0.0943	0.013	U	< 0.0133	0.0967	0.0133	U
Explosives	1,3-Dinitrobenzene	mg/kg	No criteria	0.073	6.1	< 0.0159	0.0955	0.0159	U	< 0.0156	0.0943	0.0156	U	< 0.0161	0.0967	0.0161	U
Explosives	2,4,6-Trinitrotoluene	mg/kg	No criteria	6.4	0.0134	< 0.0293	0.0955	0.0293	U	< 0.0289	0.0943	0.0289	U	< 0.0297	0.0967	0.0297	U
Explosives	2,4-Dinitrotoluene	mg/kg	No criteria	0.52	0.00029	< 0.0140	0.0955	0.014	U	< 0.0139	0.0943	0.0139	U	< 0.0142	0.0967	0.0142	U
Explosives	2,6-Dinitrotoluene	mg/kg	No criteria	0.37	0.00021	< 0.0182	0.0955	0.0182	U	< 0.0180	0.0943	0.018	U	< 0.0185	0.0967	0.0185	U
Explosives	2-Amino-4,6-dinitrotoluene	mg/kg	No criteria	2.1	150	< 0.0314	0.0955	0.0314	U	< 0.0310	0.0943	0.031	U	< 0.0318	0.0967	0.0318	U
Explosives	2-Nitrotoluene	mg/kg	No criteria	2.0	2.9	< 0.0451	0.191	0.0451	U	< 0.0445	0.189	0.0445	U	< 0.0456	0.193	0.0456	U
Explosives	3-Nitrotoluene	mg/kg	No criteria	2.4	6.1	< 0.0611	0.191	0.0611	U	< 0.0603	0.189	0.0603	U	< 0.0619	0.193	0.0619	U
Explosives	4-Amino-2,6-dinitrotoluene	mg/kg	No criteria	0.73	150	< 0.0286	0.0955	0.0286	U	< 0.0282	0.0943	0.0282	U	< 0.0289	0.0967	0.0289	U
Explosives	4-Nitrotoluene	mg/kg	No criteria	4.4	30	< 0.0349	0.191	0.0349	U	< 0.0344	0.189	0.0344	U	< 0.0353	0.193	0.0353	U
Explosives	HMX	mg/kg	No criteria	27	3800	< 0.0217	0.0955	0.0217	U	< 0.0214	0.0943	0.0214	U	< 0.0220	0.0967	0.022	U
Explosives	Nitrobenzene	mg/kg	No criteria	2.2	0.0218	< 0.0812	0.287	0.0812	U	< 0.0801	0.283	0.0801	U	< 0.0822	0.29	0.0822	U
Explosives	Nitroglycerine	mg/kg	No criteria	71	6.1	< 0.205	1.91	0.205	U	< 0.203	1.89	0.203	U	< 0.208	1.93	0.208	U
Explosives	PETN	mg/kg	No criteria	8600	120	< 0.471	1.91	0.471	U	< 0.465	1.89	0.465	U	< 0.477	1.93	0.477	U
Explosives	RDX	mg/kg	No criteria	7.5	5.5	< 0.0411	0.191	0.0411	U	< 0.0405	0.189	0.0405	U	< 0.0416	0.193	0.0416	U
Explosives	Tetryl	mg/kg	No criteria	0.99	240	< 0.0419	0.191	0.0419	U	< 0.0414	0.189	0.0414	U	< 0.0425	0.193	0.0425	U
Metals	Aluminum	mg/kg	31200 [a]	No criteria	77000	13400	233	7.23		11300	49.5	1.53		16100	246	7.61	
Metals	Barium	mg/kg	615 [a]	330	896	223	0.249	0.0351		174	0.244	0.0344		180	0.235	0.0331	
SVOC	Anthracene	mg/kg	0.33 [b]	29	1040	< .0166	0.321	0.0166	U	< .0169	0.329	0.0169	U	< .0165	0.319	0.0165	U
SVOC	Hexachloroethane	mg/kg	0.33 [b]	No criteria	0.138	< .0207	0.321	0.0207	U	< .0212	0.329	0.0212	U	< .0206	0.319	0.0206	U

Notes:

[**Bold Face**] - Result exceeds Background Threshold Level.

[*Italicized*] - Result exceeds Site Inspection Ecological Screening Level.

[Underlined] - Result exceeds Site Inspection Human Health Screening Level.

[a] - Background Threshold Level established at three times the analyte concentration detected in the background soil sample.

[b] - Background Threshold Level established at the laboratory's PQL

ft bgs = feet below ground surface
PQL = practical quantitation limit
MDL = method detection limit
REG = regular field sample
TF = field triplicate sample
VQ = validation qualifier

mg/kg = milligrams per kilogram
SVOC = semivolatile organic compound
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
PETN = pentaerythritol tetranitrate
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
Tetryl = methyl-2,4,6-trinitrophenylnitramine

Validation Qualifier Definitions

U - Not detected. The compound/analyte was analyzed for, but not detected above the associated method detection limit.

J - The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

R - The reported sample results are rejected due to the following: 1) Severe deficiencies in the supporting quality control data, 2) Anomalies noted in the sampling and/or analysis process which could affect the validity of the reported data, 3) The presence or absence of the constituent cannot be verified based on the data provided, and 4) To indicate not to use a particular result in the event of a reanalysis.

UJ - The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the reporting limit may be inaccurate or imprecise. The nondetect result should be estimated.

Table 4-2
Comparison of Bombing Range No. 3 MRS Sediment Results to Site Inspection Screening Levels
Pocatello Bombing Range No. 3

Location						**178A009**			
Sample Number						**NWO-178-1001**			
Sample Date						**20-Aug-11**			
Sample Depth (ft bgs)						**0 to 0.17**			
Sample Purpose						**REG**			
Fraction	**Parameter**	**Units**	**Background Threshold Level**	**Site Inspection Ecological Screening Level**	**Site Inspection Human Health Screening Level**	**Result**	**PQL**	**MDL**	**VQ**
Explosives	1,3,5-Trinitrobenzene	mg/kg	No criteria	0.024	2200	< 0.0136	0.0989	0.0136	U
Explosives	1,3-Dinitrobenzene	mg/kg	No criteria	0.067	6.1	< 0.0164	0.0989	0.0164	U
Explosives	2,4,6-Trinitrotoluene	mg/kg	No criteria	0.92	0.0134	< 0.0304	0.0989	0.0304	U
Explosives	2,4-Dinitrotoluene	mg/kg	No criteria	0.29	0.00029	< 0.0145	0.0989	0.0145	U
Explosives	2,6-Dinitrotoluene	mg/kg	No criteria	1.9	0.00021	< 0.0189	0.0989	0.0189	U
Explosives	2-Amino-4,6-dinitrotoluene	mg/kg	No criteria	7	150	< 0.0325	0.0989	0.0325	U
Explosives	2-Nitrotoluene	mg/kg	No criteria	5.6	2.9	< 0.0467	0.198	0.0467	U
Explosives	3-Nitrotoluene	mg/kg	No criteria	4.9	6.1	< 0.0633	0.198	0.0633	U
Explosives	4-Amino-2,6-dinitrotoluene	mg/kg	No criteria	1.9	150	< 0.0296	0.0989	0.0296	U
Explosives	4-Nitrotoluene	mg/kg	No criteria	10	30	< 0.0361	0.198	0.0361	U
Explosives	HMX	mg/kg	No criteria	0.047	3800	< 0.0225	0.0989	0.0225	U
Explosives	Nitrobenzene	mg/kg	No criteria	32	0.0218	< 0.0841	0.297	0.0841	U
Explosives	Nitroglycerine	mg/kg	No criteria	1700	6.1	< 0.213	1.98	0.213	U
Explosives	PETN	mg/kg	No criteria	120000	120	< 0.488	1.98	0.488	U
Explosives	RDX	mg/kg	No criteria	0.13	5.5	< 0.0425	0.198	0.0425	U
Explosives	Tetryl	mg/kg	No criteria	100	240	< 0.0434	0.198	0.0434	U
Metals	Aluminum	mg/kg	47700 [a]	280	77000	*23700*	93.5	1.45	
Metals	Barium	mg/kg	636 [a]	48	896	*272*	0.476	0.0671	
SVOC	Anthracene	mg/kg	0.33 [b]	57	1040	< .0164	0.318	0.0164	U
SVOC	Hexachloroethane	mg/kg	0.33 [b]	No criteria	0.138	< .0205	0.318	0.0205	U

Notes:

[**Bold Face**] - Result exceeds Background Threshold Level.

[*Italicized*] - Result exceeds Site Inspection Ecological Screening Level.

[Underlined] - Result exceeds Site Inspection Human Health Screening Level.

[a] - Background Threshold Level established at three times the concentration detected in the sediment background sample.
[b] - Background Threshold Level established at the laboratory's PQL.

ft bgs - feet below ground surface
PQL - practical quantitation limit
MDL - method detection limit
REG - regular field sample
FD - field duplicate sample
VQ - validation qualifier

mg/kg - milligrams per kilogram
SVOC - semivolatile organic compound
HMX - octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
PETN - pentaerythritol tetranitrate
RDX - hexahydro-1,3,5-trinitro-1,3,5-triazine
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