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April 14, 2006

Mr. Lonnie Wolfe
Program Manager, Alternatives Funds Division
U. S. Air Force Center for Environmental Excellence
HQ AFCEE/IWA-COR
3300 Sidney Brooks, Building 532
Brooks City-Base, TD 78235-5112

SUBJECT: Work Plan and Explosive Safety Submission, CDRLs A004 and A009, Seneca Army Depot Activity, Romulus, NY, Contract FA8903-04-D-8675, DO 0026

Dear Mr. Wolfe:

Parsons is pleased to submit the Work Plan (A004) and the Explosives Safety Submission (A009) for the Munitions Response and CERCLA Closure at Seneca Army Depot Activity (SEDA) in Romulus, New York. Please note that the Explosives Safety Submission is included in Appendix A of the Work Plan. This Work Plan was prepared in accordance with the SOW for the above referenced contract and delivery order.

Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

Enclosures

cc: S. Absolom, SEDA (1 electronic copy)
Air Force email (letter only)
T. Battaglia, USACE, NY District (1 electronic copy)

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April 14, 2006

Mr. Julio Vazquez
USEPA Region II
Superfund Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Kuldeep K. Gupta, P.E.
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, NY 12233-7015

Ms. Charlotte Bethoney
Bureau of Environmental Exposure Investigation
Flanigan Square, Room 300
547 River Street
Troy, New York 12180
Julio and Kuldeep

SUBJECT: Work Plan and Explosive Safety Submission, Seneca Army Depot Activity, Romulus, New York, Contract FA8903-04-D-8675, Delivery Order 0026

Dear Mr. Vazquez/Mr. Gupta/Ms. Bethoney:

Parsons is pleased to submit the Work Plan for the Munitions Response and CERCLA Closure at Seneca Army Depot Activity (SEDA) in Romulus, New York. The Work Plan details the scope of work for the completion of munitions removal actions at SEADs 46, 57, 002-R-01 and 007-R-01. This Work Plan is being submitted for informational purposes. The work is scheduled to begin in May 2006.

Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

Enclosures

cc: S. Absolom, SEDA (1 electronic copy)
Air Force email (letter only)
T. Battaglia, USACE, NY District (1 electronic copy)

US Army Corps of Engineers

Air Force Center for Environmental Excellence

00292

Seneca Army Depot Activity
Romulus, New York

WORK PLAN AND EXPLOSIVES SAFETY SUBMISSION

MUNITIONS RESPONSE AND CERCLA CLOSURE
SENECA ARMY DEPOT ACTIVITY

AFCEE CONTRACT NO. FA8903-04-D-8675
TASK ORDER NO. 0026
CDRL A004 and A009
EPA SITE ID# NY0213820830
NY SITE ID# 8-50-006

PARSONS
APRIL 2006

PROJECT ACTIVITIES WORK PLAN

MUNITIONS RESPONSE AND CERCLA CLOSURE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY

April 2006

Prepared for:

AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE,
BROOKS CITY-BASE, TEXAS
and
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY

Contract Number FA8903-04-D-8675
Task Order 0012
CDRL A004 and A009

EPA Site ID# NY0213820830
NY Site ID# 8-50-006

Prepared by:

PARSONS
150 Federal Street
Boston, MA 02110

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
ARAR	Applicable or Relevant and Appropriate Requirement
ASR	Archives Search Report
ATV	All-terrain vehicle
BATF	Bureau of Alcohol, Tobacco, and Firearms
BIP	blown in place
Cal	Caliber
CAR	corrective action request
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CO	Contracting Officer
DDESB	DoD Explosives Safety Board
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DoD	Department of Defense
DQO	data quality objectives
EE/CA	engineering evaluation/cost analysis
EM	electromagnetic
EOD	explosive ordnance disposal
FAR	Federal Acquisition Regulation
GFE	government-furnished equipment
GIS	geographic information system
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
in	inch
lb	pound
M&TE	measuring and test equipment
MGFD	munition with greatest fragment distance
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MOFB	miniature open front barricade
mph	miles per hour
MSA	magazine storage area
MSD	minimum separation distance
NAD83	North American Datum 1983
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

ACRONYMS AND ABBREVIATIONS (continued)

NEPA	National Environmental Policy Act
NEW	net explosive weight
nT	nanoTesla
nT/ft	nanoTesla per foot
OE	ordnance and explosives
OSHA	Occupational Safety and Health Administration
PC	personal computer
PDN	project design notes
PDOP	position dilution of precision
PM	project manager
QA	quality assurance
QA/QC	quality assurance and quality control
QC	quality control
QCP	Quality Control Plan
QD	quantity distance
RCWM	recovered chemical warfare material
RDX	cyclotrimethylenetrinitramine
RTK	Real Time Kinematic
RTS	Robotic Total Station
SDSFIE	spatial data standards for facilities, infrastructure, and environment
SHP	Safety and Health Program
SSHP	Site Safety and Health Plan
SOW	scope of work
SUXOS	Senior UXO Supervisor
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering and Support Center, Huntsville
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
UXO	unexploded ordnance
UXOQCM	UXO Quality Control Manager
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1.0 INTRODUCTION

1.1 PROJECT INTRODUCTION

Parsons received Contract No.FA8903-04-D-8675, Delivery Order No. 0026, from the Air Force Center for Environmental Excellence (AFCEE) to conduct munitions response actions at SEAD-46, SEAD-002-R-01, SEAD-57, and SEAD-007-R-01 located at Seneca Army Depot, in Romulus New York. The Scope of Work (SOW) for this project is contained in Sections 2 through 6 of this document.

The munitions response activities are being performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). In accordance with the NCP, on-site actions will not require Federal, State, or local permits; however, a variety of substantive permit requirements must be fulfilled. The munitions response and removal action will adhere to all relevant U.S. Army regulations and guidance for munitions and explosives of concern (MEC) programs.

1.2 PURPOSE AND SCOPE

The Army has determined that an anomaly removal program is the appropriate measure to protect human health from the imminent threat posed by Materials Potentially Presenting an Explosive Hazard (MPPEH) remaining at four sites within Seneca Army Depot: the Former 3.5-Inch Rocket Range (SEAD 46); the former Explosive Ordnance Demolition Area (EOD #1) (SEAD 57); the former EOD Areas #2 and #3 (SEAD 002-R-01), and the Grenade Range (SEAD 007-R-001).

The purpose of this project is to clear the sites of MPPEH and demonstrate that soil contaminant concentrations remaining at the sites meet applicable regulatory requirements. After the project work described in this work plan is complete, the Army will prepare project documentation that will support a No Further Action finding in a Proposed Plan (PP) and Record of Decision (ROD).

The following work will be performed to achieve CERCLA closure of the four sites:

- Develop project work plans including the sampling and analysis plan, site safety and health plan and the explosive safety submission (ESS);
- Mobilize and demobilize from the site;

- Visually survey all work areas for surface MPPEH and munitions debris on the ground surface, and subsequently remove and dispose of all identified items;
- Removal of vegetation to 6 inches on all work areas through mowing or brush clearing, as necessary;
- Perform typical remedial investigation soil sampling for sites where no prior sampling was conducted;
- Perform land-based electromagnetic (EM61-MK2) surveys over established geophysical survey areas and subsequently process and interpret the collected data;
- Perform geophysical anomaly reacquisition for all previously and newly identified anomalies that exceed the selected response magnitude;
- Perform appropriate intrusive investigations and removals for all designated anomalies;
- Excavate 6-inches of soil and debris from saturated response areas (either determined visually or shown to contain more than 600 anomalies per acre);
- Excavate soil containing munitions debris and MPPEH from the berms at SEAD 46 and 57;
- Mechanically sort excavated soil through 5/8-inch screen to remove the smallest MEC item (20mm projectile) identified for the four sites;
- Inspect all screening oversize material for MPPEH, and remove all MPPEH;
- Demilitarize all MPPEH removed from the physical sorting and intrusive investigations to be disposed of at an approved facility;
- Dispose all MPPEH encountered during all prior activities;
- Collect samples of the screening process fines for metals analysis and reuse as onsite backfill if results are acceptable;
- Dispose of any soil offsite that does not meet regulatory requirements; and
- Prepare all draft and final project reports including the Proposed Plan (PP) and Record of Decision (ROD).

This work plan covers all of the work prior to completing the PP and ROD.

1.3 SITE DESCRIPTION AND HISTORY

Since its inception in 1941, SEDA's primary mission had been the receipt, storage, maintenance, and supply of military items. The SEDA was proposed for the National Priority List (NPL) in July 1989. In August 1990, SEDA was finalized and listed in Group 14 on the Federal Section of the NPL. The Environmental Protection Agency (EPA), New York State Department of Conservation (NYSDEC), and the Army entered into an agreement, called the Federal Facility Agreement (FFA), also known as the Interagency Agreement (IAG). This agreement determined that future investigations were to be based on Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidelines. The Resource Conservation and Recovery Act (RCRA) was considered to be an Applicable or Relevant and Appropriate Requirement (ARAR) pursuant to Section 121 of CERCLA. In October 1995, SEDA was designated as a facility to be closed under the provisions of the BRAC process.

1.3.1 The 3.5-Inch Rocket Range (SEAD-46)

The 3.5-Inch Rocket Range (SEAD-46) covers approximately 76 acres (expanded from the original 45 acres) located on the northeast side of the Depot (Figure 1-1). The site consists of perimeter wooded areas, several central open field areas, and a large berm near the north end of the area. Aerial photos taken in 1954 show the site as a long open area in which 3.5" rockets may have been fired. It is believed that the berm at the north end of the area was a target into which the rockets were fired. Subsequent to the Army use of SEAD-46, a number of small trees have grown in the open areas.

1.3.2 The Former EOD Range (SEAD-57)

The Former EOD Range (SEAD-57), originally designated as EOD #1, consists of approximately 58 acres in the northwest portion of the Depot (Figure 1-1). This area was used as a demolition range with a reported explosive limit of 10 pounds (ASR 1998). Within the 58 acres is a bermed area that does not show up on aerial photographs until after 1978. This earthen bermed area is 100 feet long and 85 feet wide with walls 6 to 8 feet high built in the center of the 58 acre area. The berm was constructed to limit the surface effects of the blast and reduce the amount of fragmentation that was released from the blast inside. During the site visit for the Archive Search Report (ASR), shot holes were seen on the western side of the access road to the demo berm. These shot holes along with four to the south appear on a 1963 aerial photograph of the EOD range #1. According to the 1998 ASR

conducted by the BRAC department the blast radius for this area is 1800 feet from the center of the berm.

1.3.3 The Grenade Range (SEAD-002-R-01)

The Grenade Range (SEAD-002-R-01) is a 30-acre field located to the south of the SEAD 57 Demo range. The northern 10 acres of the range has a number of targets including mannequins, wooden targets, and Armored Personnel Carriers (APCs). The southern end of the site has a 20-foot observation tower and an established firing line with foxholes and a wire fence. It is reported in the 1998 ASR that this area was used for training of the 40mm rifle fired practice grenade projectiles. During the site visit for the 1998 ASR, several intact 40mm practice grenades were found in this area along with evidence of small arms use. The targets show use of training rounds but do not show any evidence of 40mm HE projectiles.

1.3.4 The EOD Range 2 and 3 (SEAD-007-R-01)

The EOD Range 2 and 3 (SEAD-007-R-01) is split into two areas both located to the north of SEAD 46. EOD # 2 is collocated with the IRFNA site (SEAD 13) on the western shore of the Duck Pond to the west of SEAD 46. The 1998 ASR states that explosive devices were used in this area, and non explosive projectiles were thrown in the water at the duck pond. EOD activities in this area were not related to the IRFNA site. The EOD #3 area is located 250 feet to the north of the earthen berm in SEAD 46. The 4.5 acre area is mostly flat with the exception of a 100 by 200 foot depression in the middle of the site. This site was reported in the 1999 ASR as an EOD disposal area.

1.4 PREVIOUS WORK

Several investigations for ordnance and explosives and chemical constituents have been conducted at these sites previously. The previous work is described in three main documents as follows:

- Final Ordnance and Explosives Engineering Evaluation/Cost Analysis Report, Seneca Army Depot (Parsons, February 2004) (OE EE/CA);
- Draft SEAD 46 and SEAD 57 Remedial Investigation, Seneca Army Depot (Parsons, December 2001); and
- Final Report Geophysical Investigation SEAD 46 and 57, Seneca Army Depot, (Shaw Environmental, April 2005).

The brief summary of the results of these investigations by site are provided below.

1.4.1 SEAD 46

A Remedial Investigation (RI) was conducted at SEADs 46 and 57 in late 1999 and 2000 with the collection of soil, sediment, surface water and groundwater samples for chemical analysis. The results of this analysis showed that the soils were slightly impacted by metals constituents. With the exception of higher metals concentrations along the front face of the berm, the soil concentrations were generally consistent with background.

As part of the OE EE/CA, geophysical surveys and intrusive investigations were conducted in 2000 at SEADs 46 and 57. A total of 43% of the 40 acres at SEAD 46 was surveyed and 1,155 anomalies were investigated. 478 contained munitions debris and 10 of these were MEC items. All items were found in the upper 12 inches of soil.

During the Shaw Environmental Geophysical Investigation of SEADs 46 and 57 (Shaw Investigation), approximately 27 acres of SEAD 46 were digitally mapped. There was one area where digital geophysical mapping (DGM) survey detected anomaly densities greater than 600 anomalies per acre. Areas that are visually saturated with anomalies or have more than 600 per acre are considered saturated response areas (SRAs). There was one SRA identified to the west of the target berm at SEAD 46. This area is approximately one acre in size. A total of 98 anomalies were intrusively investigated. No MEC items were found. A total of 1,563 anomalies with a response greater than 50 mV were found.

1.4.2 SEAD 57

A Remedial Investigation (RI) was conducted at SEADs 46 and 57 in late 1999 and 2000 with the collection of soil, sediment, surface water and groundwater samples for chemical analysis. The results of the analysis showed that some soil areas were impacted by metals constituents. With the exception of metals concentrations (principally lead and copper) in one sample inside the U-shaped berm, the soil concentrations in other areas of the berm and kickout area were generally consistent with background.

As part of the OE EE/CA, geophysical surveys and intrusive investigations were conducted in 2000 at SEAD 57. A total of 23% of the 60 acres at SEAD 57 were surveyed. 1,700 anomalies were investigated and 954 contained munitions debris. Three of these were determined to be MEC items. The three items were one MK2 grenade and two 20mm projectiles. All items were found in the upper six inches of soil.

During the Shaw Investigation of SEAD 57, approximately 22.5 acres of SEAD 57 were digitally mapped. The results indicated six SRAs at SEAD 57. The largest area is an approximate 400-foot radius ejectile spray pattern area radiating out from the demo berm with the greatest concentration of anomalies to the west of the SEAD 57 berm. A total of 13 acres of SRAs were found at SEAD 57. Seventy-five anomalies were intrusively investigated at SEAD 57. Four MEC items (a 75mm, a 75mm AP shot, a 105mm and an unknown fuzed bomb) were found and all other recovered metal was classified as ordnance related scrap, frag or non-munitions debris scrap. Only one munitions debris item was discovered below 6 inches in depth. Additionally 17,000 linear feet of woods transects were cleared and surveyed. The anomaly counts were significantly lower than in the open areas.

1.4.3 SEAD 002-R-01

As part of the OE EE/CA, geophysical surveys and intrusive investigations were conducted in 2000 at EOD Areas #2 and #3 (SEAD 002-R-01). A total of 46% of the 5-acre EOD #2 Area was surveyed and 89 anomalies were investigated. Six of the items were munitions debris and one item was MEC. All items were found in the upper three inches of the soil. A total of 80% of the 5-acre EOD #3 Area was surveyed and 64 anomalies were investigated. Thirteen of the items were munitions debris and no items were classified as MEC. Due to the proximity of SEAD 46, the items may be related to SEAD 46.

1.4.4 SEAD 007-R-01

As part of the OE EE/CA, geophysical surveys and intrusive investigations were conducted in 2000 at the Grenade Range (SEAD 007-R-01). A total of 100% of the 15-acre target area was surveyed. Additionally, two acres of meandering path data was collected from 10 acres between the firing line and the gridded target area. A total of 941 anomalies were investigated. 711 of the items were munitions debris and 103 items were considered MEC. All items were found in the upper 12 inches of the soil. All MEC items were either M73 35mm subcaliber rounds or practice 40mm rifle-fired grenades containing a spotting charge.

1.5 WORK PLAN ORGANIZATION

This work plan consists of 7 chapters, including this introduction, and 1 appendix:

- Chapter 2 provides the Technical Approach describing the project objectives, technical scope and procedures, personnel and qualifications, cost and schedule tracking and reporting requirements, and other project management activities.

- Chapter 3 provides the Geophysical Investigation Work Plan describing the methods, instrumentation and quality control requirements for completing the geophysical surveys and anomaly reacquisition activities.

- Chapter 4 provides the Field Sampling Plan describing the chemical sampling and analysis that will be performed as part of this project.

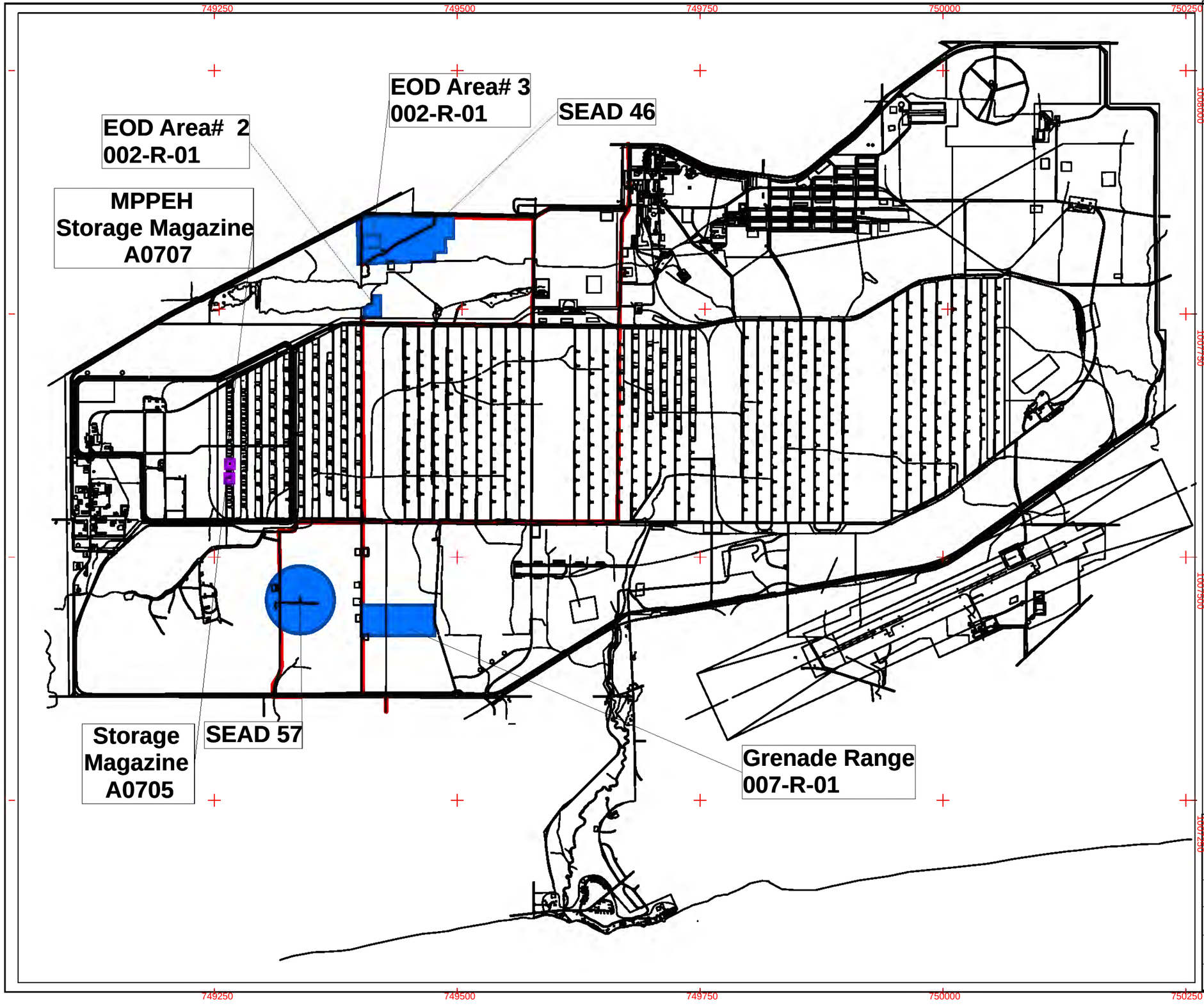
- Chapter 5 provides an Explosives Management Plan addressing the acquisition, transportation, and storage of explosives used to destroy unexploded ordnance (UXO), and an Explosive Siting Plan discussing the criteria for planning and siting explosive demolition events.

- Chapter 6 provides a Management Plan and identifies the key personnel and responsibilities.

- Chapter 7 lists the references cited in the work plan.

- Appendix A provides a copy of the Explosive Safety Submission for SEAD 57 and SEAD 007-R-01.

- Appendix B provides a copy of the Standard Operating Procedures for Demolition / Disposal Operations.



Removal Action Area

Approved Roads

Explosives Storage Magazines

997750 748750 Grid Coordinates (New York State Plane, Central)

N W E S

3,200 1,600 0 3,200 Feet

PARSONS

DESIGNED BY: BJM	Site Location Seneca Army Depot	
DRAWN BY: BJM		
CHECKED BY:	DATE PRINTED: March 31, 2006	PROJECT NUMBER: 744537-01100
SUBMITTED BY: BJM	Basemap: Base.shp	FN: Figure 1-1
	FILE: EOD3.mdx	SCALE: 1:35,080.9229

2.0 TECHNICAL APPROACH

2.1 GENERAL

This technical approach section will describe the process used to investigate and remove MPPEH and any contaminated soils from SEAD 46, SEAD 002-R-01, SEAD 57 and SEAD 007-R-01 in order to achieve site closure under CERCLA. The sites will be considered to be free of MPPEH when geophysical surveys confirm that all geophysical anomalies with an appropriate response threshold have been removed.

An appropriate response threshold will be measured using the DGM survey process outlined in Section 2.4. The response provides the relative strength of the signal from the identified item. The appropriate response threshold will be identified and verified during the geophysical prove out, and the results of the previous intrusive investigations. The response threshold to cutoff anomaly targets for intrusive investigations will be established to insure all types of MPPEH are addressed for site closure.

The method for removing MPPEH from each site will depend largely on the density of ferrous and non-ferrous anomalies and the method of geophysical surveying that was performed on each site or sub-section of each site. Since it is planned to intrusively investigate of anomalies exceeding the designated response threshold, geophysical surveys that did not provide data to make this distinction may need to be completed again. Four general MPPEH removal approaches will be used:

1. High density anomaly areas or saturated response areas (SRAs) – An area is considered a SRA if previous geophysical investigations indicated there are more than 600 targeted anomalies per acre. The approach for MPPEH removal in SRAs is to excavate the top six inches of soil and mechanically screen to remove all MPPEH. Generally, oversize material from the screening process will be inspected by UXO personnel and certified as free of MPPEH. The material passing the screen will be considered MPPEH free since the screen size will be set to not allow the smallest MPPEH item to pass with the fines. The fines will be suitable for backfilling pending chemical analysis. SEAD 57 and SEAD 46 contain approximately 14 acres of SRA.

2. Low density anomaly areas with responses clearly defined – These areas were geophysically surveyed in 2004/2005 as detailed in the report entitled Geophysical Investigations Munitions Destruction Areas, SEAD 46 and 57 (Shaw, April 2005). An appropriate response threshold will be selected to determine which anomalies will be targeted for intrusive investigations. The threshold will be based on the surveying technique utilized during this work. The density of anomalies is sufficiently low to intrusively investigate and remove individual anomalies without excavating the entire area. The current low density areas (48 acres) are located within SEAD 46 and 57. A total of 5,746 anomalies exceeding the response threshold were identified in 2005 at SEAD 46 and 57. Additional anomalies will be identified during additional DGM surveys at SEAD 002-R-01 and 007-R-01.

3. Low density anomaly areas with responses not defined – Although the work performed in the OE EE/CA did provide data that showed anomalies with the corresponding response threshold, the methods were not consistent with methods used by Shaw. These areas may require resurveying to collect data in a manner that can be directly correlated to the targeted threshold for the Shaw data. Once resurveyed, the anomalies would be reacquired, intrusively investigated and removed.

4. Incomplete survey areas – These areas were partially surveyed using meandering path methods in open areas, or surveys were performed on transects cut in wooded areas during the Shaw Investigation. New surveys will be completed for a 10-acre area of SEAD 007-R-01 where only meandering path method was used. For SEADs 46 and 57, new surveys will be performed in the transects cut through the woods during the Shaw work. The woods surveys will be used to show that the woods line was effective in blocking the intrusion of MPPEH into these areas. Additional transects may be cut in other wooded areas that were not surveyed either during the OE EE/CA or the Shaw Investigation if the results warrant. Once the surveys are complete, the identified targets will be reacquired and removed to determine if any MPPEH exists.

Table 2-1 presents a summary of the total acreage by site for each approach and the assumed number of anomalies exceeding the potential targeted threshold by site. The numbers of anomalies for SEAD 007-R-01 and SEAD 002-R-01 have been approximated since the surveys have not been completed.

TABLE 2-1
QUANTITY SUMMARY

Site	High Density Anomaly Area (acres)	Low Density Anomaly Areas with 50 mV responses (acres)	Low Density Anomaly Areas with responses not correlated to 50 mV (acres)	Incomplete or non-surveyed areas (acres)	Number of Anomalies to be Reacquired for Intrusive Investigation (assuming threshold greater than 50 mV)
SEAD 57	12.9	20.5	0	4.2	4,183 (5)
SEAD 46	1.0	27.3	0	4.8	1,563
SEAD 007-R-01	0	0	15	10	1,250
SEAD 002-R-01	0	0	10	0	100
Totals	13.9	47.8	25.0	19.0	7,096

The following sections provide a more detailed approach for completing this work.

2.2 SITE PREPARATION

2.2.1 Mobilization and Work/Staging Areas

Parsons will establish a work trailer and laydown area at SEAD 57. The soil screening area will be constructed near the work trailers. The trailer will be located outside the designated safety zone. Soil from SEAD 46 will be transported to SEAD 57 for screening. The soil screening area will be prepared and surveyed and determined to be free of MPPEH as discussed in Section 2.3.

The existing explosive storage magazines A0705 and A0704 in row Alpha will be provided by Seneca Army Depot. One explosive storage magazine will be used for the storage of MPPEH found during anomaly investigation. Only items that can be transported and stored for use in a combined shot demolition will be stored in the MPPEH explosive storage magazine.

The other explosive storage magazine will be used for the storage of demolition materials used in blow in place (BIP) and demolition activities. The existing storage magazines A0705 and 0704 are rated for the storage of 250,000 lbs. Net Explosive Weight constructed to Army and DDESB standards and is complete with required lightning and current ground testing certification (ESS April 2005). These explosive storage magazines meet the requirements of the Bureau of Alcohol, Tobacco, and Firearms (BATF) ATF P 5400.7 as well as all possible requirements of DoD 6055.9 STD and other DoD/Army requirements.

The Explosives Management and Siting Plan is provided in Section 5.

2.2.2 Establishment of GIS/Survey

Over the past 15 years, Parsons has developed a GIS database of the former Seneca Army Depot. This database provides a complete base map including the topography, site designation, rivers, roads/trails, targets and buildings.

The projection for the GIS data will be State Plane New York Central, NAD83. Projection information will be stored with each of the GIS data files. Any data received from outside sources will be projected to this State Plane coordinate system.

GIS will portray data and show the areas within the Seneca Army Depot that have had Digital Geophysical Mapping (DGM) performed and cleared. GIS maps will show the boundaries of the DGM grids and transects. The location of all anomalies selected for clearance (intrusive investigation) will be plotted on the GIS maps, as will the results of the clearance. The final deliverable will be a GIS map denoting where and what types of ordnance were found within cleared areas.

All final mapping will be generated using GIS on a PC, then provided to, USACE-COR New York, and the Seneca Army Depot Project Office in ESRI shapefiles on a CD-ROM. The shapefiles will conform to the Cadd/Technology Center SDSFIE, following the OE version of this standard developed at USAESCH. Site maps plotted from these design files will be provided on reproducible drawings. The size and scale of these drawings will be based on the information displayed.

Parsons will perform delineation and grid surveys within the response areas. Seneca Army Depot has an existing network of control monuments that will be used to provide both horizontal and vertical control for the base station, additional survey monuments should not be necessary. All land survey efforts will employ RTK GPS technologies with accuracy to 0.2 feet.

2.2.3 Identification of Off-Site Disposal Facilities

Non-hazardous soil marked for disposal will be managed by Sevenson Environmental and will be transported to either Seneca Meadows Landfill in Waterloo, New York or to Ontario County Landfill in Flint, New York for disposal. If found, hazardous soil will be stabilized onsite prior to disposal as non-hazardous. No hazardous waste has been identified at any of the sites during sampling events to date. It is not anticipated that there will be any hazardous waste.

An off-site authorized disposal facility will be located to accept all scrap metal that does not contain MPPEH. The material will be certified as scrap prior to off-site disposal for smelting and a certificate of destruction will be provided to the Army.

2.2.4 Erosion and Sedimentation Control

Temporary erosion and sedimentation controls, such as silt fencing, or soil berms, will be installed as required during operations to prevent migration of sediments and erosion of soil stockpiles. The temporary silt fencing will be maintained throughout the project and will not be removed until the stockpiles have been removed or until permanent vegetation has been re-established.

2.2.5 Site Control and Security Requirements

All four sites are located within the restricted area of Seneca Army Depot which is surrounded by a security fence with locked gates. The Army will provide site access to the field team prior to and during construction activities. Site security is necessary to prevent exposure of unauthorized, unprotected individuals to the work area. The area immediately surrounding the work area will be clearly marked through the use of signs, barrier rope, road barricades, tape, or fencing.

Site security will be enforced by the UXO Safety Officer (UXOSO) or a designated alternate who will ensure that only authorized personnel are allowed in the work area. This person will also ensure that entry personnel have the required level of personal protective equipment (PPE), are trained under the requirements of 20 Code of Federal Regulations (CFR) 1910.120, and are on a current medical monitoring program.

All visitors to the work site are required to report to the Site Manager (SM) and/or the UXOSO as soon as they arrive on site. The presence of visitors on site will be recorded in the field logbook, including the visitor's name, company, date, time, and activities performed while on site. SEDA BEC, USACE Project Engineer and Program Manager are considered essential personnel for the purpose of contract management. They will report to the site manager upon arrival on the site.

Truck transportation routes are provided on Figure 1-1.

2.2.6 Site Health and Safety

All field activities during the remedial design will be performed in accordance with the site-specific health and safety plan (HSP), "Project Safety Plan and Site-Specific Health and

Safety Plan for Munitions Response and CERCLA Closure of the Seneca Army Depot Activity" (Parsons, April 2006) in accordance with Parsons' Safety, Health, and Risk Program (SHARP) Manual. This HSP is provided under separate cover. All of Parsons subcontractors will review Parsons' HSP and develop their own HSP written specifically for remedial design activities. The Health and Safety Plan of Action portion of this document will protect site workers through the identification, evaluation, and control of health and safety hazards.

Prior to the commencement of field activities, all field team members will be briefed in site specific hazards. Site-specific health and safety training will take place. The HSP will be reviewed, and safe practices to be used when dealing with MPPEH and munitions debris will be emphasized. A safety briefing will be performed each day prior to the commencement of the day's field activities. These daily briefings will include discussion of weather conditions, specific site concerns, previous day's findings if related to safety issues, emergency response and evacuation procedures, and review of general procedures for dealing with MPPEH and munitions debris.

2.3 PROCESSING AREA

Soil from the SRAs (greater than 600 anomalies per acre) will be excavated and screened to remove MPPEH. The mechanical screening equipment and temporary office facilities will be set up on a two-acre area. Additionally, another five acre area will be needed to place processed soils stockpiles and lay out oversize material from the screening process for inspection. The screening area will be located at SEAD-57 since most of the material requiring screening will be excavated at this site. Since all of the open area at SEAD-57 contains anomalies targeted for intrusive investigations, the area will need to be cleared prior to use. Clearance will involve surface inspection, DGM, reacquisition of previously identified anomalies, anomaly removal and QC verification. The requirements for each of these activities are discussed further in Sections 2.4 through 2.6.

2.4 GEOPHYSICAL SURVEYS

Land-based geophysical survey methods will be used to identify and remove MPPEH from approximately 44 acres throughout the four sites. The digital geophysical mapping (DGM) of each of the SEADs will be performed using one of two different survey methods depending on site conditions and the results of previous investigations. The first method uses the Schonstadt™ magnetometer or Fisher™ all metal detector. The UXO technicians will sweep the lanes and record with a non metallic pin flag the position of the anomalies. The anomaly locations will be surveyed in using the RTK GPS, or RTS system and the anomalies

will be investigated after the position has been recorded in the database and a Dig Sheet produced to track intrusive activity results.

The second type of survey will incorporate the use of DGM techniques. To perform this survey, an EM61-MK2 electromagnetic locator will be used. This instrument works on the principles of Time Domain Electromagnetics TDEM. The system is made up of two coils - one transmitter and one receiver coil. The transmitter coil produces a primary magnetic field that is induced in the buried metal object, the receiver coil can than measure the time delay in the eddy current decay of the metal object as the primary field is shut off. The towed array is made up of three EM61-MK2 units linked together. This system will be used to survey any open area accessible to the 3 meter wide towed array. The towed array can collect electromagnetic data in a 3 meter wide path at a speed of 3 to 5 miles per hour. The towed array will be positioned using a predetermined heading and the RTK Global Positioning System (GPS). The towed array system will be configured to produce data that can be used to select a response threshold for intrusive investigations. In areas with limited working area, the EM61-MK2 survey can also be performed in a pedestrian mode utilizing a single 1 meter coil and Cartesian coordinates to cover the area. The data gathered from the geophysical survey will be evaluated to determine which anomalies are potential MPPEH items. In order to obtain complete coverage of the area, several methods will be used to mark the paths along which the towed array travels. These methods include spray paint, visible track marks and agricultural foam marking systems and cones to provide heading and coverage markers for the operators. Dig sheets will be developed that prioritize the anomalies above the designated response. These prioritized anomalies will then be reacquired using the RTK GPS and a Fisher/Schonstat, or an EM61-MK2.

The following section provides the general technical approach for performing geophysical investigations. The detailed methods, instrument, data management, geophysical prove-out, quality control and reporting requirements are presented in Section 3.

SEAD 57

Geophysical surveys will be conducted at SEAD 57 to accomplish the following:

- At least two acres of the 400 foot radius kick-out area from the SEAD 57 berm may not be saturated with anomalies as previously thought. This area has not been previously surveyed since it was assumed to be saturated with anomalies. It has become apparent that the highest anomaly density areas from the 400 foot radius kick-out area are skewed to the northwest. The survey will be conducted to identify anomalies with responses greater than the designated threshold. If the area is found

to be saturated, the top six inches will be excavated as discussed in Section 2.7. The survey area for SEAD 57 is provided on Figure 2-1.

- During Shaw's work in 2004/2005, 10-foot transects were cut through the woods to investigation the potential for MPPEH to be present in the woods. Surveys for ferrous materials were conducted in the transects. Depending on accessibility, Parsons will conduct either towed array EM61-MK2 pedestrian surveys or "mag and flag" surveys using a Fisher all-metal detector to investigate ferrous and non-ferrous anomalies. If EM61-MK2 surveys are conducted, designated targets will be intrusively investigated. If mag and flag surveys are performed, all anomalies will be investigated to confirm that no MPPEH is present.

- SRAs and the inner berm face and floor will be excavated to a depth of 6 inches. Following excavation, DGM will be performed to confirm that no MPPEH or anomalies above the threshold remain.

SEAD 46

Geophysical surveys will be conducted at SEAD 46 to map previously unmapped areas and to confirm that MPPEH is not found in the wooded areas. These areas are shown on Figure 2-2. The following work will be performed:

- A one-acre SRA has been identified at SEAD 46 northwest of the berm. Additionally, the front face of the berm is considered as a SRA. After six inches of soil has been removed from these areas, EM61-MK2 or mag and flag surveys will be performed to confirm that no MPPEH or targeted anomalies remain.

- During the geophysical work by Shaw in 2004/2005, transects were not cut and investigated in approximately 6 acres of the woods. Since these areas could potentially contain MPPEH, transects representing 10% of the total area will be cut. Parsons will survey these areas using an EM61-MK2 system in pedestrian mode. The data will be evaluated to select targets. The anomalies will be investigated as discussed in Section 2.5.

- As discussed for SEAD 57, Parsons will conduct either EM61-MK2 surveys or "mag and flag" surveys using a Fisher all-metal detector, surveys depending on accessibility along the existing woods transects. If EM61-MK2 surveys are conducted, designated targets will be intrusively investigated. If mag and flag

surveys are identified performed, all anomalies will be investigated to confirm that no MPPEH is present.

SEAD 002-R-01

A total of 10 acres of the EOD #2 and #3 areas were surveyed during the OE EE/CA; however the data may not be able to be used to determine the response threshold. Parsons may perform towed array EM61-MK2 surveys over the entire five-acre area for EOD #2 and five-acre area for EOD #3 to identify anomalies with the designed threshold response as shown on Figures 2-3 and 2-4. Targeted anomalies will be investigated as discussed in Sections 2.5 and 2.6.

SEAD 007-R-01

Ten acres of the Grenade Range were 100 percent surveyed during the OE EE/CA and 15 acres were partially surveyed using meandering path methods. However, a targeted threshold may not be able to be determined based on this data. Parsons may perform towed array EM61-MK2 surveys over the entire 25-acre area to identify targeted anomalies as shown on Figure 2-5. Targeted anomalies will be removed as discussed in Section 2.5.

738300.000 738800.000 739300.000 739800.000

1010500.000 1010000.000 1009500.000 1009000.000 1008500.000 1008000.000

SEAD-57
Berm

Proposed Area of Clearance

997750 748750 Grid Coordinates (New York State Plane, Central)

N W E S

- SEAD 57 Limit of Work
- SRA Excavation to 6 inches
- Area Requiring Verification Survey (10% Survey)
- Area Requiring DGM and Intrusive Investigation
- Existing Woods Transect Areas
- Anomaly to be Investigated

130 65 0 130 260 Feet

PARSONS

MPPEH Removal Plan
SEAD 57

DESIGNED BY: BJM	Print Date: March 31 2006	PROJECT NUMBER: 744538-03300
DRAWN BY: BJM	Aerial photograph: 1989, 2-ft. Resolution	FN: Figure 2-1
CHECKED BY:	FILE: O:Seneca/MR/Parsons/S57	SCALE: 1:2,643
SUBMITTED BY: BJM		

749000 749500 750000 750500

1007500 1007000 1006500 1006000 1005500

EOD Area #3

SEAD-46
BERM

Proposed Area of Clearance

- SEAD 46 Limit of Work
- SRA Excavation to 6 inches (1 acre)
- Area Requiring DGM and Intrusive Investigation (10% Survey)
- Existing Transect Woods
- Anomaly to be Investigated

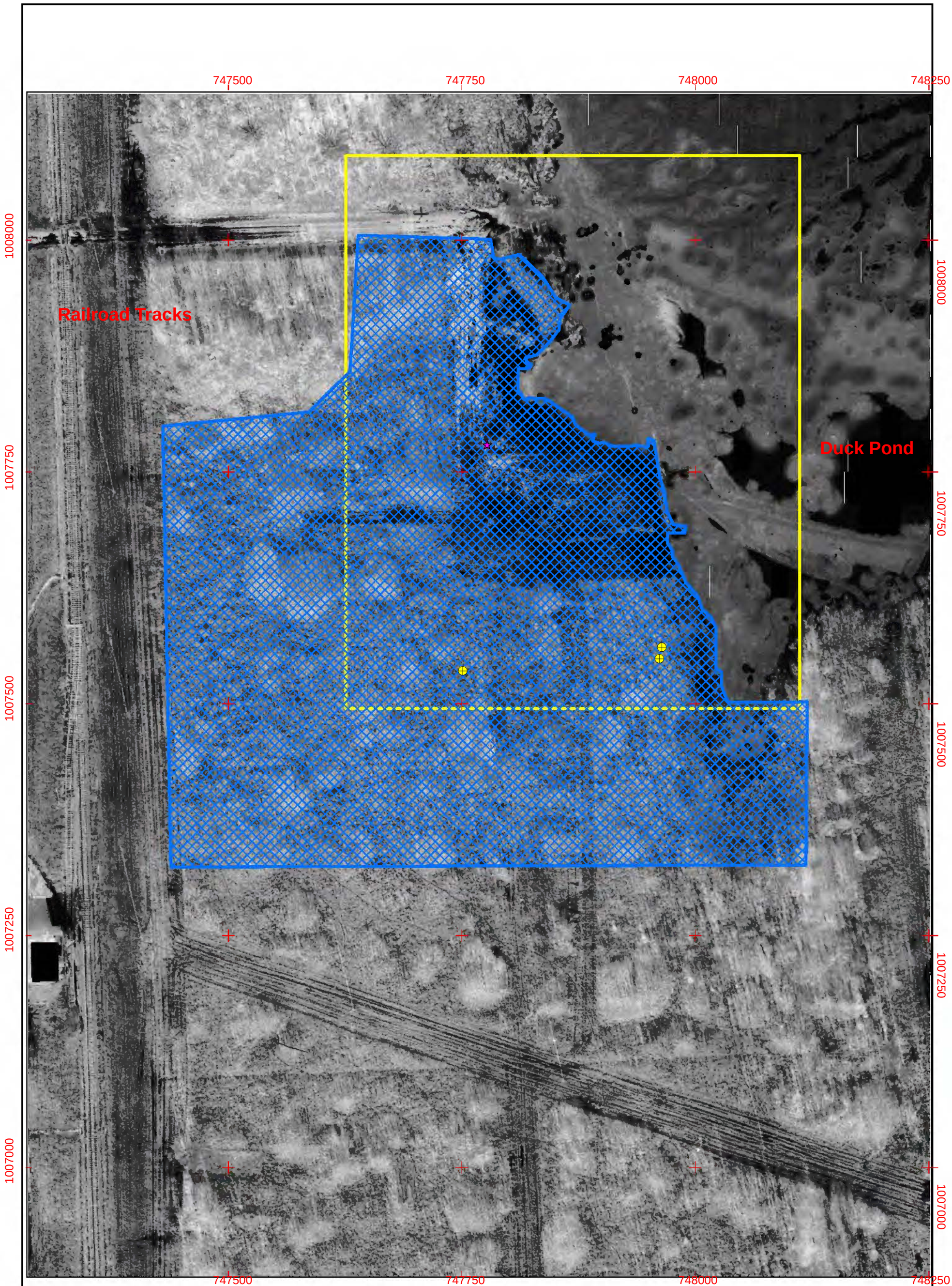
997750 748750 Grid Coordinates (New York State Plane, Central)

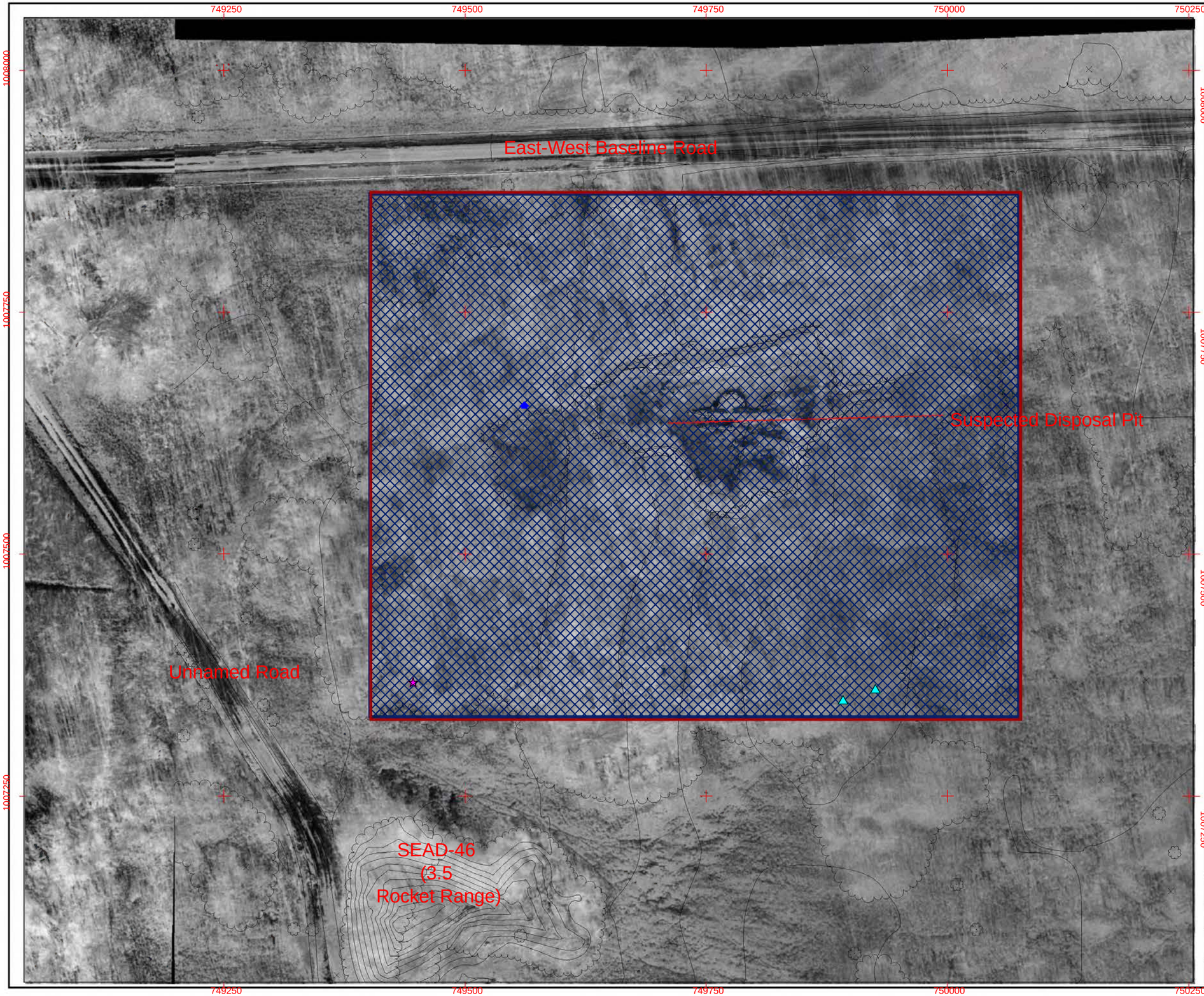
N W E S

100 50 0 100 200 300 Feet

PARSONS

DESIGNED BY: BJM	MPPEH Removal Plan SEAD 46	
DRAWN BY: BJM		
CHECKED BY:	DATE: March 31, 2006	PROJECT NUMBER: 745054-03300
SUBMITTED BY: BJM	AERIAL PHOTOGRAPH: 1989 2ft. Resolution	FN: Figure 2-2
	FILE SEAD_46.APR	SCALE: 1:2,743.17


747500
747750
748000
748250
1008000
1007750
1007500
1007250
1007000
Railroad Tracks
Duck Pond
OE Item Recovered in EOD #2 During EE/CA
Fuze and Booster Recovered in EOD # 2 During EE/CA
Area Requiring Resurvey - (5 Acres)
EOD2 Area Limit of Work
Area Mapped During EE/CA in EOD# 2 Area
997750
748750
Grid Coordinates
(New York State Plane, Central)
90 45 0 90 Feet
N
W
E
S
PARSONS
DESIGNED BY: BJM
DRAWN BY: BJM
CHECKED BY:
SUBMITTED BY: BJM
MPPEH Removal/Survey Area
EOD# 2
SEAD 002-R-01
DATE PRINTED: March 31, 2006
PROJECT NUMBER: 736703-01000
AREIAL PHOTOGRAPH: 1989 2 ft Resolution
FN: Figure 2-3
FILE: EOD2.APR
SCALE: 1:1,003.622



EOD 3 Area

OE Items Recovered During EE/CA

- M2-Fuze lighter
- Rifle grenade - illum. (Expended)
- Slap Flare -(Illumination)

Area Requiring Resurvey - (5 Acres)

997750 / 748750 Grid Coordinates (New York State Plane, Central)

N W E S

80 40 0 80 Feet

PARSONS

DESIGNED BY: BJM	MPPEH Removal Area / Survey Area EOD #3 SEAD 002-R-01	
DRAWN BY: BJM	DATE PRINTED: March 31, 2006	PROJECT NUMBER: 745054-03300
CHECKED BY:	AERIAL PHOTOGRAPH: 1989 2 ft Resolution	FN: Figure 2-4
SUBMITTED BY: BJM	FILE: EOD3.mdx	SCALE: 1:891.9946

736750 737000 737250 737500 737750 738000

1009000 1008750 1008500 1008250 1008000 1007750 1007500 1007250

East-West Baseline Road

Items Recovered in Grenade Range During EE/CA

- M73 (35mm) Subcaliber Pratice Rocket
- M382 (40mm) Pratice Grenade
- OE Item Recovered During EECA

Area Requiring Resurvey - (15 Acres)

Area Requiring Resurvey - Previous Survey Not Complete (10 acres)

997750 748750 Grid Coordinates (New York State Plane, Central)

N W E S

110 55 0 110 220 Feet

PARSONS

DESIGNED BY: BJM	MPPEH Removal Area/Survey Area Grenade Range SEAD 007-R-01	
DRAWN BY: BJM	DATE: March 31, 2006	PROJECT NUMBER: 744538-01100
CHECKED BY:	AERIAL PHOTOGRAPH: 1989 2 ft. Resolution	FN: Figure 2-5
SUBMITTED BY: BJM	FILE: GR_RNG.APR	SCALE: 1:2,100

2.5 REACQUISITION OF ANOMALIES

For towed array surveys, anomalies will be identified through geophysical data analysis. Anomalies will be selected for intrusive investigation based on a designated predetermined response threshold. A dig sheet listing all selected anomalies with their respective local and New York State Plane coordinates will be prepared for each grid surveyed. For mag and flag surveys, geophysical anomalies will be identified in the field during the survey process. Locations of confirmed mag & flag anomalies will be marked with survey pin flags, surveyed for location using GPS or RTS, and recorded on a dig sheet.

The following steps will be performed to re-acquire the location of the selected anomalies:

- A geophysical reacquisition team will use an RTK system RTS or measuring tapes to determine the location of the anomaly from the grid corners. The ground will be marked at the measured location of the suspected anomaly.

- The geophysical reacquisition team will use a Fisher all metal detector, Schonstedt, or EM61-MK2 for reacquiring geophysical anomalies. If the anomaly is found within 1 meter of the painted location, a pin flag will be placed at the actual anomaly location. The signal response, offset distance, and direction from the reacquired location will be noted on the dig sheet.

The required quality control for anomaly reacquisition is provided in Section 3.

2.6 INTRUSIVE INVESTIGATION AND OE CLEARANCE

As discussed previously, designated anomalies will be reacquired and targeted for investigation. Dig sheets are developed as discussed in Section 2.5. Using the dig sheets, the UXO Dig Team will excavate each of the selected target anomalies. Site-specific conditions (e.g., a larger size ordnance item found than was anticipated) may warrant modification of the exclusion zone minimum separation distance (MSD) and removal procedures described herein. As necessary, any changes will be prepared and submitted separately for approval prior to initiation of further activities on-site.

Excavations will be conducted using Schonstedt™ GA52Cx magnetometers or Fisher™ all metal detector to assist the team in determining and refining the location and orientation of the target item. Once and if an item is recovered, the depth, orientation, and the type of item found will be compared against the dig sheet for accuracy. If an item is recovered, the

false positive dig will be indicated on the dig sheets. Any deviation from the dig sheet location will be noted and reported by the dig team to Parsons site manager.

Earth-moving machinery (EMM) may be used to excavate overburden around suspected MPPEH items and will be shielded as discussed in the Explosive Safety Submission (ESS) in Appendix A. EMM will not be used to excavate within 12 inches of a suspected MPPEH item. Once the EMM is within 12 inches of the suspected MPPEH item, the excavation will be completed by hand excavation methods. Personnel who are not UXO qualified may operate EMM only when the EMM has either been sufficiently armored according the established shielding guidelines in the ESS or supervised by a UXO Technician III or a UXO-qualified individual of higher rank than UXO Technician III. If more than one earth-moving machine is to be used onsite, the same minimum separation distances established in the ESS is required for multiple work teams will apply. EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926, subpart P. Excavation operations, whether by hand or EMM, will employ a step down or offset access method. Under no circumstances will any EMM excavation be made directly over suspected MPPEH items.

If the item encountered during an intrusive operation is larger than the established munition with the greatest fragmentation distance (MGFD) for the site, a new Public Access Exclusion Distance (PAED) will be established. If that PAED is outside the base perimeter, than the intrusive operations will be carried out using one of two methods:

1) Miniature open front barricade (MOFB) commonly called a “Bud Lite,” as detailed in and HNC-ED-CS-S-99-1 (Dated March 1999 [Terminology updated March 2000] *Open Front and Enclosed Barricades*), HNC-ED-CS-S-96-8-Revision 1, dated September 1997 (*Guide for Selection and Sitting of Barricades for Selected Unexploded Ordnance*), and HNC-ED-CS-S-98-8, dated November 1988 (Miniature Open Front Barricades).

2) A site person will be off base within the PAED distance and will signal for operations to stop via radio if an individual enters the PAED distance.

The calculations for the PAED and MGFD are provided in the ESS in Appendix A.

2.7 EXCAVATION AND SCREENING ACTIVITIES

There are SRAs within SEADs 46 and 57 where DGM or visual observations have confirmed the presence of anomalies at a density greater than 600 per acre. Since these areas are saturated with ferrous and non-ferrous anomalies, it will be impractical or cost-efficient

to remove individual anomalies as prescribed for the low density areas. This section provides a detailed approach for removal of all MPPEH items in the high density areas.

2.7.1 Surface Sweep

Prior to work beginning in the SRAs, a surface sweep will be performed by the UXO technician to confirm the absence of MPPEH or munitions debris on the surface that could impact mowing and excavation activities at the SRAs. If MPPEH is found, it will be handled and disposed as discussed in Section 5.

2.7.2 Mowing

Following the surface sweeps, the SRAs will be mowed using a wing mower or similar equipment to cut vegetation height to less than six inches. The mowing allows higher visibility of the ground surface during excavation activities.

2.7.3 Exclusion Zone

The exclusion zone for the excavation of SRAs at SEAD 57 will be determined by the MGFD for the area outlined in the ESS presented in Appendix A. For SEAD 57 this item has been established in Section 3 of the ESS as the 37mm MKII projectile with a Net Explosive Weight of 0.0530 lbs. of TNT and an established Public Access Exclusion Distance (PAED) of 980 feet. The separation distance for teams of personnel (related and unrelated) to protect from an unintentional detonation has been determined by the greatest of 200 foot distance. The justification for this separation is outlined in the ESS as being the separation distance for all unrelated personnel for an unintended detonation from an item. This separation distance will be determined by the greatest of 200 feet, or the K50 distance (maximum fragmentation throw distance). The K50 distance for the 37mm has been established in the ESS as 20 feet as determined by the Fragmentation Data Review Form. This established separation distance will allow approved teams of personnel with prior safety training to work within 200 feet of the area being excavated, intrusively investigated, mapped or surveyed.

The MGFD and PAED have also been determined to be applicable for SEAD 46 as discussed in the ESS.

2.7.4 Grading and Staking

The areas identified as SRAs are shown on Figure 2-1 and 2-2. Wooden grade stakes will be installed to mark the boundary of each area. After the areas have been cultivated as

discussed in Section 2.7.5, stakes will be installed on a 100 foot grid system based on the 100x100 foot grid system established in the EE/CA, based on the State Plane Coordinate system. The border of the SRA will have wooden grade stakes placed 10 feet from the border of the SRA with non-metallic pin flags placed at the immediate outside border of the SRA. The wooden perimeter stake will remain in place for the entire duration of the excavation as a reference for the earth moving equipment. The pin flag placed at the border will be used as a guide for the earth moving equipment to establish accurate control of the removal area. Each grade stake installed as part of the grid system will be sequentially numbered with the grid letter and number on the stake. The grade stakes placed within the excavated area will be installed to a vertical accuracy of ± .01 ft using the Trimble 5700 RTK GPS system or similar. Additional grade stakes will be added, as necessary, in areas with varying elevations or interrupted line of site. The grade stake grid will remain in place until the verification of the removed material is performed. A UXO technician will provide clearance support for the survey team installing the grade and perimeter stakes to ensure the area is free of MPPEH and to clear the grade stake location. If a grade stake location is not able to be verified clear by the UXO technician, the grade stake will be moved outside the grid corner and the deviation will be noted on the grade stake and annotated in the survey database. All grade stake locations will be cleared by a Fisher all metal detector or similar instrument.

2.7.5 Soil Excavation

Soil will be excavated from the high density anomaly areas for mechanical screening. A total of 11,900 cy of soil will be excavated from SEAD 46 and 57. 1,000 cy and 500 cy will be excavated from the SEAD 46 and 57 berms, respectively, and the remaining volume will be excavated from the identified SRAs shown on Figure 2-1 and 2-2.

The removal of material in the SRA will be accomplished by qualified equipment operators working in appropriately shielded equipment that meet the shielding requirements established in the ESS. The equipment operators will work under the direct supervision of qualified UXO personnel, in constant radio contact with qualified UXO technicians. All earthmoving and material processing will be monitored for established dust and volatile emission levels set forth in the HSP (Parsons, April 2005).

Berm Excavation

SEAD 57 has a 6 foot high and 30 foot diameter demo berm constructed of soil/shale material. The Army believes that the majority of the munitions debris will be contained in the outer twelve inches of the berm material since it does not appear based on historic photos

that the berm has been reworked or reshaped since its initial construction. Since the MPPEH and munitions debris will most likely be situated in the top twelve inches of the inner berm face and floor, the inside face and floor of the berm will first be removed with a hardened smooth bucket and loaded into the transport truck for stockpiling. Once the top twelve inches of soil has been removed from the inside of the demo berm and floor, the remainder of the berm will be inspected to determine if it appears that munitions debris is present further into the berm. If the remaining berm material does not visually contain munitions debris, the faces and floor will be surveyed to determine if anomalies remain. If anomalies remain, the anomalies will be removed according to the process discussed earlier in this section. Surveying and anomaly removal will be performed as discussed in Sections 2.4 through 2.6. Mass excavation of the remaining berm material will only be conducted if munitions debris appears to extend deep into the berm and removal of individual anomalies appears to not be cost-effective.

The SEAD 46 berm will be handled in a similar manner. A twelve-inch cut will be removed using a smooth bucket excavator on the target face of the berm only. This material will be loaded and transported to the stockpile area. The remainder of the berm will be surveyed for munitions debris along the front face and the back side. Anomalies will be removed as discussed for the SEAD 57 berm.

Saturated Response Area Excavation

A cultivator or similar piece of equipment will be pulled by a shielded loader within each of the SRA removal areas to break up the soil, roots, vegetation and soil clods to facilitate drying and more effective mechanical screening. The use of the cultivator to loosen the material may make multiple passes of the area depending on the moisture content of the material and the amount of vegetative cover.

Once the material from each SRA has been cultivated, the soil will either be excavated using a smooth bucket excavator or windrowed with a shielded grader and picked up by a rubber-tired loader. The soil will be loaded onto shielded tandem trucks for transportation to a cleared stockpile area.

The excavation activity will constantly be monitored by a UXO technician for the presence of MPPEH. If MPPEH is encountered that is explosively configured, it will be removed by hand and taken to a holding magazine for further disposition as detailed in Section 5. If MPPEH is encountered that cannot be removed safely by hand, all excavation operations will be stopped. All personnel will evacuate outside of the MGFD or relocated

behind appropriate blast protection. The MPPEH will be detonated in place by UXO personnel.

The excavated material will be transported to the stockpile area and placed in 500 cy "Jersey Barrier" cells. The stockpile material will be covered with tarps to control dust and runoff.

Once the top 6-inch excavation is completed, DGM will be performed to determine if there are any anomalies exceeding the designated threshold remaining in the former SRAs. The geophysical mapping and anomaly removal techniques are presented in Section 2.4 through 2.6.

2.7.6 Mechanical Screening

Mechanical screening will be performed to reduce the amount of soil that needs to be inspected by the UXO personnel. The mechanical screening process has been developed to pass as much material through a 5/8-inch screen as possible. Once the material passes through a 5/8-inch screen, it will be classified as not containing MPPEH. The 5/8-inch screen was selected based on the 20mm (0.78 inch) MKII projectile which is the smallest MPPEH item encountered during previous investigations for SEADs 46 and 57. Since the smallest dimension of the 20mm is only slightly larger than 3/4-inch, a 5/8-inch screen will be used to provide a factor of safety that no MPPEH greater than 20mm passes that screen.

The soil stockpile and screening operation will be setup in an area that has previously been certified free of dangerous items. The stockpiled material will moved by a shielded rubber-tired loader from the soil stockpile to the screening process in-feed hopper. From the in-feed hopper, the material will make the first pass at the grizzly screen that will remove gross oversize material of 6 inches and greater. This material will be stockpiled below the bar screen for further hand processing by UXO technicians. All material passing through the grizzly will pass through a low speed delumper to further break up the material. This material will be screened by a vibrating 5/8-inch harp screen deck and all material passing this deck will be stockpiled by a stacking conveyor. All material less than 6 inches and greater than 5/8 of an inch will pass to an out-feed conveyor under a cross belt magnet and over a magnetic head pulley to remove the ferrous items. The ferrous items will be deposited into metal storage containers for further processing.

The stockpiled screened streams will be handled as follows:

- Material >6-inch and Material <6-inch and >5/8-inch. These stockpiles will be periodically laid down in 12-inch lifts in a previously cleared area where it will be screened for MPPEH by the UXO technicians using a Fisher or similar all metal detector. Anomalies will be investigated by hand digging and any munitions debris or MPPEH will be removed. The MPPEH material will be removed and placed into the storage bunker for future disposal. Munitions debris will be demilitarized and sent off-site for disposal at a smelter. The remaining soil, once cleared, will be sampled for metals in accordance with the sampling and analysis plan in Section 4. If found to be contaminated, it will be loaded out for off-site disposal. Material that meets the metals requirements will be used as backfill, as necessary.

- Material <5/8-inch. This material will be sampled for metals in accordance with Section 4. At this point, the material that has passed through the 5/8-inch screen will be considered free of MPPEH and available for backfill as determined by the analytical results of the soil sampling efforts.

- Ferrous material in metal containers. This material will be laid down in a previously cleared area in a 6-inch lift where it will be visually inspected for MPPEH and munitions debris by UXO technicians. MPPEH material will be removed and placed into storage in the storage bunker for future disposal as discussed in Section 5. Munitions debris will be demilitarized as required, and along with the scrap will be sent to an off-site smelter for disposal.

Each step of the screening process will be observed by a UXO technician either remotely via CCTV or protected behind an approved protective barrier. If any identifiable MPPEH is observed that is explosively configured, the item will be monitored and removed from its final process area.

Quality Control audits and routine maintenance will be performed on the screening process to verify that the operation is functioning properly. The QC audit will include collecting any identified seed items that are removed from the process line. External checks by the UXOQCS to confirm the screens are being cleaned daily and any holes in the screen are repaired immediately. The screened soils piles will be checked visually to confirm that all MPPEH and munitions debris greater than 5/8-inch are being removed during the screening process. QC and maintenance checks will be performed and documented at the beginning of every day.

2.7.7 Debris Inspection

All material that will not pass through either the 6-inch gross oversize screen, the 5/8-inch screen or has been segregated by the cross belt magnetic removal process will be considered oversize material and be subjected to visual inspection by qualified UXO technicians.

Oversize debris that needs to be inspected will be brought to a previously cleared area by the shielded transport truck and placed on the ground. The material will than be spread out using the shielded excavator in a 6-inch or 12-inch lift over a 100x100 foot area. Oversize material will than be inspected for MPPEH and energetic material using the following three step process.

1. The first step will be a visual inspection of the material after it is spread over the lay down area. This will remove any surficial debris and potential MPPEH uncovered as the material was spread out.

2. A team of qualified UXO technicians will perform a second analog survey of the area using a Fisher all metal detector. The area will be divided into 5 foot lanes and the lane will be swept with the metal detector for any response from the instrument. When an instrument response is confirmed, a non-metallic pin flag will be placed at the location. When the entire lay down area has been swept, the pin flag locations will be investigated. All scrap metal, munitions debris and metal fragments will be collected and brought to a central collection location.

3. A third inspection of material removed by the magnetic separation process and material collected from the lay down inspection will be sorted by qualified UXO technicians. Any MPPEH or energetic materials found will be removed and demilitarized. All remaining scrap metal will be segregated and sent off-site for disposal.

2.7.8 Confirmation Mapping of SRA Areas

Preceding the grade stake removal, digital geophysical mapping will be performed over the entire area within the SRA excavations to identify remaining areas of metallic debris. All remaining and designated targets identified after the geophysical survey will be investigated by the UXO dig teams for potential MPPEH. Any area that remains saturated after the initial excavation will have an additional 6 inches of material removed by the shielded excavator and brought to the soil stockpile to be processed in the sifting operation.

Upon completion of the confirmation mapping and subsequent removal, an additional 10% of the area within the SRA excavation will be remapped to confirm the complete removal of all metallic debris of concern. Upon completion of this final 10% mapping effort and subsequent certification of all anomalies removed from the SRA, the area will be approved as cleared to 4 feet or the depth of detection.

2.8 REPORTING

A Construction Completion Report documenting all fieldwork and construction activities will be prepared and submitted to document the MPPEH removal project. The report will be prepared in accordance with requirements as specified in Data Item Description OE-030.01, Site Specific Final Report. Documentation of any MPPEH materials collected, treated, and/or disposed of will be included in the report. The completion report will be prepared to show that all MPPEH and soil exceeding applicable standards have been removed from all four sites and that no further action is required.

3.0 GEOPHYSICAL INVESTIGATION WORK PLAN

3.1 INTRODUCTION

As part of the work at SEAD 57, 46, 002-R-01 and 007-R-01, Digital Geophysical Mapping (DGM) will be performed to identify subsurface anomalies. The site-specific approach for performing surveys and anomaly reacquisition is provided in Sections 2.4 and 2.5.

3.2 GEOPHYSICAL SURVEY TYPES AND INSTRUMENTATION

Land-based geophysical survey methods will be utilized to identify and remove MPPEH throughout the four areas at Seneca Army Depot. Survey methods will employ Schonstedt GA52Cx magnetometers, Fisher all metal detector, and EM61-MK2 both in pedestrian and towed array configuration. Surveys employing Schonstedt™ GA52Cx magnetometers, Fisher™ all metal detector, EM61-MK2 towed array, and stand alone EM61-MK2 pedestrian system are hereafter referred to as "mag and flag," "towed array," and "pedestrian mode" surveys, respectively. These methods are discussed in this section. A geophysical prove-out will be conducted before data collection begins to ensure that these methods will successfully detect buried ordnance items at their target depth within the former Seneca Army Depot.

3.2.1 Mag and Flag Surveys

Mag and Flag surveys will be conducted in areas where the maneuverability of the EM61-MK2 is limited and for surface clearance. This type of survey requires multiple operators using a Fisher™ all metal detector or Schonstedt™ GA52Cx magnetometers to identify anomalies in the field (the "mag" portion of the survey). Upon identification, the anomaly locations will be marked with survey pin flags (the "flag" portion of the survey). Data from these surveys are not digitally recorded in a data logger, as they will be during surveys employing the EM61-MK2. The locations of these anomalies marked in the field will be indicated on field data forms. The marked locations will either be surveyed using a Robotic Total Station RTS survey system, RTK GPS system for inclusion to the database.

Instrumentation

The Schonstedt™ GA52Cx magnetometer is a hand-held unit that employs two fluxgate sensors aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal. The Schonstedt™ GA52Cx magnetometer responds with an audio output and a meter deflection when either sensor is exposed to a disturbance of the earth's ambient field associated with a ferrous metal target and/or the presence of a permanent field associated with a ferrous metal target. (In most cases, it will be a combination of both circumstances.) Schonstedt™ GA52Cx magnetometers, which are

highly portable, will also be used during UXO avoidance activities reacquisition and intrusive operations.

The Fisher™ all metal detector works on the principle of electromagnetic induction. In an electromagnetic metal detector, an electromagnetic field is generated in the coil of the metal detector. This magnetic field is created around the coil and into the ground. As the coil and induced field pass over a metal object in the ground, the generated magnetic field generates electrical currents in the metal object called eddy currents. This weak electrical field in turn generates the opposite field on the receiver coil in the metal detector. As the electromagnetic field in the metal detector is switched off, the weak magnetic field that has been created by the eddy currents around the metal item is induced on the detector coil. This generates a signal in the receiver coil and in turn creates an audible tone in the metal detector electronics.

Data Acquisition

Mag and flag survey operations will be performed by UXO technicians or sweep personnel. The area that cannot be mapped with either the towed array or pedestrian mode EM61-MK2 will be gridded off and divided into 5 foot lanes. The mag and flag survey will be initiated by establishing a linear array of operators each in a lane along the southern boundary of a survey grid. The first member in the array will be positioned at the southwest corner of the grid. The remaining members will be spaced to the east one in each lane at 5-foot intervals. Using Schonstedt GA52Cx magnetometers or Fisher all metal detectors, each member of the array will proceed in a straight line toward the northern boundary of the survey grid. Each operator surveys a 5-foot wide path with the chosen detector. The team's leader (a qualified UXO technician) follows the effort to ensure that the 5-foot spacing is maintained and to verify identified anomalies. Locations of confirmed anomalies are marked in the field with survey pin flags and recorded on a field form.

Upon reaching the northern boundary of the survey grid, the linear array of magnetometer operators repositions to the east and repeats the process back towards the southern boundary of the survey grid. This process repeats until the entire grid is surveyed. All anomalies identified in the mag and flag survey will have the northing and easting location surveyed for entry to the database. From the database dig sheets will be generated for the locations flagged to aid with the intrusive investigation.

3.2.2 EM61-MK2 Surveys

A towed array system will be used on all open areas previously un-surveyed. These areas are identified on Figures 2-1 through 2-5. The towed array system will consist of three EM61-MK2's attached to a platform constructed of structural fiberglass and other non-metallic pieces. It will be towed behind a small four- or six-wheel all-terrain vehicle (ATV)

such as a John Deere Gator. The geophysical array location will be positioned using a GPS system with RTK accuracy, such as the Trimble 5700 or equivalent.

The EM61-MK2 operated in "Pedestrian Mode" will be used in areas inaccessible to the towed array such as the woods transects or the smaller areas the towed array cannot cover. The EM61-MK2 system operated in pedestrian mode will be positioned using the Trimble™ 5700 RTK GPS or 5600 Robotic Total Station RTS. This system will use a single EM-61 MKII coil pulled manually by the operator. This setup will deliver positional information to the EM61-MK2 data logger from the GPS receiver. The positional Data will be time stamped by the EM61-MK2 Data logger and logged in the internal memory of the Data logger. This data will than be transferred to a laptop computer for processing.

If GPS coverage is not sufficient in the woods areas the Em61 MKII survey will use fiducial positioning methods. In this method a survey stake will be placed every 50 feet along the transect using Total Station.

Data Acquisition

The data for the EM61-MK2s Towed Array and the Trimble system will be recorded on a laptop computer located on the tow vehicle via RS-232 ports. The data will be recorded using the Geometrics Maglog software. This program will record all four data streams (3 EM61s and a GPS system) on hard disk, time-stamping them with the computer time. This common time stamp will ensure that all data are tied to a single consistent set of times and will remove the need for synchronization between the EM61-MK2 data logger clocks and the GPS clocks as well as eliminating the effects of clock drift between the various instruments.

Maglog software will graphically display the data on the laptop screen to provide the operator with visual feedback regarding the instrument operation. Visual and audible warnings can be configured for the software so that the geophysical equipment operator is immediately aware if any of the elements of the towed array or survey instrumentation are not functioning optimally.

Maglog records the data in the raw form that it receives from the serial port on the laptop hard disk in a separate file for each data stream (three EM61-MK2 files and one RTK GPS file). After the completion of each day (or more often as needed), the data will be transferred to the data processing computer. A single day's worth of data is expected to be on the order of several hundred megabytes.

Subsequently, the GPS data will be filtered using Parsons proprietary software to remove GPS data that does not meet required positional quality tests. The filtering will be based on the positional type of each point (i.e. RTK, differential GPS, uncorrected), position dilution

of precision (PDOP), and apparent velocity between points. Points that are within a specified radius from each other will be discarded.

After filtering, the complete data set is imported into Geometrics Magmapper software. This software merges the EM61-MK2 data and the GPS data to position the geophysical data. The user inputs the offset from the center of the GPS antenna to the centers of each of the three coils to position the data recorded from each of the coils. Magmapper positions the data using these offsets and the computed bearing of the GPS data. The data is then exported in Geosoft in ASCII.XYZ format. The exported data will include positional information in latitude-longitude format, the data from each of the four channels for each coil, battery voltage, other equipment status information, and the time stamp derived from the laptop.

This data will then be imported into the Geosoft Oasis montaj™ geophysical data processing environment using a custom script. The script will automate the process for importing the data, converting the positions to North American Datum 1983 New York Central State Plane coordinates and automatically leveling the data using the UX-Detect drift correction algorithm. In addition, a sum or weighted average of the four channels is calculated for use in later processing.

The geophysical processor then evaluates the results of the latency test performed prior to data collection to determine the instrument latency correction necessary for the data set. This corrects for delays that occur in the electronics of the EM61-MK2s and in the processing of the data on the data recording computer. The latency correction is computed on a sensor-by-sensor basis by determining the latency value that overlaps the anomaly due to the latency test item when the array travels over the anomaly in different directions. Typically this value is between 0.2 and 0.4 seconds.

Once this value is determined, it is applied to the whole data set, and the sum or average channel is gridded and displayed. The display is evaluated against the information in the field notes to determine if they are consistent and whether or not the data meets expected data quality standards.

The geophysical data processor will then automatically make anomaly selections on the data using the Geosoft UX-Detect Blakely algorithm. Using a proprietary GX written by Parsons, these anomaly selections will then be evaluated to determine if the response from all four channels decays in a manner consistent with an anomaly due to a buried metallic object. If not, the anomaly will not be intrusively investigated. This evaluation has proven useful in decreasing anomaly selections of noisy data and peaks that result from gridding artifacts that can arise from closely spaced lines. The remaining anomaly selections will then be merged so that closely spaced anomaly selections will be consolidated to single pick. The anomaly selections and the data will then be evaluated by the geophysical data processor to ensure that

the remaining anomaly selections are valid. Anomaly selections around surface features identified in the field notes will be removed. The processor can also add or delete any other anomaly selections that the processor feels necessary.

Data Analysis and Interpretation

Once the data is collected, it will be uploaded to a processing PC and processed. The basic processing steps are summarized below:

1. Upload data from data loggers/laptops to processing computer;
2. Filter GPS data using Parsons proprietary software;
3. Import towed-array data into Geometrics Maglog or hand-pulled EM61-MK2 data into DAT61W;
4. Input and edit sensor geometry;
5. Export data in ASCII XYZ data format;
6. Import into Geosoft Oasis montaj™;
7. Correct for instrument latency, drift, and heading
8. Grid and display data;
9. Select anomalies; and
10. Generate dig sheet for reacquisition.

Data Evaluation

The anomaly selections obtained for each the EM61-MK2, and towed array will be analyzed by comparing them to the known targets using the routines available in the Geosoft DOD quality assurance (QA) package. For each method, several criteria will be used to demonstrate the effectiveness of the method. The criteria will include:

- Percentage of items detected,
- Percentage of false positives,
- Average distance between the anomaly selection location and actual target location, and
- Optimal threshold level for each method that results in the maximum number of buried targets detected and minimizes the number of false positives. Based on the results of the current and previously conducted prove-outs, it is expected that threshold values 1.5 mV for pedestrian EM61-MK2 surveys and 5 mV for towed array EM61 surveys will be used.

- The threshold value for each removal area will be established based on the results of the geophysical prove-out. Additional items if needed will be placed in the prove-out grid at the anticipated depth of detection. The prove-out grid will have DGM performed and the response value for the anticipated item and depth of detection will be used to establish the threshold value for that removal area.

In addition secondary Data Quality Objectives (DQOs) will be developed from the prove-out data. DQOs will be developed for the following items:

- Instrument Latency,
- Processing,
- Sampling Density,
- Anomaly Selection,
- Navigation,
- Background noise, and
- Tow vehicle speed.

Instrument Standardization

At the beginning of each day, the operator will let the instruments warm up, check the sensor positions, and check all connections including a cable shake test, perform a six line test and static test.

The six-line test will be conducted to evaluate the repeatability and positional accuracy of the response amplitude of a ferrous object. The EM61-MK2 will be hand pulled between two wooden stakes placed 100 feet apart, with a marker at 50 feet. The test object will be placed at 50 feet. The operator will walk between the stakes six times and mark a fiducial at 50 feet. The first time will be with no spike object present; the operator will walk slowly the fifth time and the quickly sixth.

The six-line test will be repeated using the towed array to evaluate the repeatability and positional accuracy of the response amplitude of a ferrous object. The test object will be placed at a known location (i.e., SW corner of the prove-out grid). The towed array will be driven over the test object six times. The first time will be with no spike object present; the operator will drive slowly the fifth time and quickly the sixth. This will allow a latency correction to be determined for the towed array. A six-line test will also be conducted with the EM61-MK2 towed array over three test items arranged diagonally so that each item will be directly under the center of each of the coils when the system is driven over the items in orthogonal directions.

At the beginning and end of each day, each instrument will complete a static test. This test is done by parking the towed array or hand pulled EM61-MK2 and collecting background data for three minutes. Subsequently a metallic object will be placed within the center of each sensor and data recorded for one minute. This procedure is repeated until data has been collected with the spike object located in each of the three sensors.

A latency test will also be conducted at least twice a day by driving the array over three buried objects. The objects are arranged in a diagonal line so that when the array is driven over them in orthogonal directions, each object will pass directly underneath only a single sensor. This will allow determination of the latency value for each sensor individually. The location of these objects will be surveyed in so that the absolute positioning system can be verified by comparing the final locations of the anomalies with the known locations of the buried objects. It is expected that the anomaly peaks will be located within 1-foot of the actual buried object location.

Before the geophysical data collection can begin at the mapping area, every instrument will collect data over the prove-out grid. The towed array will acquire data over the prove-out grid, with the results compared with the hand-pulled system to verify the operation of the towed array system. The six-line test will be conducted to evaluate different equipment parameters and will only need to be done once with one EM61-MK2 instrument.

3.3 GEOPHYSICAL PROVE-OUT

The geophysical prove-out for the Munitions Response Removal Action will demonstrate the capabilities of the geophysical equipment and personnel to be employed during this phase of the work. The geophysical methodologies employed for this project have been selected based on Parsons' previous experience with geophysical mapping at the site. The Geophysical prove-out will demonstrate and document the ability to detect buried items of known depth and orientation. The results from the prove-out will be used to establish the lower threshold for the depth of detection for the anticipated items in the survey area. To perform the prove-out digital geophysical data will be collected over one of the three the existing prove-out grids that have been established at the former army depot. These prove-out plots have been used previously during the EE/CA and Time Sensitive Geophysical Investigation (Parsons). The prove-out grids contain a number of buried stimulant objects of a variety of sizes and orientations that reflect the expected items to be encountered at the areas covered under this task order. The data collected over the prove-out grid will be compared to previous data collection efforts to compare equipment response and positional accuracy of the anomaly picks. The prove-out data will also be used to set a lower threshold limit for noise and depth of detection within the geophysical data set. The prove-out grid will act as a standardized location to test equipment and operators.

3.3.1 Seed Items

As part of the proposal process for the Time Sensitive Geophysical Investigation project, Parsons was required to demonstrate the ability to use an EM61 towed array for the detection of buried ordnance items. The Q (East) area prove-out grid, the South prove-out grid and the West grid exist at the site with known seed items already in place. The Q area prove-out grid had been used previously by Parsons as part of the OE EE/CA conducted at the site in 2000. The grid contained several items that were buried by Parsons and additional items buried by the USACOE. The locations of these items were known to Parsons, and these data were used to evaluate the positioning and noise level produced by the array. The original locations, determined during the January, 2000 OE EE/CA Geophysical Prove-Out (Report on Geophysical Equipment Test Prove-Out, Parsons, June, 2000),

The South and West prove-out grids contained items that had been previously buried by the Weston Solutions under supervision of USACOE. Parsons had no knowledge of the location or nature of the items buried in the West and South prove-out grids

3.3.2 Site Preparation

The existing "East" test plot was used in 2000 during the EE/CA and during the Time Sensitive geophysical Investigation and in 2004 for the Geophysical Investigation of the OD Grounds. Therefore, minimal site preparation is required. The ground surface is typical of Seneca Army Depot site: relatively flat with tall grasses and low brush and some low lying wet areas in the West test plot. The site has been surface swept by qualified UXO technicians so that no escorts will be required during geophysical data acquisition at the prove-out.

3.3.3 Test Plot Design

The "East" prove-out grid is a pre-existing prove-out grid located in the "Q" area established by Parsons and USACE as part of the EE/CA in 1999, the "West" and "South" prove-out grids were established as part of the Time Sensitive geophysical investigation. One or a combination of these grids will be used during the prove-out for the Munitions Response Removal Action. These grids are in an area that has been cleared of MPPEH; therefore, UXO avoidance personnel will not be required for geophysical data acquisition operations in these areas.

3.3.4 Prove-Out Grid Location Surveying

The buried items in the West and South prove-out grid have been previously surveyed in using RTK GPS with sub-centimeter accuracy. The location of anomalies chosen in the prove-out grid data will be compared to the actual locations of the stimulant items when they

were buried. By comparing the actual location surveyed during the construction of the prove-out grid to the location picked in the geophysical data set the effectiveness of data collection can be determined. Both the location positional accuracy and response of the instrument (repeatability) can be checked by surveying the prove-out grid. This is an effective way to check the operator technique and the performance of the instrument.

3.3.5 Corrections to Positioning on the Prove-Out Grid

The grids for each prove-out area were displayed on a map along with the track maps showing the position of each sensor. Maps with the grids displayed are shown in Figures 3-1 through 3-3 for the East, West, and South prove-out grids respectively. The known locations for the items buried in the East prove-out grid are also shown in Figure 3-1. These locations have been corrected based on the corner locations obtained by Weston during the prove-out. The original locations, determined during the January, 2000 OE EE/CA Geophysical Prove-out (Report on Geophysical Equipment Test Prove-Out, Parsons, June, 2000), were obtained by pulling tapes from corner locations surveyed in using a Trimble ProXRS with sub-meter accuracy. The locations plotted on Figure 3-1 were calculated using the more accurate corner locations. Because the original corner distances for the COE buried items were not available, an approximate shift in position was obtained using the difference between the original and improved corner locations.

3.3.6 GPO Letter and Report

The results of this analysis will be summarized in a letter report and provided to the AFCEE and USACOE-COR within one week of completion of the data acquisition over the prove-out grid. The geophysical letter report will include the following items:

- Map showing as-built design of the prove-out plot,
- Pictures of new seed items,
- Color contour maps of the geophysical data collected during the prove-out,
- Summary of the GPO results, as discussed in section
- Any modifications to the proposed geophysical data acquisition
- Supporting information for any proposed changes.

During the geophysical prove-out, the data collected will be used in the development of the secondary DQOs. The project objectives will be established and a review that secondary DQOs are sufficient for assuring data quality will be required prior to the beginning of geophysical mapping for the remedial action. If additional teams and equipment are brought to the site, they will be required to meet the same criteria as the original teams.

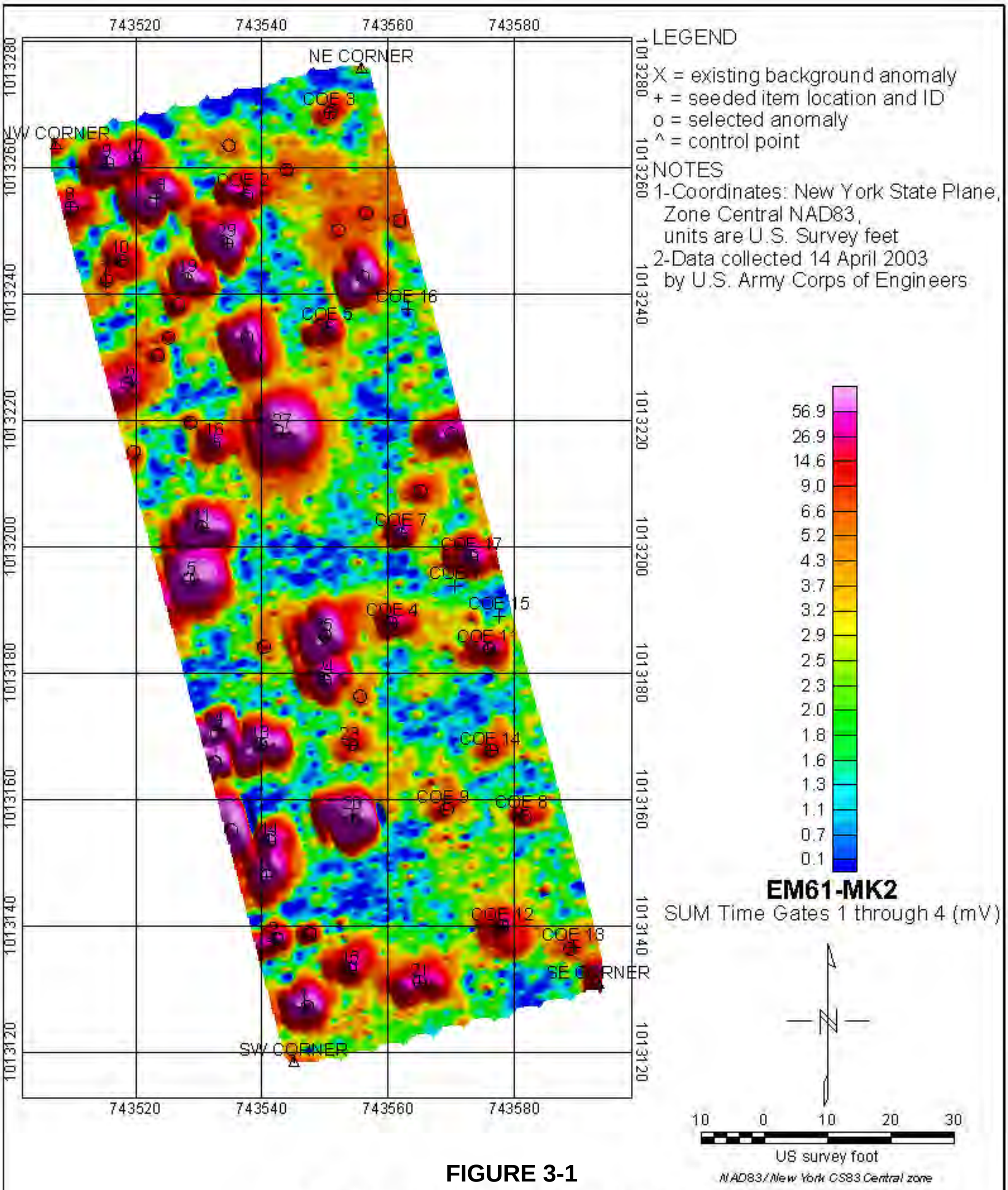


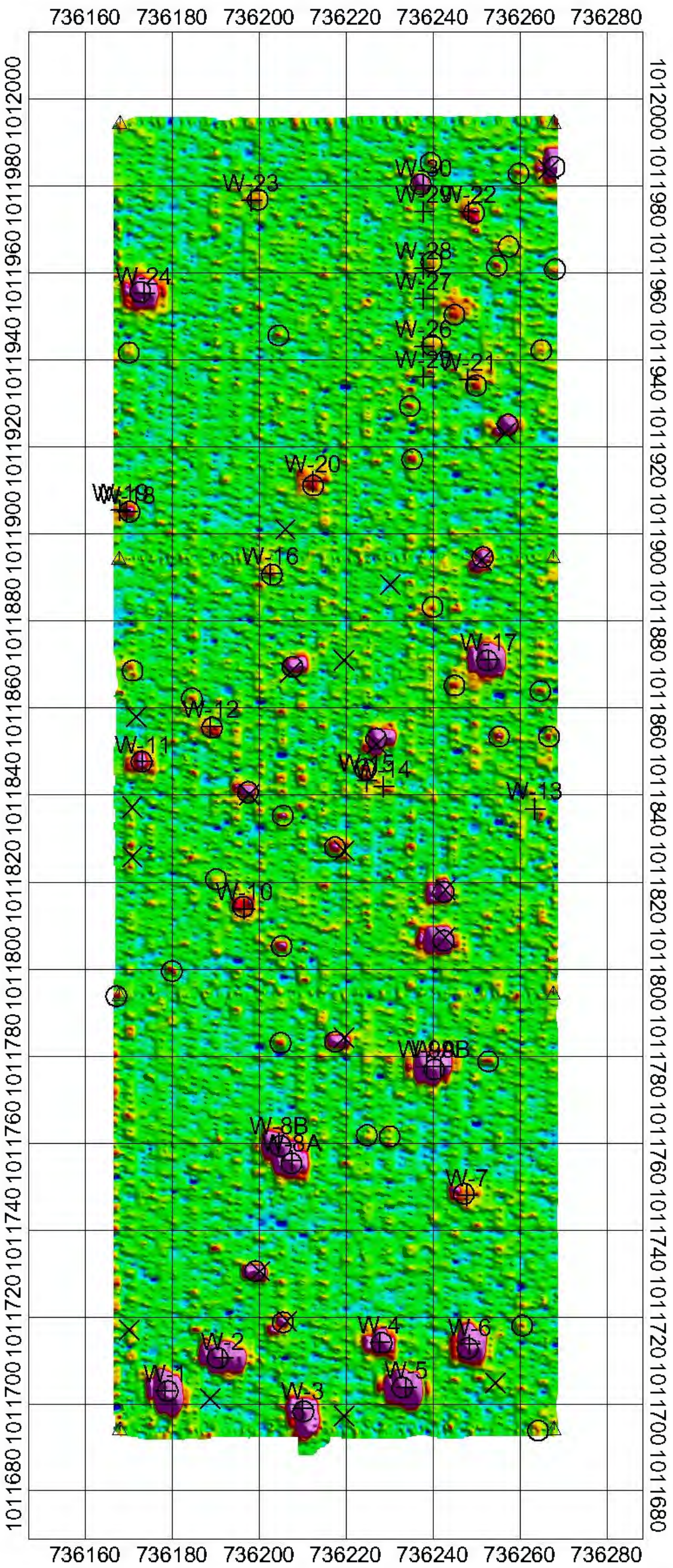
FIGURE 3-1

U.S. ARMY CORPS OF ENGINEERS

SENECA ARMY DEPOT ACTIVITY

EM61-MK2 SEEDED SURVEY-EAST PROVE OUT GRID

DRAFT DATA
CLOSE-HOLD INFORMATION
Do not release without prior consent of U.S. Army Corps of Engineers



LEGEND

X = existing background anomaly
\+ = seeded item location and ID
o = selected anomaly

^ = control point

NOTES
1-Coordinates: New York State Plane, Zone Central NAD83, units are U.S. Survey feet
2-Data collected 14 April 2003 by U.S. Army Corps of Engineers

14.1
13.3
12.4
11.5
10.6
9.8
8.9
8.0
7.2
6.3
5.4
4.5
3.7
2.8
1.9
1.1
0.2
-0.7
-1.6

EM61-MK2
SUM Time Gates 1 through 4 (mV)

25 0 25 50
US survey foot
NAD83 / New York CS83 Central zone

FIGURE 3-2

U.S. ARMY CORPS OF ENGINEERS

SENECA ARMY DEPOT ACTIVITY

EM61-MK2 SEEDED SURVEY-WEST PROVE OUT GRID

DRAFT DATA
CLOSE-HOLD INFORMATION

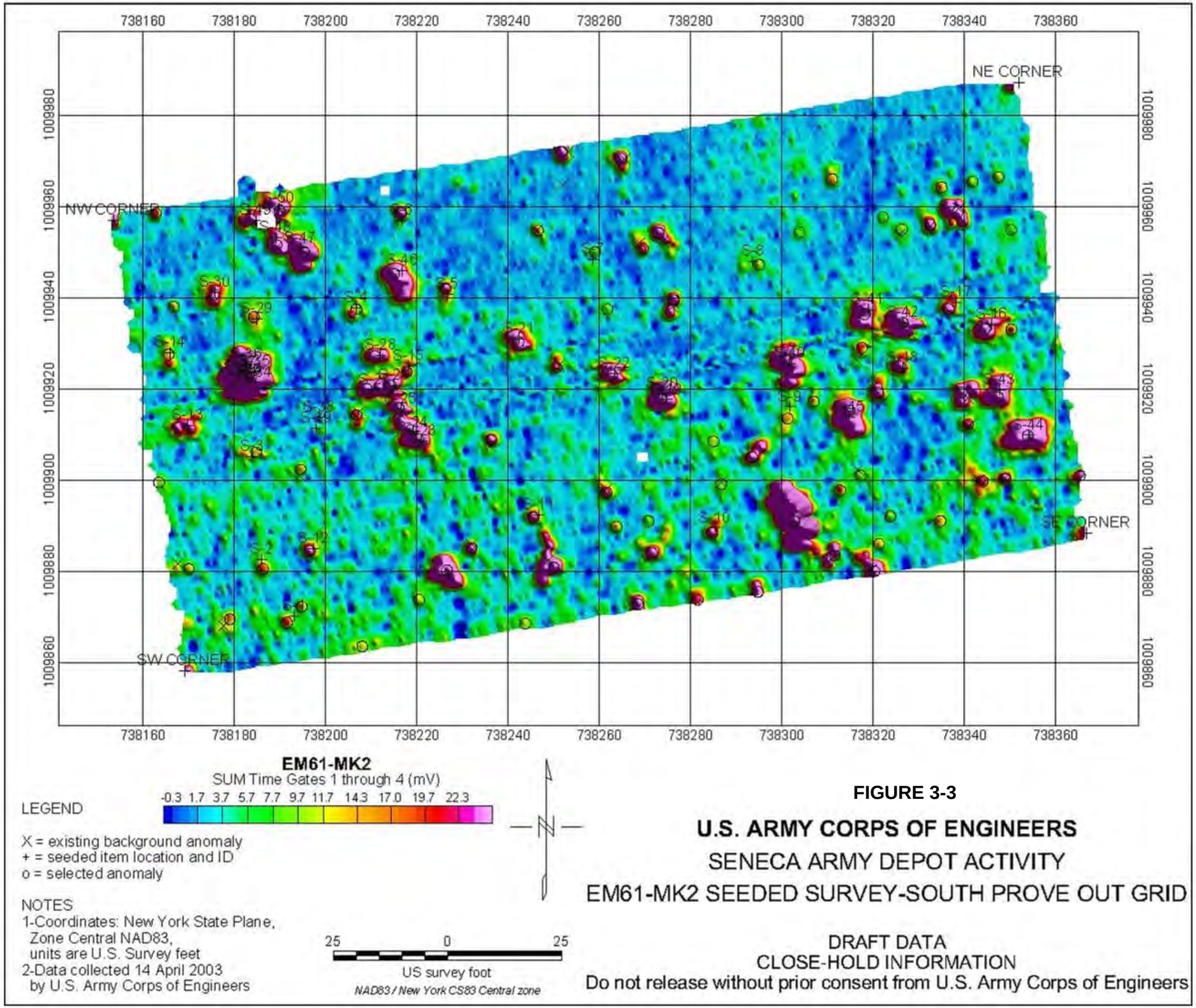

738160
738180
738200
738220
738240
738260
738280
738300
738320
738340
738360
1009980
1009960
1009940
1009920
1009900
1009880
1009860
NW CORNER
NE CORNER
SW CORNER
SE CORNER
EM61-MK2
SUM Time Gates 1 through 4 (mV)
-0.3 1.7 3.7 5.7 7.7 9.7 11.7 14.3 17.0 19.7 22.3
LEGEND
X = existing background anomaly
+ = seeded item location and ID
o = selected anomaly
NOTES
1-Coordinates: New York State Plane, Zone Central NAD83, units are U.S. Survey feet
2-Data collected 14 April 2003 by U.S. Army Corps of Engineers
25 0 25
US survey foot
NAD83 / New York CS83 Central zone
FIGURE 3-3
U.S. ARMY CORPS OF ENGINEERS
SENECA ARMY DEPOT ACTIVITY
EM61-MK2 SEEDED SURVEY-SOUTH PROVE OUT GRID
DRAFT DATA
CLOSE-HOLD INFORMATION
Do not release without prior consent from U.S. Army Corps of Engineers

TABLE 3.1

DETECTION ANALYSIS EAST AREA PROVE-OUT GRID

Item ID	Item	depth (in)	Target Northing (NAD83)	Target Easting (NAD 83)	Target ID	Pick Northing	Pick Easting	Instrument Response (mV)	Pick-Target Distance (ft)
1	3.5" warhead	15	1013127.08	743546.30	54	1013127.00	743546.50	42.41	0.22
21	3.5" motor	23	1013131.19	743565.09	52	1013131.00	743564.50	8.80	0.62
15	flare	12	1013134.27	743553.77	51	1013134.00	743554.50	10.73	0.78
2	fuze	12	1013137.85	743540.14	48	1013137.50	743540.50	8.94	0.50
3	75mm	31	1013148.89	743541.68	46	1013149.50	743540.50	28.63	1.33
14	MKII grenade	13	1013153.62	743541.56	45	1013153.00	743542.50	24.48	1.13
20	3.5" rocket	30	1013157.00	743553.84	42	1013157.50	743554.00	139.31	0.52
13	3.5" rocket	9	1013168.73	743540.90	37	1013168.50	743542.50	38.30	1.62
23	fuze	23	1013168.52	743555.31	38	1013168.00	743555.00	2.32	0.61
4	3.5" motor	11	1013170.11	743531.94	35	1013170.00	743533.00	77.19	1.07
24	flare	15	1013179.23	743550.07	34	1013178.50	743549.00	19.89	1.30
25	75mm	35	1013186.09	743550.60	31	1013184.50	743550.00	65.99	1.70
5	155mm	38	1013194.83	743530.18	29	1013194.50	743530.00	132.37	0.38
11	75mm	18	1013202.72	743531.19	27	1013202.00	743530.50	40.58	1.00
16	MKII grenade	20	1013215.78	743531.71	24	1013216.00	743532.50	13.20	0.82
27	155mm	21	1013218.15	743543.66	22	1013218.00	743544.00	136.60	0.37
6	3.5" warhead	21	1013226.00	743519.33	21	1013225.00	743518.50	9.60	1.30
28	3.5" motor	18	1013230.63	743538.29	17	1013232.50	743538.50	29.10	1.88
7	3.5" warhead	45	1013239.37	743513.46	N/A	N/A	N/A	N/A	ND
19	MKII grenade	10	1013241.34	743529.13	15	1013241.00	743528.50	52.58	0.72
10	3.5" warhead	32	1013245.38	743517.82	13	1013244.00	743516.50	5.01	1.91
29	75mm	18	1013248.23	743534.73	12	1013247.50	743534.00	56.45	1.03
8	slap flare	20	1013253.80	743509.90	10	1013253.50	743510.50	9.12	0.67
18	3.5" motor	10	1013255.04	743523.57	9	1013255.00	743525.50	46.24	1.93
9	fuze	7	1013260.46	743515.62	5	1013259.50	743515.00	16.66	1.14
17	75mm	32	1013261.41	743519.91	4	1013261.00	743520.00	10.94	0.42
								Average pick-target distance:	**1.00**

3.4 QUALITY CONTROL

The geophysical survey data quality checks will be conducted daily after the initial equipment startup. In addition, the daily tests will be conducted before and after the acquisition of the geophysical data as a demonstration of equipment functionality.

3.4.1 Data Quality Objectives

Geophysical data associated with potential anomalies will be reviewed at several stages. The first quality check will be during data collection. The field crews will check the data logger to ensure that data is being collected and will examine the data during data logger "dumps" when the information is downloaded to the hard drive of a portable computer. A second quality check will be performed when the data is evaluated. If the coordinates of the data do not fall within those of the area investigated, Parsons will become aware of this when loading the data for evaluation. A final quality check will occur during the intrusive investigation, when the findings are compared against the interpretation of the geophysical data. The data will also be evaluated against the secondary DQO's developed during the prove-out and any discrepancies noted. Efforts will be made to automate the checking of the DQOs within Geosoft. If the discrepancies can't be addressed by fixing equipment or procedures in the field than a root cause analysis of the discrepancy will be generated and submitted to USACE-COR representatives.

3.4.2 Additional Seed Items

Existing items buried in the prove-out grid provide a variety of different targets, as shown in Table 3.2. The smallest item of interest identified by the EE/CA study conducted at the site is a grenade fuse. At present, there are no 40-mm shells or simulants within the prove-out grid. Prior to the geophysical acquisition over the prove-out grid, 40-mm simulants will be buried. The items will be buried at a depth of 12 in. (the maximum estimated detection depth of 1 foot) in three different orientations: vertical, horizontal oriented east-west, and horizontal oriented north-south. The locations of the items will be surveyed using an RTK GPS system, and their locations will be added to the database.

3.4.3 MPPEH Detection

The objective of the geophysical investigation is to accurately locate and record the locations of geophysical anomalies (potential MPPEH). The geophysical investigation areas and identified anomalies will be mapped for subsequent evaluation (including intrusive investigations of anomalies where geophysical signal strength and amplitude suggest the potential of UXO/MPPEH). The accuracy goal for 95 percent of reacquired geophysical anomaly locations is within a 2 foot radius and 4 foot depth of their locations indicated on the

dig sheet. Horizontally, 95 percent of all excavated items will be within a 35-cm radius of the reacquired location.

3.4.4 False Positives

A false positive results when an anomaly is detected at a given location, posted on an anomaly dig sheet, and no basis for the anomaly is found upon excavation. Items larger than 40-mm in diameter will likely have false positive rates well below the 15 percent, typically less than 5 percent. However, items smaller than 40-mm in diameter and buried in near-horizontal orientations may have higher false positive rates. This occurs because such items do not induce large responses and are sometimes "hidden" in background noise recorded by the geophysical instruments. Attempting to identify such items in the geophysical data would likely result in an increase in the number of false positives among those anomalies that are identified from low-amplitude responses. For such low-amplitude anomalies, the false positive rate may exceed 15 percent.

3.4.5 False Negatives

A false negative is defined for this project as a location where a buried metallic item lies within the detection capability of the geophysical survey instrument but whose location was not selected for intrusive investigation. False negatives can be the result of instrument failure, operator error, or data processing error. The performance goal with respect to false negatives is to have zero occurrences over the course of the project.

3.4.6 Geophysical Survey QC

Quality control is an appropriate evaluation, performed by Parsons of contractually defined products, to assure those products fully meet the prescribed requirements and comply with applicable laws, regulations, and sound technical practices.

During geophysical data acquisition, 5% of the surveyed area will be repeated using a similar instrument. This will be done by the geophysical team during the initial acquisition. The data will be processed and compared to the original data. Any discrepancies between the two data sets will be investigated. If the cause of the discrepancy was instrument failure or improper operating procedures, the survey area will be resurveyed.

During the intrusive investigation, the QC team, in consultation with the geophysicist, will select additional anomalies from the geophysical data for excavation. An additional 5 percent more anomalies will be selected. The additional selected anomalies will be those that produced a reading below the threshold limit value selected for that area and that were not selected for excavation by the UXO Team. This will be used to QC the selection process.

The threshold limit value is the value assigned to targeted ordnance at a specific depth as derived from data collected at the test grid.

QC of the field data will be performed by Parsons before it is delivered to USACE-COR and will include checks and reviews of the digital data deliverable. Specific checks will include data completeness, quality, and format checks. Parsons will sign off that the data have been QCed by Parsons personnel. Data that have not undergone quality control checks shall not be delivered to the government unless by mutual agreement. If at any point during this process the data are found to be deficient, Parsons will take corrective action regarding the data in question.

After the intrusive results have been entered into the database the results will be reviewed by a geophysicist to determine if the items found correspond to the mapped anomaly. If the item found is interpreted to be too small to have resulted in the mapped anomaly, the anomaly will be flagged for reacquisition and further intrusive investigation. Each no-contact anomaly will be reviewed to determine possible causes and for possible further investigation. The information gathered from these reviews will be used to determine if the threshold limit value and the picking analysis can be refined to reduce the percentage of no-contacts or small metallic items that are dug.

3.4.7 Analog Instrument QC Surveys

An additional 10 percent QC survey will be performed after the intrusive investigation, using the Fisher All Metal detector or Schonstedt GA52Cx. The discovery of any UXO or UXO-like item (similar in size and mass to a 40 mm projectile at a depth of 12 inches or less) will constitute a failure of the grid being investigated. If a failure occurs, the root cause will be evaluated and corrective action will be taken.

3.4.8 Geophysical QC Checks

Geophysical QC checks will be performed during and after geophysical operations have been completed. The methodology for performing the QC survey is as follows:

- Verify that QC tests have met the acceptance criteria.
- Perform audits of the data collection and processing procedures by the project geophysicist.
- Use seed items in the survey area to verify geophysical coverage, detection capability and positional accuracy.
- Evaluate the excavation results to verify that the excavated material correlates with the size and amplitude of the corresponding geophysical anomaly.

3.4.9 Geophysical Survey QA

QA is an appropriate management review by USACE-COR of the overall effectiveness of the QC program, processes, and compliance of Parsons. The QA procedures are the process by which Parsons fulfills its responsibility to be certain that QC is functioning and that the desired specific product (job result) is realized. The QA failure criteria for grids will be the same as QC criteria.

Geophysical Survey QA will be performed by placing Stimulant seed items in the survey area at the anticipated depth of detection. The seed items will be brightly painted stimulant items placed by at known locations to check the removal and detection procedure. The seed items will be buried at a frequency of 1% of the anticipated anomalies to be investigated. The locations of the buried items will be surveyed in using the GPS at the time of burial and a table will be made of the seed item locations. As part of the geophysical data processing the chosen anomaly target locations will be compared to the Northing and Easting location of the seed items. The detection of a known item location will be compared to the known (surveyed) location of the seed item. This process will allow a running QA check of the geophysical data location accuracy and target response threshold. The failure to identify a seed item will result in a resurvey of the geophysical data set and a root cause analysis to be performed.

3.4.10 Equipment Maintenance and Performance Tests

Measurement equipment utilized on-site, i.e., Schondstat magnetometers, Fisher all metal detectors, geophysical mapping equipment, etc., are checked for operational reliability. As much as possible, equipment used at the former Seneca Army Depot is dedicated solely to the project until it is completed. At times, equipment rental will be necessary to meet demand. The UXOQCS is specifically responsible for inspecting the equipment and its maintenance records. Records of these checks are maintained in the UXO supervisor's journals. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment is tagged and removed from service. Parsons' PM is notified and a request for replacement equipment is placed immediately. Replacement equipment must meet the same specifications for accuracy and precision as the equipment removed from service.

Parsons has reviewed the equipment requirements of this task and identified the following equipment as requiring daily maintenance or tests: geophysical survey instruments (e.g., Fisher metal locator, Schonstedt GA52Cx magnetometers, Geonics EM61-MK2) and GPS receivers.

3.4.11 Geophysical Data QC

At the beginning of the geophysical investigation, a standardization test will be performed. Table 3.2 lists the tests that will be performed at the project start-up, the objective of each test, and pass fail criteria. The data from each of the tests will be analyzed on-site by the project geophysicist prior to beginning data acquisition.

TABLE 3.2

GEOPHYSICAL QC TEST REQUIREMENTS DURING PROJECT STARTUP

Description	Purpose	Acceptance Criteria	Instrument
6 Line Test	Determine the instrument latency; ensure proper operation of the instrument	Response amplitude within 20% and positional accuracy of $\pm$ 20 cm	EM61-MK2
Static Test	Ensure repeatability in data collection sensor.	+/- 20%standard instrument response, after background correction	EM61-MK2
Tow Vehicle Noise Test	Ensure that the sensors are a sufficient distance from the tow vehicle and that operation of the tow vehicle does not produce noisy data	Operation of the vehicle does not produce noise in excess of 1 mV	Towed array EM61-MK2 only
Analog Instrument check	Demonstrate stability of instrument calibration	Analog instruments detects all items in line	Schonstedt GA52Cx and Fisher metal locator

Table 3.3 lists the tests that will be performed on a daily basis, the objective of each test, and the acceptance criteria. A daily standardization test for the EM61-MK2 will involve operating the instrument to collect background data in a static (stationary) mode for three minutes. When the instrument has stabilized (i.e., instrument readings have less than a 1 mV [EM61-MK2] variation), a static spike test will be performed for one minute. For the towed array system, the static spike test will be conducted with the test item located within each coil. A second daily test (latency test) will involve operating each instrument over a test item before and after surveying each area. The test item will remain in the same location until the

entire survey area has been covered. For the towed array EM61-MK2 system, three test items will be placed on the ground in a diagonal line, and the array will pass over the items in two orthogonal directions. The items will be arranged so that they are spaced one lane width apart in both orthogonal directions. This will ensure that each sensor will pass over the test item at a different location during the test. The results from these tests will be reviewed on a daily basis. Additional daily tests will include a test in which the instrument cables are shaken to ensure that poor connectors and cables will not introduce noise into the data.

TABLE 3.3

GEOPHYSICAL DAILY QC TESTS

Description	Purpose	Acceptance Criteria	Instrument
Static Background Test	Determine the stability of instrument readings	EM-61-MK2: 2.5mV	EM61-MK2
Static Spike Test	Demonstrate stability of instrument calibration	+/- 20%standard instrument response, after background correction	EM61-MK2
Latency Test	Determine the instrument latency; ensure proper operation of the instrument	Response amplitude within 20% and positional accuracy of +/- 20cm	EM61-MK2
Cable Vibration Test	Determine the presence of shorts or bad connections within the cables	Data profile does not exhibit data spikes	EM61-MK2
Operator Test	Determine the presence of ferrous metal on the operators that could affect magnetic measurements	Schonstedt magnetometer detects no ferrous items on each operator	Fisher metal locator and Schonstedt GA52Cx

Standardization data for the geophysical instruments will be reviewed by the field geophysical team and will later be reviewed by data processors. QC issues will be identified by a degradation of 20 percent or more of the signal response when operated over the standard. If such a problem is identified, the project geophysicist will immediately be notified and a determination will be made concerning the use of the instrument.

3.4.12 Analog Instrument QC

For the purpose of testing the hand held Fisher and Schonstedt instruments, a test location will be constructed at the beginning of the project using a 40-mm stimulant buried at 12 inches. The test location will be located adjacent to the site trailer. Each operator will check the instrument daily will provide a verification that the Fisher or Schonstedt instrument is functioning properly.

The Schonstedt GA52Cx magnetic locator emits a tone that is directly proportional to the measured magnetic field intensity. However, this tone is intended only to provide an indication of the magnetic field relative to the chosen display range of the magnetometer data logger. In this capacity, the tone emitted is used by the operator as an indicator that the magnetometer is operating and collecting data. Large, high frequency changes in the emitted tone that cannot be reproduced will indicate to the magnetometer operator that an electrical or magnetic storm is occurring, and data collection will be stopped.

Fisher all metal detector emits an audible tone either into headphones or over a speaker that is directly proportional to the size and distance of the metal object from the receiver coil. The tone generated like the Schonstedt GA52Cx magnetic locator is used to identify the presence of buried metal. Once the general location is identified, a back and forth search pattern is used to further refine the location by the operator. The size of the location can be refined only to the size of the receiver coil. If the instrument is operating an 8 inch coil, the location can be refined to 8 inches, and a 4 inch coil refined to 4 inches. When the location is identified the operator will than flag this location for intrusive investigation. Electromagnetic metal detectors are however susceptible to background interference that can be zeroed out by ground balancing out the local background conductance of the ground. The Fisher all metal detectors can ground balance the receiver coil with the ability to employ multiple frequencies to help discriminate the naturally occurring background from the buried metal objects.

3.4.13 Preventive Maintenance

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations.

The manufacturer's written maintenance schedule shall be followed to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to this maintenance schedule and to arrange prompt service as required. At a minimum, equipment used daily will be kept in good operating condition. Qualified personnel shall perform service to the equipment instruments, tools, etc. Testing, repair, or replacement records will be filed and maintained by the geophysical survey team leader and intrusive

investigation field supervisor and may be subject to audit by the Parsons QA manager. Testing records of the field instrumentation and their equipment serial numbers will be filed with the Parsons PM in Boston MA, after the fieldwork is completed.

3.4.14 Equipment Spare Parts

An extra battery pack for each type of geophysical instrument shall be on-site at all times. A back-up geophysical instrument will not be kept on site; however, arrangements shall be made with an equipment vendor so replacement equipment or any needed spare parts can be delivered to the site by overnight delivery.

3.5 DATA MANAGEMENT

Geophysical data collected in the field will be processed and managed by Parsons geophysical data processors. Processing procedures vary depending on the technology / instrument selected for use.

3.5.1 Field Records Management

Paper records (field data forms, field note copies) will be maintained in the on-site project office. All records will be filed such that they can be found using the date they were created and the team who created them. Field forms will also be scanned for digital delivery.

3.5.2 Field Data Storage

All data collected in the field will be stored electronically on field laptop computers. Data from the surveys will be downloaded from data loggers at regular intervals to ensure that the work performed will not be interrupted by a lack of storage capacity in the

3.5.3 Instrument Calibration

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. By manufacturer's design, these instruments are calibrated at the time of manufacture and do not require field calibration. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, pre-operational and post-operational checks will be performed. Following these checks, any equipment that is found unsuitable will be immediately removed from service. These checks will provide QC data indicating the proper functionality of the instruments.

3.5.4 Survey Equipment

Positioning equipment will be checked for proper operation by placing the system's antenna over two known points and recording the calculated location at the beginning and end of each day. For GPS units using real time corrections from a dedicated base station, the position repeatability standard will be ± 0.1 ft for RTK DGPS systems. The position dilution

of precision (PDOP), a unit less measure of how good the geometry is between the satellite receiver and the satellites being used to calculate a position, threshold will be set at no more than 8. This PDOP setting will ensure that positions recorded are accurate to within ± 0.1 ft.

3.6 Final Reports and Maps

All final mapping will be generated using GIS and provided to the USAESCH, USACE-New York, Seneca Army Depot in ESRI Arc View digital design files on a CD-ROM. All data characteristics (e.g., file naming and relationships, level structures, colors, line styles, weights) will be compiled in the design files in accordance with the surveying and mapping requirements of the Tri-Service Spatial Data Standards. Site maps plotted from these design files will be provided on reproducible drawings. The size of these drawings will be based on the information to be displayed.

The location, identification, and coordinates of the control points will be plotted on the reproducible maps (the surveyors-control points will be provided to the AFCEE and USACE-New York in digital format). Each map will include grid orientation to true north and magnetic north, with the differences between them shown in minutes and seconds. Grid lines or tick marks in feet and at systematic intervals will be shown with their grid values on the edges of the map. A legend showing the standard National Geodetic Survey symbols used for the mapping, a map index showing the site in relationship to all other sites within the boundary lines of the project area, a border, and a standard AFCEE title block also will be shown on each map.

4.0 FIELD SAMPLING PLAN

4.1 INTRODUCTION

This Field Sampling Plan (FSP) describes the approach to complete soil sampling necessary to demonstrate that chemical concentrations do not exceed applicable cleanup criteria at the 3.5" Rocket Range (SEAD 46), the former EOD Range (SEAD 57), the rumored EOD Range (SEAD 002-R-01) and the Grenade Range (SEAD 007-R-001). The soil sampling information will be used in conjunction with the MEC removal information outlined in Section 2 to show that no further action is required under CERCLA.

The sampling proposed in this FSP has been designed to provide the information necessary to:

1. Confirm the completion of the needed munitions response actions at SEAD 46, SEAD 57, SEAD 002-R-01 and SEAD 007-R-001;

2. Confirm the removal of soils at SEAD 46, SEAD 57, SEAD 002-R-01 and SEAD 007-R-001 that exceed identified site cleanup goals, if any;

3. Characterize any decontamination water generated during the munitions response activity for disposal; and

4. Characterize excavated and processed soils for disposal or for reuse as fill at the sites.

Project specific data quality objectives (DQOs) for sampling are described throughout this section.

The work covered in this plan includes site characterization sampling and analysis at the EOD Area #2 and #3 (SEAD 002-R-01) and at the Grenade Range (SEAD 007-D-001); sampling and analysis of off-site source areas for clean fill, if needed; disposal characterization sampling and analysis; sampling and analysis of accumulated excavation water (if encountered); and miscellaneous sampling requirements. For each type of work, this FSP specifies the following:

- Types of sampling required;
- Number of required samples;
- List of required analyses;

- Acceptance criteria for analytical results; and
- Sample labeling and recording system.

This FSP is supplemented by the "Final Generic Site-Wide Sampling and Analysis Plan for Seneca Army Depot Activity (SAP)" (Parsons, December 2005). This SAP was provided to the agencies under separate cover. The SAP specifies the following:

- Data quality objectives;
- Specific field sampling procedures;
- Sample custody and management;
- QC sample collection;
- Analytical methods;
- Data validation;
- Laboratory analytical requirements;
- Data management and evaluation;
- Performance assessment and system audits; and
- Preventative maintenance.

4.2 PROJECT SCOPE AND OBJECTIVES

This project focuses on performance of munitions response and CERCLA closure actions necessary at four identified sites; the 3.5" Rocket Range (SEAD 46), the former EOD Range (SEAD 57), the rumored EOD Range (SEAD 002-R-01) and the Grenade Range (SEAD 007-R-001). In order to accomplish this project, several different sampling tasks are required. These are outlined below and discussed in further detail in the SAP.

4.2.1 Task Description

The tasks required to complete field sampling for the four sites are presented in this section. Field sampling details are presented in **Section 4.3**.

4.2.1.1 Site Characterization Sampling

Site characterization sampling and analyses were conducted at SEAD 46 and SEAD 57 under a Remedial Investigation in 1999 and 2000, which was previously reported to the EPA and the NYSDEC in a Sampling Report issued in 2001. The results of the investigations performed at these two sites indicated that the majority of the hazardous substances detected in all media were metals, and that levels of metals detected were generally consistent with the range of metals found in SEDA background soils. Additionally, virtually all of identified contaminants were restricted to surface samples, exclusive of those collected from the walls

of the containment or impact sides of the berm structures. Therefore, the Army will not collect confirmational samples from the locations of the shallow excavations at SEAD 46 or SEAD 57.

Site characterization sampling has not been performed at SEAD 002-R-01 or SEAD 007-R-01. However, due to the similarity of operations performed at these sites with those performed at SEAD 46 and SEAD 57 and other ordnance sites at the SEDA, the Army anticipates that a majority of the substances likely to be identified during any site characterization will be limited to metals and be limited to levels that are generally consistent with SEDA background soil. Nonetheless, the Army will collect and analyze soil samples from SEAD 002-R-01 and SEAD 007-R-001 for Target Compound List (TCL): volatile organic, semivolatile organic, organo-chlorine pesticides and polychlorinated biphenyls compounds; Target Analyte List (TAL) metal compounds; nitroaromatics and nitramines; and nitrate/nitrogen. It is currently anticipated that 20 soil samples, plus associated QA/QC samples (e.g., field blanks, trip blanks, field duplicate, matrix spike/matrix spike duplicates, etc) will be collected from SEAD 002-R-01, while 40 samples, plus associated QA/QC fractions, will be collected from the area of SEAD 007-R-001. Site characterizations samples from SEAD 002-R-01, the rumored EOD Range and SEAD 007-R-001, the Grenade Range will be collected on a grid-wise basis.

4.2.1.2 Sampling of Water Wastes

Water wastes from the decontamination of various pieces of equipment or any other water generated during construction are expected to be the only components of waste that will be collected in frac tanks. After each frac tank has been filled and allowed to settle, a sample of the water will be collected and analyzed for parameters requested by the Seneca County Sewer District No. 2 (the District) wastewater treatment facility that will be receiving the water. If the analytical results meet the District's discharge requirements, the water will be discharged to the sewer. Solids settled in the tank will be disposed off-site at approved locations.

4.2.1.3 Fill Material Sampling

As is noted above, the Army expects that site excavations will be limited to depths of 6 inches, and it expects that these will be left open once the underlying area is certified-clear of MPPEH by the SUXOS. In the unlikely event that backfill is needed, an off-site borrow pit will be qualified and designated as the source of fill material for the project. One sample of material from the pit will be collected for characterization to determine compliance with site-

specific cleanup goals. If these goals are not met, material from that pit will not be used as backfill.

4.2.1.4 Post MEC / MPPEH Removal Confirmational Sampling

Major excavations anticipated as part of this effort will be limited to the removal of soils contained in the aboveground berms located at SEAD 46, the 3.5" Rocket Rage and SEAD 57, the former EOD Range, and the removal of the top 6 inches of soil from the high density UXO anomaly areas identified at these two sites. In total, it is currently anticipated that between 11,000 and 12,000 cubic yards of soil will be excavated.

Subsequent to excavation, UXO personnel will resurvey the excavation sites to determine if evidence of MPPEH remains; if evidence is found, additional excavations will be planned as needed to eliminate the threat of MPPEH. If no evidence of residual MPPEH is found, the excavation will be considered complete and the area will be certified as free of MPPEH. The soils located beneath the footprints of the excavation sites at SEAD 46 and SEAD 57 will be presumed to be clean based on the results of the prior site characterization data which indicate that few hazardous substances other than metals were identified, and all identified contamination was restricted to the surficial level at each site. No confirmatory soil samples will be collected from the excavation areas.

All soil associated with the excavation activities will be transported to an area near SEAD-57 where it will be mechanically processed to separate MPPEH and screened into three size fractions, including greater than 6 inch, less than 6 inch but greater that 0.625 inch, and less than 0.625 inch. The two larger size fractions will subsequently be spread out across a clean area in 6 to 12 inch lifts that will subsequently be screened and sorted by UXO personnel to identify, recover, and segregate MPPEH. Each lift is expected to represent approximately 1 day's worth of production which is estimated to be on the order of 350 to 400 cubic yards of soil and correspond to a volume measuring 100 ft by 100 ft by 1 ft in size. The smaller size fraction will be stockpiled without further processing or sorting because it is too small to contain MPPEH of interest.

Each of the over-size material lifts will then be resurveyed and sorted by UXO technicians to identify, recover and segregate MPPEH. Once each lift is certified clear of MPPEH, a single composite sample will be collected and submitted to the laboratory for TAL metals analysis. The composite will consist of five equally sized subsamples being collected from randomly designated locations within five equally sized sectors of the original lift. For example, it the original lift measures 100 ft by 100 ft in size, each of the five subsectors will measure 20 ft by 100 ft in size. Each subsector will subsequently be divided into 100 grid

cells (each measuring 0.2 feet by 1 ft in size) which are numbered from 00 to 99. A two-digit random number will then be used to select the location where each subsample aliquot will be recovered prior to compositing. The analytical results from these samples will be used to verify that the soil that remains in the lifts is consistent with site background, and therefore can be left in place. This comparison will be based on a review of individual sample results against site background maximum concentrations for metals. If necessary, risk assessment data developed by pooling the site characterization data and the conformational sampling data will be used to confirm that the residual soils left at the site do not pose a risk.

One sample of soil will also be collected from each 500 cubic yard stockpile of fines generated during the MPPEH clearance operation. A single sample will be pulled from each of the fine stockpiles and the results for metals will be compared directly to the maximum levels of metals found in the SEDA site –wide background soil data sets. Again, if necessary, risk assessment data developed by pooling the site characterization data and the conformational sampling data will be used to confirm that the residual soils left at the site do not pose a risk.

No large-scale soil removal operations are anticipated for SEAD 002-R-01, the rumored EOD Range or SEAD 007-R-001, the Grenade Range based on the available geophysical information for these sites. Therefore, identified anomalies will be hand dug, sorted and segregated, and the cleared soil will be left in place. Site characterization sampling and analysis data for SEAD 002-R-01 and SEAD 007-R-001 will be used to verify that soils left at the do not pose a risk.

For disposal characterization, the disposal facility requires that one composite sample will be collected and submitted for analysis for each 500 cubic yards of stockpiled soil. This sampling requirement is based on the disposal facility's review of the historic sampling results at SEAD 46 and SEAD 57 which show site soils are generally consistent with SEDA's background, and the Army's belief that impacts likely to be found at SEAD 002-R-01 and SEAD 007-R-001 are probably very similar in nature. The disposal facility has already pre-approved acceptance of the anticipated soil based on these data.

4.2.1.5 Waste Residuals

Waste residuals generated during the field sampling activities, including disposable sampling tools, plastic sheeting, and disposable personal protective equipment will be bagged and disposed in an on-site trash dumpster.

4.2.1.6 Air Monitoring

An air monitoring plan has been developed to protect the workers involved in the munitions response and CERCLA closure actions for all four sites (SEAD 46, 3.5" Rocket Range; SEAD 57, the former EOD Range; SEAD 002-R-01, the rumored EOD Range; and SEAD 007-R-001, the Grenade Range). Public health and safety is ensured by monitoring within the work zone and creating an exclusion zone surrounding the construction area at each site. The air monitoring will be conducted in accordance with the air monitoring program outlined in Section A8 of the Project Safety Plan and Site-Specific Health and Safety Plan for Munitions Response and CERCLA Closure of the Seneca Army Depot (Parsons, 2006c). In addition, perimeter air monitoring will be conducted in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP). Based on requirements specified in the NYSDOH CAMP, the perimeter air monitoring program will consist of real-time perimeter measurements for total VOCs and respirable airborne dust particulates (particulate matter less than 10 microns – PM_{10}).

4.3 FIELD SAMPLING DETAIL

This section provides a detailed description of the field activities that were outlined in the previous section. Refer to the SAP (Parsons, December 2005) for a more detailed description of the analytical program, including sample custody, sample management, and data validation. Quality control (QC) samples will be collected in accordance with the SAP.

4.3.1 Site Characterization Sampling (SEAD 002-R-01 and SEAD 007-R-001)

Site characterization sampling will be performed at SEAD 002-R-01, the rumored EOD Range and at SEAD 007-R-001, the Grenade Range. These data will be collected to develop data that indicate that hazardous substances are not present, or are present at levels consistent with background and therefore do not pose a threat.

4.3.1.1 Site Characterization Sample Collection

At SEAD 002-R-01 (the rumored EOD Range), site characterization samples will be collected from a grid configuration, with each sample being collected from a randomly selected location within an area of roughly 0.5 acre (21,780 square feet). Specific sampling locations will be selected by laying out a 100 cell grid covering the area, followed by the collection of the necessary sample volumes from the centroid of the grid cell. The location of the sampled grid cell will be selected using a two-digit random number generator. It is

anticipated that 20 site characterization, plus associated QA/QC samples, will be collected at SEAD 002-R-01.

At SEAD 007-R-001 (the Grenade Range), site characterization samples will be collected from a grid configuration, with each sample being collected from a randomly selected location within an area of roughly 0.5 acre (21,780 square feet). Specific sampling locations will be selected by laying out a 100 cell grid covering the area, followed by the collection of the necessary sample volumes from the centroid of the grid cell. The location of the sampled grid cell will be selected using a two-digit random number generator. It is anticipated that 40 site characterization, plus associated QA/QC samples, will be collected at SEAD 007-R-001.

QC samples will be collected in accordance with the SAP.

4.3.1.2 Sample Analysis

All site characterization samples will be analyzed for TCL: volatile organic (5035 and 8260B), semivolatile organic (8270C), organo-chlorine pesticides (8081B) and polychlorinated biphenyls compounds (8082A); TAL metal compounds (6010B and 7XXX for thallium); nitroaromatics and nitramines (8330); and nitrate/nitrogen in accordance with the methodologies identified.

4.3.1.3 Sample Numbering

Confirmatory soil samples from SEAD 002-R-01 will be labeled as follows:

002R01XXXX

The prefix 002R01 designates that the sample is from SEAD 002-R01, the rumored EOD Range. XXXX is the sample number (1000 to 1999 reserved for soil; 0001 to 0100 reserved for TB; 0101 – 0199 reserved for field blanks).

Confirmatory samples from SEAD 007-R-001 will be labeled as follows:

007R01XXXX

The prefix 007R01 designates that the sample is from SEAD 007-R01, the Grenade Range. XXXX is the sample number (1000 to 1999 reserved for soil; 0001 to 0100 reserved for TB; 0101 – 0199 reserved for field blanks).

4.3.2 Confirmatory Sampling of Excavated and Certified UXO Cleared Soils

Sampling of UXO certified-clean, stockpiled soils will be performed to show residual metals contained in the soil are generally consistent with SEDA's background concentrations and that they can be left in place.

4.3.2.1 General

Each lift or fine pile will be uniquely identified with an alpha-numeric code. A single composite sample will then be collected and submitted to the laboratory for TAL metals analysis from each lift or each stockpile.

The composite from each over-sized material pile lift will consist of five equally sized subsamples being collected from randomly designated locations within five equally sized sectors of the original lift. For example, it the original lift measures 100 ft by 100 ft in size, each of the five subsectors will measure 20 ft by 100 ft in size. Each subsector will subsequently be divided into 100 grid cells (each measuring 0.2 feet by 1 ft in size) which are numbered from 00 to 99. A two-digit random number will then be used to select the location where each subsample aliquot will be recovered prior to compositing. The analytical results from these samples will be used to verify that the soil that remains in the lifts is consistent with site background, and therefore can be left in place.

A single grab sample will be collected from a random location within each fine soil stockpile.

The Army proposes that all stockpiled soil showing metal concentrations that are less than or equal to the maximum concentrations for metals found in SEDA-wide background samples be used as backfill on the site.

4.3.2.2 Sample Analysis

All lift and fine stockpile samples will be analyzed for TAL metal compounds (6010B and 7XXX for thallium) in accordance with the methodologies identified.

4.3.2.3 Sample Numbering

Confirmatory soil samples from lifts will be labeled as follows:

LYYYXXXX

The prefix L designates that the sample is from an over-size material **L**ift, with YYY indicating which discrete lift. XXXX is the sample number (1000 to 1999 reserved for soil; 0001 to 0100 reserved for TB; 0101 – 0199 reserved for field blanks).

Confirmatory soil samples from under-sized material stockpiles will be labeled as follows:

PYYYXXXX

The prefix P designates that the sample is from an under-size material stock**P**ile, with YYY indicating which discrete lift. XXXX is the sample number (1000 to 1999 reserved for soil; 0001 to 0100 reserved for TB; 0101 – 0199 reserved for field blanks).

4.3.3 Sampling of Waste Water

Site waste water, including predominantly decontamination water, will be collected directly from the on-site 20,000 gallon frac tanks. After filling, these tanks will be allowed to settle for a minimum of 72 hours before sampling.

4.3.3.1 Sample Collection

Samples will be collected from the mid depth of the tank using a dedicated disposable polyethylene bailer lowered into the tank with nylon rope.

4.3.3.2 Sample Analysis

Seneca County Sewer District No. 2 requires that the following list of parameters are analyzed: pH, total dissolved solids (TDS), total suspended solids (TSS), biological oxygen demand (BOD), and ammonia as nitrogen. If the analytical results are acceptable to the District, the contents of the frac tank will be emptied directly into the on-site sewer for disposal. For acceptance by the District, the waste stream must be non-hazardous according to 6 NYCRR Part 371. It is anticipated that all collected water will be suitable for discharge to the sewer.

4.3.3.3 Sample Numbering

The water samples will be numbered as follows:

WW-XX-TT-MMDD

WW designates that it is a water sample. XX is the SEAD number (SEAD-57, as this will be the major staging area for this effort). TT indicates the tank number. MMDD is the

month and the day that the sample is collected. It is anticipated that one tank may service a number of areas in a particular SEAD, and that the tank may be used several times over the length of the project.

4.3.4 Fill Material Sampling

Fill material from an off-site borrow pit is not expected to be required for this effort; however, if it is necessary, potential fill will be characterized before it is used. Prior to accepting any material from the pit, fill material will be sampled to determine if it meets the site-specific cleanup goals for VOCs and SVOCs. The contractor will provide Parsons with data indicating that the soil is below the cleanup goals and is suitable for use as fill.

4.3.4.1 Sample Collection

The contractor will submit a representative sample from the borrow pit and provide the analytical results for comparison to site cleanup goals. One sample will be collected from the backfill prior to use and one sample for every 2,500 cy of borrow soil used thereafter.

4.3.4.2 Sample Analysis

The soil sample will be submitted for analysis for VOCs and SVOCs. If any of the site-specific cleanup goals are exceeded in the analytical results, the borrow pit will be rejected as a source of fill material for the project. Sampling frequency and required parameters are presented in **Table 4-2**.

4.3.4.3 Sample Designation

The fill material will be designated as follows:

FM-XX-YY

FM indicates that the sample is fill material. XX is the number of the source pit, assigned sequentially (e.g., FM-01). YY is the sample number.

4.3.5 Disposal Characterization Sampling

For disposal characterization, the disposal facility requires that one composite sample will be collected at each site and submitted for analysis. Disposal characterization samples will be collected and analyzed to determine if the excavated soils can be disposed as non-hazardous waste. If no soil exceeds the soil standards, disposal characterization sampling will not be required.

4.3.5.1 Sample Collection

At each of the four sites, one composite sample will be collected from five grab samples taken from representative areas of each site. Each of the grab samples will be composited to form one sample for each site.

4.3.5.2 Sample Analysis

Each sample will be analyzed for VOC TCLP, SVOC TCLP, metals TCLP, reactivities, flashpoint, and pH.

4.3.5.3 Sample Numbering

The disposal samples collected from SEAD 46, SEAD 57, SEAD 002-R-01 and SEAD 007-R-01 will be labeled as DS-46-01, DS-57-01, DS-002-01, and DS-007-01, respectively. "DS" designates the sample as a disposal characterization sample.

5.0 EXPLOSIVES MANAGEMENT AND SITING PLAN

This plan outlines the explosives management and MD/MEC identification and disposal operations procedures Parsons and USA Environmental will use to perform the MPPEH removal project at the Seneca Army Depot. The procedures listed herein are in accordance with DID OE-005-03.01 and the following documents:

- DOD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives;
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards;
- Applicable Sections of DOT, 49CFR Parts 100-199;
- AR 385-64, Ammunition and Explosives Safety;
- AR 190-11, Physical Security of Arms, Ammunition and Explosives;
- EM 1110-1-4009 Engineer Manual, Ordnance and Explosives;
- EP1110-1-18 Engineer Pamphlet, Ordnance and Explosives Response;
- Local and state laws and regulations;
- USACE EM 385-1-95a, Basic Safety Concepts and Considerations for Unexploded Ordnance;
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- AFPT 5400.7 Bureau of Alcohol Tobacco and Firearms, Federal Explosives Laws and Regulations; and
- Parsons explosives storage and transportation SOP.

5.1 EXPLOSIVES ACQUISITION

Parsons and USA Environmental both have BATF permits to purchase and use explosives (see Figures 5.1 and 5.2). These permits will be posted on site and will be available for local, state, or federal inspection. USA Environmental will store the demolition material on site in two Type II BATF-approved explosive storage Igloo provided by the depot. Primary responsibility, accountability, and use of the explosives will remain with USA Environmental

unless custody is transferred to the Government or another contractor with a current BATF explosive license.

5.1.1 Description and Estimated Quantities

When required, USA Environmental will order and stock an initial quantity of not more than 50 pounds net explosive weight (NEW) of commercial counter charges, initiating explosives, and venting charges for disposal and demilitarization operations. Based on usage and demand, the quantity in stock may increase, but at no time will storage quantities exceed 100 pounds NEW.

5.1.2 Acquisition Source

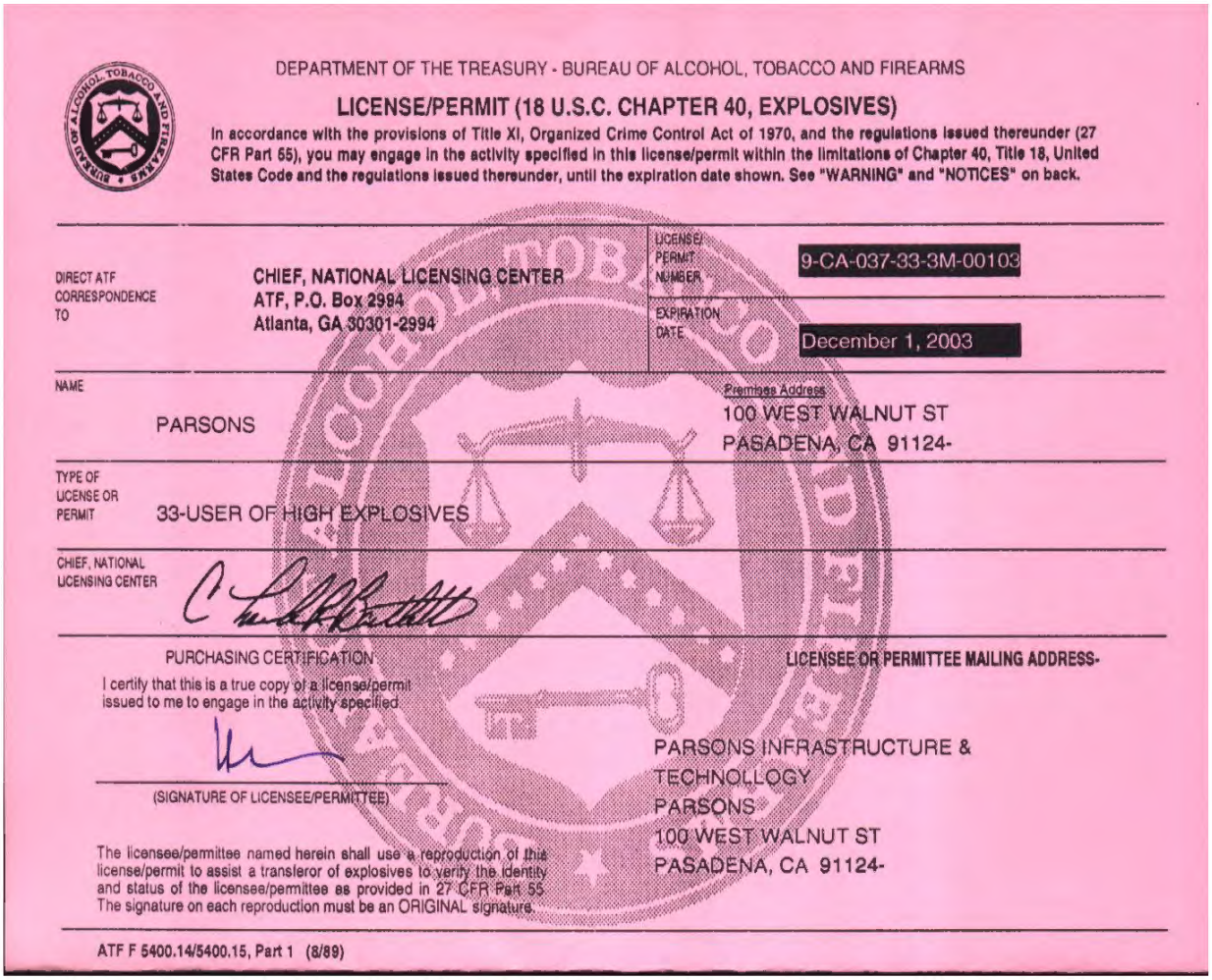
Parsons and or USA Environmental will purchase explosives from a local licensed explosives distributor, who will deliver the demolition material to the site. The SUXOS will be authorized to request and receive explosives from the explosives distributors.

5.1.3 Listing of Proposed Explosives

The types of explosives that may be used are:

- Cast booster (1/2 – 1 pound);
- Perforator charge (32 gram shape charge);
- Detonating cord (50 & 80 grain);
- Blasting caps (non-electric);
- Safety fuze and fuze igniters;
- Binary explosives; and
- Nonel® Shock Tube.

FIGURE 5.1
PARSONS BATF LICENSE



DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 55), you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO: CHIEF, NATIONAL LICENSING CENTER
ATF, P.O. Box 2994
Atlanta, GA 30301-2994

LICENSE/PERMIT NUMBER: 9-CA-037-33-3M-00103

EXPIRATION DATE: December 1, 2003

NAME: PARSONS

Premises Address:
100 WEST WALNUT ST
PASADENA, CA 91124-

TYPE OF LICENSE OR PERMIT: 33-USER OF HIGH EXPLOSIVES

CHIEF, NATIONAL LICENSING CENTER

PURCHASING CERTIFICATION

I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 55. The signature on each reproduction must be an ORIGINAL signature.

LICENSEE OR PERMITTEE MAILING ADDRESS-

PARSONS INFRASTRUCTURE &
TECHNOLLOGY
PARSONS
100 WEST WALNUT ST
PASADENA, CA 91124-

ATF F 5400.14/5400.15, Part 1 (8/89)

FIGURE 5.2
USA ENVIRONMENTAL BATF LICENSE

DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 55), you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT CORRESPONDENCE TO: CHIEF, NATIONAL LICENSING CENTER
ATF
2600 CENTURY PARKWAY, SUITE 400
Atlanta, GA 30345

LICENSE PERMIT NUMBER: 1-FL-057-33-5C-12602

PREVIOUS PERMIT NO.:

DATE: July 1, 2005

NAME: USA ENVIRONMENTAL INC

PREMISES ADDRESS: 5802 BENJAMIN CENTER DR #101
TAMPA, FL 33634-0000

TYPE OF LICENSE OR PERMIT: 33-USER OF HIGH EXPLOSIVES

CHIEF, NATIONAL LICENSING CENTER

PURCHASING CERTIFICATION

I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

LICENSEE OR PERMITTEE MAILING ADDRESS

USA ENVIRONMENTAL INC
5802 BENJAMIN CENTER DR #101
TAMPA, FL 33634-0000

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR 55.95. The signature on each reproduction must be an ORIGINAL signature.

ATF F 5400.14/5400.15, Part 1 (8/89)

5.2 RECEIPT PROCEDURES

The SUXOS will strictly control access to all explosives. All receipts, issues, turn-ins, and inventories of explosives will be properly documented and verified, through physical count, by the SUXOS and UXOQCS.

5.2.1 Records Management and Accountability

All original explosive records will be forwarded to USA Environmental for archive in accordance with BATF regulations and requirements. Copies of all records will be maintained on site by the site supervisor and will be available for inspection by authorized agencies. Explosive items will be tracked by their respective lot number until the items are expended or transferred to government control and accountability or are returned to the distributor.

5.2.2 Authorized Individuals

Parsons is required to provide explosives distributors with documentation of individuals authorized to request and receive explosives. The individuals authorized to receive and issue explosives are the Parsons SUXOS and, in some cases when the SUXOS is not available, either the USA Environmental Tech III demolition supervisor or the Parsons UXOQCS. The SUXOS will designate in writing the individual(s) authorized to transport and use explosives.

5.2.3 Certification

The SUXOS and UXO Technician III team leader performing demolition will sign and date the Explosives Usage Form (see Figure 5.3) certifying that the explosives were used for their intended purpose.

FIGURE 5.3
EXPLOSIVES USAGE RECORD

Explosives Usage Record *Contract Number:*

Team Number: Date: Project Name:

Team Leader: Work Areas & Grid Numbers:

Explosives Issued Signature Of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended Signature Of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned Signature Of SUXOS:

Item	Quantity	Lot Number	Checkers Initials

The signatures in each section of this document indicate that the items listed in that section were in fact issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

5.2.4 Procedures for Receipt of Explosives

On receipt, the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Magazine Data Card (Figure 5.4). The original receipt documents and an inventory will be maintained on file by the site supervisor. The Magazine Data Card will remain in the magazine with the explosive items and be annotated and updated upon each issue, receipt, and inventory.

5.2.5 Procedures for Reconciling Receipt Documents

The SUXOS will reconcile the delivery shipping documentation with the requested amounts ordered and received. Any shortages or overages will be reported to the USA Environmental PM, who will contact the explosives distributor and reconcile any differences. In addition he will notify the Parsons site and project managers.

5.3 INVENTORY PROCEDURES

Explosives will be inventoried at least weekly by the UXOQCS and the SUXOS. Complete inventories will also be conducted after any issues/turn-ins of demolition material.

5.3.1 Storage Facility Physical Inventory Procedures

The SUXOS will strictly control access to all explosives. All issues and turn-ins of explosives will be properly documented and verified, through physical count, by the SUXOS and USA Environmental Tech III. On receipt, the type, quantity, and lot number of each explosive item is recorded on the Magazine Data Card (Figure 5.4).

The SUXOS will review all requests for explosives from the individual operating sites and only sufficient explosives for the day's operations will be issued. Issues of explosives are recorded on Explosives Usage Records entries (Figure 5.3) and deducted from the Magazine Data Card(s) and annotated in the daily journal. This procedure will ensure that the issued explosives are accounted for while they are in the possession of individual users. The end user of explosives shall certify on the Explosives Usage Record that the explosives were used for their intended purpose. Entries made on the Explosives Usage Records and Magazine Data Cards will be verified through physical count by the demolition team UXO Technician III when drawing or turning in the explosives and verified by the UXOQCS.

FIGURE 5.4
MAGAZINE DATA CARD

MAGAZINE DATA CARD

Nomenclature:_____
Lot Number: Unit:_____ Date Of Issue:_____

Date	Name	Received	Issue	Balance	Checker's Initials

The signatures in each section of this document indicate that the items listed were in fact issued, expended, or returned to storage and that all quantities listed were verified through a physical count.

At the end of each disposal operation, the UXOQCS and the demolition team UXO Technician III will reconcile the entries on each Explosives Usage Record and will turn these records over to the SUXOS. The record of ordnance items destroyed with the explosives consumed will be kept in the SUXOS daily log.

Entries made on the Explosives Usage Records and Magazine Data Cards will be verified through physical count of the amount being drawn by the demolition team UXO Technician III when drawing or turning in the explosives, and the UXOQCS will verify the record.

5.3.2 Procedures for Reconciling Inventory Discrepancies

The SUXOS and UXOQCS will be responsible for performing a documented weekly inventory of the explosives within the magazine. If there is a discrepancy between the inventory and the volume of explosives within the magazine, then they will review the magazine Data Card and Explosives Usage Record to see if the inventory records are current. If the records review does not reconcile the discrepancy, it will be reported to the USACE safety specialist, contracting officer representative (COR), and USA Environmental PM for investigation. In addition, the Parsons site and project managers will be notified.

5.3.3 Reporting Loss or Theft of Explosive Materials

If it is confirmed that ordnance or explosives are missing, then the SUXOS will contact the COR immediately by telephone and in writing within 24 hours. The USACE site safety specialist, USA Environmental Tampa, and Parsons site and project managers will be notified following the notification of the COR. USA Environmental Tampa will notify BATF and immediately begin an investigation. Local authorities will be notified, and a written report will be issued within 24 hours.

5.3.4 Procedures for Return to Storage of Explosives Not Expended

Explosives that were issued for use but were not expended will be returned daily to the magazines at the completion of disposal operations. The demolition team UXO Technician III will return the unused explosives to the storage magazine and record the items on the Magazine Data Card and Explosives Use Record.

5.4 STORAGE

When required, explosives will be stored in standard ammunition magazine(s) that exist at Seneca Army depot within a fenced area with appropriate signage and emergency notification data.

5.4.1 Establishment of Storage Facilities

USA Environmental will comply with BATF, federal, and local storage and compatibility criteria and procedures when sitting explosives storage magazines, which include:

- Use portable, approved BATF Type 2 structures;
- Locate, install, and maintain the magazine(s) to comply with the magazine criteria and quantity distance requirements established in BATF Regulation ATF P 5400.7 and DOD 6055.9-STD, *DOD Ammunition and Explosives Safety Standards*; and
- Install sufficient magazines or a type of magazine with an attached, separate detonator magazine to comply with explosive compatibility requirements, (i.e., bulk explosives, initiating explosives).

5.4.2 Physical Security of Storage Facilities

A chain link fence exists surrounding the entire ammo area and explosive storage igloo, which will be in accordance with 6055-9 STD and EM 1110-1-4009. The magazine storage area (MSA) will be inspected each workday by the SUXOS and UXOSO to ensure the integrity of the enclosure.

5.5 TRANSPORTATION

Transportation of demolition material will comply with all federal, state, and local regulations. Even though permits are not required for the transportation of the small quantities of explosives to be used on site, Parsons will use the most expeditious route when transporting demolition material. No public roads will be used during the transport of explosives during this RA on the Seneca Army Depot property.

5.5.1 Procedures for Transportation from Storage to Disposal Location

Transportation of explosives on the former Seneca Army Depot will not require travel on public highways. However, should it occur, placarding and inspections will be conducted in accordance with the Parsons explosives storage and transportation SOP. The UXOSO will provide the team with a transportation route plan in the event public roads will be traveled. Every effort will be made to take a route with the least public exposure. For transportation of demolition material, USA Environmental will comply with the following:

- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate container and secured away from other explosive items.

- A Mk 663 container will be used to transport caps, and the explosives will be placed in a lockable wooden box. The two containers will be placed in the bed of the vehicle and blocked in using sand bags or other means to keep the containers from shifting. The containers will then be covered with a tarp.

- Compatibility requirements will be observed.

- Only UXO Technicians III and above may be issued and transport explosive materials. The receiving party shall sign the receipt documents for accountability.

- Operators transporting explosives will have a valid driver's license.

- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 mph.

- Personnel will not ride in the cargo compartment of a vehicle transporting explosives.

FIGURE 5.5
VEHICLE INSPECTION FORM

Explosive Vehicle Inspection, ON-SITE			
This form must be filled out prior to loading for any vehicle carrying explosives.			
This form is for use on site only; if traveling on public highways, use DD Form 626			
DRIVER'S NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	SAT.	UNSAT.	COMMENT
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			
INSPECTION RESULTS (INSPECTOR INITIAL)			
ACCEPTED:			
REJECTED:			
REMARKS			
DRIVER'S SIGNATURE/DATE			INSPECTOR'S SIGNATURE/DATE

5.5.2 Explosive Transportation Vehicle Requirements

Explosives will be transported in closed vehicles whenever possible. The load shall be braced and, except when in closed vehicles, covered with a fire-resistant tarpaulin or in an appropriate shipping container. Minimum vehicle requirements include:

- Vehicles transporting explosives or MPPEH will be inspected daily using the Explosive Vehicle Inspection Form (Figure 5.5), as applicable, and will be properly placarded;
- Vehicle engine will not be running when loading/unloading explosives;
- Vehicle will be chocked to prevent movement while loading;
- Beds of vehicles will have either a wooden bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings; and
- Vehicles transporting explosives will have a first aid kit, two 10 BC fire extinguishers, and a means of communication with the UXOSO.

5.6 DISPOSAL OF REMAINING EXPLOSIVES

BATF requires an accounting of all explosives purchased and used; therefore, at project completion, all unused explosives will either be disposed of by detonation or custody, and accountability will be transferred to an incoming contractor, a government agency, or returned to the distributor.

5.7 ORDNANCE AND EXPLOSIVES AREAS

Ordnance and explosive areas will change as locations for removal change. Figure 1-1 shows the existing field arrangement of the storage igloos.

5.8 SAFE SEPARATION DISTANCES

The MGFDs are established in the ESS in Appendix A and are also listed in Table 5.1 for each sector based on the results of previous intrusive investigations. During most explosive operations, and due to the nature of the former Seneca Army Depot and the open areas available, the MSDs listed Table 5.2 will be used.

The MFGD will apply to both intrusive and planned detonation work. Any reduction of these distances must be approved by the UXOSO and the USACE OE Safety Specialist. The

MFGD worksheets are provided in the ESS by the USAESCH for the former Seneca Army Depot.

5.9 DEMOLITION AREAS

MPPEH will be disposed of in the areas where encountered. Items that are acceptable to move (unfuzed or unfired) may be consolidated, with the concurrence of the UXOSO and USACE COR, to one location within that day's survey area to reduce the probability of demolition shots and fragmentation contamination. In areas where an acceptable fragmentation distance cannot be achieved, items acceptable to move may be moved to another area (as long as the movement does not require transportation on public roads). If movement to another area is not possible, other USACE-OE-safety-approved methods of mitigation, such as berms, tamping, or barricades, will be employed to reduce the fragmentation hazard. If these methods of disposal are determined to be impractical, the UXOSO will notify the on-site USACE COR.

TABLE 5.1
MPPEH ENCOUNTERED AND MGFD BY SECTOR

Sector No.	Sector Name	MGFD	
1	SEAD 57	37mm MKII Projectile (NEW 0.053 lbs.) (UXO)	= 980 ft
2	SEAD 46	40mm M382 practice Grenade (NEW 6g RDX) (UXO)	= 345 ft
3	Grenade Range	40mm M406 HE (NEW 0.85lbs.)	= 345 ft
4	EOD area #2	Unknown Fuse and booster (OE)	= n/a
6	EOD area #3	M2 Fuse lighter (OE)	= n/a

TABLE 5.2
MINIMUM SEPARATION DISTANCES

UXO Operation		
	Separation Distance Between Teams (Feet)	**Public Access Exclusion Distance PAED (feet)**
For Unintentional Explosive Detonations		
Surface Sweeps	200	200
Mag/Flag	200	200
Intrusive Investigation	200	200
37mm MKII Projectile (NEW 0.527 lbs.)	200	980
40mm M406 HE (NEW 0.85lbs.)	200	345

** Based on MSD - Max Fragment Range provided in ESS dated April 2005 (Appendix A). PAED computed using HNC-ED-S-98-1

5.10 FOOTPRINT AREAS

There are three types of footprint areas: BIP, ordnance collection points within a clearance area, and consolidated shots within a collection area.

5.10.1 Blow-in Place

BIP will be used for ordnance items not safe to move. The demolition locations will be confined to the boundaries of each sub-area. Demolition sites will exist where MPPEH are found and detonated. The location of MPPEH that must be detonated in place cannot be predicted, and they could occur at any point within the removal area. All MPPEH detonated in place will be well documented, with the position indicated on the site map. Table 5.2, which deals with intentional and unintentional detonations, identifies the MSD for all personnel for munitions and/or explosives expected to be encountered during the clearance operation. If a conventional ordnance item not listed in Table 5.2 is encountered, its MSD shall be determined in accordance with Chapter 11 of EM 1110-1-4009. BIP is the footprint area used most commonly at the former Seneca Army Depot where MPPEH is found in unstable configurations.

5.10.2 Collection Points

Ordnance collection points within a clearance area will not be used at the former Seneca Army Depot, as items will be disposed either by BIP or consolidated shots.

5.10.3 In-Grid Consolidated Shots

Items that are acceptable to move (unfuzed or unfired) may be consolidated to one location within that day's survey area to reduce the number of demolition shots and fragmentation contamination. MPPEH that is safe to move may be consolidated to reduce the number of shots. All movement of MPPEH will be coordinated with and approved by the on-site USACE OE Safety Specialist. Consolidated shots will be in accordance with EP 1110-1-17, Appendix D. A copy of the report will be available on site for reference.

5.11 EXPLOSIVES STORAGE MAGAZINES

5.11.1 Types(s) of Magazines

Explosives will be stored at Seneca in the storage magazines that exist as part of the former Seneca Army Depot ammunition storage facility. These "Double Igloo" type, earthen covered magazines were constructed in 1942 and conform to DDESB and Army safety standards for lightning protection and explosives storage.

- The magazines are approved for 250,000 lbs HC of 1.1 explosives.
- The explosive storage igloos are located within the Seneca Army Depot former Ammunition area that is surrounded by a chain link fence behind locked gates that effectively prevent unauthorized access. These magazines comply with the criteria and quantity distance requirements established in DoD 6055.9-STD, Department of Defense Ammunition and Explosives Safety Standards, DA Pam 385-64, and other DoD and BATF directives.
- Magazines are used to comply with explosive compatibility requirements (i.e., bulk explosives, initiating explosives).
- The magazines are bullet-resistant, fire-resistant, weather-resistant, theft-resistant, ventilated, and grounded. In the event of a thunderstorm, no activities are to be conducted in the magazine area. They are built in direct contact with the ground, and the ground around them slopes away for drainage.
- Hinges and hasps are attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps have been installed such that they cannot be removed when the doors are closed and locked. Each door is equipped with two padlocks fastened in separate hasps and staples. Padlocks have at least five tumblers and a casehardened shackle of at least 3/8-inch diameter. Padlocks are protected with not less than 1/4-inch steel hoods constructed to prevent sawing or lever action on the locks, hasps, and staples.

5.11.2 Net Explosives Weight and Hazard Division

The contents, NEW, and quantity distance (QD) criteria are presented in Table 5.3.

TABLE 5.3
EXPLOSIVE MAGAZINE DATA

Magazine Type	Contents	Hazard Division	Amount	Net Explosive Weight (lbs)	Distance (in feet) From	
					Inhabited Buildings *	Public Traffic Route *
High Explosive	PETN boosters, 1 lb.	1.1	10 ea.	10.0		
	Detonating cord, 80 grain	1.1	2000 ft.	14.3		
	Jet perforator, 38 grain shape charge	1.4	320 ea.	2.6		
			Total NEW	26.9	658	402
Initiating Explosives	Blasting cap, non-electric.	1.1	50	Less than 1 lb		
	Excel MS, shock tube.	1.4	2500	4		
	Fuze, time safety	1.4	100 ft.	0.1		
	Fuze lighter, commercial	1.4	100	0.4		
			Total NEW	5.5	658	402
*From DoD 6055.9-STD Rev 4, 5 January 2004, Table C9.T2						

5.11.3 Engineering Controls

In areas where an acceptable fragmentation distance cannot be achieved, items safe to move may be moved to another area, with the concurrence of the USACE COR. If movement to another area is not possible, other methods of mitigation, such as berms, tamping, or sandbag barricades (in accordance with HNC-ED-CS-S-98-7), will be employed to reduce the fragmentation hazard. If these methods of disposal are determined to be impractical, Parsons will notify the on-site USACE COR.

5.12 SITE MAP

Figures 2-1 through 2-5 show the locations of the specific areas that will be cleared.

6.0 MANAGEMENT PLAN

6.1 PROJECT ORGANIZATION

Several organizations are directly involved in the former Seneca Army Depot Munitions Response Removal Action project. The key team members are presented below along with their contact information. The technical team consists of Seneca Army Depot Activity, USACE New York District, AFCEE, Parsons and Parsons subcontractors Sevenson Environmental and USA Environmental.

Name	Title	Phone Number	Primary Location
Lonnie Wolfe	AFCEE Contracting Officer's Representative (COR)	Office: (210) 536-5269	Off-site (Brooks-City-Base, TX)
Stephen Absolom	Seneca Army Depot Activity's Point of Contact (POC)	Office: (607) 869-1309	On-site
Thomas Battaglia	Seneca Army Depot Activity's COR	Office: (607) 869-1353	On-site
Todd Heino	Parsons Project Manager (PM)	Office: (617) 449-1405	Off-site (Boston, MA)
Tim Mustard	Program Health and Safety Officer (PHSO)	Office: (303) 764-8810	Off-site (Denver, CO)
Tom Andrews	Site Manager (SM)	Office: (716) 633-7074 Cell: (716) 998-7473	On-site 1 to 2 days/wk Off-site (Buffalo, NY)
Salvatore Molle	Senior UXO Supervisor	Cell: (202) 885-8516	On-site
Ken Cargel	UXO Safety Officer	Cell: (416) 725-2979	On-site
Ben McAllister	Geophysics Team Leader	Office: (617) 449-1592 Cell: (207) 409-6151	On-site

6.2 PROJECT PERSONNEL

UXO teams will consist of qualified personnel approved by the Army. Non-UXO qualified personnel will not perform any excavation nor handle UXO/MPPEH. Parsons will provide UXO support to the project. All project personnel will complete the OSHA 40-hour training course for hazardous waste site workers as required by the specific task. Additional site specific training, in accordance with 29 CFR 1910.120, EM 385-1-1 (*USACE Safety and Health Requirements Manual*), and ER 385-1-92 (*Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste and Ordnance and Explosive Waste OE activities*) will be provided to all personnel upon their initial mobilization. A medical surveillance program will be in place with the latest exam within the last 12 months.

All qualified UXO teams must meet the requirements set forth in Data Item Description (DID) OE-025.01, Personnel/Work Standards. UXO personnel will be U.S. citizens and graduates of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland; the U.S. Naval EOD School; the EOD Assistants Course, Redstone, Alabama; the EOD Assistants Course, Eglin AFB, Florida; or a DoD-certified equivalent course. The following subsections detail individual UXO personnel qualifications.

6.2.1 UXO Safety Officer

The UXOSO shall have the following skills/knowledge:

- The ability to identify fusing, necessary precautions, and fuze condition; i.e. armed, functioned, or armed and functioning; how this condition can or will affect the munition payload should other forces be applied.
- The ability to recognize munition/ordnance types and to determine the hazards and make risk assessments. This includes identifying potential fillers, including those in extremely deteriorated condition; e.g., high explosives, fragmentation, white phosphorous, and chemical warfare material. Must also be able to determine if munitions can be moved before destroying or if the munitions must be blown in place (BIP); fragmentation radius; and, in the case of chemical warfare material, the potential down-wind hazard along with the engineering controls to mitigate risk.

The UXOSO will have the same minimum prerequisites as the UXO Technician III. In addition, the UXOSO will also have the specific training, knowledge and experience necessary to implement the Parsons Site Safety and Health Plan (SSHP), SHARP Manual and verify compliance with applicable safety and health requirements.

6.2.2 Senior UXO Supervisor

The SUXOS will have at least 15 years combined active duty in military EOD and contractor UXO experience, including at least 10 years in supervisory EOD and UXO positions. This individual will have documented experience with and/or specialized training in the type of UXO/MPPEH expected to be encountered. This individual will be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland, or the U.S. Naval EOD School.

As the most senior UXO qualified individual onsite, the SUXOS directly supervises all daily UXO/MPPEH activities. This individual is responsible for the successful performance of field teams, early detection and identification of potential problem areas, and instituting corrective measures. The SUXOS shall execute instructions from the Parsons site manager; document site conditions; photographically document operations; prepare project reports; and identify efforts to accomplish the statement of work. The SUXOS reports to the Parsons site manager.

6.2.3 UXO Technician III

This individual supervises a UXO team. This individual will have experience in OE clearance operations and supervising personnel and will be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland; or the U.S. Naval EOD School. The UXO Technician III will have at least 10 years combined active duty military EOD and contractor UXO/MPPEH experience. USA Environmental will provide one UXO Technician III for the duration of the project to assist in the disposal of MEC.

6.2.4 UXO Technician II

This individual will be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland; or the U.S. Naval EOD School. The UXO Technician II may be a UXO Technician I with at least five years combined military EOD or contractor UXO/MPPEH experience. USA Environmental will provide one UXO Technician II for the duration of the project to assist in the disposal of MEC.

6.2.5 UXO Technician I

The UXO Technician I will be a graduate of the EOD Assistant Course at Redstone Arsenal, Alabama, Eglin Air Force Base, Florida, or a DoD-certified equivalent course. The UXO Technician I will not perform UXO procedures without the direct supervision of a fully qualified UXO Technician II (or above). A UXO Technician I may become a UXO Technician II with at least 5 years combined military EOD and contractor UXO/MPPEH experience.

6.2.6 UXO Quality Control Specialist

The UXOQCS will have experience in UXO/MPPEH clearance operations and supervising personnel. This individual will have at least 10 years combined active duty military EOD and contractor UXO/MPPEH experience. The UXOQCS will have the required quality control training, including at least two years of experience providing QC on similar projects. The role of UXOQCS and UXOSO may be a dual hat role with one person filling both requirements.

6.2.7 Project Geophysicist

This individual need not be a UXO-qualified individual, but shall have a degree in geophysics, geology, geological engineering, or a closely related field and shall have a minimum of five years directly related geophysical experience.

6.2.8 Geophysics Team Leader

This individual need not be a UXO-qualified individual, but shall have a degree in geophysics, geology, geological engineering, or a closely related field and shall have a minimum of three years directly related geophysical experience.

6.2.9 Geophysical Assistant

This individual need not be a UXO-qualified individual, but shall have a degree in geophysics, geology, geological engineering, or a closely related field.

6.2.10 Heavy Equipment Operator/Technician

This individual need not be a UXO-qualified individual, but shall have the documented training and experience to properly operate the assigned equipment. In addition, the individual shall have 40-hour hazardous waste operations training.

6.2.11 UXO Sweep Personnel

Parsons employee who has received the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training will be hired to fill positions on the visual surface sweep teams and the mag & flag survey teams under the direct supervision of a UXO Technician III. UXO sweep personnel will receive on-site training in UXO/MPPEH recognition avoidance and safety.

6.2.12 Site Manager

The project manager will designate authority to a site manager to manage the day-to-day field operations. The site manager will be responsible for planning the daily field activities and for ensuring that all field data is collected and documented.

6.3 FIELD ORGANIZATION

The field teams will have the following personnel composition.

6.3.1 Survey Team

Each survey team will have a UXO Tech II escort and establish survey horizontal and vertical survey control within the survey locations.

6.3.2 Surface Clearance Team

Surface clearance teams will have sweep personnel from Parsons with a UXO Technician III team leader. The surface clearance team will remove metallic debris and surface MPPEH within the surveyed areas to provide a safe working environment and to reduce potential interference with the geophysical surveys.

6.3.3 Geophysical Team

There will be up to two geophysical teams; one will collect the geophysical data and one will use the RTK to reacquire the anomalies. Each geophysical team will consist of a Parsons geologist/geophysicist and a geophysical assistant. These teams may work consecutively collecting data one day and reacquiring targets the next.

6.3.4 Anomaly Reacquisition Team

There will be one anomaly reacquisition team. Each anomaly reacquisition team will consist of a Parsons geologist/geophysicist, a geophysical assistant, and a UXO Tech II.

6.3.5 Intrusive Investigation Team

There will be up to two intrusive investigation teams. Each intrusive investigation team will consist of a UXO Tech III and one UXO Tech II. In addition, the UXO Tech III may oversee up to four UXO Tech IIs to make up two dig teams operating in the same area.

6.3.6 Subcontractors

Parsons will direct the work of their two subcontractors, USA Environmental and Sevenson Environmental. USA will provide a UXO Technician II and III to assist in MEC transportation, storage and disposal. Sevenson Environmental will perform all earthwork activities including excavation, material screening, laydown of oversize material, stockpile maintenance and backfilling, if required.

6.4 LINES OF AUTHORITY

Parsons has established lines of authority for field personnel with assigned key roles for executing the project objectives. The lines of authority and organization chart are provided as follows:

The Project Manager, Todd Heino, will be responsible for overall project authority and client liaison. He will direct overall project work and will rely on the Geophysics Team Leader and the Site Manager to direct field operations.

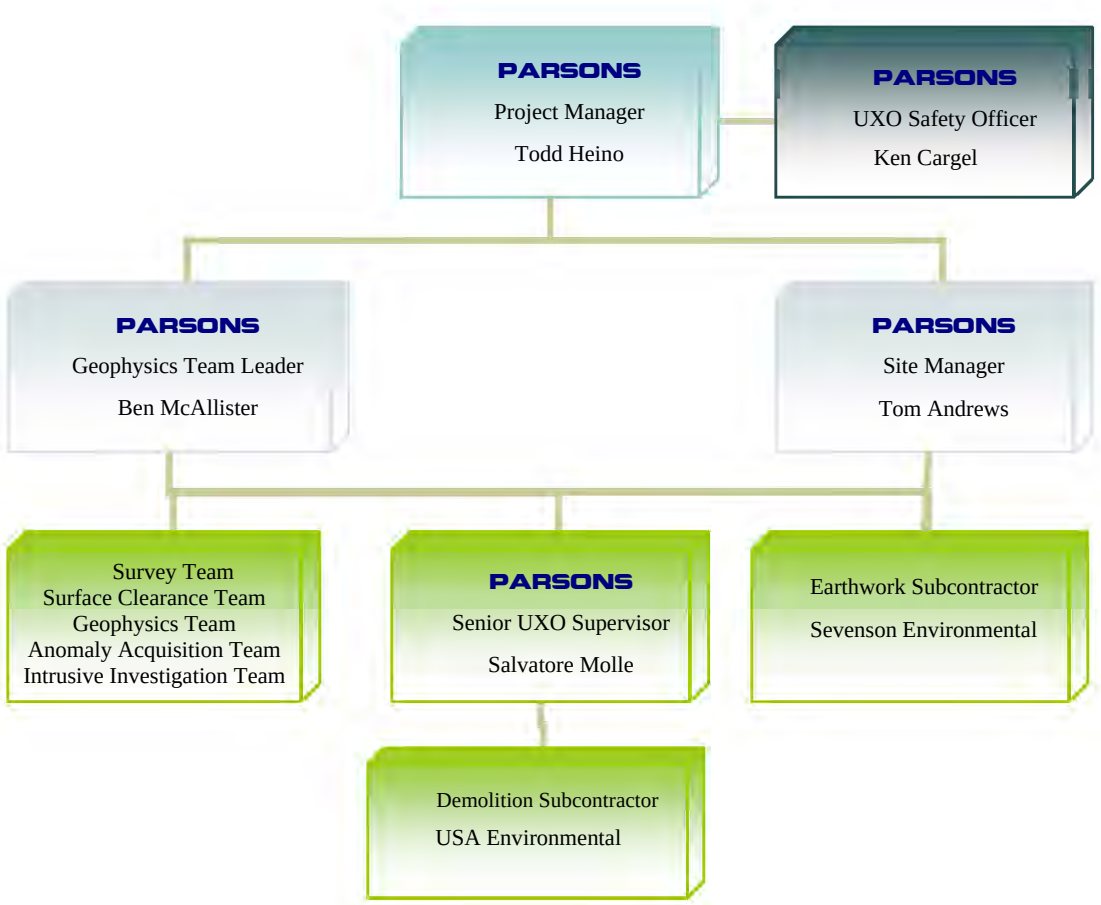
The Site Manager, Tom Andrews, is responsible for directing the excavation and screening of soil and will manage the earthwork subcontractor Sevenson™. Mr. Andrews will be assisted by the Senior UXO Supervisor (SUXO) when MPPEH is encountered.

The Geophysics Team Leader, Ben McAllister, is responsible for DGM mapping, data collection and processing, reacquisition, database management and selection of targets for intrusive investigation. Mr. McAllister will be assisted by the SUXO when MPPEH is encountered.

The Senior UXO Supervisor (SUXO), Salvatore Molle, is responsible for supporting the geophysical mapping target reacquisition, intrusive investigation of reacquired targets and supervision of the demolition contractor USA Environmental. The UXO team will also provide MPPEH inspection and handling for the excavation and screening support effort.

FIGURE 6.1

LINES OF AUTHORITY



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APPENDIX A

EXPLOSIVES SAFETY SUBMISSION

FORMER EOD RANGE, SEAD-57 AND THE FORMER RIFLE GRENADE RANGE, SEAD-007-R-01 (APRIL 2006)

EXPLOSIVES SAFETY SUBMISSION

MUNITIONS RESPONSE

SEAD 002-R-01, SEAD 57, SEAD 46 AND SEAD 007-R-01

SENECA ARMY DEPOT ACTIVITY,

ROMULUS, NEW YORK

April 2006

Prepared by:

PARSONS
150 Federal Street
Boston, MA 02110

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OE EE/CA by Parsons dated February 2004 and Geophysical Investigation by Shaw dated April 2005

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INTRODUCTION

This revised Explosive Safety Submission (ESS) is for the Munitions Response at the Former EOD Range (SEAD 57), the Former 3.5 inch Rocket Range (SEAD 46) and the Former Rifle Grenade Range (SEAD 007-R-01), Seneca Army Depot Activity (SEDA), New York. This ESS outlines the explosives control, procedures that will be implemented for the planned removal of MEC and munitions debris on the property listed above that is currently owned by the Department Of Defense (DoD).

SEDA is a US Army facility located in New York State, within Seneca County in the town of Romulus. SEDA occupies approximately 10,600 acres (Figure 1, Appendix A). It is bounded on the west by State Route 96A and on the east by State Route 96. The cities of Geneva and Rochester are located to the northwest (14 and 50 miles, respectively); Syracuse is 53 miles to the northeast and Ithaca is 31 miles to the south. The surrounding area is generally used for farming and rural in nature.

SEDA was included on the Federal Facilities National Priorities List on July 13, 1989. Consequently, all work to be performed under this contract will be performed according to Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the "Federal Facility Agreement under CERCLA Section 120 in the matter of Seneca Army Depot, Romulus, New York,"

In 1995 SEDA was added to the Base Realignment and Closure List and was officially closed in 1999. The Seneca County Industrial Development Agency (IDA) has prepared a reuse report entitled "Seneca Army Depot Reuse Plan and Implementation Strategy". The within this plan the majority of the installation will be reused for housing developments, industrial development, institutional and conservation/recreation uses upon transfer. Sites covered under this ESS currently fall within the area designated for "Conservation/Recreation" by the IDA. The IDA has designated the intended uses, "Conservation/Recreation", which is defined in the reuse plan as wildlife habitation, wildlife viewing, hiking/walking and picnicking. Although there is currently no plan for establishing camping facilities, the IDA does not wish to restrict such a possibility in the future.

This ESS is based upon the a clearance depth (4 ft) chosen in accordance with the Public Access scenario (e.g. surface recreation) with future excavation below this depth controlled by deed restrictions. Upon completion of the removal actions, clearance to competent bedrock and unrestricted use may be achieved at some or all of the sites.

1.0 REASON FOR MPPEH

SEAD 46

SEAD 46 consists of approximately 45 acres on the North side of the Depot due East of the Ammunition Storage Area. Although the Archive Search Report (ASR) described SEAD 46 as a 3.5" Rocket Range, it is apparent the area had multiple uses. It includes a reputed EOD disposal site as

well as a known Reserve Component Training Area. Despite this fact, it is hard to ignore the manmade earthen "hill" at the North end of the site that appears to be a backstop or perhaps a protective barricade of some sort. While this area may have been used as a firing or function test range, it is likely that the use was as a rocket motor testing range. There is a least one picture of a 3.5" motor fixed to a tripod in front of the berm in the SEAD historical records.

As part of the OE EE/CA, geophysical surveys and intrusive investigations were conducted in 2000 at SEAD 46. A total of 43% of the 40 acres was surveyed and 1,155 anomalies were investigated. 478 contained munitions debris and 10 of these were MPPEH.

The majority of MPPEH recovered (40mm rifle grenades, practice) were located at the South end, opposite the large hill. This probably reflects the site's use as a local training area in 1980's and 1990's.

Miscellaneous fuses, fuse igniters, slap fares, and MD were found in the vicinity of the "hill". This probably reflects the site use as a function test or disposal range. All items were found in the upper 12 inches of soil

During the Geophysical Investigation conducted by Shaw (April 2005) of SEAD 46 and 57, approximately 27 acres of SEAD 46 were digitally mapped. There was one area where the digital geophysical mapping (DGM) survey detected anomaly densities greater than 600 anomalies per acre. Areas that are saturated with anomalies or have more than 600 per acre are considered saturated response areas (SRAs). There was one SRA identified to the west of the berm at SEAD 46. This area is approximately one acre in size. In addition to the identification of the SRA, a total of 98 anomalies were intrusively investigated by Shaw. No MPPEH items were found.

SEAD 57

SEAD 57 formerly known as EOD# 1, consists of approximately 79 acres at the northwestern end of Depot immediately adjacent and South of the Open Burning/Open Detonation Grounds (435 acres) (Figure 3). An earthen berm is located in the center of the SEAD 57 area. The 143d Explosives Ordnance Detachment (EOD) was a Department of Army tenant organization located at Seneca Army Depot and performed ordnance and explosives (OE) disposal by detonation for more than 20 years, was assigned to this demolition area, known as SEAD 57, in the northwest portion of the installation.

The area was used by the 143rd from the 1970's until 1984 for disposal of munitions and homemade explosive devices that were collected from federal, state, and police agencies within the Northeastern United States. Training of EOD specialists assigned to the unit also took place at this location. After November 1984, transportation of munitions and homemade explosive devices to Seneca Army Depot was prohibited and disposal of these items was conducted at appropriate locations within the jurisdiction of the requesting authorities. Records in the ASR indicated that a ten (10) pound Net Explosive Weight (NEW) limit was enforced at the site.

The earthen bermed area in SEAD 57 is 100 feet long and 85 feet wide with sidewalls to 4 feet high built in the center of the 79 acre area. During the site visit for the ASR in 1998, shot holes were observed on the western side of the access road to the demo berm. These shot holes appear on a 1963 aerial photograph of what was at the time known as EOD range #1. According to the 1998 ASR conducted by the BRAC department, the blast radius for this area is 1800 feet from the center of the berm.

As part of the OE EE/CA (Parsons, February 2004), geophysical surveys and intrusive investigations were conducted at SEAD 57. A total of 23% of the 60 acres was mapped, 1,700 anomalies were investigated and 954 were classified as munitions debris. Three of these were determined to be MEC items. The three items were one MK2 grenade and two 20mm projectiles. During the surface sweep for the EE/CA, a 37mm APHE item was found at ground surface near the abandoned ammunition disassembly plant across the road from the site. All items found during the EE/CA were found the ground surface to six inches.

During the Geophysical Investigation of SEAD 57 conducted by Shaw (April 2005), approximately 22.5 acres of SEAD 57 were digitally mapped. The results indicated six SRAs at SEAD 57. The largest is an approximate 400-foot radius ejection spray pattern radiating out from the demo berm with the greatest concentration to the west of the SEAD 57 berm. A total of 13 acres of SRAs were found at SEAD 57. A total of 75 anomalies were intrusively investigated at SEAD 57. Four MPPEH items (a 75mm, a 75mm AP shot, a 105mm and an unknown bomb) were found and placed in storage for inspection. All other recovered metal was classified as munitions debris or scrap metal. Only one MD item was discovered below 6 inches in depth.

Additionally, approximately 40 acres heavy vegetation within the 1800 foot radius of SEAD 57 were investigated by clearing and grubbing ten foot wide transects every fifty feet. 17,000 liner feet of these transects were cleared by the “mag and flag” technique. The anomaly counts were significantly lower than in the open areas, however this may be due in part to the amount of non-ferrous MD found.

SEAD 007-R-01 – Grenade Range

The Grenade Range (SEAD 007-R-01) consists of a 30-acre Security Force Practice Range immediately South of SEAD 57 which was constructed during the mid 1980’s (Figure 4). The range still contains wooden and armored vehicle targets, distance, boundary markers, and the range control tower. The ASR states that 40mm M407A1 and 35mm M73 sub-caliber LAW were used at the site for security forces training. There is no record (or indication at the targets) that HE rounds were used. Small arms (blanks) casings are present (ASR 1998).

An OE EE/CA was completed in February 2004. A 15-acre area was digitally mapped using an EM-61. In addition to the 15 acres, the EM61 was used to sample 10 % of the area between the firing line and the target area. Relocation and verification of DGM targets during the EE/CA investigated 865 DGM targets in the range area. This intrusive investigation resulted in 102 MPPEH items (101 35 mm sub-cal LAW M73, and 1 Rifle Grenade M407A1, Practice) and numerous munitions debris items. Relocation and verification of 10% sampled area from the firing line to the target area identified 95 DGM targets in the meandering path data. Intrusive investigation of these targets revealed additional MPPEH and munitions debris.

SEAD 002-R-01 – EOD Ranges 2 and 3

The EOD Range 2 and 3 (SEAD-007-R-01) is split into two areas both located to the north of SEAD 46. EOD # 2 is collocated with the IRFNA site (SEAD 13) on the western shore of the Duck Pond to the west of SEAD 46 as shown on Figure 5. The 1998 ASR states that explosive devices were used in this area, and non explosive projectiles were thrown in the water at the duck pond. EOD activities in this area were not related to the IRFNA site. The EOD #3 area is located 250 feet to the north of the earthen berm in SEAD 46 as shown on Figure 6. The 4.5 acre area is mostly flat with the exception of a 100 by 200 foot depression in the middle of the site. This site was reported in the 1999 ASR as an EOD disposal area.

2.0 MAPS

Maps detailing the location and extent of the area of concern are presented in Figures 1 through 4 in Appendix A to this submission.

3.0 AMOUNT AND TYPE OF MPPEH

MPPEH presence and density at SEAD 46, 57, and 007-R-01 has been characterized. The OE EE/CA and the Shaw Geophysical Investigation has been provided to USATCES.

A summation of the Geophysical Investigation effort follows:

At SEAD 46, 27 acres were mapped with an EM61-MK2. 98 anomalies were intrusively investigated. No MPPEH was found. Forty-five (45) acres of heavy vegetation was cleared and grubbed in ten foot wide transects. 19,500 feet of these transects were cleared with the “mag and flag” technique. No MPPEH was found. MD and scrap metal was found in both open and wooded areas.

Based upon this result and the EE/CA, the most common MPPEH found was the M382 and M407A1, 40 mm practice grenade. Since the possibility exists that a M383/384 HE round may have been demonstrated at the site, this is chosen as the MGFD. The NEW of the M383/384 is 54.5 g of Comp A5. The Fragmentation Data Review Forms are in Appendix D. The PAED is 345 feet.

At SEAD 57, 22.5 acres was mapped with an EM 61 Mk II. 75 anomalies were intrusively investigated.

Four (4) MPPEH were found and placed in storage for future inspection. Forty (40) acres of heavy vegetation was cleared and grubbed in ten foot wide transects. 17,000 feet of these transects were cleared with the "mag and flag" technique. No MPPEH was found. MD and scrap metal was found in both the open and wooded areas.

Based upon the results of the EE/CA, the Geophysical Investigation, and all MPPEH removed during recent Munitions Response projects at SEAD, the MGFD most likely to be encountered will remain the same as used on the adjacent Open Burning/Open Detonation Grounds (SEAD 45/115). This is the 37mm MKII projectile. The Net Explosive Weight (NEW) is 0.0533 lbs. of TNT. The Fragmentation Data Review Forms are in Appendix D. The PAED is 980 feet (DDESB TP-16, 1 Dec 2003).

For SEAD 007-R-01 the possibility exists that a few 40mm HE may have been demonstrated at the site. Therefore, the MGFD is the M383/384 HE grenade.

If a larger, live, or suspected live MPPEH item is encountered at any site, the withdrawal distances will be adjusted in accordance with TP 16 and an amendment to the ESS will be submitted. Until the appropriate distances are determined by TP-16, the default distances in DoD 6055.9-STD (Chapter 5, Paragraph E.4.a) will be used.

4.0 START DATE

The target start date for the intrusive investigation and mechanical sorting operation is July 2006.

5.0 FROST LINE DEPTH

The design frost depth for this site is 40 inches.

6.0 CLEARANCE TECHNIQUES

This section presents information concerning the techniques to be used to clear each of the sites of MPPEH. In general, in areas of low density anomalies, individual targeted anomalies will be reacquired and intrusively investigated. In areas of high density anomalies, the soil will be excavated and MPPEH will be removed using a mechanical screening and visual inspection process. Details of these processes are provided below.

6.1 Low Density Anomalies

The Contractor's UXO qualified personnel will reacquire the targeted anomalies based on the previous Geophysical Investigation of Munitions Destruction Areas SEAD 46 & 57 (Shaw 2005). The anomalies will be targeted based on a review of the DGM data that shows a response level

corresponding to MPPEH. These anomalies will be intrusively investigated and all identified MPPEH will be removed to a depth of four (4) feet. Any MPPEH encountered below this depth during the intrusive investigation will also be removed, however, none is expected.

In the wooded areas, the Contractor will excavate the Mag and Flag anomalies in the existing transects previously surveyed (Shaw April 2005). If no MPPEH is found, the wooded areas will be considered safe for public access. If MPPEH is found, the wooded areas will be cleared using technology-aided surface removal techniques.

The Contractor will resurvey the entire 25 acres to identify DGM targets above the established threshold. From the DGM data, target anomalies will be identified. The identified anomalies will be reacquired and intrusively investigated. Once all identified target anomalies have been removed, a 10% QC survey will be performed to confirm all target anomalies have been removed. Any MPPEH encountered during the intrusive investigation will be destroyed, or certified as munitions debris, on a weekly basis.

A final Munitions Response Report will be submitted. All of the data gathered from the mapping, anomaly investigation, and soil processing will be compiled to draw conclusions on the existence, or non-existence, of MEC that may remain at the sites.

6.2 High Density Anomaly Areas

The high density or saturated response areas (SRAs) will be excavated and screened to remove MPPEH. The SRAs are located at SEAD 46 and SEAD 57.

Soil Excavation

In addition to the Mag and Flag transects, DGM and intrusive investigation, the SRAs will be excavated to remove MPPEH. The perimeter of each SAR area will be staked with a 10’ off set using established coordinates from the DGM. RTK GPS will be used to install grade stakes and perimeter markers. After the SAR area has been established, an initial surface sweep of the area will be conducted by UXO personnel. If MPPEH is identified during the surface sweep, it will be transported to the onsite storage at the designated site storage bunker for future disposal. If the MEC cannot be safely moved, the area will be cleared and the MEC will be detonated in place by UXO personnel.

When the SRA has been initially cleared, it will be mowed to a height of 6 inches using a bush-hog which has been shielded for a 37mm in accordance with the attached Fragmentation Data Review Form in Appendix D. The area again will be visually inspected by qualified UXO personnel for any surface MEC material.

The SRA area will than cultivated to a depth of six (6) inches using a cultivator mounted behind a rubber tired tractor. The tractor operator will be protected to the standard attached in Appendix D.

Once the area has been cultivated, the area will be excavated to a six (6) inch depth using a shielded grader which will stockpile the material in a windrow to remove moisture. The windrowed material will be loaded out with a shielded rubber tired loader and transported to the processing area. The operators of the excavator, grader, loader and trucks will operate behind shielding in accordance with the standard outlined in Appendix D.

The entire mowing, cultivation, excavation and loading process will be observed by UXO personnel. Again if MEC is encountered, it will be transported to the site storage bunker for future disposal or detonated in place as required.

The identified SRA on the front face of the target berm at SEAD 46 to a depth of one foot will be removed and transported to the processing area located at SEAD 57. The areas on the rear of the berm are wooded and will be checked for anomalies using a Schonstedt GX 72 or Fischer All Metal Detector used in the Mag and Flag survey mode. Identified anomalies will be flagged and investigated as required on an individual basis.

If the sides and rear of the berm prove to be SRA, the trees and vegetation will be removed and the top one foot of soil will be excavated and transported to the processing area. The excavated area will be checked consistent with the procedure outlined for the frontal area.

Soils Processing

The stockpiled material will be processed through a screening plant similar to a Trommel™ screen or shaker screen. The following equipment will be used:

- A grizzly sized at greater then 6”
- A de-lumper
- Vibrating 5/8” harp screen deck
- Cross belt magnet
- Magnetic head pulley
- Stack-out conveyors

The material will be taken from the stockpile area by a shielded loader and placed into the 6” grizzly screen where all material greater than 6” will be retained. The material passing through the grizzly will continue to a low speed de-lumper for further size reduction. Once the material has been homogenized by the de-lumper, the material will than pass to a vibrating 5/8” Harp screen. The 5/8” screen size was selected because the smallest munitions found at the site was a 20 mm which has a least dimension of 0.78” which is larger than the 5/8” harp screen. The material retained by the 5/8”

Harp screen will pass onto a sorting conveyor with an active cross belt magnet and a magnetic head pulley. The cross belt magnet will remove all large ferrous items from the conveyor and drop them into a steel container. The out-feed material on the conveyor from the harp screen will be maintained at a maximum of five inches for efficient cross belt magnet operation. Any smaller ferrous material in the out-feed material not removed by the cross belt magnet will be retained by a magnetic head pulley. This unit has a strong electromagnet built into the final pulley on the conveyor. As the material leaves the out-feed conveyor, the ferrous material is attracted to the magnetic head pulley and dropped into a container below the head pulley. Both of the magnetic separators are self cleaning magnets that will remove the ferrous material from the oversize (greater than 5/8") output. The remaining non-ferrous soil and remaining munitions debris that pass the magnetic separation system will be conveyed to a stockpile by a stack out conveyor. This material will be the secondary oversize material

The entire mechanical sorting operation will be observed by a UXO Technician located in a Blast Shield Protective Device- See Appendix D. The UXO observer will have a remote kill switch to stop the out-feed conveyors if a MEC or smoking round is observed in the process. If a potential MEC item is observed in the process stream, the process equipment will be stopped with the kill switch and all personnel moved to a safe withdrawal distance. The MEC round will be removed and placed into a dedicated storage container. If the round is smoking it will be allowed to react unless it is deemed to be safe to remotely start up the conveyor and discharge the round into a bucket containing water to stop the reaction.

The screening process will generate four separate material streams that will be treated as follows:

- Material 6" and greater (gross oversize): This material will consist of large rocks, vegetation and metal scrap that do not pass through the "Grizzly" screen. This material will be sorted as needed by the UXO technicians for possible MEC. The remaining oversize rocks and vegetation will be separated from the munitions debris and used as onsite backfill. Once the MEC and munitions debris are removed, the remaining scrap metal will be stockpiled until it is disposed of at the scrap dealer upon completion of the project

- Material >5/8" and <6": The secondary oversize stockpile will periodically be mechanically laid down in 6-inch to 12-inch lifts in a previously cleared area surrounded by silt fence. Once the material is laid out it will be swept for MEC by the UXO Technicians using a Fisher™ or similar all metal detector. All anomalies identified by the sweep team will be investigated by hand digging. Any MEC encountered that can be transported will be removed and placed into the onsite storage bunker for future disposal. Any item deemed unsafe to move will be BIP in the lay down area before the remainder of the area can be swept. All remaining MPPEH will be demilitarized and certified clean before being sent off-site for disposal at a smelter.

- Material <5/8": The material that passes through the harp screen will be used as site backfill. At this point, the material that has passed through the 5/8-inch screen will be considered free of MPPEH and available for backfill as determined by the analytical results of the soil sampling effort.

- Ferrous Removed by Magnet: This material will be laid down in a previously cleared area in a 6-inch lift where it will be visually inspected for MEC and munitions debris by UXO technicians. MEC material will be removed and placed into storage in the onsite storage bunker for further disposal. Munitions debris will be rendered unidentifiable as required and along with the scrap will be sent to an off-site smelter for disposal.

MPPEH will be destroyed, or certified as munitions debris, on a weekly basis.

6.3 Other Project-Specific Procedures

The Contractor will place simulated UXO objects, at known depth and orientation at a pre-determined frequency for QA purposes prior to the start of work. The contractor will be required to identify and recover all QA targets in each area prior to acceptance by the government. The Contractor's QC Manager, together with the SUXO, will inspect 10% of the target locations after removal efforts by the UXO teams. Failure to identify a QC target will require a root cause investigation and rework of the deficient portion of the work. Failure to identify a QA target will require the rework of all grids worked that day.

The contractor will provide explosives for destruction operations. It is anticipated that demolition materials, perforated charges and shaped charges, as appropriate, will be used. These are considered Class 1.1 and 1.4 explosives.

Explosives will be stored in the SEDA OB/OD area double igloo type, earthen-covered magazine. The storage igloo locations are shown on Figure 1. The existing magazine is constructed to DDESB and Army standards and is complete with the required lightning protection and current ground testing certification. The contractor will store detonating cord, perforators and time fuse in one half of one of the magazines. In the other half of the first magazine, the contractor will store initiators. A sandbag wall (minimum two feet wide and at least as high as materials stacked on either side) will separate the two halves of this magazine. In the second of the magazines, MEC (which was located and is awaiting the weekly demolition operation) will be stored. Each of the two magazines is designed for storage of a maximum NEW not to exceed 450 pounds. At no time will the contractor store more than 100 pounds NEW in either magazine.

Magazine A0705, which is approved for up to 250,000 lbs HC 1.1 explosives, will be used to store any recovered MEC that exceeds the 100 lb limit for the OB/OD service magazine.

For security, access into the fenced SEDA ammunition area is restricted. Additionally, SEDA has erected a new fence further restricting unauthorized access to Munitions Response Area. Access into

a work site exclusion zone will be limited to contractor personnel specifically authorized to work on site, the Army Corps of Engineers Contracting officer representative's representative (CORR), the AFCEE Contracting Officer and Contracting Officer's Representative, and the installation manager. All other personnel will be restricted from entering the exclusion zone or be escorted by contractor or Corps personnel.

Disposal/Venting/Demilitarization operations will be carried out weekly. Items which can be moved will be consolidated in accordance with "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites", dated August 1998 and approved by DDESB on 27 October 1998. Disposal will be carried out at the "Hill" on the OD Ground. MEC will be stored in the second magazine while awaiting demo operations. Items that cannot be moved will be blown-in-place daily, on an individual basis.

All munitions debris will be certified as explosive free and demilitarized prior to removal from the Seneca Army Depot.

All applicable OSHA, USACE (EM385-1-1), DOD (6055.9-STD), Army (385-64) safety regulations will be followed at all times, without exception. Hazard analyses and daily safety briefings will be prepared and conducted as stated in the contractor's approved Site Safety and Health Plan (SSHP).

7.0 ALTERNATE TECHNIQUES

None Identified.

8.0 QUANTITY-DISTANCES

The appropriate Quantity-Distances are shown on the site maps.

MEC Areas: The PAED has been established at 980 feet for the 37mm projectile at SEAD 57 and a minimum of 345 feet at SEAD 46 and SEAD007-R-01 for the 40mm M383 and 384.

Explosive storage magazine separation distance: Minimum of 658 feet (Front) and 250 feet (Rear and Sides), IAW Table 9-1 of DoD 6055.9-STD. Note that these distances are for 100 lbs. HD 1.1 explosives; the contractor at any given time will store only 50 lbs of donor explosives therefore, they exceed the distance requirements for the 1.4 demolition materials to be stored in one of the magazines. MEC (Class 1.1) will be stored in the second magazine.

Another approved ammunition storage magazine, A0705 is available. The applicable PAED for this magazine is 3,150 ft.

Intentional Detonations: Minimum of 980 feet (via approved calculation).

During operations, appropriate protection will be used for site personnel and the public during situations where an intentional detonation is planned for MEC found on the removal operations. Most MEC will be moved to the OD "Hill" for detonation or Thermal Treatment/Certification as munitions debris.

9.0 OFF-SITE DISPOSAL

All munitions debris will be sent to a local specialty metals supplier, and smelted. Certificates of Destruction will be provided to the SEDA upon removal from the site.

10.0 TECHNICAL SUPPORT

No Chemical Warfare Materials (CWM) are suspected at this site. The contractor will positively identify all MPPEH uncovered before items are removed or destroyed. If a suspect CWM is encountered, the Site Safety Officer will stop all operations on site and notify the BEC. The BEC will notify the appropriate Explosive Ordnance Disposal (EOD) Detachment (725th Ordnance Company (EOD) Fort Drum) and/or Technical Escort Unit.

11.0 LAND USE RESTRICTIONS

The area will be restricted to public access (i.e. surface recreation), which will be controlled by deed covenants. Sites where clearance for unrestricted activity can be obtained, upon transfer from Army ownership, will include a deed notice advising property owners that the parcel was a former Military Munition Response Site and that all MEC has been removed and should an object be found, they are to contact the local law enforcement agency

12.0 PUBLIC INVOLVEMENT

This removal is being performed under the CERCLA umbrella since Seneca is a BRAC federal facility on the National Priorities List. Consequently, the required public involvement process is already in place (BCT, RAB, and general public involvement) with the SEDA BEC taking the lead.

13.0 AFTER ACTION REPORT

Following the completion of the MPPEH removal project for the four sites, a copy of the Final Report will be provided.

14.0 AMENDMENTS AND CORRECTIONS

An amendment or correction discussing any changes in the procedures to be used or the conditions encountered during this removal will be provided for review and approval as warranted.

15.0 REFERENCES

General

a. AR 385-64, Ammunition and Explosives Safety Program dated 2/1/2000

b. PAM 385-64 Ammunition and Explosive Safety Standards 12/15/1999

c. Department of Defense Explosives Safety Board, Interim Guidance on Land Clearance Planning and Removal Depth for Ammunition and Explosives. 1993.

d. DDESB, Guidance for Clearance Plans, 27 January 1998.

e. Interim Final, "Guidance for Conducting Remedial Investigations/Feasibility Studies Under CERCLA", U.S. EPA, Office of Solid Waste and Emergency Response, October 1988.

f. "U.S. Corps of Engineers Safety and Health Requirements Manual," U.S. Army Engineering Manual No. EM-385-1-1, 3 September 1996.

g. "Safety Concepts and Basic Considerations for Unexploded Ordnance (UXO) Operations", U. S. Army Engineering and Support Center, Huntsville, Revised 16 February 1996.

h. "Interim Guidance Documents": http://www.hnd.usace.army.mil/oew/intguidocs.asp

i. "Regulations, Pamphlets, Manuals": http://www.hnd.usace.army.mil/oew/erepems.asp

j. TP 16 database access go to http://www.ddesb.pentagon.mil/ (password required)

k. Comprehensive Environmental Response Compensation and Liability Act (CERCLA), December 11, 1980

l. . Seneca Army Depot Reuse Plan and Implementation Strategy

m. Federal Facilities National Priorities list as amended July 13, 1989

n. 1995 Base Realignment and Closure List

Specific

a. "Federal Facility Agreement under CERCLA Section 120 in the matter of Seneca Army Depot, Romulus, New York," Docket No. II-CERCLA-FFA-00202, USEPA, U.S. Department of the Army, and the New York State Department of Environmental Conservation, November 1990.

b. Final Ordnance and Explosives Engineering Evaluation/Cost Analysis (EE/CA), Seneca Army Depot, February 2004. Former EOD area SEAD 45 and Former Grenade Range SEAD 007-R-01, Parsons Engineering.

c. Final Geophysical Investigation, Munitions Destruction Areas, SEAD 46 and 57, April 2005, Shaw Environmental.

16.0 ABBREVIATIONS AND ACRONYMS

Abbreviations and Acronyms are listed on the attached pages.

Consolidated Definitions
Anomaly Avoidance. Techniques employed on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.
Chain of Custody. The activities and procedures taken throughout the inspection, re-inspection and documentation process to maintain positive control of MPPEH to ensure the veracity of the process used to determine the status of material as to its explosive hazard. This includes all such activities from the time of collection through final disposition.
Chemical Agent (CA). A chemical compound (to include experimental compounds) that, through its chemical properties produces lethal or other damaging effects on human beings, is intended for use in military operations to kill, seriously injure, or incapacitate persons through its physiological effects. Excluded are research, development, testing and evaluation (RDTE) solutions, riot control agents, chemical defoliants and herbicides; smoke and other obscuration materials; flame and incendiary materials; and industrial chemicals.
Chemical Agent (CA) Hazard. A condition where danger exists because CA is present at a concentration high enough to present potential unacceptable effects (e.g., death, injury, damage) to people, operational capability, or the environment.
Chemical Agent (CA) Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of a mishap involving chemical warfare material (CWM) and CA in other than munitions configurations.
Chemical Warfare Material (CWM). Items generally configured as a munition containing a chemical compound that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other than munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide (AC), cyanogen chloride (CK), or carbonyl dichloride (called phosgene or CG)) configured as a military munition. Due to their hazards, prevalence, and military-unique applications, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control devices; chemical defoliants and herbicides; industrial chemicals (e.g., AC, CK, or CG) not configured as a munition; smoke and other obscuration producing items; flame and incendiary producing items; or soil, water, debris or other media contaminated with low concentrations of chemical agents where no CA hazards exist.
Chemical Warfare Material (CWM) Response. Munitions responses and other responses to address the chemical safety, explosives safety, when applicable, human health, or environmental risks presented by CA-filled munitions and CA in other than munitions configurations. (See munitions response.)
Construction Support. Assistance provided by DoD EOD or UXO qualified personnel and/or by personnel trained and qualified for operations involving CA, regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or CA hazards.
Cultural Debris. Debris found on operational ranges or munitions response sites, which may be removed to facilitate a range clearance or munitions response, that is not related to munitions or range operations. Such debris includes, but is not limited to: rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, and fence wire.
Defense Sites. Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. 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 U.S.C. 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 of, consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))
Disposal. End of life tasks or actions for residual materials resulting from demilitarization or disposition operations.
Disposition. The process of reusing, recycling, converting, redistributing, transferring, donating, selling, demilitarizing, treating, destroying, or fulfilling other life-cycle guidance, for DoD property.

Documentation of the Explosives Safety Status of Material. Documentation attesting that material: (1) does not present an explosive hazard and is consequently safe for unrestricted transfer within or release from DoD control, or (2) is MPPEH, with the known or suspected explosive hazards stated, that is only transferable or releasable to a qualified receiver. This documentation must be signed by a technically qualified individual with direct knowledge of: (1) the results of both the material's 100 percent inspection and 100 percent re-inspection or of the approved process used and the appropriate level of re-inspection, and (2) the veracity of the chain-of-custody for the material. This signature is followed by the signature of another technically qualified individual who inspects the material on a sampling basis (sampling procedures are determined by DoD entity that is inspecting the material).
Environmental Regulatory and Safety Officials. Include, but may not be limited to environmental regulators, environmental coordinators or hazardous material coordinators, law enforcement officers, and safety personnel of the U.S. Environmental Protection Agency (USEPA), American Indians and Alaska Natives, other Federal Land Managers, and/or the States. When appropriate, public health officials of various agencies may also be involved.
Explosive Hazard. A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage to people, property, operational capability, or the environment).
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 imminent danger, for example, by damage or deterioration.
Explosive Ordnance Disposal (EOD) Personnel. Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal, are assigned to a military unit with a Service-defined EOD mission, and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform Render Safe Procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices.
Explosive Ordnance Disposal (EOD) Unit. A military organization constituted by proper authority, manned with EOD personnel, outfitted with equipment required to perform EOD functions, and assigned an EOD mission.
Explosives or Munitions Emergency Response. All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency. An explosives or munitions emergency response may include in-place render-safe procedures, treatment or destruction of the explosives or munitions, and/or transporting these items to another location to be rendered safe, treated, or destroyed. Any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency. Explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at RCRA facilities. (Military Munitions Rule, 40 CFR 260.10)
Explosives Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions.
Interim Holding Facility (IHF). A temporary storage facility designed to hold recovered chemical warfare material (RCWM).
Land Use Controls (LUC). LUC are physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property, to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.
Long-Term Management (LTMgt). The period of site management (including maintenance, monitoring, record keeping, 5-year reviews, etc.) initiated after response (removal or remedial) objectives have been met (i.e., after Response Complete).
Material Potentially Presenting an Explosive Hazard (MPPEH). Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Military Munitions. Military munitions means all 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 Department of Defense, the Coast Guard, the 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 ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other than nonnuclear components of nuclear devices that are managed under the nuclear weapon program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)(A) through (C))

Military Munitions Burial Site. A site, regardless of location, where military munitions or CA, regardless of configuration, were intentionally buried, with the intent to abandon or discard. This term includes burial sites used to dispose of military munitions or CA, regardless of configuration, in a manner consistent with applicable environmental laws and regulations or the national practice at the time of burial. It does not include sites where munitions were intentionally covered with earth during authorized destruction by detonation, or where in-situ capping is implemented as an engineered remedy under an authorized response action.

Minimum Separation Distance (MSD). MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

Munition with the Greatest Fragmentation Distance (MGFD). The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

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 U.S.C. 101(e)(5); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

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 U.S.C. 2710(e)(3)).

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

Munitions Response. Response actions, including investigation, removal actions and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC), or to support a determination that no removal or remedial action is required.

Munitions Response Area (MRA). Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

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

Mutual Agreement. A meeting of the minds on a specific subject, and a manifestation of intent of the parties to do or refrain from doing some specific act or acts. Inherent in any mutual agreement or collaborative process are the acknowledgement of each member's role in the process and their differing views of their authorities. The mutual agreement process will provide a means of resolving differences without denying the parties an opportunity to exercise their respective authorities should mutual agreement fail to be achieved.

One Percent Lethality Distance. A distance calculated from a given CA Maximum Credible Event (MCE) and meteorological conditions (temperature, wind speed, Pasquill stability factor) and established as the distance at which dosage from that MCE agent release would be 150 mg-min/m^3 for H and HD agents, 75 mg-min/m^3 for HT agent, 150 mg-min/m^3 for Lewisite, 10 mg-min/m^3 for GB agent, 4.5 mg-min/m^3 for VX vapor, and 0.1 mg-min/m^3 for inhalation and deposition of liquid VX.

On-call Construction Support. Construction support provided, on an as needed basis, where the probability of encountering UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, has been determined to be low. This support can respond from off-site when called, or be onsite and available to provide required construction support.

On-site Construction Support. Dedicated construction support, where the probability of encountering UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, has been determined to be moderate to high.

On-the-Surface. A situation in which UXO, DMM or CA, regardless of configuration, are: (A) entirely or partially exposed above the ground surface (i.e., the top of the soil layer); or (B) entirely or partially exposed above the surface of a water body (e.g., because of tidal activity).

Open Burn (OB). An open-air combustion process by which excess, unserviceable, or obsolete munitions are destroyed to eliminate their inherent explosive hazards.

Open Detonation (OD). An open-air process used for the treatment of excess, unserviceable or obsolete munitions whereby an explosive donor charge initiates the munitions being treated.

Operational Range. A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101(e)(3)(A) and (B)). Also includes "military range," "active range," and "inactive range" as those terms are defined in 40 CFR §260.200.

Primary Explosive. Primary explosives are highly sensitive compounds that are typically used in detonators and primers. A reaction is easily triggered by heat, spark, impact or friction. Examples of primary explosives are lead azide and mercury fulminate.

Public Access Explosion Distance (PAED). The PAED is defined as longest distance of the hazardous fragment distance, inhabited building distance (IBD) or overpressure, or the One Percent Lethality Distance. For siting purposes, the PAED is analogous to the IBD for explosives; therefore, personnel not directly associated with the chemical operations are not to be allowed within the PAED.

Qualified Receiver. Entities that have personnel who are, or individuals who are, trained and experienced in the identification and safe handling of used and unused military munitions, and any known or potential explosive hazards that may be associated with the MPPEH they receive; and are licensed and permitted or otherwise qualified to receive, manage, and process MPPEH.

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 U.S.C. 101(e)(1)(A) and (B)).

Range activities. Research, development, testing, and evaluation of military munitions, other ordnance, and weapon systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapon systems. (10 U.S.C. 101(e)(2)(A) and (B)).

Range Clearance. The destruction, or removal and proper disposition of used military munitions (e.g., unexploded ordnance (UXO) and munitions debris) and other range-related debris (e.g., target debris, military munitions packaging and crating material) to maintain or enhance operational range safety or prevent the accumulation of such material from impairing or preventing operational range use. "Range clearance" does not include removal, treatment, or remediation of chemical residues or munitions constituents from environmental media, nor actions to address discarded military munitions (e.g., buried pits) on operational ranges.

Range-Related Debris. Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., target debris, military munitions packaging and crating material).

Recovered Chemical Warfare Material (RCWM). CWM used for its intended purpose or previously disposed of as waste, which has been discovered during a CWM response or by chance (e.g., accidental discovery by a member of the public), that DoD has either secured in place or placed under DoD control, normally to a DDESB-approved storage location or interim holding facility, pending final disposition.

Render Safe Procedures (RSP). The portion of EOD procedures that involves the application of special disposal methods or tools to interrupt the functioning or otherwise defeat the firing train of UXO, thus triggering an unacceptable detonation.
Secondary Explosives. Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX or cyclonite), HMX, and tetryl.
Small Arms Ammunition. Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.
Team Separation Distance (TSD). The distance that munitions response teams must be separated from each other during munitions response activities involving intrusive operations.
Technical Escort Unit (TEU). A DoD organization manned with specially trained personnel that provide verification, sampling, detection, mitigation render safe, decontamination, packaging, escort and remediation of chemical, biological and industrial devices or hazardous material.
Technology-aided Surface Removal. A removal of UXO, DMM or CWM on the surface (i.e., the top of the soil layer) only, in which the detection process is primarily performed visually, but is augmented by technology aids (e.g., hand-held magnetometers or metal detectors) because vegetation, the weathering of UXO, DMM or CWM, or other factors make visual detection difficult.
Time Critical Removal Action (TCRA). Removal actions where, based on the site evaluation, a determination is made that a removal is appropriate, and that less than 6 months exists before on-site removal activity must begin (40 CFR 300.5)
Unexploded Ordnance (UXO). Military munitions that (A) have been primed, fused, 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 whether by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C))
UXO Technicians. Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.
UXO-Qualified Personnel. Personnel who have performed successfully in military EOD positions, or are qualified to perform to the following Department of Labor, Service Contract Act Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.
Venting. Exposing any internal cavities of MPPEH, to include training or practice munitions (e.g., concrete bombs), using DDESB- or DoD Component-approved procedures, to confirm that an explosive hazard is not present.

APPENDIX A

FIGURES

749250 749500 749750 750000 750250

1008000 1007750 1007500 1007250 1007000

EOD Area 2
002-R-01

EOD Area 3
002-R-01

SEAD 46

MPPEH
Storage Magazine
A0707

Storage
Magazine
A0705

SEAD 57

PARSONS
FIELD OFFICE

Grenade Range
007-R-01

Removal Action Area

Approved Roads

Storage Magazines

997750 Grid Coordinates
748750 (New York State Plane, Central)

N
W E
S

3,200 1,600 0 3,200 Feet

PARSONS

DESIGNED BY: BJM	Location and Traffic Plan		
DRAWN BY: BJM			
CHECKED BY:	DATE PRINTED: March 31, 2006	PROJECT NUMBER: 74504-01210	
SUBMITTED BY: BJM	AREIAL PHOTOGRAPH: 1989 2 ft Resolution	FN: Figure 1	
	FILE: Sitemap.mdx	SCALE: 1:35,080.9229	

Open Burning Grounds

PAED 980 ft

PAED 980 ft

SEAD-57
Berm

Proposed Area of Clearance

- Area of Excavation (14 acres)
- SEAD 57 Area 1000 feet from center of berm
- SEAD 57 Public Access Exclusion Distance PAED (980 feet)
- Woods Area
- 997750 / 748750 Grid Coordinates (New York State Plane, Central)

N W E S

350 175 0 350 700 Feet

PARSONS

DESIGNED BY: BJM	Proposed Area of Clearance SEAD-57
DRAWN BY: BJM	
CHECKED BY:	Print Date: March 23, 2006
	PROJECT NUMBER: 744538-03300
	Aerial photograph: 1989 2-ft. Resolution
	PAGE NUMBER: Figure 2
SUBMITTED BY: BJM	FILE: O:Seneca/MR/Parsons/S57
	SCALE: 1:1200

PAED Distance 345 feet from Greande Range Clearance Area

Grenade Range Clearance Area (25 Acres)

997750 748750 Grid Coordinates (New York State Plane, Central)

N W E S

110 55 0 110 220 Feet

PARSONS

DESIGNED BY: BJM	Public Access Exclusion Distance Grenade Range 007-R-01
DRAWN BY: BJM	
CHECKED BY:	DATE: March 31, 2006 / PROJECT NUMBER: 744538-01100
SUBMITTED BY: BJM	AREIAL PHOTOGRAPH: 1989 2ft. Resolution / FN: Figure 3
	FILE: GR_RNG.APR / SCALE: 1:2,484.367

Proposed Area of Clearance

SEAD46 Area of Clearance

SRA Excavation Area

PAED 345 feet

997750 748750 Grid Coordinates (New York State Plane, Central)

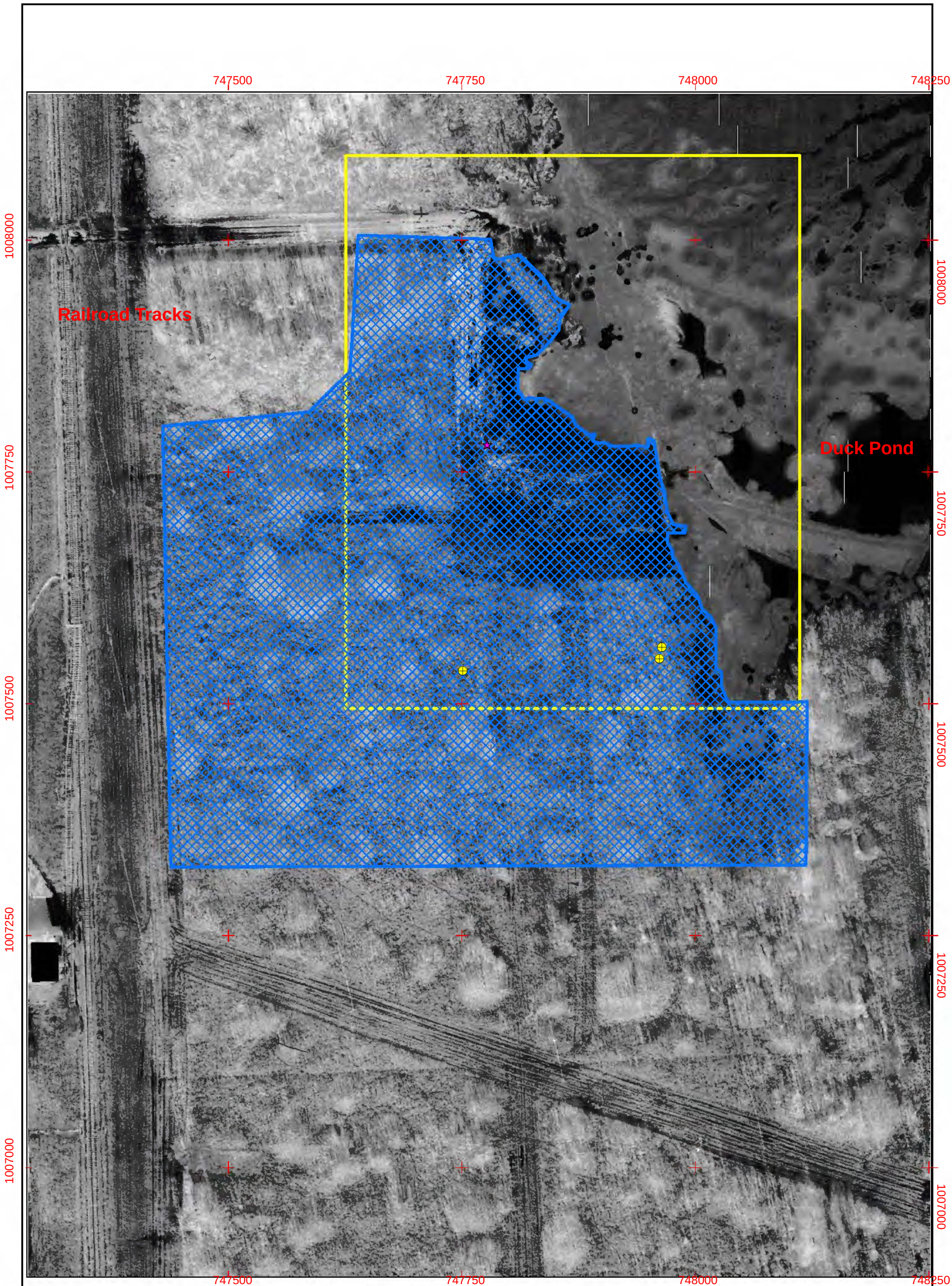
N W E S

160 80 0 160 320 480 Feet

Note: Grids investigated intrusively during the EE/CA will not be re-surveyed

PARSONS

DESIGNED BY: BJM	Public Access Exclusion Distance SEAD 46	
DRAWN BY: BJM		
CHECKED BY:	DATE: March 31, 2006	PROJECT NUMBER: 736703-01000
SUBMITTED BY: BJM	AERIAL PHOTOGRAPH: 1998 2 ft Resolution	FN: Figure 4
	FILE: SEAD_46.APR	SCALE: 1:4,203.240185



OE Item Recovered in EOD #2 During EE/CA

Fuze and Booster Recovered in EOD # 2 During EE/CA

Area Requiring Resurvey - (5 Acres)

EOD2 Area Limit of Work

Area Mapped During EE/CA in EOD# 2 Area

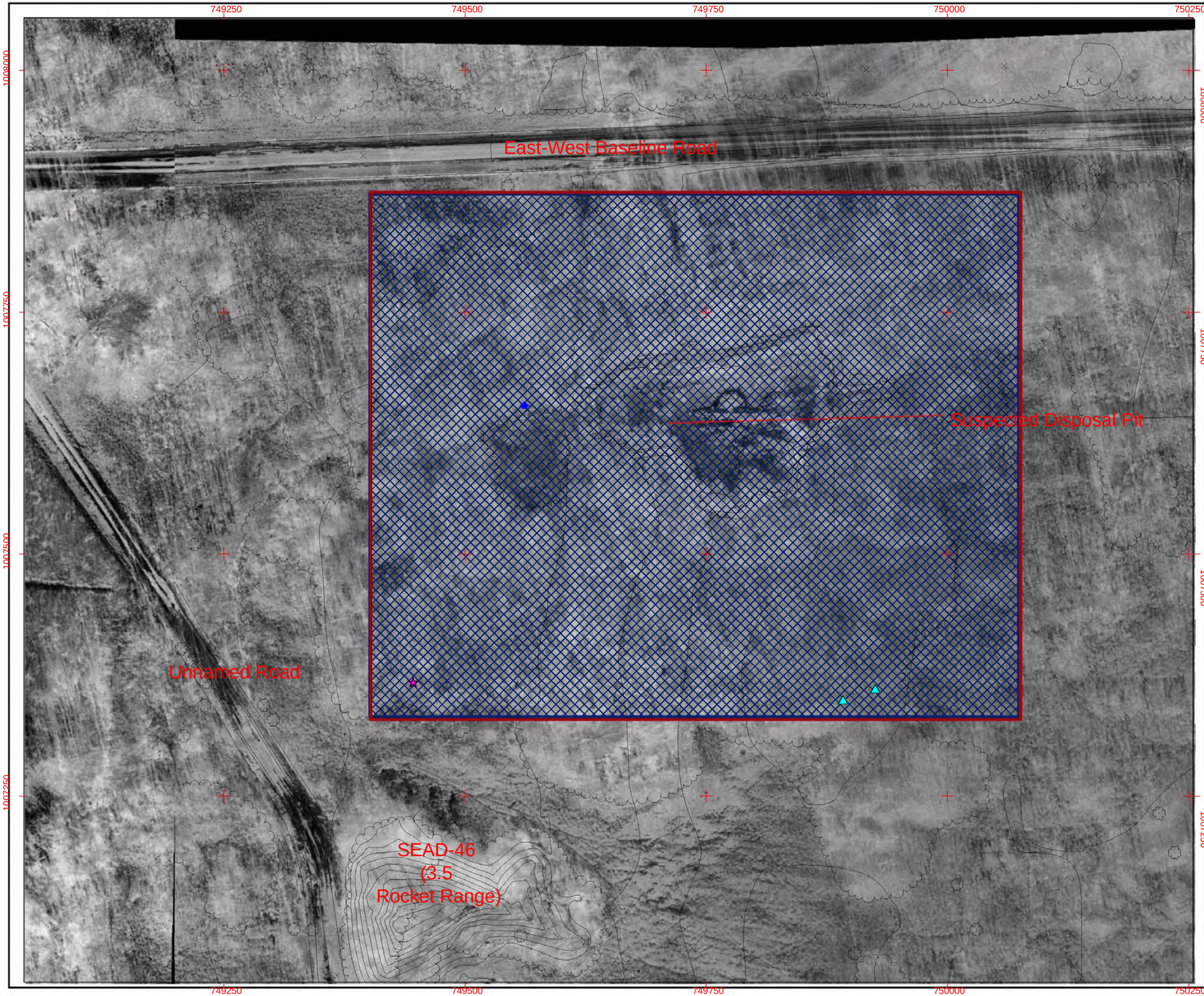
997750
748750
Grid Coordinates
(New York State Plane, Central)

90 45 0 90 Feet

N
W E
S

PARSONS

DESIGNED BY: BJM	MPPEH Removal/Survey Area EOD# 2 SEAD 002-R-01
DRAWN BY: BJM	
CHECKED BY:	DATE PRINTED: March 31, 2006 — PROJECT NUMBER: 736703-01000
	AREIAL PHOTOGRAPH: 1989 2 ft Resolution — FN: Figure 5
SUBMITTED BY: BJM	FILE: EOD2.APR — SCALE: 1:1,003.622



EOD 3 Area

OE Items Recovered During EE/CA

- M2-Fuze lighter
- Rifle grenade - illum. (Expended)
- Slap Flare -(Illumination)

Area Requiring Resurvey - (5 Acres)

997750 / 748750 Grid Coordinates (New York State Plane, Central)

N W E S

80 40 0 80 Feet

PARSONS

DESIGNED BY: BJM	MPPEH Removal Area / Survey Area EOD #3 SEAD 002-R-01	
DRAWN BY: BJM	DATE PRINTED: March 31, 2006	PROJECT NUMBER: 745054-03300
CHECKED BY:	AERIAL PHOTOGRAPH: 1989 2 ft Resolution	FN: Figure 6
SUBMITTED BY: BJM	FILE: EOD3.mdx	SCALE: 1:891.9946

APPENDIX B

MEC AND OE RECOVERED AT SENECA ARMY DEPOT

OE EE/CA by Parsons dated February 2004 and Geophysical Investigation by Shaw dated April 2005

Table 3-1
SEAD 46: DGM Anomaly Verification

Form 2-2

Site: SEDA **Project GP: K. Boler** **COR: T. Westenburg** **EM61MK2 Data**
Area: SEAD 46 **QC GP: J. Ma** **SEDA: T. Battaglia** **RTS Navigation**
COE GP: R. Grabowski **NAD 83 NY State Plane, CZ**

Shaw E & I, Inc.

Anomaly ID(1)	DGM SURVEY Location (ft) Easting(X)	Northing(Y)	Amp(2) (mV)	REACQUISTION Location (ft) Offset	Dir.	Amp(2) (mV)	Comments	Date	DIG RESULTS Location (ft) Offset	Dir.	Type Code	Depth (in)	Date	Item Description	Clear. Code	POST-DIG QC Amp(2) (mV)	QC Code	GP QC Initials
46A16-109	748950.00	1007475.00	37.6	0		21		6/28/04	0		OS	2	6/28/04	.50 cal	A	<10	G	KB
46A16-177	748994.75	1007414.25	13.2	0		5	little or no peak	6/28/04	0.5	E	S	1	6/28/04	Fe scrap	A	<10	G	KB
46A18-070	748918.25	1007508.00	39.8	0.5	N	29		6/28/04	0.5	W	S	4	6/28/04	const. debris	A	<10	G	KB
46C08-007	749243.25	1006406.00	16.3	1	S	6	little or no peak	6/25/04	0.5	S	OS	8	6/28/04	.50 cal cart case	A	<10	F	KB
46C10-010	749236.50	1006549.50	23.7	1	SW	19		6/25/04	0		S	2	6/28/04	nail	A	<10	G	KB
46C16-007	749011.38	1007400.68	103.5	1.5	E	75		6/28/04	0.5	E	S	5	6/28/04	filler cap	A	<10	G	KB
46C18-059	749156.00	1007557.50	22.1	0		13	on edge of road	6/28/04	0		S	4	6/28/04	nails	A	<10	G	KB
46E08-172	749304.75	1006435.00	14.2	0.5	NE	13		6/25/04	0		S	2	6/28/04	nail	A	<10	G	KB
46E08-180	749256.25	1006472.75	13.7	0.5	E	5	little or no peak	6/25/04					6/28/04	no contact	D1	<10	F	KB
46E10-029	749405.25	1006550.25	46.1	0		20		6/25/04	0		OS	6	6/28/04	.50 cal	A	<10	G	KB
46E10-085	749426.25	1006529.25	22.7	0		13		6/25/04	0		OS	4	6/28/04	fill plug	A	<10	G	KB
46E12-025	749469.25	1006786.75	60.9	0		31		6/25/04	0		OS	3	6/28/04	.50 cal	A	<10	G	KB
46E12-081	749425.50	1006772.00	30.2	0.5	S	28		6/25/04	0		OS	6	6/28/04	.50 cal	A	<10	G	KB
46E14-002	749487.75	1007067.75	597861	0		3968		1/24/05	0	W	S	6	1/25/05	Trash can lid	A	<10	G	BC
46E14-004	749473.25	1007049.00	3372.6	0		188		1/24/05	0		S	3	1/25/05	Steel scrap	A	<10	G	BC
46E14-007	749481.25	1007067.50	1458.3	0		123		1/24/05	1.5	E	S	4	1/25/05	Steel Scrap	A	<10	G	BC
46E14-009	749496.25	1007061.25	1390.2	0		100		1/24/05	1	W	S	4	1/25/05	Steel Scrap	A	<10	G	BC
46E14-011	749480.00	1007082.25	894.6	0		104		1/24/05	0		S	3	1/25/05	Long bolt	A	<10	G	BC
46E14-012	749473.50	1007055.75	841.7	0		66		1/24/05	0.7	S	S	3	1/25/05	Long bolt	A	<10	G	BC
46E14-015	749483.63	1007072.32	383.2	0		42		1/24/05	0		OS	3	1/25/05	trip flare, clamp	A	<10	G	BC
46E14-080	749385.75	1007035.25	40.9	0		26		6/25/04	0		OS	3	6/28/04	.50 cal	A	<10	G	KB
46E16-070	749406.25	1007493.25	21.4	0		14		6/28/04	0		S	5	6/28/04	3/8-in bolt	A	<10	G	KB
46E18-024	749463.00	1007643.50	28.8	0		21		6/28/04	0		S	6	6/28/04	Fe scrap	A	<10	G	KB
46E20-008	749465.75	1007756.25	34.3	1	N	22		6/28/04	0		S	4	6/28/04	Fe scrap	A	<10	G	KB
46G04-013	749708.75	1005984.75	64.1	1	E	130		6/25/04	0		S	3	6/28/04	spike	A	<10	F	KB
46G06-002	749,596.50	1,006,186.75	1,362	0		254		1/20/05	0		OS	3	1/24/05	(2) Pop flare	A	<10	G	BC
46G06-004	749,739.00	1,006,190.50	1,003	0		195		1/20/05	0		S	2	1/21/05	Scrap steel	A	<10	G	BC
46G06-005	749,607.75	1,006,154.25	772	0		147		1/20/05	0		OS	2	1/24/05	Pop flare	A	<10	G	BC
46G06-006	749,577.50	1,006,187.25	724	1	E	139		1/20/05	0.6	W	OS	6	1/24/05	Pop flare	A	<10	G	BC
46G06-007	749,667.25	1,006,162.25	724	0		161		1/20/05	0		OS	3	1/21/05	Pop flare	A	<10	G	BC
46G06-008	749,589.50	1,006,187.25	628	0		140		1/20/05	0.7	E	OS	4	1/24/05	Pop flare	A	<10	G	BC

12 March 05

Table 3-1
SEAD 46: DGM Anomaly Verification

Anomaly ID(1)	DGM SURVEY Location (ft) Easting(X)	Northing(Y)	Amp(2) (mV)	REACQUISTION Location (ft) Offset	Dir.	Amp(2) (mV)	Comments	Date	DIG RESULTS Location (ft) Offset	Dir.	Type Code	Depth (in)	Date	Item Description	Clear. Code	POST-DIG QC Amp(2) (mV)	QC Code	GP QC Initials
46G06-009	749,596.50	1,006,151.00	622	0		165		1/20/05	0		OS	2	1/24/05	Pop flare	A	<10	G	BC
46G06-010	749,663.25	1,006,141.00	589	0		260		1/20/05	0.2	W	OS	3	1/21/05	Pop flare	A	<10	G	BC
46G06-011	749,603.00	1,006,173.25	569	0		139		1/20/05	0		OS	2	1/24/05	Pop flare	A	<10	G	BC
46G06-012	749,609.75	1,006,178.75	562	0		105		1/20/05	0.5	S	OS	3	1/24/05	Pop flare	A	<10	G	BC
46G06-013	749,601.75	1,006,151.00	553	0		116		1/20/05	0		OS	2	1/21/05	Pop flare	A	<10	G	BC
46G06-014	749,644.25	1,006,154.50	478	0		135		1/20/05	1	W	OS	6	1/21/05	Pop flare	A	<10	G	BC
46G06-015	749,620.00	1,006,101.75	470	0		180		1/20/05	0.9	E	S	0	1/21/05	12in nail	A	<10	G	BC
46G06-016	749,676.75	1,006,167.75	469	0		83		1/20/05	0.5	E	OS	6	1/21/05	Pop flare	A	<10	G	BC
46G06-017	749,648.75	1,006,128.75	466	0		160		1/20/05	0.5	W	OS	3	1/21/05	Pop flare	A	<10	G	BC
46G06-018	749,671.50	1,006,147.00	455	0		98		1/20/05	0.6	W	OS	4	1/21/05	Pop flare	A	<10	G	BC
46G06-019	749,603.75	1,006,168.00	450	0		61		1/20/05	0.3	E	OS	6	1/24/05	Pop flare	A	<10	G	BC
46G06-020	749,579.50	1,006,209.25	443	0		91		1/20/05	0.4	E	OS	4	1/24/05	Pop flare	A	<10	G	BC
46G06-021	749,640.00	1,006,132.25	436	0		82		1/20/05	0		OS	2	1/21/05	Pop flare	A	<10	G	BC
46G06-022	749,605.75	1,006,197.25	429	0		122		1/20/05	0		OS	3	1/24/05	Pop flare	A	<10	G	BC
46G06-023	749,637.25	1,006,086.75	417	0		98		1/20/05	1.1	E	OS	7	1/21/05	Pop flare	A	<10	G	BC
46G06-024	749,568.00	1,006,185.75	415	0		115		1/20/05	1	W	OS	8	1/25/05	Pop flare	A	<10	G	BC
46G06-025	749,594.75	1,006,224.00	414	0		86		1/20/05	0		OS	6	1/24/05	Pop flare	A	<10	G	BC
46G06-026	749,569.25	1,006,164.75	401	0		75		1/20/05	0		OS	4	1/21/05	Pop flare	A	<10	G	BC
46G06-027	749,580.75	1,006,180.75	391	1	S	148		1/20/05	0		OS	4	1/25/05	Pop flare	A	<10	G	BC
46G06-008	749,680.00	1,006,169.00	374	0		122		1/20/05	1	W	OS	4	1/21/05	Pop flare	A	<10	G	BC
46G06-029	749,570.25	1,006,200.75	373	0		158		1/20/05	0		OS	3	1/24/05	Pop flare	A	<10	G	BC
46G06-030	749,578.75	1,006,194.50	367	0		75		1/20/05	0.2	E	OS	5	1/24/05	Pop flare	A	<10	G	BC
46G06-086	749713.75	1006109.50	75.3	0		72		6/25/04	0		OS	5	6/28/04	Al scrap	A	<10	G	KB
46G06-167	749675.75	1006091.00	26.8	0.5	NW	31		6/25/04	0		OS	3	6/28/04	Al scrap	A	<10	G	KB
46G08-061	749518.25	1006484.50	56	0		27		6/25/04	0		OS	12	6/28/04	Al scrap	A	<10	G	KB
46G08-123	749518.00	1006442.75	22.8	0		15		6/25/04	1	S	OS	2	6/28/04	fuze liter	A	<10	G	KB
46G10-037	749516.00	1006566.50	137.5	0		86		6/25/04	0		OS	6	6/28/04	two .50 cal	A	<10	G	KB
46G10-068	749505.75	1006585.75	48.1	1	NE	20		6/25/04	0		S	5	6/28/04	coke can	A	<10	G	KB
46G12-042	749637.50	1006928.75	49.2	1	NE	26		6/25/04	0		OS	4	6/28/04	.50 cal	A	<10	G	KB
46G12-081	749578.00	1006987.75	38.9	0		29		6/25/04	1	SW	OS	3	6/28/04	.50 cal	A	<10	G	KB
46G14-241	749743.50	1007112.25	40.3	0		20		6/25/04	0		OS	2	6/28/04	.50 cal	A	<10	G	KB
46G14-379	749581.00	1007026.75	30.7	0.5	E	14		6/25/04	1	NE	OS	1	6/28/04	.50 cal	A	<10	G	KB
46G16-003	749,727.50	1,007,294.00	2,020	0		150		1/25/05	0		S	0	1/25/05	Lightning rod	A	<10	G	BC
46G14-004	749,726.50	1,007,297.00	1,948	0		180		1/25/05	0		S	0	1/25/05	Same as 003	A	<10	G	BC
46G16-033	749679.00	1007323.25	47.8	0		33		6/25/04	0		S	2	6/28/04	lots of nails	B	12	F	KB
46G16-015	749719.00	1007481.50	88.3	1	N	43		6/25/04	0		OS	2	6/28/04	.50 cal	A	<10	F	KB

Table 3-1
SEAD 46: DGM Anomaly Verification

Anomaly ID(1)	DGM SURVEY Location (ft) Easting(X)	Northing(Y)	Amp(2) (mV)	REACQUISTION Location (ft) Offset	Dir.	Amp(2) (mV)	Comments	Date	DIG RESULTS Location (ft) Offset	Dir.	Type Code	Depth (in)	Date	Item Description	Clear. Code	POST-DIG QC Amp(2) (mV)	QC Code	GP QC Initials
46G18-021	749543.50	1007548.00	23.9	0		17		6/28/04	0		OS	3	6/28/04	.50 cal	A	<10	G	KB
46G20-002	749526.50	1007759.25	52	0		28		6/28/04	0		S	6	6/28/04	Fe scrap	A	<10	G	KB
46I04-261	749957.00	1005941.75	23.1	0.5	SE	5	little or no peak	6/25/04	0				6/28/04	no contact	D1	<10	U(3)	KB
46I04-314	749914.00	1005936.25	21.2	0		31		6/25/04	0		F	2	6/28/04	Al frag	A	<10	G	KB
46I06-055	749985.50	1006142.25	58.4	1	W	41		6/25/04	0		F	3	6/28/04	Al frag	A	<10	G	KB
46I06-117	749899.25	1006181.00	38.9	0.5	SW	32		6/25/04	0		OS	4	6/28/04	Al scrap	A	<10	G	KB
46I08-122	749931.50	1006383.75	21	0		51		6/25/04	0		F	2	6/25/04	Al frag	A	<10	F	KB
46I08-145	749910.75	1006390.25	17.6	0.5	W	18	by road	6/25/04	1	N	OS	2	6/25/04	m2 fuze igniter	A	<10	G	KB
46I10-082	749913.75	1006598.75	31.4	0.5	NE	35		6/25/04	1	S	OS	4	6/25/04	.50 cal tracer	A	<10	G	KB
46I10-106	749757.50	1006697.50	26.3	1.5	E	20		6/25/04	0		S	2	6/28/04	ox shoe nail	A	<10	G	KB
46I12-047	749755.25	1006969.75	42.4	1	SE	35		6/25/04	0		OS	3	6/28/04	.50 cal	A	<10	G	KB
46I12-077	749966.50	1006969.75	30.6	0		17		6/28/04	0		S	3	6/28/04	Fe scrap	A	<10	G	KB
46I14-018	749920.25	1007185.25	61.9	0.5	N	28		6/28/04	0.5	N	S	6	6/28/04	nail, drift pin	A	<10	G	KB
46I14-055	749778.25	1007053.75	27.5	0		22		6/25/04	1	N	OS	2	6/28/04	.50 cal	A	<10	G	KB
46I16-009	749766.75	1007427.00	54.9	0.5	SE	33	adjacent to gap area	6/28/04	0		S	5	6/28/04	padlock	A	<10	G	KB
46I16-102	749859.25	1007495.75	12.6	0		6	little or no peak	6/28/04					6/28/04	no contact	D1	<10	F	KB
46I18-026	749885.50	1007509.00	21.7	0		15		6/28/04	1	N	S	3	6/28/04	nail	A	<10	G	KB
46K02-044	750222.00	1005700.00	88.5	0		39		6/25/04	0		OS	12	6/25/04	Al scrap	A	<10	G	KB
46K02-153	750233.25	1005693.75	17.5	0		14		6/25/04	0		OS	8	6/25/04	Al scrap	A	<10	G	KB
46K04-153	750100.50	1005944.75	62	0		47		6/25/04	0		OS	4	6/28/04	Al scrap	A	<10	G	KB
46K04-297	750197.50	1005828.50	35.2	0		24		6/25/04	1	NE	OS	2	6/25/04	Fe scrap	A	<10	G	KB
46K06-116	750025.25	1006219.75	45.6	0		27		6/25/04	0.5	W	F	4	6/25/04	Al frag	A	<10	G	KB
46K06-460	750157.25	1006147.00	18.2	0.5	SW	8		6/25/04	2	N	F	0	6/25/04	Al scrap	A	<10	F	KB
46K08-024	750080.25	1006399.00	47.6	0		22		6/25/04	0		OS	3	6/25/04	Al scrap	A	<10	G	KB
46K08-063	750105.00	1006321.00	28.5	0.5	N	31		6/25/04	0		OS	1	6/25/04	Al scrap	A	<10	G	KB
46K10-012	750060.25	1006538.25	51	0.5	W	38		6/25/04	0		OS	5	6/25/04	.50 cal tracer	A	<10	G	KB
46K10-086	750079.75	1006555.00	16.2	0		6	little or no peak	6/25/04	0		F	2	6/25/04	Al scrap	A	<10	G	KB
46M02-033	750250.25	1005744.75	42.4	0		20		6/25/04	0		OS	12	6/25/04	Al scrap	A	<10	G	KB
46M04-051	750316.5	1005903.25	146.9	0.5	SE	133		6/25/04	0		OS	6	6/25/04	Al scrap	A	<10	G	KB
46M04-211	750300.00	1005929.50	22.9	1.5	E	13		6/25/04	0		OS	3	6/25/04	Al scrap	A	<10	G	KB
46M06-060	750262.50	1006065.25	16.1	0.5	NE	13		6/25/04	0		OS	3	6/25/04	Al scrap	A	<10	G	KB

Type Code: U (UXO), F(frag), OS (ordnance related scrap), S (non-OE scrap), H (hot rock/dirt)
Clearance Code: A (response peak has been removed), B (large item has been removed from hole), C (source deeper than 4 feet), D (other - specify)
D1- no contact detected with either Schonstedt or Fisher instruments. E.g. anomaly was within noise or due to surface metal no longer present.
QC Code: Agreement between DGM results and Dig results: G (Good), F (Fair), U (Unacceptable).
(1) Anomaly ID = Site + Quad ID + anomaly number in review dig list.
(2) Sensor coils were 4.5-in lower in the towed array than in the standard wheel configuration. Wheeled single units used for reacquisition/clearance show lower values/peaks.
Reported amplitude is the sum of time gates 1-4. Reacquisition and clearance numbers were field "leveled" by operator.
(3) Likely surface metal moved by mowing. Only a very low amplitude blip found in a 3-ft radius during reaquisition. No contact (Schonstedt ot Fisher) found in dig.

Table 4-1
SEAD 57: DGM Anomaly Verification

Form 2-2

Site: SEDA	**Project GP: K. Boler**	**COR: T. Westenburg**
Area: SEAD 57	**QC GP: J. Ma**	**SEDA: T. Battaglia**
		COE GP: R. Grabowski

EM61MK2 Data
RTS Navigation
NAD83 NY State Plane, CZ

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	DGM SURVEY			REACQUISTION					DIG RESULTS							POST-DIG QC		
Anomaly	Location (ft)		Amp(2)	Location (ft)		Amp(2)			Location (ft)		Type	Depth	Date	Item	Clear.	Amp(2)	QC	GP QC
ID(1)	Easting(X)	Northing(Y)	(mV)	Offset	Dir.	(mV)	Comments	Date	Offset	Dir.	Code	(in)		Description	Code	(mV)	Code	Initials
57C14-327	738228.50	1009936.75	10.1	0		5	little or no peak	6/22/04					6/23/04	no contact	D1	<10	F	KB
57E04-002	738496.50	1008652.50	162.5	0		70		6/22/04	0		OS	1	6/22/04	Al scrap	A	<10	G	KB
57E06-008	738486.00	1008793.75	124.2	0		45		6/22/04	0.5	W	OS	2	6/22/04	Al scrap	A	<10	F	KB
57E08-251	738466.75	1009044.50	11.1	1	S	31	between track interp.	6/22/04	1	N	F	2	6/23/04	Al frag	A	<10	F	KB
57E10-159	738464.75	1009314.75	118.7	0		74		6/22/04	0		OS	2	6/23/04	Al scrap	A	<10	G	KB
57E10-247	738457.25	1009425.25	45.5	1	W	32		6/22/04	0.5	W	F	3	6/23/04	Al frag	A	<10	G	KB
57E10-281	738482.75	1009278.75	23.7	0		33		6/22/04	0		F	4	6/23/04	Al frag	A	<10	G	KB
57E12-143	738457.50	1009722.00	41.3	0.5	W	39		6/22/04	0.5	E	F	2	6/23/04	Al frag	A	<10	G	KB
57E12-188	738441.50	1009526.75	25.1	0.5	W	23		6/22/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57E14-424	738475.25	1009756.25	24.4	0.5	N	26	anom. to W	6/22/04	0		F	1	6/23/04	Al frag	A	<10	G	KB
57E14-470	738451.25	1009766.25	22.4	0		20		6/22/04	0		OS	4	6/23/04	.50 cal links	A	<10	G	KB
57E16-022	738481.25	1010039.75	34.4	0		19		6/22/04	0		F	1	6/23/04	Al frag	A	<10	G	KB
57G04-001	738708.00	1008647.75	1705	0		776		1/19/05	0		S	6	1/20/05	Shovel	A	<10	G	BC
57G04-154	738684.50	1008733.00	56.8	0.5	SE	28		6/22/04	0		F	4	6/22/04	Al frag	A	<10	G	KB
57G04-266	738677.25	1008705.50	20.9	0	NE	24		6/22/04	0		F	4	6/22/04	Al frag	A	<10	G	KB
57G06-243	738546.50	1008825.50	32.5	0.5	N	15		6/22/04	0		F	6	6/22/04	Al frag	A	<10	G	KB
57G06-037	738567.00	1008894.00	180.2	0.5	NE	85		6/22/04	0		OS	3	6/23/04	Al scrap	A	<10	G	KB
57G08-001	738530.00	1009072.25	1367	0		126		1/19/05	0		S	2	1/20/05	rebar	A	<10	G	BC
57G08-003	738536.00	1009059.00	1296	0		192		1/19/05	0		S	1	1/20/05	rebar	A	<10	G	BC
57G08-156	738525.50	1009050.64	33.3	0		36	anom. to SE	6/22/04	0.5	E	OS	1	6/23/04	unidentified ORS	A	<10	G	KB
57G10-002	738504.75	1009276.50	1173	0		93		1/19/05	0		U	3	1/20/05	unkn. bomb, fuzed	A	<10	G	BC
57G10-424	738548.50	1009451.25	22.7	0.5	NE	23		6/22/04	0.5	SW	F	4	6/23/04	Al frag	A	<10	G	KB
57G12-561	738583.50	1009692.00	110.5	0.5	E	64		6/22/04	1	NE	S	12	6/23/04	COE SEED #6	A	<10	G	KB
57G12-711	738585.75	1009695.75	70.6	0.5		38	adj. to 57G12-561	6/22/04			S		6/23/04	same as above	A	<10	G	KB
57G14-497	738696.00	1009990.50	39.6	0		16		6/22/04	0		F	1	6/23/04	Al frag	A	<10	G	KB
57G14-669	738554.75	1009993.25	23.3	0		15		6/22/04	0.5	NE	S	2	6/23/04	construction debris	A	<10	G	KB
57G16-171	738645.75	1010085.25	30.3	0		15		6/22/04	0		F	1	6/23/04	Al frag	A	<10	G	KB
57G16-287	738702.50	1010120.75	16.5	0.5	NW	10		6/22/04	0		F	2	6/23/04	Fe frag	A	<10	G	KB

Table 4-1
SEAD 57: DGM Anomaly Verification

	DGM SURVEY			REACQUISTION					DIG RESULTS							POST-DIG QC		
Anomaly	Location (ft)		Amp(2)	Location (ft)		Amp(2)			Location (ft)		Type	Depth	Date	Item	Clear.	Amp(2)	QC	GP QC
ID(1)	Easting(X)	Northing(Y)	(mV)	Offset	Dir.	(mV)	Comments	Date	Offset	Dir.	Code	(in)		Description	Code	(mV)	Code	Initials
57I04-001	738756.75	1008663.75	2671	0		276		1/20/05			U	7	1/20/05	105mm proj.	A	<10	G	BC
57I04-002	738784.25	1008747.50	2647	0		176		1/19/05	0.2	W	U	4	1/20/05	75mm proj.	A	<10	G	BC
57I04-003	738774.75	1008648.50	1743	0		140		1/19/05			S	0	1/20/05	Grounding rod	A	<10	G	BC
57I04-004	738799.25	1008701.00	1579	0		227		1/19/05	0.2	W	S	3	1/20/05	Shackle	A	<10	G	BC
57I04-005	738822.00	1008677.00	1361	0		106		1/19/05			U	10	1/20/05	75mm AP shot	A	<10	G	BC
57I04-214	738773.50	1008660.75	41.5	0.5	N	218		6/22/04	0		OS	2	6/22/04	Unident. ORS	A	<10	G	KB
57I04-338	738913.25	1008680.00	14.4	0		11		6/23/04	0.5	E	F	3	6/22/04	Al frag	A	<10	G	KB
57I06-001	738793.50	1008770.25	2045	0		218		1/19/05	0.5	N	S	2	1/19/05	Construction debris	A	<10	G	BC
57I06-038	738767.50	1008771.25	16.2	0.5	S	17		6/22/04	0.5	W	F	2	6/22/04	Al frag	A	<10	G	KB
57I12-120	738956.50	1009689.25	186.1	0		105		6/23/04	0		F	3	6/23/04	Al frag	A	<10	G	KB
57I12-512	738954.75	1009715.50	23.1	0.5	N	16		6/23/04	1	E	F	2	6/23/04	Al frag	A	<10	G	KB
57I14-015	738817.25	1009924.75	1933	0		179		1/19/05	0.5	S	S	2	1/20/05	Tent peg	A	<10	G	BC
57I14-022	738814.75	1009980.75	1559	0		80		1/19/05	0.2	S	S	2	1/20/05	Bolt	A	<10	G	BC
57I14-163	738861.25	1009779.75	167.3	0.5	W	74		6/22/04	0		F	3	6/23/04	Fe frag	A	<10	G	KB
57I14-291	738862.25	1009783.25	81.7	0		55		6/22/04	1	SW	S	5	6/23/04	COE SEED #7	A	<10	G	KB
57I14-466	738920.25	1009973.25	37.1	0.5	S	21		6/22/04	0		F	2	6/23/04	Fe frag	A	<10	G	KB
57I14-761	738941.50	1009936.25	19	0.5	N	15		6/22/04	0		F	3	6/23/04	Al frag	A	<10	G	KB
57I16-005	738767.38	1010097.33	5378	0		930		1/19/05			S	2	1/20/05	grd rods	A	<10	G	BC
57I16-006	738777.50	1010112.00	2883	0		166		1/19/05	0.5	W	S	4	1/20/05	Bolt	A	<10	G	BC
57I16-008	738978.46	1010071.23	2035	1	N	750		1/19/05			S	2	1/20/05	grd rods	A	<10	G	BC
57I16-009	738773.50	1010110.75	1812	0		580		1/19/05	0.7	E	S	4	1/20/05	Bolt	A	<10	G	BC
57I16-205	738997.75	1010024.75	27.4	0.5	W	19		6/22/04	0		F	2	6/23/04	Fe frag	A	<10	G	KB
57I16-082	738839.00	1010072.25	67.7	0.5	S	26		6/22/04	1	NW	F	3	6/23/04	Fe frag	A	<10	G	KB
57K04-036	739091.00	1008711.00	36.2	0		33		6/23/04	0		F	3	6/23/04	Al frag	A	<10	G	KB
57K04-046	739005.75	1008649.25	28.4	0.5	W	22		6/23/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57K06-003	739097.50	1008753.00	51.8	1	W	36		6/23/04	0.5	N	S	2	6/23/04	construction debris	A	<10	G	KB
57K12-358	739050.75	1009696.50	40.8	0		29		6/23/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57K12-447	739177.25	1009720.75	23.6	0.5	N	16		6/23/04	0		F	6	6/23/04	Fe frag	A	<10	G	KB
57K14-258	739102.75	1009767.50	59.8	0		43		6/23/04	0		F	3	6/23/04	Al frag	A	<10	G	KB
57K14-305	739064.00	1009867.00	47.3	0.5	NW	31		6/22/04	1	S	S	4	6/23/04	construction debris	A	<10	G	KB
57K16-176	739091.00	1010008.25	33.8	0		19		6/22/04	1	NE	S	4	6/23/04	construction debris	A	<10	G	KB
57K16-270	739202.25	1010088.50	21.6	0		29		6/22/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57M06-146	739412.25	1008957.00	15.4	0		7	little or no peak	6/23/04					6/23/04	no contact	D1	<10	F	KB

Table 4-1
SEAD 57: DGM Anomaly Verification

	DGM SURVEY			REACQUISTION					DIG RESULTS							POST-DIG QC		
Anomaly ID(1)	Location (ft) Easting(X)	Northing(Y)	Amp(2) (mV)	Location (ft) Offset	Dir.	Amp(2) (mV)	Comments	Date	Location (ft) Offset	Dir.	Type Code	Depth (in)	Date	Item Description	Clear. Code	Amp(2) (mV)	QC Code	GP QC Initials
57M08-011	739422.75	1009240.25	229.4	0		110		6/23/04	0		F	1	6/23/04	Al frag	A	<10	G	KB
57M08-048	739469.25	1009033.25	51.2	0		40		6/23/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57M10-045	739415.25	1009462.25	53.4	0.5	N	34		6/23/04	0.5	N	F	3	6/23/04	Fe frag	A	<10	G	KB
57M10-063	739485.25	1009344.50	41.6	1.5	NE	27		6/23/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57M12-422	739451.25	1009695.75	41.2	0		27		6/23/04	0		F	3	6/23/04	Fe frag	A	<10	G	KB
57M12-653	739331.25	1009714.50	16.8	0		6	little or no peak	6/23/04					6/23/04	no contact	D1	<10	F	KB
57M14-198	739355.75	1009990.00	51.4	0		31		6/23/04	0		F	4	6/23/04	Fe frag	A	<10	G	KB
57M14-392	739433.00	1009801.00	21.9	0.5	W	16		6/23/04	0		F	2	6/23/04	Al frag	A	<10	G	KB
57M16-153	739287.25	1010141.00	32.5	1	N	23		6/22/04	0		F	3	6/23/04	Fe frag	A	<10	G	KB
57M16-358	739358.25	1010107.75	10.4	0		6	little or no peak	6/22/04	0		OS	2	6/23/04	small arms ammo	A	<10	G	KB
57O10-100	739530.25	1009441.25	15.2	0		6	little or no peak	6/23/04					6/23/04	no contact	D1	<10	F	KB
57O10-061	739509.25	1009448.50	19.9	0		16		6/23/04	0		F	3	6/23/04	Al frag	A	<10	G	KB
57O12-062	739553.00	1009615.00	20.7	0.5	NE	18		6/23/04	0.5	E	F	2	6/23/04	Al frag	A	<10	G	KB
57O12-097	739517.00	1009703.50	13.9	0		7	little or no peak	6/23/04					6/23/04	no contact	D1	<10	F	KB

Type Code: U (UXO), F(frag), OS (ordnance related scrap), S (non-OE scrap), H (hot rock/dirt)

Clearance Code: A (response peak has been removed), B (large item has been removed from hole), C (source deeper than 4 feet), D (other - specify)
D1- no contact detected with either Schonstedt or Fisher instruments. E.g. anomaly was within noise or due to surface metal no longer present.

QC Code: Agreement between DGM results and Dig results: G (Good), F (Fair), U (Unacceptable).

(1) Anomaly ID = Site + Quad ID + anomaly number in review dig list.

(2) Sensor coils were 4.5-in lower in the towed array than in the standard wheel configuration. Wheeled single units used for reacquisition/clearance show lower values/peaks.
Reported amplitude is the sum of time gates 1-4. Reacquisition and clearance numbers were field "leveled" by operator.

(3) Likely surface metal moved by mowing. Only a very low amplitude blip was found in a 3-ft radius during reaquisition. No contact (Schonstedt ot Fisher) was found in dig.

APPENDIX E
DEMOLITION ACTIVITIES
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Date	Quantity	Demolition Supplies	Location	Quantity	Type	Disposition[1]
7/12/2000			SEAD 57	1	37mm HE (live)	BIP
7/12/2000			SEAD 57	1	40mm HE (live)	BIP
8/3/2000	14	Shaped Charges	SEAD 46	1	3.5' rocket warhead	Demo
8/3/2000	8	1Lb. Boosters	SEAD 45	1	Stokes mortar/Prac	Vent
8/3/2000	14	Electric Blasting Caps	SEAD 45	5	57mm/HE	Demo
8/3/2000	50 ft.	100 gpf Detonating Cord	SEAD 45	2	75mm/HE	BIP
8/3/2000			SEAD 45	4	75mm/APHE	BIP
8/3/2000			SEAD 45	1	105mm/HE	Demo
8/3/2000			SEAD 45	1	105mm/WP	Demo
8/3/2000			SEAD 45	7	M66 Base Fuze	BIP
8/3/2000			SEAD 45	1	PD nose Fuze	BIP
8/3/2000			SEAD 45	15	Rifle Grenade Fuze	Demo
8/3/2000			SEAD 45	2	Half Shells from Buterfly Bomblet	Demo
8/3/2000			SEAD 45	1	20mm/HE unfuzed	Demo
8/3/2000			SEAD 45	1	Tail Fuze Unknown	BIP
8/3/2000			SEAD 45	1	Fuze Component Unknown	BIP
8/8/2000	2	Electric Blasting Cap	SEAD 57	1	EOD Trainer (Pipe Device)	BIP
8/8/2000	2	1 Lb.Orange Cap Booster				
8/8/2000	6 ft.	100 gpf Detonating Cord				
8/28/2000	6	Electric Blasting Caps	SEAD 45	1	75mm projo APHE (Fuzed)	BIP
8/28/2000	10 ft.	100 gpf Detonating Cord	SEAD 45	1	Bounding Mine (Fuzed)	BIP
8/28/2000	2	Shaped Charges	SEAD 45	1	M66 Base Fuze (Armed)	BIP
8/28/2000	3	1Lb. Boosters	SEAD 45	2	57mm projo. (Unfuzed)	Demo
8/28/2000			SEAD 45	1	3.5 Rkt. Warhead (Unfuzed)	Demo
8/28/2000			SEAD 45	1	37mm projo. (Unfuzed)	Demo
8/30/2000	4	Electric Blasting Cap	SEAD 45	8	57mm HE projo.	Demo
8/30/2000	14	1 Lb.Orange Cap Booster	SEAD 45	3	75mm HE projo.	Demo
8/30/2000	30 ft	100 gpf Detonating Cord	SEAD 45	6	M66 Base Fuze	BIP
8/30/2000			SEAD 45	6	Rifle Grenade Fuze	Demo
8/30/2000			SEAD 45	3	105mm Smoke	Demo
8/30/2000			SEAD 45	2	155 Smoke	Demo
8/30/2000			SEAD 45	1	Nose Fuze	Demo
8/30/2000			SEAD 45	2	Base Fuze	Demo
8/30/2000			SEAD 45	1	75 mm APHE projo.	BIP
8/30/2000			SEAD 45	2	2.36 WP	Demo
8/30/2000			SEAD 45	1	75mm HE projo.(Fuzed)	BIP
9/14/2000	2	Electric Blasting Cap	Grenade	30	M73, 35mm subcal rocket (LAW)	BIP
9/14/2000	100 ft.	100 gpf Detonating Cord				
9/18/2000	2	Electric Blasting Cap	SEAD 46	2	M123 Base Fuze Chem Long Delay	BIP
9/18/2000	1	1 Lb.Orange Cap Booster		2	Rifle Grenade Smoke	BIP
9/18/2000	6 ft.	100 gpf Detonating Cord				
9/26/2000	2	Electric Blasting Cap	Grenade	16	M73, 35mm subcal rocket (LAW)	BIP
9/26/2000	50 ft.	100 gpf Detonating Cord				
10/2/2000	2	Electric Blasting Cap	SEAD 17	1	Point detonating Fuze	BIP
10/2/2000	3 ft.	100 gpf Detonating Cord				
10/2/2000	1	Shape Charge				
10/13/2000	2	Electric Blasting Cap	SEAD 44A		40 mm Grenade , Pratice M407A1 6g. RDX	BIP
10/13/2000	3 ft.	100 gpf Detonating Cord				
	1	Shape Charge				
10/14/2000	2	Electric Blasting Cap	Grenade	60	M73, 35mm subcal rocket (LAW)	BIP
10/14/2000	100 ft.	100 gpf Detonating Cord				
10/16/2000	2	Electric Blasting Cap	EOD 2	1	M48 Series Base Fuze	BIP
10/16/2000	1	1 Lb.Orange Cap Booster				
10/16/2000	6 ft.	100 gpf Detonating Cord				
10/18/2000	2	Electric Blasting Cap	SEAD 57	1	20 mm projo. HE	BIP

[1] BIP - Blown in Place, Demo - Item moved and detonated with other movable UXO or OE, Vent - Suspected inert item confirmed with perforators

APPENDIX E
DEMOLITION ACTIVITIES
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Date	Quantity	Demolition Supplies	Location	Quantity	Type	Disposition[1]
10/18/2000	3 ft.	100 gpf Detonating Cord				
10/18/2000	1	Shape Charge				
10/26/2000	10	Electric Blasting Cap	SEAD 45	1	75mm APHE projo. (Unfuzed)	Demo
10/26/2000	175 ft.	1 Lb.Orange Cap Booster	SEAD 45	23	75mm projo. (Unfuzed)	Demo
10/26/2000	37	Shape Charge	SEAD 45	2	155 Ilum projo. (Unfuzed)	Demo
10/26/2000	22	100 gpf Detonating Cord	SEAD 45	4	57mm HE projo (Unfuzed)	Demo
10/26/2000			SEAD 45	1	105mm WP, projo. (Unfuzed)	Demo
10/26/2000			SEAD 45	4	M66 Fuze Base Detonating	BIP
10/26/2000			SEAD 45	8	Smoke Canister	Demo
10/26/2000			SEAD 45	6	20mm HE projo.	Demo
10/26/2000			SEAD 45	1	37mm HE projo. (Unfuzed)	Demo
10/26/2000			SEAD 45	3	Rifle Grenade (Unfuzed)	Demo
10/26/2000			SEAD 45	6	Misc Fuze Components	Demo
10/26/2000			SEAD 45	1	Unknown Fuze W. Booster	BIP
10/26/2000			SEAD 45	1	Unknown Warhead only	Demo
10/26/2000			SEAD 45	1	BDU33/MK 76 Pratice	Vented
10/26/2000			SEAD 45	1	81mm Mortar, HE (Unfuzed)	Demo
10/26/2000			SEAD 45	1	106mm HE Projo. (Unfuzed)	Demo
10/26/2000			SEAD 45	1	5" projo HE Unfuzed	Demo
10/26/2000			SEAD 45	2	115mm Projo. HE (Unfuzed)	Demo
10/26/2000			SEAD 45	3	4.2" Mortar, WP (Unfuzed)	Demo
10/26/2000			SEAD 45	3	90mm Projo HE (Unfuzed)	Demo
10/31/2000	1	Electric Blasting Cap	SEAD 57	1	MK2 Type Grenade, Frag. HE w/Fuze	BIP
10/31/2000	6 ft.	1 Lb.Orange Cap Booster			MK30 type pratice grenade, (Unfuzed)	Vented
10/31/2000	1	Shape Charge				
10/31/2000	1	100 gpf Detonating Cord				
11/1/2000	2	Electric Blasting Cap	SEAD 44A	1	40mm Grenade , Pratice M407A1 6g. RDX	BIP
11/1/2000	1	1 Lb.Orange Cap Booster		1	Rifle Grenade Smoke	BIP
11/1/2000	6 ft.	100 gpf Detonating Cord				
11/13/2000	4	Electric Blasting Cap	SEAD 45	35	20mm prpjo. HE	Demo
11/13/2000	30 ft.	1 Lb.Orange Cap Booster	SEAD 45	1	m66 Fuze w/ Tracer	BIP
11/13/2000	8	Shape Charge	SEAD 45	1	3' Stokes Mortar, Pratice	Vented
11/13/2000	10	100 gpf Detonating Cord	SEAD 45	3	M48 Fuze	Demo
11/13/2000			SEAD 45	2	Fuze, VT	Demo
11/13/2000			SEAD 45	1	57mm projo. HE (Unfuzed)	Demo
11/13/2000			SEAD 45	2	37mm projo. HE (Unfuzed)	Demo
11/7/2000	8	Electric Blasting Cap	Grenade Range		M73, 35mm subcal rocket (LAW)	BIP
11/7/2000	10 ft.	1 Lb.Orange Cap Booster			Mechanical Time Fuze	BIP
11/7/2000	1	100 gpf Detonating Cord				
11/30/2000	2	Electric Blasting Cap	SEAD 46	1	M83 4 lb. Frag. Bomb	
11/30/2000	1	1 Lb.Orange Cap Booster				
11/30/2000	6 ft.	100 gpf Detonating Cord				
12/4/2000		Thermal Treatment	SEAD 45	2,906	20mm Projo.	
12/4/2000		R.E.M.T.C.		677	Misc fuzes	
12/20/2000	78	Electric Blasting Cap	SEAD 45	2	M407A1, 40 mm grenade prac. (Live)	BIP
12/20/2000	35	1 Lb.Orange Cap Booster	SEAD 45	5	75mm projo. HE	Demo
12/20/2000	2,380	100 gpf Detonating Cord	SEAD 45	3	M66 Fuze (Live)	Demo
12/20/2000	53	Shape Charge	SEAD 45	4	VT Fuze (Live)	Demo
12/20/2000			SEAD 45	5	Unknown Bomb Fuze (Live)	Demo
12/20/2000			SEAD 45	9	Subcaliber Rocket (Live)	BIP
12/20/2000			SEAD 45	4	M48 Fuze Live	Demo
12/20/2000			SEAD 45	1	M52 series Fuze (Live)	Demo
12/20/2000			SEAD 45	1	M103 Fuze (Live)	Demo
12/20/2000			SEAD 45	10	57mm projo. (Live)	Demo
12/20/2000			SEAD 45	14	105mm Projo. HE	Demo
12/20/2000			SEAD 45	2	105 mm projo. Illumination	Demo
12/20/2000			SEAD 45	200	20mm projo. HE	Demo
12/20/2000			SEAD 45	2	120mm projo. HE	Demo

[1] BIP - Blown in Place, Demo - Item moved and detonated with other movable UXO or OE, Vent - Suspected inert item confirmed with perforators

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
44D4-25	752641.12	985214.76	0	40mm HE (live)	UXO
44D4-80	752616.21	985363.17	3	Slap flare (live)	UXO
44F5-2	752896.31	985261.05	3	40mm - live	UXO
44H3-73	753072.5	985082.51	8	40MM PRATICE (LIVE)	UXO
44L1-29	753455.67	984970.87	0	40MM GRENADE (LIVE)****	UXO
45A11-1	737476.55	1013175.06	2	75mm shrapnell w/ expelling charge - live	UXO
45B15-5	737520.12	1013575.64	6	57MM HE (LIVE)	UXO
45C13-20	737665.02	1013433.08	4	FUZE (LIVE)	UXO
45C13-26	737642.12	1013486.97	2	57MM w. HE (LIVE)	UXO
45D11-20	737783.61	1013244.5	6	Unknown fuze, frag - live fuze?	UXO
45E12-6	737882.03	1013308.76	6	Bomb fuze and booster - live	UXO
45F9-24	737905.98	1013224.78	0	81mm mortar - live	UXO
45G14-19	738083.16	1013557.78	3	57MM HE (LIVE)	UXO
45G6-37	738102.33	1012794.91	0	37MM HE - LIVE	UXO
45G6-40	738049.97	1012857.58	2	FUZE (LIVE)	UXO
45H3-11	738111.64	1012442.14	1	Rkt fuze - live	UXO
45K5-5	738454.9	1012588.08	3	105mm WP - live	UXO
45M6-10	738666.03	1012700.13	3	Fuze (heavy) - live	UXO
45M6-14	738689.9	1012709.23	4	Base fuze and 20mm - both live	UXO
45MP-104	736811.53	1012352.28	6	M-66 fuze - live	UXO
45MP-127	737065.16	1012356.36	4	Fuze - live	UXO
45MP-191	737083.08	1012470.97	8	VT fuze - live	UXO
45MP-391	737274.07	1012794.55	0	Nose fuze - live	UXO
45MP-418	737077.31	1012865.73	2	VT fuze - live	UXO
45MP-421	737050.04	1012864.72	0	M-66 - live	UXO
45MP-440	737127.42	1012962.83	4	Fuze - live	UXO
45MP-497	737025.18	1013148.84	6	M-48 fuze - live	UXO
45MP-529	737268.34	1013158.61	6	VT fuze - live	UXO
45MP-542	737296.59	1013244.43	6	Smoke can - live	UXO
45MP-589	737004.85	1013343.72	3	M-48 fuze - live	UXO
45MP-615	737138.46	1013444.16	3	M-103 fuze - live	UXO
45MP-619	736961.26	1013471.79	6	57mm - live WP	UXO
45MP-652	737074.81	1013562.04	4	M-48 fuze - live	UXO
45MP-703	737245.68	1013677.38	5	Fuze - live	UXO
45MP-712	737262.58	1013633.76	4	Fuze - live	UXO
45MP-737	737500.97	1013981.32	4	Booster - live	UXO
45MP-738	737492.63	1013997.7	5	M-66 fuze - live	UXO
45MP-811	737701.36	1014074.24	5	M-66 - live	UXO
45MP-905	737802.96	1013882.27	6	57mm - live	UXO
45MP-969	738018.24	1013721.91	0	VT fuze - live	UXO
45N11-17	738738.99	1013235.8	36	M66 fuzes (7 - live), 20mm, 14" projectile in hole	UXO
45N14-108			3	20mm - live	UXO
45N14-118			4	20mm - live	UXO
45N14-17			8	M48 fuze - live	UXO
45N14-2			8	20mm - live	UXO
45N14-23			1	20mm - live	UXO
45N14-24			6	M48 fuze - live	UXO
45N14-27			2	20mm - live	UXO
45N14-32			1	20mm - live	UXO
45N14-33			7	VT fuze - live	UXO
45N14-36			1	20mm - live	UXO
45N14-37			0	VT fuze - live	UXO
45N14-44			6	M66 fuze - live	UXO
45N14-46			0	20mm - live	UXO
45N14-52			4	57mm - live	UXO
45N14-70			3	M48 fuze - live	UXO
45N14-74			1	20mm - live	UXO

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45P15-112			4	20mm (2) - live	UXO
45P15-120			2	20mm - live	UXO
45P15-154			2	20mm - live	UXO
45P15-158			3	20mm - live	UXO
45P15-161			4	20mm - live	UXO
45P15-162			3	20mm - live	UXO
45P15-166			3	20mm - live	UXO
45P15-173			2	20mm - live	UXO
45P15-18			0	M66 fuze - live	UXO
45P15-189			4	20mm - live	UXO
45P15-191			3	20mm - live	UXO
45P15-192			3	20mm - live	UXO
45P15-199			4	20mm - live	UXO
45P15-200			3	20mm - live	UXO
45P15-202			4	20mm - live	UXO
45P15-206			3	20mm - live	UXO
45P15-30			2	M66 fuze - live	UXO
45P15-72			5	57mm - live	UXO
46D3-1	749463.21	1005924.1	0	Slap flare - live	UXO
46D3-8	749442.52	1005968.16	3	Slap flare - live	UXO
46E7-12	749545.71	1006376.92	0	Fuze - live	UXO
46E7-29	749530.46	1006401.49	0	M123 Fuze - live	UXO
46E7-4	749566.43	1006348.05	12	Rifle grenade - residue live	UXO
46I2-65	749978.35	1006085.07	4	Smoke charge - live	UXO
46J1-8	750082.83	1005784.66	0	Smoke signal (live)	UXO
46J5-26	750080.49	1006255.71	4	Fuze - live	UXO
46K5-35	750111.97	1006196.52	8	Smoke charge - live	UXO
46K7-12	750179.98	1006347.42	9	M-83 - live	UXO
57F19-5	738698.59	1010017.29	0	French grenade - live	UXO
57M13-5	739449.94	1009427.79	3	20mm fuzed (live)	UXO
57O13-48	739568	1009480.63	3	20mm w/ fuze - live	UXO
EA2A1-21	747694.29	1007513.43	2	Fuze and booster (live)	UXO
GRA1-22	737141.73	1008065.74	1	35mm subcaliber round (live)	UXO
GRA9-5	736975.58	1008974.65	0	35mm subcaliber round - live	UXO
GRB2-13	737017.48	1008307.35	2	35mm subcaliber round (live)	UXO
GRB5-12	737052.52	1008477.26	0	35mm subcaliber round - live	UXO
GRB5-26	737085.08	1008553.69	0	35mm subcaliber round - live	UXO
GRB7-37	737006.74	1008737.07	2	35mm subcaliber round (live)	UXO
GRB7-38	736993.86	1008758.31	2	35mm subcaliber round (live)	UXO
GRB7-54	737017.19	1008841.48	1	35mm subcaliber round (live)	UXO
GRB7-56	737049.53	1008846.59	0	35mm subcaliber round (live)	UXO
GRB7-59	737073.36	1008839.35	1	35mm subcaliber round (live)	UXO
GRB7-6	737008.74	1008611.65	1	35mm subcaliber round (live)	UXO
GRB7-8	737017.51	1008633.28	1	35mm subcaliber round (live)	UXO
GRC2-100	737125.86	1008358.66	0	35mm subcaliber round - live	UXO
GRC2-105	737122.48	1008371.65	0	35mm subcaliber round - live	UXO
GRC2-107	737097.44	1008371.92	0	35mm subcaliber round - live	UXO
GRC2-108	737091.62	1008375.31	0	35mm subcaliber round - live	UXO
GRC2-109	737089.32	1008379.64	0	35mm subcaliber round - live	UXO
GRC2-115	737140.35	1008383.97	1	40mm - live	UXO
GRC2-13	737150.69	1008129.85	0	35mm subcaliber round - live	UXO
GRC2-53	737145.71	1008235.1	0	35mm subcaliber round - live	UXO
GRC2-69	737134.94	1008270.2	0	35mm subcaliber round - live	UXO
GRC2-73	737147.53	1008287.26	0	35mm subcaliber round - live	UXO
GRC2-77	737159.98	1008295.01	0	35mm subcaliber round - live	UXO
GRC2-83	737115.45	1008311.26	0	35mm subcaliber round - live	UXO
GRC2-84	737164.99	1008305.3	0	35mm subcaliber round - live	UXO

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRC2-87	737134.94	1008319.79	0	35mm subcaliber round - live	UXO
GRC5-11	737125.34	1008417.7	1	35mm subcaliber round (live)	UXO
GRC5-16	737108.61	1008440.05	1	35mm subcaliber round (live)	UXO
GRC5-62	737308.61	1008488.85	1	35mm subcaliber round (live)	UXO
GRC5-63	737305.6	1008495.41	1	35mm subcaliber round (live)	UXO
GRC5-74	737199.26	1008474.93	1	35mm subcaliber round (live)	UXO
GRC5-76	737191.69	1008467.48	1	35mm subcaliber round (live)	UXO
GRC6-105	737206.77	1008499.98	1	35mm subcaliber round (live)	UXO
GRC6-106	737205.82	1008509.06	1	35mm subcaliber round (live)	UXO
GRC6-20	737155.93	1008505.07	1	35mm subcaliber round (live)	UXO
GRC6-7	737123	1008517.54	1	35mm subcaliber round (live)	UXO
GRC6-75	737379.56	1008535.98	1	35mm subcaliber round (live)	UXO
GRC6-77	737378.89	1008530.02	1	35mm subcaliber round (live)	UXO
GRC6-93	737298.61	1008519.85	1	35mm subcaliber round (live) and 40mm practice	UXO
GRC7-1	737129.56	1008600.49	1	35mm subcaliber round (live)	UXO
GRC7-46	737097.41	1008740.97	1	35mm subcaliber round (live)	UXO
GRC7-47	737116.77	1008746.63	1	35mm subcaliber round (live)	UXO
GRC7-57	737157.38	1008848.26	1	35mm subcaliber round (live)	UXO
GRC7-61	737097.49	1008893.35	0	35mm subcaliber round (live)	UXO
GRC7-62	737092.42	1008893.8	0	35mm subcaliber round (live) same anom. as GRC7-61	UXO
GRC7-9	737132.98	1008633.26	0	35mm subcaliber round (live)	UXO
GRD1-1	737202.83	1008014.44	1	35mm subcaliber round (live)	UXO
GRD1-48	737441.59	1008044.45	1	35mm subcaliber round (live)	UXO
GRD1-49	737450.64	1008099.22	0	35mm subcaliber round (live)	UXO
GRD1-90	737223.55	1008074.72	1	35mm subcaliber round (live)	UXO
GRD4-101	737253.18	1008382.21	2	35mm subcaliber round - live	UXO
GRD4-13	737275.72	1008131.92	4	35mm subcaliber round - live	UXO
GRD4-85	737272.54	1008318.39	1	35mm subcaliber round - live	UXO
GRD7-1	737194.59	1008621.85	0	35mm subcaliber round (live)	UXO
GRD7-12	737207.09	1008660.77	1	35mm subcaliber round (live)	UXO
GRD7-19	737196.78	1008708.99	0	35mm subcaliber round (live)	UXO
GRD7-20	737214.29	1008711.02	1	35mm subcaliber round (live)	UXO
GRE2-161	737356.18	1008363.76	2	35mm subcaliber round (live) and 40mm practice	UXO
GRE2-167	737324.85	1008368.45	1	35mm subcaliber round (live)	UXO
GRE2-168	737319.88	1008368.45	1	167	UXO
GRE2-41	737362.32	1008163.91	0	35mm subcaliber round - 4 (live)	UXO
GRE2-70	737352.43	1008233.63	2	35mm subcaliber round (live)	UXO
GRE2-92	737387.35	1008235.41	1	35mm subcaliber round (live)	UXO
GRE7-2	737320.05	1008602.65	1	35mm subcaliber round (live)	UXO
GRE7-3	737325.23	1008610.26	1	35mm subcaliber round (live)	UXO
GRE7-34	737315.07	1008750.03	0	35mm subcaliber round (live)	UXO
GRE7-37	737372.13	1008769.05	0	35mm subcaliber round (live)	UXO
GRF2-17	737422.48	1008206.36	2	35mm subcaliber round (live)	UXO
GRF2-23	737404.98	1008240.07	3	35mm subcaliber round (live)	UXO
GRF2-34	737425.03	1008296.88	2	35mm subcaliber round (live)	UXO
GRF2-38	737396.15	1008293.5	2	35mm subcaliber round (live)	UXO
GRF2-39	737397.47	1008301.72	0	35mm subcaliber round (live)	UXO
GRF2-45	737404.45	1008350.08	0	35mm subcaliber round (live)	UXO
GRF2-46	737398.44	1008353.6	0	35mm subcaliber round (live)	UXO
GRF2-47	737413.25	1008357.71	1	35mm subcaliber round (live)	UXO
GRF2-49	737434.95	1008375.3	2	35mm subcaliber round (live)	UXO
GRF5-15	737424.72	1008473.73	1	35mm subcaliber round (live)	UXO
GRF5-17	737391.91	1008480	1	35mm subcaliber round (live)	UXO
GRF6-29	737431.28	1008551.16	0	35mm subcaliber round (live)	UXO
GRF6-32	737427.65	1008537.5	1	35mm subcaliber round (live)	UXO
GRF6-50	737430.97	1008594.46	0	35mm subcaliber round (live)	UXO
GRF7-10	737443.76	1008632.93	3	35mm subcaliber round (live), fuze and det	UXO

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRF7-12	737459.08	1008641.14	2	35mm subcaliber round (live)	UXO
GRF7-14	737440.29	1008645.25	3	35mm subcaliber round (live)	UXO
GRF7-15	737430.81	1008653.31	1	35mm subcaliber round (live)	UXO
GRF7-18	737411.77	1008660.6	2	35mm subcaliber round (live)	UXO
GRF7-19	737409.09	1008665.97	2	35mm subcaliber round (live), fuze and det	UXO
GRF7-2	737407.92	1008606.55	2	35mm subcaliber round (live), fuze	UXO
GRF7-26	737412.4	1008693.61	4	35mm subcaliber round (live)	UXO
GRF7-29	737423.14	1008707.67	6	35mm subcaliber round (live)	UXO
GRF7-3	737431.44	1008613.19	2	35mm subcaliber round (live)	UXO
GRF7-33	737438.72	1008720.05	3	35mm subcaliber round (live)	UXO
GRF7-35	737440.14	1008715.47	3	35mm subcaliber round (live)	UXO
GRF7-39	737422.61	1008729.37	2	35mm subcaliber round (live)	UXO
GRF7-41	737455.14	1008741.69	2	35mm subcaliber round (live)	UXO
GRF7-42	737446.77	1008737.74	3	35mm subcaliber round (live)	UXO
GRF7-43	737440.14	1008737.11	2	35mm subcaliber round (live)	UXO
GRF7-44	737430.19	1008743.75	2	35mm subcaliber round (live)	UXO
GRF7-49	737445.19	1008755.12	3	35mm subcaliber round (live)	UXO
GRF7-58	737435.08	1008779.86	2	35mm subcaliber round (live)	UXO
GRF7-63	737462.72	1008817.92	5	35mm subcaliber round (live)	UXO
GRF7-71	737397.71	1008886.58	3	35mm subcaliber round (live)	UXO
GRMP-66	737391.31	1007960.65	1	35mm subcaliber round (live)	UXO
17A3-3	748909.43	997940.7	2	Fuze	OE
17E6-19	749302.05	998272.96	3	20mm	OE
17E6-7	749254.97	998242.99	5	20mm	OE
44B5-1	752427.5	985202.41	10	40mm practice	OE
44B5-10	752492.4	985240.9	3	40mm practice	OE
44B5-11	752489.93	985249.56	4	40mm practice	OE
44B5-14	752499.94	985256.91	1	40mm practice	OE
44B5-16	752494.95	985253.31	3	40mm practice	OE
44B5-18	752481.36	985280.75	0	40mm practice	OE
44B5-20	752477.47	985288.52	2	40mm practice, scrap metal	OE
44B5-21	752467.49	985288.24	4	40mm practice	OE
44B5-23	752494.67	985304.74	4	40mm practice	OE
44B5-26	752497.52	985317.73	3	40mm practice	OE
44B5-27	752496.55	985326.74	4	40mm practice	OE
44B5-28	752485.87	985324.8	5	40mm practice, wire	OE
44B5-29	752479.9	985323.41	6	40mm practice, slug	OE
44B5-30	752475.32	985326.19	3	40mm practice	OE
44B5-32	752482.67	985338.39	0	40mm practice	OE
44B5-34	752462.55	985344.22	4	40mm practice	OE
44B5-36	752462.55	985321.06	3	40mm practice	OE
44B5-38	752410.51	985330.21	0	40mm practice	OE
44B5-40	752479.12	985359.84	6	40mm practice, scrap	OE
44B5-41	752464.95	985362.75	3	40mm practice	OE
44B5-43	752494.12	985374.97	6	40mm practice	OE
44B5-5	752462.43	985229.63	1	40mm practice	OE
44B5-6	752464.9	985220	7	40mm practice	OE
44B5-7	752472.46	985219.87	5	40mm practice	OE
44B5-9	752489.93	985235.67	2	40mm practice, arrow tip	OE
44B7-17	752503.52	985411.54	2	40mm cap	OE
44B7-22	752572.3	985412.17	3	40mm practice	OE
44B7-24	752559.42	985432.48	4	40mm practice	OE
44B7-26	752557.53	985440.42	0	40mm practice	OE
44B7-28	752567.12	985438.66	0	40mm practice	OE
44B7-29	752575.07	985445.97	2	40mm practice	OE
44C5-10	752520.79	985217.87	4	40mm practice, steel frag	OE
44C5-15	752522.44	985250.59	4	40mm practice	OE
44C5-17	752575.05	985243.57	6	40mm practice, sifter part	OE
44C5-19	752567.42	985262.69	6	40mm practice	OE

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SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
44C5-2	752527.97	985201.14	3	40mm practice	OE
44C5-20	752559.95	985261.5	2	40mm practice	OE
44C5-23	752500	985255.65	2	40mm practice	OE
44C5-24	752507.48	985264.17	1	40mm practice	OE
44C5-25	752519.89	985272.39	4	40mm parts	OE
44C5-26	752532.45	985262.53	2	40mm practice, sm frag	OE
44C5-27	752531.55	985275.68	4	40mm practice, scrap	OE
44C5-29	752547.85	985268.36	2	40mm practice	OE
44C5-31	752551.29	985280.32	6	40mm practice (3)	OE
44C5-32	752552.94	985286.74	2	40mm practice (3), frag	OE
44C5-33	752569.69	985294.52	3	40mm expended	OE
44C5-34	752562.96	985302.74	3	40mm practice	OE
44C5-35	752538.13	985300.94	1	40mm practice (2)	OE
44C5-39	752501.05	985305.58	3	40mm practice	OE
44C5-4	752565.03	985204.13	3	40mm practice	OE
44C5-41	752525.72	985310.96	6	40mm part, al canister	OE
44C5-42	752563.09	985323.93	2	40mm expended, al frag	OE
44C5-45	752507.73	985336.49	4	40mm practice, scrap	OE
44C5-46	752512.81	985337.54	6	40mm practice	OE
44C5-49	752527.05	985357.55	3	Drive shaft, 40mm	OE
44C5-51	752506.99	985360.1	3	40mm practice	OE
44C5-52	752507.44	985377.31	4	40mm practice	OE
44C5-55	752508.19	985386.74	2	40mm practice	OE
44C5-56	752524.51	985382.4	3	40mm practice	OE
44C5-59	752529.33	985228.79	12	40mm practice (2)	OE
44C5-61	752585.27	985271.96	12	40mm practice	OE
44D1-10	752681.05	984868.53	0	40 MM PRATICE (surf)	OE
44D4-15	752634.74	985169.33	0	40mm practice	OE
44D4-16	752656.26	985188.49	0	40mm practice	OE
44D4-18	752633.07	985182.55	2	40mm practice	OE
44D4-20	752644.95	985200.38	2	40mm practice	OE
44D4-21	752687.51	985207.85	0	40mm practice	OE
44D4-22	752670.64	985208.81	2	40mm practice	OE
44D4-23	752631.54	985204.59	2	40mm practice	OE
44D4-26	752612.18	985218.4	2	40mm practice	OE
44D4-27	752606.81	985215.52	2	40mm practice	OE
44D4-29	752612.37	985231.63	2	40mm practice	OE
44D4-30	752647.06	985220.7	1	40mm practice	OE
44D4-33	752652.43	985232.78	2	40mm practice	OE
44D4-37	752603.65	985266.26	2	40mm practice	OE
44D4-38	752646.21	985281.22	2	40mm practice	OE
44D4-39	752651.77	985282.75	4	40mm practice	OE
44D4-40	752649.85	985288.31	2	Cable clamp, ogive, 40mm practice	OE
44D4-41	752652.72	985272.21	1	40mm practice	OE
44D4-42	752656.75	985277.19	2	40mm practice	OE
44D4-43	752658.28	985268.18	3	40mm practice	OE
44D4-45	752663.84	985275.85	2	40mm practice	OE
44D4-46	752669.98	985270.1	3	40mm practice	OE
44D4-47	752684.16	985272.78	2	40mm practice	OE
44D4-49	752670.17	985279.87	3	40mm practice	OE
44D4-54	752690.1	985291.19	3	40mm practice	OE
44D4-55	752695.66	985287.16	2	40mm practice (3)	OE
44D4-56	752699.5	985289.65	2	40mm practice	OE
44D4-57	752696.62	985296.56	2	40mm practice	OE
44D4-59	752674.96	985299.43	2	40mm practice	OE
44D4-61	752639.31	985293.68	1	40mm practice	OE
44D4-63	752619.95	985294.45	2	40mm practice	OE
44D4-64	752614.77	985298.09	3	40mm practice and frag	OE
44D4-65	752602.31	985303.46	2	40mm practice	OE
44D4-67	752655.79	985294.64	2	40mm practice (3)	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
44D4-68	752657.9	985289.27	6	40mm practice	OE
44D4-70	752669.02	985292.34	0	40mm practice	OE
44D4-81	752612.57	985375.44	2	40mm practice	OE
44D7-19	752672.46 .	985471.92	2	40mm practice	OE
44E3-36	752747.56	985074.98	0	40mm practice	OE
44E5-10	752732.57	985287.63	6	40mm practice	OE
44E5-11	752752.47	985292.63	3	40mm practice	OE
44E5-12	752757.48	985290.27	5	40mm practice	OE
44E5-13	752762.63	985279	2	40mm practice	OE
44E5-14	752767.08	985284.71	2	40mm practice	OE
44E5-15	752786.42	985316.42	5	40mm practice	OE
44E5-16	752762.49	985315.86	6	40mm practice	OE
44E5-2	752715.55	985218.92	3	40mm practice	OE
44E5-20	752718.66	985301.12	3	40mm practice	OE
44E5-22	752737.17	985313.91	4	40mm practice	OE
44E5-24	752707.41	985321.71	0	40mm practice	OE
44E5-25	752756.71	985321.57	4	40mm practice	OE
44E5-26	752771.2	985330.2	3	40mm practice	OE
44E5-27	752779.97	985333.96	6	40mm practice	OE
44E5-28	752769.67	985340.5	4	40mm practice	OE
44E5-29	752778.16	985345.38	2	40mm practice	OE
44E5-3	752752.47	985263.57	6	40mm practice	OE
44E5-31	752747.94	985351.92	8	40mm practice	OE
44E5-39	752753.65	985491.75	0	40mm practice	OE
44E5-6	752737.44	985280.4	4	40mm practice	OE
44E5-7	752722.42	985275.11	6	40mm practice	OE
44E5-9	752725.9	985282.2	8	40mm practice	OE
44F3-22	752895.42	985059.94	4	40mm practice	OE
44F4-10	752830.58	985198.41	1	40mm practice	OE
44F4-11	752824.93	985195.79	4	40mm practice	OE
44F4-7	752883.64	985182.42	2	40mm practice	OE
44F4-8	752878.54	985196.07	3	40mm practice	OE
44F4-9	752867.38	985197.45	2	40mm practice	OE
44F5-10	752842.21	985279.26	5	40mm practice	OE
44F5-12	752887.9	985273.04	6	40mm practice	OE
44F5-13	752879.94	985282.9	0	40mm practice	OE
44F5-15	752883.05	985291.2	4	40mm practice, ogive	OE
44F5-16	752889.11	985294.32	4	40mm practice	OE
44F5-18	752872.15	985293.1	3	40mm practice	OE
44F5-19	752864.88	985293.1	8	40mm practice	OE
44F5-20	752840.13	985298.64	4	40mm practice, al frag	OE
44F5-21	752832.34	985306.08	1	40mm practice, scrap	OE
44F5-22	752849.82	985307.81	1	40mm practice	OE
44F5-23	752867.48	985310.23	4	40mm practice (2)	OE
44F5-24	752875.09	985306.25	6	40mm practice	OE
44F5-28	752882.88	985314.21	3	40mm practice (2)	OE
44F5-29	752867.3	985320.26	3	40mm practice	OE
44F5-30	752859.86	985319.05	4	40mm practice	OE
44F5-31	752856.75	985327.53	3	40mm practice	OE
44F5-32	752838.06	985320.78	3	40mm practice	OE
44F5-33	752851.13	985334.55	1	40mm practice	OE
44F5-35	752852.34	985367.43	2	40mm practice	OE
44F5-36	752894.93	985375.74	1	40mm practice	OE
44F5-4	752899.92	985270.49	6	40mm practice	OE
44F5-5	752840.67	985266.71	3	40mm practice	OE
44F5-6	752809.94	985266.2	3	40mm practice	OE
44F5-8	752813.48	985275.46	2	40mm practice	OE
44F5-9	752817.46	985280.3	4	40mm practice	OE
44G3-13	752943.95	985036.08	2	40mm practice	OE
44G3-14	752947.92	985037.5	3	40mm practice	OE

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UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
44G3-18	752991.14	985025.45	2	40mm practice	OE
44G3-23	752999.5	985045.01	2	40mm practice	OE
44G3-25	752979.38	985052.52	1	40mm practice	OE
44G3-26	752967.61	985054.51	3	SLAP FLARE	OE
44G3-44	752926.95	985067.5	3	40MM SLUG	OE
44G3-48	752949.44	985042.12	10	40mm practice	OE
44G4-13	753042.98	985176.93	4	40MM SLUG	OE
44G4-16	753014.85	985190.18	3	40mm practice	OE
44G4-19	753007.31	985187.32	6	40mm practice	OE
44G4-20	753001.4	985198.13	6	40mm practice	OE
44G4-7	753036.87	985148.2	3	40 MM SLUG	OE
44H3-12	753128.59	985007.08	2	40mm practice	OE
44H3-29	753000.36	985054.93	6	40mm practice	OE
44H3-34	753071.76	985054.93	2	40mm practice	OE
44H3-4	753053.6	985011.4	4	40mm practice	OE
44H3-51	753091.72	985070.04	2	SLAP FLARE	OE
44H3-68	753197.26	985084.99	0	40mm practice	OE
44H3-72	753128.87	985100.06	8	40mm practice	OE
44H5-1	753001.39	985213.21	0	40MM PRATICE	OE
44H5-10	753085.47	985227.97	2	40MM PRATICE	OE
44H5-102	753133.13	985287.45	4	40MM	OE
44H5-109	753113.65	985289.92	1	40mm practice	OE
44H5-11	753090.45	985246.48	3	40mm practice	OE
44H5-112	753109.71	985278.45	4	40mm practice	OE
44H5-114	753125.6	985275.95	0	40MM PRATICE -Surf	OE
44H5-115	753121.06	985267.71	0	40MM PRATICE - Surf	OE
44H5-121	753084.26	985274.99	4	40mm practice	OE
44H5-122	753088.08	985259.34	2	40mm practice	OE
44H5-124	753064.66	985268.9	2	FLARE	OE
44H5-125	753089.52	985287.41	4	40mm practice	OE
44H5-13	753099.15	985243.63	6	40MM PRATICE	OE
44H5-132	753024.73	985290.9	1	40mm practice	OE
44H5-134	753023.3	985272.35	2	40mm practice	OE
44H5-136	753021.26	985254.27	1	40mm practice	OE
44H5-141	753001.72	985236.62	2	40mm practice	OE
44H5-144	753195.79	985300.13	3	40mm practice	OE
44H5-146	753116.22	985274.98	6	40mm practice	OE
44H5-20	753133.46	985222.79	0	40mm practice	OE
44H5-24	753131.08	985246.13	4	40MM PRATICE	OE
44H5-25	753132.62	985241.24	0	40MM PRATICE	OE
44H5-39	753160.86	985235.05	10	40MM PRATICE	OE
44H5-4	753038.07	985204.99	4	40MM PRATICE	OE
44H5-40	753160.62	985245.65	5	40MM PRATICE	OE
44H5-41	753160.5	985249.94	0	40MM PRATICE	OE
44H5-53	753189.61	985258.81	5	40MM PRATICE	OE
44H5-55	753173.01	985257.02	6	40mm practice	OE
44H5-57	753138.27	985249.98	6	40MM PRATICE	OE
44H5-6	753025.09	985237.14	0	40MM PRATICE	OE
44H5-61	753160.84	985265.02	6	40MM PRATICE	OE
44H5-68	753183.64	985270.51	3	40mm practice	OE
44H5-87	753160	985289.96	0	40MM - Surf	OE
44H5-88	753153.43	985290.44	4	40MM	OE
44H5-9	753068.68	985237.49	1	40mm practice	OE
44H5-94	753141.25	985291.51	4	40mm practice	OE
44H5-99	753142.21	985270.74	3	40MM	OE
44H6-14	753174.34	985397.27	0	40mm practice	OE
44H6-2	753137.78	985384.99	2	40mm practice	OE
44H7-15	753175.92	985414.98	4	40mm practice	OE
44H7-18	753177.7	985422.51	4	40mm practice	OE
44H7-21	753155.85	985427.31	4	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
44H7-26	753199.87	985429.51	12	40mm practice	OE
44H7-37	753197.85	985469.98	2	40mm practice	OE
44H7-49	753142.65	985475.94	2	SLAP FLARE	OE
44H7-55	753169.57	985475	4	40mm practice	OE
44H7-62	753156.16	985483.79	2	40mm practice	OE
44H7-68	753126.93	985442.57	2	SLAP FLARE	OE
44H7-79	753168.36	985486.05	2	40mm practice	OE
44H7-82	753174.04	985495.42	0	40mm practice	OE
44H7-90	753122.05	985451.96	2	40MM PART	OE
44H8-20	753231.58	985504.94	1	40mm practice	OE
44H8-28	753280.5	985505.67	2	40mm practice	OE
44H8-3	753043.03	985547.51	3	40mm practice	OE
44H8-36	753269.91	985516.61	3	40mm practice	OE
44H8-39	753297.02	985529.98	4	40mm practice	OE
44H8-63	753226.15	985589.62	3	40mm practice	OE
44H8-70	753198.58	985570.68	2	CS GRENADE	OE
44H8-73	753195.32	985595.22	0	40mm practice (2)	OE
44H8-74	753180.54	985596.39	0	CS GRENADE	OE
44H8-76	753159.01	985554.63	2	CS GRENADE	OE
44H8-81	753151.71	985594.06	2	40mm practice	OE
44H8-88	753011.4	985557.85	2	CS GRENADE	OE
44H9-16	753150.46	985605.97	3	Pop-up flare	OE
44H9-45	753261.18	985633.5	2	Pop-up flare	OE
44J10-12	753285.71	985713.73	4	Slap flare	OE
44J10-16	753287.2	985724.26	6	40mm practice	OE
44J10-19	753261.88	985736.71	3	Slap flare	OE
44J10-38	753257.48	985780.01	1	40mm practice	OE
44J7-1	753210.99	985429.45	3	40mm practice	OE
44J7-13	753295.26	985439.99	3	40mm practice	OE
44J7-17	753239.22	985435.29	2	40mm practice	OE
44J7-48	753239.65	985475.76	6	40mm practice	OE
44J7-57	753281.64	985495.76	8	40mm practice	OE
44J7-58	753272.5	985494.9	3	40mm practice	OE
44J7-67	753266.58	985495.25	3	40mm practice	OE
44L1-42	753436.06	984998.85	0	40mm practice	OE
44L1-47	753500.06	984993.68	6	40mm practice	OE
44L9-56	753450.1	985789.22	9	40mm practice	OE
45A11-10	737411.81	1013209.18	12	20mm frag	OE
45A11-11	737407.47	1013218.13	2	20mm	OE
45A11-13	737426.38	1013221.9	12	Butterfly bomb and fuze	OE
45A11-16	737449.89	1013246.11	12	20mm	OE
45A11-18	737472.55	1013220.78	4	20mm and frag	OE
45A11-2	737490.67	1013195.06	8	Lg frag and 20mm (2)	OE
45A11-7	737408.31	1013181.35	2	20mm	OE
45A11-8	737407.89	1013193.66	6	M61 fuze	OE
45A1-25	737445.74	1012197.51	2	FUZE	OE
45A1-29	737468.17	1012209.15	2	20MM	OE
45A1-3	737423.88	1012177.65	1	20MM	OE
45A13-1	737434.86	1013375.55	2	Fuze	OE
45A13-11	737421.34	1013397.28	6	Frag and 20mm	OE
45A13-13	737420.62	1013414.4	6	Fuze and frag 2"-6"	OE
45A13-15	737502.78	1013413.25	6	Bomb fuzes (2)	OE
45A13-17	737434.19	1013427.47	1	Frag and 20mm	OE
45A13-19	737470.04	1013447.34	8	20mm and frag	OE
45A13-2	737442.63	1013366.63	6	Fuze parts and 20mm	OE
45A13-20	737475.08	1013446.05	6	20mm (2)	OE
45A13-5	737499.04	1013362.31	4	20mm	OE
45A1-46	737427.48	1012242.47	2	FUZE	OE
45A1-47	737437.99	1012223.31	2	FUZE	OE
45A1-48	737449.78	1012222.46	4	FUZE	OE

APPENDIX C
UXO AND OE RECOVERED
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Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45A1-51	737449.78	1012232.96	3	FUZE	OE
45A1-59	737485.14	1012259.51	0	20MM (surf)	OE
45A1-6	737453.83	1012180.06	6	20MM & FRAG	OE
45A1-61	737477.9	1012249.57	1	FUZE	OE
45A1-64	737451.91	1012246.59	4	20MM	OE
45A1-68	737437.28	1012245.03	2	20MM	OE
45A1-69	737448.36	1012256.1	2	FUZE ADPT.	OE
45A1-70	737442.39	1012254.97	3	20MM	OE
45A4-1	737445.75	1012459.48	3	75mm	OE
45A4-14	737441.5	1012494.65	1	Fuze	OE
45A4-18	737450.39	1012488.41	3	PD fuze	OE
45A4-19	737460.47	1012489.87	6	PD fuze	OE
45A4-21	737460.07	1012503.27	4	20mm	OE
45A4-33	737470.02	1012501.68	3	20mm	OE
45A4-4	737429.96	1012474.48	3	20mm	OE
45A4-40	737433.88	1012544.66	3	20mm, 57mm	OE
45A4-42	737432.95	1012569.6	1	M66	OE
45A4-44	737454.57	1012572.12	5	M66	OE
45A4-58	737452.08	1012606.87	2	Frag, fuze	OE
45A4-6	737409.13	1012471.96	4	Fuze, 20mm	OE
45A4-64	737503.07	1012593.66	2	Fuze	OE
45A4-66	737454.99	1012632.83	2	Fuze	OE
45A4-67	737444.44	1012636.21	6	Fuze	OE
45A4-69	737450.39	1012647.85	2	Fuze	OE
45A4-70	737422.52	1012652.18	3	Landmine fuze	OE
45B15-10	737595.67	1013602.22	5	57MM	OE
45B15-15	737580.04	1013630.81	3	FUZE	OE
45B15-18	737557.92	1013648.13	4	FUZE	OE
45B15-19	737545.24	1013653.48	3	FUZE	OE
45B15-2	737523.21	1013564.67	5	FUZE	OE
45B15-4	737586.67	1013582.67	4	FUZE	OE
45B15-6	737532.78	1013588.02	5	FUZE	OE
45B15-7	737546.15	1013586.75	6	FUZE (2)	OE
45B15-9	737581.32	1013600.81	6	75MM PROJECTILE	OE
45B3-16	737568.98	1012382.87	3	Fuze	OE
45B3-17	737565.1	1012376.3	2	Fuze	OE
45B3-23	737527.59	1012394.92	2	M66	OE
45B3-3	737533.35	1012364.11	3	Fuze	OE
45B3-33	737575.68	1012413.14	3	20mm	OE
45B3-35	737569.92	1012411	3	20mm	OE
45B3-37	737558.67	1012405.78	6	Frag, 20mm	OE
45B3-39	737552.5	1012415.02	3	20mm	OE
45B3-4	737575.01	1012362.5	1	20mm	OE
45B3-44	737519.3	1012415.7	2	Fuze	OE
45B3-45	737510.05	1012422.4	2	Fuze	OE
45B3-46	737507.5	1012447.19	3	20mm	OE
45B3-47	737517.55	1012455.77	3	20mm	OE
45B3-49	737536.45	1012460.19	0	Frag, 20mm	OE
45B3-57	737580.53	1012439.42	2	Fuze	OE
45B3-66	737538.59	1012432.85	2	Fuze	OE
45B3-7	737591.35	1012374.56	3	20mm	OE
45B9-1	737584.92	1012970.35	4	75mm projectile	OE
45B9-11	737516.43	1013030.61	6	75mm (1/2), frag	OE
45B9-12	737535.07	1013044.26	12	75mm, 20mm	OE
45B9-17	737568.88	1013023.02	6	Fuze, frag	OE
45B9-18	737525.75	1013029.74	6	20mm (5), fuze	OE
45B9-19	737562.6	1012977.72	6	Fuze	OE
45B9-2	737605.08	1012987.26	4	20mm	OE
45B9-24	737510.02	1013071.42	0	Frag, 75mm, fuze	OE
45B9-28	737593.09	1013091.31	12	Fuzes (2), frag (5)	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45B9-32	737550.02	1013075.79	0	Fuzes and frag to 2'	OE
45B9-34	737535.16	1013076.01	0	Frag, 20mm	OE
45B9-35	737514.39	1013087.81	6	Fuzes, frag, armor plate	OE
45B9-36	737518.32	1013079.5	6	Havar venturi and lg frag	OE
45B9-39	737604.68	1013140.5	4	Frag, 20mm, 60mm motor	OE
45B9-4	737534.2	1012998.31	6	Fuze, frag, 20mm	OE
45B9-5	737543.74	1013007.85	11	20mm, fuze	OE
45B9-9	737578.2	1013032.56	12	Lg frag, fuze	OE
45C13-10	737695.59	1013391.98	12	75MM FUZE	OE
45C13-12	737664.66	1013387.1	4	FUZE	OE
45C13-13	737654.89	1013381.78	4	20 MM	OE
45C13-14	737649.86	1013387.1	3	FUZE	OE
45C13-17	737692.19	1013413.14	12	ROCKET VENTURI	OE
45C13-23	737670.08	1013462.45	4	FUZE	OE
45C13-31	737679.66	1013513.87	4	FUZE	OE
45C13-32	737695.06	1013518.66	9	FUZE	OE
45C13-38	737637.44	1013545.81	5	FUZE	OE
45C13-39	737614.79	1013548.83	3	ROCKET VENTURI	OE
45C13-4	737654.15	1013361.51	4	BASE FUZE	OE
45C13-5	737702.84	1013360.33	6	FUZE (2)	OE
45C2-1	737699.96	1012262.89	3	75mm	OE
45C2-14	737675.06	1012355.71	4	Fuze	OE
45C2-16	737701.19	1012343.22	6	Base fuze	OE
45C2-18	737676.15	1012276.87	6	Base fuze	OE
45C2-2	737689.79	1012262.19	4	75mm	OE
45C2-3	737686.44	1012270.69	8	Fuzes (2)	OE
45C2-4	737696.2	1012286.71	4	75mm - HE	OE
45C2-5	737699.12	1012311.36	12	Fuzes (3), 20mm	OE
45C2-6	737693.83	1012316.1	6	Base fuze (2)	OE
45C6-1	737621.9	1012660.89	2	Fuze, 20mm	OE
45C6-10	737705.03	1012661.8	3	20mm	OE
45C6-12	737692.24	1012683.08	2	20mm	OE
45C6-15	737675.8	1012690.91	2	Fuze	OE
45C6-16	737660.01	1012684.52	1	M66 fuze	OE
45C6-18	737624.77	1012689.74	2	20mm, fuze parts	OE
45C6-20	737629.08	1012702.4	3	M103 fuze	OE
45C6-22	737604.94	1012694.83	1	20mm	OE
45C6-23	737642.52	1012713.75	3	20mm	OE
45C6-24	737646.31	1012709.19	3	M66	OE
45C6-27	737662.49	1012702.01	2	20mm (2)	OE
45C6-29	737672.27	1012707.75	3	20mm, frag	OE
45C6-3	737628.69	1012666.9	2	20mm	OE
45C6-35	737684.96	1012725.7	2	Fuze	OE
45C6-38	737661.73	1012735.37	4	Fuze, frag (2)	OE
45C6-39	737662.51	1012743.33	4	Frag (3), 20mm (2)	OE
45C6-44	737628.58	1012753.51	0	Fuze	OE
45C6-53	737698.76	1012745.69	6	Fuzes (4), 20mm (2)	OE
45C6-54	737697.72	1012718.15	8	Fuze, frag	OE
45C6-58	737695.38	1012731.15	3	20mm	OE
45D11-10	737742.67	1013202.65	12	Nose fuze, 20mm	OE
45D11-12	737775.7	1013204.23	6	75mm HE	OE
45D11-14	737776.6	1013221.2	8	Fuze, fuze parts, 20mm (5)	OE
45D11-15	737743.57	1013245.18	6	Frag, bomb fuze parts, 20mm (5)	OE
45D11-16	737749.45	1013250.16	6	75mm, frag, 20mm (5)	OE
45D11-17	737763.48	1013258.53	6	20mm (2), fence post	OE
45D11-18	737768.23	1013231.61	10	75mm, M83	OE
45D11-19	737752.85	1013235.23	8	20mm, frag	OE
45D11-2	737740.4	1013172.78	6	Nose fuze, frag	OE
45D11-3	737712.35	1013183.87	2	75mm HE and fuze	OE
45D11-5	737744.02	1013183.87	6	Havar venturi	OE

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Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45D4-12	737705.4	1012472.66	4	20mm (2)	OE
45D4-17	737740.15	1012485.76	2	20mm	OE
45D4-18	737745.09	1012483.88	0	20mm	OE
45D4-2	737730.66	1012460.23	6	20mm	OE
45D4-3	737732.66	1012472.52	3	M66 fuze	OE
45D4-5	737735.07	1012480.14	0	20mm and frag	OE
45D4-52	737705.2	1012494.97	4	20mm	OE
45D4-53	737704.93	1012501.36	3	20mm	OE
45D4-54	737709.87	1012506.57	6	Fuze	OE
45D4-57	737720.16	1012519.14	6	Fuze	OE
45D4-6	737722.11	1012467.98	4	20mm	OE
45D4-66	737737.27	1012534.11	4	20mm (2)	OE
45D4-67	737750.09	1012529.83	4	20mm	OE
45D4-69	737774.41	1012530.1	3	Bomb fuze	OE
45D4-70	737794.74	1012534.23	3	20mm frag	OE
45D4-71	737784.99	1012542.65	6	Heavy frag and 20mm	OE
45D4-72	737787.53	1012549.6	4	Fuze	OE
45D4-74	737780.45	1012559.09	6	Lg frag (2)	OE
45D4-75	737773.1	1012546.52	4	Fuze and frag	OE
45D4-77	737761.34	1012553.07	3	75mm HE	OE
45D4-78	737758.53	1012546.39	3	Frag and fuze	OE
45D4-79	737748.78	1012560.16	8	Fuze	OE
45D4-80	737739.96	1012550.4	8	20mm and fuzes (2)	OE
45D4-81	737734.88	1012558.69	5	20mm (2)	OE
45D4-82	737738.62	1012539.84	4	20mm and frag	OE
45D4-9	737720.1	1012477.34	3	20mm and frag	OE
45D9-11	737784.97	1013047.22	6	Fuze, 20mm	OE
45D9-12	737786.1	1013051.52	8	Fuze, 20mm	OE
45D9-14	737726.6	1013057.4	4	20mm frag	OE
45D9-18	737716.42	1012984.32	4	Frag, fuze	OE
45D9-19	737763.71	1012969.61	1	Base fuze	OE
45D9-3	737775.02	1012990.66	4	75mm, 20mm, fuze	OE
45D9-5	737801.26	1012992.69	3	75mm	OE
45D9-7	737782.03	1013015.54	16	20mm, lg frag	OE
45E1-12	737857.44	1012219.7	10	20mm, fuze	OE
45E1-17	737842.59	1012249.77	3	90mm	OE
45E1-18	737844.48	1012243.84	3	81mm mortar, fuze	OE
45E1-19	737851.1	1012232.37	8	75mm	OE
45E12-1	737887.23	1013260.79	10	Base plate, fuze	OE
45E12-10	737804.88	1013262.6	0	Frag, base plate, fuze	OE
45E12-12	737833.39	1013344.28	18	Frag, 20mm (5), bomb fuze - burial area	OE
45E12-13	737827.73	1013340.2	18	Base plate, 20mm (5), frag	OE
45E12-14	737805.11	1013329.12	4	Frag, 20mm	OE
45E12-16	737899.23	1013337.49	14	Frag (2), fuzes (2)	OE
45E12-18	737874.79	1013314.86	6	Fuzes (2), frag (2)	OE
45E12-19	737841.08	1013313.96	8	75mm	OE
45E12-2	737902.17	1013267.35	6	Fuze	OE
45E12-3	737894.93	1013270.29	6	Frag, 20mm	OE
45E12-4	737883.16	1013280.02	24	20mm, fuze, parts	OE
45E12-5	737852.85	1013273.69	12	Frag, 20mm (2), assoc. frag	OE
45E12-7	737890.63	1013333.64	8	Frag, fuze, base fuze	OE
45E12-8	737832.03	1013323.69	4	75mm projectile, frag	OE
45E12-9	737843.57	1013360.12	4	Wire, frag, 20mm	OE
45E1-3	737887.2	1012189.12	10	Venturi, 20mm	OE
45E13-1	737807.83	1013431.15	4	Metal scrap, fuze, plate	OE
45E13-11	737860.09	1013455.59	10	75mm	OE
45E13-14	737894.47	1013452.65	10	Frag, fuze, base plate	OE
45E13-16	737888.37	1013417.58	6	75mm	OE
45E13-17	737847.87	1013409.66	6	Base plate, 20mm, fuze	OE
45E13-18	737819.82	1013406.04	8	20mm, lg frag, 57mm	OE

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Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45E13-20	737818.91	1013379.12	6	Trash, 20mm	OE
45E13-3	737806.92	1013418.71	6	Frag, 20mm(s)	OE
45E13-4	737809.86	1013443.6	6	Base fuze, 155mm	OE
45E13-5	737833.84	1013444.28	6	Havar venturi, fuzes (5), 20mm	OE
45E13-6	737843.57	1013433.42	8	Fuze, frag, base plate	OE
45E13-7	737842.44	1013422.78	12	Base plate, 20mm(s), fuzes	OE
45E13-8	737848.1	1013426.18	14	Fuzes, frag, 20mm(s)	OE
45E13-9	737848.55	1013418.03	12	Frag (6), fuzes, 20mm (s)	OE
45E1-4	737900.96	1012198.02	6	Rkt motor, 57mm, fuze	OE
45E1-8	737822.46	1012204.76	8	57mm, frag	OE
45E4-1	737848.82	1012460.22	6	20mm frag	OE
45E4-11	737880.94	1012602.23	2	75mm	OE
45E4-12	737808.58	1012591.46	8	20mm pit	OE
45E4-13	737818.51	1012600.72	8	20mm (6)	OE
45E4-14	737836.41	1012618.88	8	20mm and fuze pit	OE
45E4-16	737876.3	1012618.71	2	Lg frag and 37mm	OE
45E4-18	737903.56	1012611.81	10	75mm (3) HE	OE
45E4-2	737838.09	1012460.72	12	20mm pit - stopped dig due to water	OE
45E4-3	737853.94	1012472.11	3	20mm	OE
45E4-4	737899.51	1012460.05	14	75mm, butterfly frag (2)	OE
45E4-5	737889.61	1012500.85	6	75mm HE fuze	OE
45E4-7	737819.1	1012524.63	7	20mm pit	OE
45E4-9	737880.61	1012567.05	2	Lg frag and 75mm	OE
45F3-10	737982.07	1012393.72	12	20mm, nails, frag	OE
45F3-11	737965.03	1012379.9	8	Heavy wire, fuze	OE
45F3-12	737960	1012376.83	12	Base fuze	OE
45F3-14	737916.28	1012393.86	12	Frag, fuze	OE
45F3-17	737937.51	1012416.48	4	75mm	OE
45F3-18	737944.96	1012445.36	4	75mm	OE
45F3-19	737950.56	1012452.48	4	75mm	OE
45F3-2	737993.32	1012376.38	18	Burn hole - 4.2" base, 20mm, nails	OE
45F3-6	737926.82	1012430.4	6	75mm APHE, M-83 (1/2)	OE
45F3-7	737969.88	1012449.81	18	75mm APHE, fuze	OE
45F3-8	737957.79	1012458.91	0	8" NUC sim round	OE
45F3-9	737915.96	1012446.96	1	75mm	OE
45F9-1	737912.69	1012969.72	6	75mm and 1/2 57mm	OE
45F9-14	737985.13	1012988.1	0	115mm HEAT	OE
45F9-25	737975.72	1013254.85	1	75mm	OE
45F9-26	737921.4	1013011.39	6	75mm	OE
45F9-30	737995.66	1013083.38	6	Frag and fuze	OE
45F9-33	737995.13	1013106.07	6	Frag (3) and 20mm	OE
45F9-35	737972.92	1013123.52	6	75mm (1/2)	OE
45F9-7	737941.41	1012983.24	6	20mm, bomb frag, fuze	OE
45G14-1	738005.25	1013463.58	2	FUZE	OE
45G14-12	738027.36	1013515.92	4	FUZE	OE
45G14-14	738044.89	1013533.72	4	FUZE	OE
45G14-16	738055.33	1013544.85	5	FUZE	OE
45G14-17	738053.8	1013550.83	4	FUZE	OE
45G14-4	738058.23	1013478.2	8	20 MM	OE
45G14-8	738064.58	1013499.3	3	FRAG & 20 MM	OE
45G14-9	738074.1	1013504.13	6	BASE FUZE	OE
45G2-1	738033.19	1012267.56	4	Frag, fuze	OE
45G2-11	738027.02	1012309.59	4	57mm - HE, fuze w/ detonator	OE
45G2-12	738012.51	1012323.28	0	75mm	OE
45G2-13	738040.9	1012320.4	6	120mm HEAT (MT)	OE
45G2-17	738005.9	1012295.49	10	Frag, 20mm	OE
45G2-2	738090.3	1012269.34	6	Base plates (2), 20mm, frag	OE
45G2-20	738100.05	1012292.75	12	Fuzes, Base plate	OE
45G2-3	738095.92	1012273.45	6	Frag, base plate, 20mm	OE
45G2-9	738061.68	1012304.52	3	75mm - HE	OE

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Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45G6-10	738043.52	1012801.83	4	37MM APHE	OE
45G6-11	738049.13	1012819.66	3	20 MM & FUZE	OE
45G6-12	738043.09	1012828.86	2	FUZE	OE
45G6-19	738082.9	1012710.51	2	FUZE & 20 MM	OE
45G6-21	738031.17	1012760.79	3	FUZE	OE
45G6-23	738093.65	1012731.06	8	20 MM BURIAL AREA	OE
45G6-29	738075.97	1012857.75	2	FUZE	OE
45G6-36	738019.11	1012799.67	2	25 MM	OE
45G6-8	738066.58	1012763.22	2	FUZE & FRAG	OE
45H12-1	738161.67	1013295.86	6	75mm projectile	OE
45H12-10	738150.13	1013352.65	2	20mm, metal and scrap	OE
45H12-11	738140.4	1013335.23	0	Fuze	OE
45H12-12	738141.53	1013330.02	6	Frag (3), fuze at 12"	OE
45H12-13	738130.9	1013318.71	6	120mm case, frag	OE
45H12-15	738105.34	1013340.2	6	Lg frag, 20mm	OE
45H12-17	738109.41	1013298.8	6	20mm, frag	OE
45H12-18	738143.12	1013265.09	6	75mm (1/2)	OE
45H12-19	738172.76	1013285.68	6	Frag, fuze	OE
45H12-20	738145.61	1013295.18	6	Lg frag, 20mm	OE
45H12-3	738174.79	1013305.59	10	20mm, frag	OE
45H12-7	738180.45	1013340.43	4	Metal pail, 20mm, scrap	OE
45H12-9	738196.51	1013352.65	4	Lg frag, 20mm	OE
45H3-1	738155.4	1012424.9	12	Hole full of 20mm	OE
45H3-10	738112.38	1012434.02	12	Frag, 20mm	OE
45H3-18	738190.19	1012402.79	10	Frag, 20mm	OE
45H3-19	738159.87	1012389.19	10	Frag, fuze, 20mm	OE
45H3-5	738184.16	1012430.47	18	75mm, 20mm	OE
45H3-9	738200.11	1012411.43	12	Frag, 20mm	OE
45I13-12	738285.95	1013366.01	3	VENTED FUZE	OE
45I13-14	738233.86	1013406.61	4	75MM PROJECTILE	OE
45I13-16	738207.95	1013409.27	5	75MM	OE
45I13-20	738287.41	1013433.07	4	75MM PROJO	OE
45I13-7	738250.24	1013367.97	5	20 MM	OE
45I13-8	738253.88	1013370.91	6	FRAG & 20 MM	OE
45I13-9	738236.38	1013368.11	6	20 MM	OE
45I2-10	738279.93	1012339.84	3	75mm - HE	OE
45I2-13	738249.99	1012350.95	5	Frag, 20mm	OE
45I2-16	738268.81	1012279.52	2	Metal fuze	OE
45I2-5	738287.43	1012310.92	6	75mm shell, VT fuze	OE
45I2-7	738215.36	1012328.16	4	Fuze	OE
45I2-9	738264.96	1012339.98	2	57mm	OE
45J11-1	738399	1013160.11	0	75mm	OE
45J11-10	738384.52	1013207.62	3	Fuze, 20mm	OE
45J11-11	738393.34	1013210.34	3	Frag, components, fuze	OE
45J11-12	738357.6	1013180.02	6	75mm, frag	OE
45J11-17	738305.56	1013248.58	5	20mm, tail fuze, lg frag	OE
45J11-18	738311.9	1013253.1	6	Frag, fuze, components	OE
45J11-20	738392.66	1013257.63	10	Frag, 20mm	OE
45J11-4	738309.41	1013188.85	6	75mm frag, 20mm	OE
45J11-5	738312.58	1013205.14	5	20mm (2)	OE
45J11-9	738366.65	1013208.3	5	Bomb fuze, frag	OE
45J2-11	738315.53	1012264.68	3	FUZE	OE
45J2-14	738336.76	1012287.52	3	40MM PRATICE & 20 MM	OE
45J2-16	738345.01	1012306.44	3	BOMB FUZE	OE
45J2-17	738322.97	1012316.84	6	FUZE ADPT.	OE
45J2-3	738313.83	1012340.9	5	FUZE (2)	OE
45J2-8	738387.48	1012340.08	4	20 MM & FRAG	OE
45J8-1	738304.54	1012872.68	0	105MM (surf)	OE
45J8-10	738307.35	1012925.28	8	75MM BASE	OE
45J8-11	738364.86	1012957.27	4	105MM PROJO (MT)	OE

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Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45J8-12	738397.56	1012957.54	3	FRAG & 20 MM	OE
45J8-14	738388.41	1012929.15	6	75MM & 20MM	OE
45J8-15	738390.31	1012863.73	12	FRAG & 20 MM	OE
45J8-3	738367.45	1012907.56	6	20 MM & FRAG	OE
45J8-5	738399.05	1012896.85	6	FRAG & 20 MM	OE
45J8-8	738403.31	1012863.62	2	20 MM	OE
45K10-11	738457.23	1013150.18	6	VT fuze	OE
45K10-15	738451.8	1013134.1	10	20mm (2), 90mm round	OE
45K10-19	738481.67	1013075.03	3	20mm, frag	OE
45K10-2	738484.62	1013127.54	2	57mm, frag	OE
45K10-3	738488.01	1013138.86	6	75mm, frag, 57mm	OE
45K10-5	738477.6	1013152.89	8	Fuze BP M61	OE
45K10-8	738461.75	1013137.73	6	Fuze parts, fuze, frag	OE
45K10-9	738410.83	1013145.65	7	Frag, 20mm, lg frag	OE
45K5-11	738484.9	1012587.4	8	Fuzes (2), 75mm frag, wire, and 20mm	OE
45K5-14	738482.86	1012657.66	4	75mm (1/2)	OE
45K5-17	738435.8	1012651.52	8	20mm (surf), frag, and thermal battery	OE
45K5-20	738487.4	1012571.48	6	Frag and 20mm	OE
45K5-4	738498.31	1012581.71	4	75mm WP	OE
45K7-12	738423.83	1012835.42	6	37mm, 20mm, frag	OE
45K7-14	738416.5	1012841.45	2	37mm base	OE
45K7-18	738514.15	1012838.56	3	40mm practice	OE
45K7-19	738501.85	1012846.42	2	Fuze and frag	OE
45K7-2	738434.04	1012785.66	16	20mm frag	OE
45K7-3	738465.45	1012767.86	4	75mm and frag	OE
45L11-1	738574.39	1013161.32	0	75mm (1/2) and fuze (VT)	OE
45L11-10	738595.76	1013193.82	4	Fuze (VT) and frag	OE
45L11-11	738511.42	1013216.49	48	250lb bomb body (3) - stopped digging at 4'	OE
45L11-14	738598.07	1013214.47	0	Frag, fuze, and 20mm	OE
45L11-15	738521.4	1013222.4	3	Frag and fuze	OE
45L11-16	738562.58	1013229.34	4	75mm projectile	OE
45L11-17	738584.84	1013229.49	6	Fuzes and frag	OE
45L11-19	738547.55	1013256.66	6	Frag and fuze	OE
45L11-2	738580.31	1013167.96	6	57mm w/ HE	OE
45L11-5	738535.25	1013200.46	5	Frag and fuze (VT)	OE
45L11-6	738567.74	1013184.72	6	Frag and 20mm	OE
45L11-7	738582.48	1013177.64	4	20mm and frag	OE
45L11-8	738590.85	1013204.22	6	Lg frag (2) and fuze (VT)	OE
45L11-9	738551.28	1013216.06	6	Frag and 20mm	OE
45L3-1	738513.82	1012378.23	2	Fuze, frag, 20mm	OE
45L3-11	738564.19	1012424.66	2	Fuzes (3)	OE
45L3-12	738595	1012433.69	6	Base plate, 20mm, frag	OE
45L3-15	738524.07	1012445.87	12	40mm parts w/ HE, 90mm	OE
45L3-16	738518.6	1012452.99	3	90mm (2)	OE
45L3-18	738528.73	1012452.99	6	Fuzes (3), 20mm	OE
45L3-19	738535.16	1012457.37	7	Grenade parts - HE	OE
45L3-2	738545.59	1012410.53	2	Frag, fuze	OE
45L3-3	738514.77	1012392.2	6	Frag, 20mm	OE
45L3-4	738517.35	1012384.88	6	Frag (2), fuze, 20mm	OE
45L3-6	738547.22	1012403.06	5	Nose fuze, 20mm	OE
45L3-7	738563.52	1012413.65	4	75mm APHE	OE
45L3-9	738506.35	1012411.88	4	20mm (3), base plate	OE
45L9-10	738696.82	1013004.62	0	20mm (2), frag, 60 seriel fuze	OE
45L9-12	738694.84	1013048.2	2	75mm	OE
45L9-14	738665.14	1012992.87	7	75mm	OE
45L9-17	738687.49	1013016.2	2	20mm and frag	OE
45L9-18	738699.72	1013012.94	8	3.5" rocket	OE
45L9-2	738509.4	1012972.25	24	20mm pit - hole still hot below 2'	OE
45L9-23	738653.23	1013034.15	0	M61 fuze	OE
45L9-26	738618.54	1013036.92	3	Frag and 20mm	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45L9-29	738518.22	1012991.75	0	20mm (6)	OE
45L9-3	738609.85	1013026.58	8	Lg plate, fuzes, frag	OE
45L9-30	738521.44	1012997.73	14	20mm (30) and frag	OE
45L9-31	738516.3	1013002.51	0	20mm (5)	OE
45L9-32	738511.52	1013005.38	8	20mm and frag	OE
45L9-33	738537.5	1012960.93	8	Frag and M66 fuze	OE
45L9-8	738675.74	1012994.81	6	20mm frag (2)	OE
45M6-1	738691.04	1012666.71	3	75mm and frag	OE
45M6-13	738664.9	1012734.24	3	20mm and frag	OE
45M6-15	738686.27	1012705.59	2	Nose fuze	OE
45M6-17	738653.3	1012686.94	0	Fuzes (2)	OE
45M6-20	738651.71	1012666.48	4	Frag and 20mm	OE
45M6-6	738632.39	1012722.64	6	20mm and frag	OE
45M6-9	738662.4	1012663.07	4	Fuze and frag	OE
45MP-10	736973.81	1012163.41	4	Fuze	OE
45MP-102	737335.81	1012252.66	4	Fuze	OE
45MP-103	737343.06	1012244.87	4	M-60 base fuze	OE
45MP-105	736874.3	1012366.48	3	57mm	OE
45MP-106	736883.02	1012349.04	12	Fuze	OE
45MP-110	736920.18	1012367.57	5	Fuze	OE
45MP-115	736952.07	1012351.87	2	Fuze	OE
45MP-116	736961.28	1012355.36	2	Fuze, 20mm	OE
45MP-117	736976.73	1012371.3	12	Fuze	OE
45MP-12	737044.3	1012153.57	6	VT fuze	OE
45MP-122	737004.38	1012372.8	3	Fuze	OE
45MP-124	737029.54	1012352.12	6	Fuze	OE
45MP-13	737063.95	1012141.79	4	Fuze	OE
45MP-15	737055.37	1012164.59	4	20mm	OE
45MP-17	737071.89	1012165.01	4	Fuze	OE
45MP-170	736792.02	1012474.22	6	Fuze	OE
45MP-172	736800.93	1012456.53	5	Fuze	OE
45MP-173	736824.59	1012455	6	Fuze	OE
45MP-179	736949.62	1012446.01	2	Fuze	OE
45MP-18	737093.65	1012148.48	6	57mm	OE
45MP-180	736959.63	1012466.04	8	Fuze	OE
45MP-181	736957.41	1012443.78	2	Fuze	OE
45MP-184	737052.76	1012451.77	3	Fuze	OE
45MP-185	737058.88	1012442.03	3	Fuze	OE
45MP-186	737069.45	1012446.76	4	57mm - WP	OE
45MP-189	737059.16	1012471.25	8	Fuze, frag	OE
45MP-190	737067.23	1012471.53	4	20mm	OE
45MP-194	737096.99	1012445.93	4	Fuze	OE
45MP-21	737102.85	1012170.66	8	57mm - HE	OE
45MP-250	737270.85	1012553.17	4	57mm - HE	OE
45MP-254	736875.25	1012557.53	5	Fuze	OE
45MP-255	737014.96	1012551.6	6	Nose fuze	OE
45MP-256	737111.6	1012548.38	3	Fuze	OE
45MP-262	736787.95	1012566.24	2	Fuze	OE
45MP-263	736865.35	1012564.67	4	75mm APHE	OE
45MP-264	736874.99	1012558.94	5	Fuze	OE
45MP-267	736898.19	1012562.59	6	Fuze	OE
45MP-269	736991.43	1012561.18	3	20mm	OE
45MP-270	737001.34	1012553.35	3	Fuze	OE
45MP-272	737014.12	1012553.88	6	Nose fuze	OE
45MP-274	737030.03	1012560.14	4	Fuze	OE
45MP-275	737055.85	1012557.27	3	Fuze	OE
45MP-276	737082.95	1012560.53	2	20mm	OE
45MP-278	737105.12	1012552.7	3	Fuze	OE
45MP-280	737114.51	1012557.92	4	Fuze	OE
45MP-288	737201.87	1012558.7	5	20mm	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-289	737210.21	1012567.83	6	Fuze	OE
45MP-292	737222.99	1012563.13	3	Fuze	OE
45MP-294	737234.21	1012561.05	12	Fuze	OE
45MP-296	737251.11	1012560.67	3	Fuze	OE
45MP-297	737263.1	1012560.41	2	20mm	OE
45MP-298	737270.67	1012570.06	6	Fuze	OE
45MP-299	737275.62	1012562.5	4	57mm - HE	OE
45MP-3	736819.07	1012138.62	3	Nose fuze	OE
45MP-305	736777.99	1012652.47	6	Fuze	OE
45MP-306	736827.54	1012661.31	3	Fuze	OE
45MP-307	736866.65	1012654.61	6	Fuze	OE
45MP-308	736940.31	1012661.84	4	Fuze	OE
45MP-311	736995.01	1012665.63	5	Havar venturi	OE
45MP-312	737013.22	1012664.55	3	75mm - HE	OE
45MP-314	737037.59	1012665.63	4	Fuze	OE
45MP-315	737081.25	1012658.39	4	20mm	OE
45MP-317	737101.61	1012667.5	4	RKT venturi	OE
45MP-318	737107.5	1012658.12	6	VT fuze	OE
45MP-321	737157.84	1012664.11	6	Frag, fuze	OE
45MP-323	737176.32	1012665.72	5	RKT venturi	OE
45MP-324	737189.71	1012664.11	3	57mm	OE
45MP-325	737204.98	1012656.07	4	37mm	OE
45MP-326	737213.82	1012655	8	Nose fuze	OE
45MP-328	737220.25	1012664.91	4	20mm	OE
45MP-330	737239.8	1012655	8	20mm	OE
45MP-331	737251.79	1012657.49	6	M-66 fuze	OE
45MP-332	737259.02	1012662.32	6	Fuze	OE
45MP-333	737265.99	1012655.62	2	20mm, frag	OE
45MP-335	737293.58	1012663.66	3	20mm (2)	OE
45MP-339	736752.68	1012771.45	3	20mm	OE
45MP-341	736827.05	1012773.8	4	20mm	OE
45MP-342	736870.8	1012752.59	2	20mm	OE
45MP-343	736887.96	1012761.68	6	Fuze	OE
45MP-344	736917.58	1012749.9	4	57mm - HE	OE
45MP-345	736924.31	1012761.01	3	Fuze	OE
45MP-348	736989.24	1012787.38	8	20mm	OE
45MP-350	736969.04	1012760.78	6	Fuze	OE
45MP-352	737007.08	1012752.36	2	Fuze	OE
45MP-353	737015.49	1012761.79	4	Fuze	OE
45MP-355	737035.02	1012752.36	5	75mm	OE
45MP-357	737034.01	1012761.45	6	Havar venturi	OE
45MP-358	737062.28	1012753.03	2	20mm	OE
45MP-359	737073.39	1012763.47	4	Fuze	OE
45MP-360	737011.12	1012787.04	6	37mm APHE	OE
45MP-361	737086.52	1012783	6	M-48 fuze	OE
45MP-364	737106.38	1012752.69	4	Fuze	OE
45MP-365	737129.95	1012754.71	2	Fuze	OE
45MP-366	737126.24	1012783.34	6	Fuze	OE
45MP-367	737152.84	1012794.45	4	Fuze	OE
45MP-368	737148.46	1012763.47	3	Fuze	OE
45MP-369	737148.8	1012754.71	6	Fuze, 20mm	OE
45MP-370	737161.59	1012763.81	4	Fuze	OE
45MP-371	737171.39	1012794.55	8	Fuze	OE
45MP-372	737180.48	1012794.88	2	Fuze	OE
45MP-374	737184.86	1012784.78	2	Fuze	OE
45MP-376	737206.07	1012785.46	2	Fuze	OE
45MP-378	737186.88	1012754.48	4	Fuze, frag	OE
45MP-379	737211.79	1012755.15	2	Fuze	OE
45MP-380	737212.13	1012762.9	6	Fuze	OE
45MP-382	737230.3	1012762.56	2	Fuze	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-384	737254.88	1012763.57	4	Fuze	OE
45MP-385	737248.82	1012754.14	2	Fuze	OE
45MP-387	737248.48	1012786.8	8	20mm (2), fuze	OE
45MP-388	737259.93	1012795.89	8	Fuze	OE
45MP-389	737261.95	1012787.81	1	20mm, frag	OE
45MP-390	737272.38	1012789.5	8	Fuze	OE
45MP-396	737281.47	1012754.14	4	RKT venturi	OE
45MP-4	736803.8	1012162.26	3	57mm - HE	OE
45MP-420	737065.19	1012852.6	4	Fuze	OE
45MP-423	737025.8	1012862.7	2	Fuze	OE
45MP-424	736965.88	1012858.33	1	Fuze	OE
45MP-425	736927.17	1012853.95	6	Frag, fuze	OE
45MP-427	736816.74	1012966.5	10	Havar venturi	OE
45MP-429	736936.07	1012957.66	8	Fuze	OE
45MP-430	736952.05	1012956.64	10	Fuze	OE
45MP-432	737003.67	1012964.19	4	M-66 fuze	OE
45MP-433	737008.77	1012957.39	3	20mm	OE
45MP-435	737030.87	1012957.05	4	Fuze	OE
45MP-436	737050.93	1012962.83	6	Fuze	OE
45MP-437	737057.72	1012956.03	7	Fuze, 20mm	OE
45MP-438	737076.76	1012963.17	6	Base fuze	OE
45MP-443	737152.58	1012963.51	4	20mm	OE
45MP-447	737195.41	1012964.53	6	Nose fuze	OE
45MP-448	737212.18	1012965.16	4	Frag, 20mm	OE
45MP-449	737220.34	1012957	4	20mm (2), frag	OE
45MP-450	737230.2	1012965.16	3	20mm	OE
45MP-451	737240.06	1012957	12	20mm, frag	OE
45MP-452	737249.58	1012956.66	4	Fuze	OE
45MP-453	737249.92	1012965.16	3	Fuze	OE
45MP-455	737297.85	1012938.98	4	20mm	OE
45MP-458	737282.93	1012983.9	6	Fuze	OE
45MP-459	737279.87	1013001.92	6	20mm, fuze	OE
45MP-461	737251.66	1013033.55	3	VT fuze	OE
45MP-463	737219.7	1013057.35	3	57mm - HE	OE
45MP-466	737171.89	1013060.23	3	20mm	OE
45MP-467	737158.97	1013069.75	3	Frag, 20mm	OE
45MP-468	737132.11	1013061.25	6	Fuze	OE
45MP-471	737110.36	1013068.39	4	Fuze	OE
45MP-475	737065.34	1013057.54	6	Frag, 20mm	OE
45MP-476	737048.34	1013067.41	4	Fuze	OE
45MP-477	737037.8	1013067.07	10	Fuze	OE
45MP-479	736982.38	1013066.39	6	40mm - HE	OE
45MP-480	736952.81	1013065.71	6	Fuze	OE
45MP-481	736924.93	1013055.5	6	Fuze	OE
45MP-482	736915.75	1013055.5	6	Fuze	OE
45MP-485	736760.03	1013141.19	6	37mm	OE
45MP-486	736769.5	1013162.84	7	Fuze	OE
45MP-487	736817.76	1013163.74	6	Fuze	OE
45MP-490	736896.08	1013145.82	6	Fuze	OE
45MP-493	736924.61	1013146.6	3	Fuze	OE
45MP-494	736943.77	1013168.5	2	57mm	OE
45MP-496	736999.28	1013170.45	4	Fuze	OE
45MP-498	737033	1013164.09	8	Fuze	OE
45MP-499	737042.38	1013153.92	4	57mm	OE
45MP-5	736843.76	1012143.22	6	Nose fuze	OE
45MP-501	737047.46	1013170.34	5	Fuze	OE
45MP-502	737063.1	1013171.91	8	Fuze	OE
45MP-503	737075.61	1013148.45	2	20mm	OE
45MP-506	737103.76	1013162.52	6	37mm	OE
45MP-507	737110.4	1013153.14	5	Fuze	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-510	737134.64	1013155.48	6	Fuze	OE
45MP-511	737149.5	1013146.1	10	Frag, fuze	OE
45MP-512	737156.14	1013149.62	4	Fuze	OE
45MP-514	737181.55	1013155.88	3	Havar venturi	OE
45MP-516	737189.37	1013165.65	3	Fuze	OE
45MP-517	737205.01	1013148.05	6	Fuze	OE
45MP-518	737208.13	1013169.95	4	Fuze	OE
45MP-520	737233.54	1013171.52	8	Fuze	OE
45MP-521	737241.36	1013161.74	7	Base fuze	OE
45MP-522	737238.63	1013153.92	3	20mm	OE
45MP-523	737226.12	1013147.66	4	Fuze	OE
45MP-525	737249.57	1013159	1	20mm	OE
45MP-526	737257.78	1013169.56	3	Fuze	OE
45MP-527	737253.48	1013147.66	7	Fuze	OE
45MP-531	737272.24	1013169.17	8	Fuze	OE
45MP-548	737257.89	1013259.68	3	Fuze	OE
45MP-549	737256.71	1013246.78	4	Fuze	OE
45MP-551	737246.94	1013239.74	3	Fuze	OE
45MP-554	737201.87	1013244.41	4	Fuze	OE
45MP-555	737209.3	1013259.27	3	37mm	OE
45MP-557	737235.88	1013274.52	6	Fuze	OE
45MP-558	737283.18	1013275.69	2	20mm (2)	OE
45MP-563	737122.51	1013278.43	6	Fuze	OE
45MP-565	737076.38	1013280.78	4	Fuze	OE
45MP-566	737060.35	1013262.4	3	20mm	OE
45MP-567	737050.58	1013238.55	0	20mm	OE
45MP-568	737038.85	1013239.72	4	Fuze	OE
45MP-569	736991.53	1013239.94	3	25mm	OE
45MP-570	736972.37	1013238.76	5	Fuze	OE
45MP-571	736926.63	1013281.78	6	Fuze	OE
45MP-572	736919.6	1013228.21	3	Fuze	OE
45MP-573	736910.21	1013239.16	12	Frag, fuze	OE
45MP-574	736877.77	1013279.43	4	Fuze	OE
45MP-575	736891.45	1013227.82	10	Fuze	OE
45MP-576	736876.99	1013227.42	4	Fuze	OE
45MP-577	736837.11	1013250.89	3	Fuze	OE
45MP-578	736806.62	1013226.64	7	Fuze	OE
45MP-579	736760.73	1013236.08	6	Fuze	OE
45MP-580	736619.22	1013224.74	6	Fuze	OE
45MP-581	736512.44	1013219.65	6	20mm, fuze	OE
45MP-583	736269.87	1013218.6	6	Fuze	OE
45MP-584	736847.87	1013372.08	6	Fuze	OE
45MP-585	736876.02	1013348.23	3	Fuze	OE
45MP-586	736906.12	1013346.28	6	Fuze	OE
45MP-587	736944.82	1013375.6	3	20mm (2)	OE
45MP-588	736957.72	1013374.04	3	Fuze	OE
45MP-590	737013.45	1013368.36	4	57mm - HE	OE
45MP-6	736857.98	1012164.77	6	Nose fuze	OE
45MP-616	737110.98	1013444.81	10	Base fuze	OE
45MP-617	737037.1	1013448.33	3	Fuze	OE
45MP-620	736863.68	1013473.02	6	Fuze	OE
45MP-622	736813.02	1013466.53	4	Fuze	OE
45MP-623	736918.77	1013466.87	10	37mm	OE
45MP-624	736966.38	1013465.17	4	Fuze	OE
45MP-625	737100.31	1013449.38	5	Fuze	OE
45MP-626	737098.61	1013458.22	8	Fuze	OE
45MP-627	737121.75	1013454.82	3	Fuze	OE
45MP-644	736883.65	1013542.82	18	Fuze	OE
45MP-646	736924.26	1013537.02	6	Fuze	OE
45MP-648	737041.34	1013541.24	5	20mm	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-649	737053.99	1013542.29	6	Fuze	OE
45MP-650	737063.48	1013545.98	6	20mm	OE
45MP-654	737086.55	1013557.71	6	Fuze	OE
45MP-655	737099.21	1013559.87	1	20mm	OE
45MP-656	737115.89	1013560.8	2	20mm	OE
45MP-660	737200.82	1013563.27	6	Fuze	OE
45MP-661	737212.25	1013556.48	7	Fuze, frag	OE
45MP-665	737206.03	1013636.74	4	Fuze	OE
45MP-666	737193.98	1013636.43	6	Fuze, frag	OE
45MP-668	737127.52	1013636.12	6	57mm - HE	OE
45MP-670	737200.78	1013659.62	2	20mm	OE
45MP-674	737130.61	1013666.42	3	Fuze	OE
45MP-675	737111.22	1013659.56	5	Fuze	OE
45MP-676	737092.06	1013645.34	6	Fuze	OE
45MP-677	737037.97	1013668.53	3	Fuze	OE
45MP-678	737020.35	1013631.12	5	Fuze	OE
45MP-679	737001.19	1013638.54	6	Fuze	OE
45MP-680	736970.28	1013634.83	4	Fuze	OE
45MP-682	736973.99	1013667.6	4	Fuze	OE
45MP-683	736944.32	1013668.22	2	Fuze, frag	OE
45MP-685	736847.64	1013668.5	2	VT fuze	OE
45MP-686	736799.73	1013668.5	3	PD Fuze	OE
45MP-687	736786.13	1013609.76	3	20mm	OE
45MP-689	736774.92	1013751.63	5	Fuze	OE
45MP-69	736865.54	1012244.01	12	Nose fuze	OE
45MP-690	736875.07	1013752.56	3	Fuze	OE
45MP-692	736922.7	1013763.01	4	Fuze	OE
45MP-693	736948.04	1013752.81	3	Fuze	OE
45MP-694	737068.76	1013757.42	3	20mm	OE
45MP-697	737117.59	1013746.91	3	57mm - HE	OE
45MP-698	737133.35	1013763.6	1	20mm	OE
45MP-7	736938.66	1012168.85	6	Nose fuze	OE
45MP-700	737175.08	1013757.42	3	Fuze	OE
45MP-701	737210.94	1013732.07	5	Fuze	OE
45MP-702	737219.59	1013696.82	4	20mm	OE
45MP-707	737292.84	1013775.63	3	Fuze	OE
45MP-709	737361.33	1013952.28	4	57mm	OE
45MP-71	736936.41	1012285.63	5	Nose fuze	OE
45MP-710	737378.64	1013977.32	4	Fuze	OE
45MP-73	736955.2	1012265.76	6	Fuze	OE
45MP-740	737504.15	1014069.53	3	Fuze	OE
45MP-742	737499.07	1014371.64	6	Fuze	OE
45MP-746	737596.83	1014189.9	3	Fuze	OE
45MP-748	737603.89	1014047.03	4	20mm	OE
45MP-749	737605.12	1014010.85	3	20mm	OE
45MP-751	737606.67	1013949.02	4	Fuze	OE
45MP-756	737606.39	1013889.78	4	20mm	OE
45MP-757	737597.73	1013875.25	3	Fuze	OE
45MP-759	737554.77	1013918.53	8	Fuze	OE
45MP-761	737562.8	1013870.61	4	Fuze	OE
45MP-762	737573	1013861.34	4	Fuze	OE
45MP-763	737596.5	1013845.88	2	Fuze	OE
45MP-765	737567.05	1013829.84	6	20mm, fuze	OE
45MP-766	737574.47	1013816.24	6	Fuze	OE
45MP-769	737556.54	1013765.54	4	VT fuze	OE
45MP-770	737545.1	1013725.96	6	Base plate, 20mm	OE
45MP-774	737534.37	1013682.35	8	Fuze	OE
45MP-775	737540.24	1013664.42	6	Fuze	OE
45MP-776	737554.15	1013662.87	2	20mm	OE
45MP-777	737567.44	1013665.04	6	Fuze (2)	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-778	737577.95	1013665.66	5	20mm	OE
45MP-779	737587.84	1013664.42	3	20mm	OE
45MP-780	737596.8	1013665.97	4	Fuze	OE
45MP-784	737601.58	1013815.19	3	Fuze	OE
45MP-786	737599.11	1013785.52	6	20mm	OE
45MP-789	737601.43	1013721.61	4	Fuze	OE
45MP-792	737648.41	1013712.03	4	20mm, fuze	OE
45MP-794	737704.97	1013726.87	4	Fuze	OE
45MP-796	737703.73	1013758.09	2	20mm, frag	OE
45MP-797	737704.66	1013770.77	4	Fuze	OE
45MP-803	737695.04	1013876.74	4	20mm	OE
45MP-804	737695.66	1013894.51	6	Fuze	OE
45MP-805	737703.56	1013913.39	3	Fuze	OE
45MP-812	737702.15	1014155.89	6	Fuze	OE
45MP-815	737190.46	1013965.1	3	Fuze	OE
45MP-816	737195.88	1013991.12	5	40mm practice	OE
45MP-818	737171.67	1014047.51	4	Fuze	OE
45MP-819	737169.55	1014138.53	4	20mm	OE
45MP-82	737077.51	1012262.15	6	Fuze	OE
45MP-820	737149.55	1014292.57	36	90mm - APHE	OE
45MP-823	737804.16	1013968.4	2	Fuze	OE
45MP-824	737803.75	1013981.26	3	Fuze, bolt	OE
45MP-827	737804.99	1014014.45	4	Fuzes (2)	OE
45MP-83	737101.41	1012272.63	8	Fuze	OE
45MP-830	737803.75	1014029.79	3	Base fuze	OE
45MP-831	737804.99	1014043.48	5	Fuze	OE
45MP-832	737824.9	1014055.1	2	Fuze	OE
45MP-833	737806.65	1014089.94	6	Fuze	OE
45MP-834	737823.24	1014100.31	12	Fuze	OE
45MP-835	737806.65	1014115.25	4	20mm	OE
45MP-837	737806.01	1014156.17	4	Fuze	OE
45MP-838	737819.29	1014175.26	2	Fuze	OE
45MP-839	737809.33	1014192.27	4	M-48 fuze	OE
45MP-840	737806.84	1014241.25	2	Fuze	OE
45MP-841	737817.63	1014266.56	8	Fuze	OE
45MP-842	737816.93	1014359.12	6	Fuze	OE
45MP-843	737815.27	1014384.85	6	Fuze	OE
45MP-848	737909.08	1014201.24	5	Fuze	OE
45MP-849	737900.53	1014130.37	5	105mm Ill - candle	OE
45MP-850	737902.61	1014100.49	3	Fuze	OE
45MP-854	737899.29	1014022.05	3	Fuze	OE
45MP-858	737896.44	1013945.38	4	Fuze	OE
45MP-859	737898.93	1013931.69	4	Fuze	OE
45MP-86	737105.97	1012250.33	4	Fuze	OE
45MP-862	738008.13	1013967.67	6	Fuze	OE
45MP-866	738008.13	1014045.69	12	Fuze	OE
45MP-867	738011.45	1014066.03	4	Fuze	OE
45MP-868	738013.11	1014088.03	4	Fuze	OE
45MP-87	737134.97	1012253.02	3	Fuze	OE
45MP-870	738006.21	1014154.4	3	Fuze	OE
45MP-874	738014.97	1014295.76	5	Fuze	OE
45MP-875	738003.35	1014312.77	2	20mm	OE
45MP-881	738100.95	1014472.2	4	Fuze	OE
45MP-882	738102.61	1014441.08	10	Fuze	OE
45MP-883	738108	1014415.76	4	Fuze	OE
45MP-89	737184.78	1012276.45	6	20mm	OE
45MP-890	738110.72	1014138.94	4	57mm - HE	OE
45MP-892	738109.48	1014077.52	6	Fuze	OE
45MP-893	738103.25	1014062.99	4	Fuze	OE
45MP-895	738106.57	1014015.68	3	Fuze	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45MP-896	738110.52	1013990.23	6	20mm	OE
45MP-897	738102.22	1013965.74	10	20mm	OE
45MP-9	736935.94	1012137.46	3	Fuze	OE
45MP-901	737785.58	1013745.07	2	37mm	OE
45MP-902	737791.39	1013769.97	2	Fuze	OE
45MP-906	737803.37	1013910.49	3	20mm	OE
45MP-907	737831.17	1013922.53	4	57mm	OE
45MP-908	737832.83	1013883.93	2	Fuze	OE
45MP-909	737834.08	1013850.73	2	57mm	OE
45MP-910	737836.57	1013832.05	2	Fuze	OE
45MP-911	737837.81	1013806.32	2	Fuze	OE
45MP-914	737875.51	1013745.88	2	20mm	OE
45MP-915	737888.37	1013747.54	4	Fuze	OE
45MP-917	737900.4	1013779.5	4	Fuze	OE
45MP-919	737904.3	1013838.65	5	Fuze	OE
45MP-920	737897.67	1013859.81	2	Fuze	OE
45MP-922	737895.18	1013904.22	4	Fuze	OE
45MP-924	737892.1	1013740.14	4	40mm practice	OE
45MP-926	737919.49	1013747.2	2	Fuze, 20mm	OE
45MP-93	737261.31	1012265.17	3	Fuze	OE
45MP-933	738005.44	1013865.89	2	Fuze	OE
45MP-934	738014.99	1013856.34	3	Fuze	OE
45MP-936	738015.4	1013819.82	4	Fuze	OE
45MP-937	738011.67	1013796.16	3	57mm	OE
45MP-938	738008.76	1013779.98	4	Fuze	OE
45MP-94	737275.27	1012262.48	3	Fuze	OE
45MP-945	738104.9	1013896.65	8	57mm - HE	OE
45MP-946	738099.09	1013879.22	6	Fuze	OE
45MP-947	738099.92	1013932.75	5	Fuze	OE
45MP-959	738065.93	1013744.24	4	Fuze	OE
45MP-966	737982.95	1013745.48	4	Fuze	OE
45MP-968	737924.88	1013720.25	6	Fuze	OE
45MP-97	737314.33	1012273.34	6	Fuze	OE
45MP-970	737801.27	1013865.14	4	M-66 fuze	OE
45N11-10	738718.32	1013233.84	8	20mm and lg frag	OE
45N11-11	738725.02	1013249.91	6	75mm and 20mm	OE
45N11-12	738740.11	1013256.9	4	75mm	OE
45N11-14	738779.23	1013253.96	18	75mm	OE
45N11-19	738737.85	1013222.6	8	20mm AP	OE
45N11-2	738729.92	1013170.04	6	105mm	OE
45N11-20	738744.67	1013228.05	18	75mm - hole still hot	OE
45N11-3	738738.57	1013169.9	1	75mm	OE
45N11-4	738732.57	1013175.9	0	T-bar fuze (M48-M51) and frag	OE
45N11-7	738793.16	1013213.87	3	Venturi base and 20mm	OE
45N11-8	738745.69	1013201.03	12	M66 fuzes (4)	OE
45N14-29			2	37mm APHE	OE
45N14-39			8	37mm APHE	OE
45N4-11	738754.45	1012619.42	4	Frag, fuze	OE
45N4-13	738747.65	1012612	4	Fuze, 20mm	OE
45N4-14	738743.17	1012608.3	6	Fuze, frag	OE
45N4-18	738710.41	1012606.75	6	Tail fuze, 20mm	OE
45N4-2	738750.59	1012645.98	4	Havar venturi	OE
45N4-20	738709.95	1012596.25	4	Frag, 20mm	OE
45N4-24	738712.63	1012464.71	4	Fuzes (2), frag	OE
45N4-26	738706.58	1012493.54	4	Frag, 20mm	OE
45N4-31	738762.1	1012510.12	4	Base fuze	OE
45N4-38	738717.03	1012547.79	3	VT fuze, frag	OE
45N4-8	738794.78	1012624.36	4	75mm	OE
45N4-9	738778.87	1012613.86	4	75mm	OE
45N8-10	738757.74	1012911.77	6	105mm and frag	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
45N8-12	738710.82	1012934.51	6	75mm and frag	OE
45N8-18	738732.63	1012936.53	8	75mm and frag	OE
45N8-4	738772.27	1012867.33	6	Frag and 20mm	OE
45N8-7	738790.13	1012861.1	4	Metal sign, fuze, and adapter	OE
45N8-9	738778.22	1012903.46	0	M66 and frag (2)	OE
45P8-14	738965.66	1012944.13	6	75mm	OE
45P8-3	738920.09	1012879.24	2	20mm	OE
45P8-6	738983.46	1012862.89	0	Fuze and warhead w/ HE, 20mm, and 36" leaking pipe	OE
45P8-7	738975.29	1012879.93	12	75mm and frag	OE
46B9-7	749220.58	1006578.59	6	Tail fuze	OE
46C13-2	749300.16	1006943.39	0	60mm mortar body	OE
46C7-1	749360.1	1006349.61	0	Rifle grenade part w/ HE	OE
46D3-10	749473.89	1005970.86	1	40mm practice	OE
46D3-17	749438.69	1006005.15	12	40mm practice	OE
46D3-3	749444.14	1005942.62	2	Slap flare	OE
46D3-9	749479.7	1005959.1	6	40mm practice	OE
46E13-29	749507.63	1007075.85	0	M904 bomb fuze	OE
46E7-1	749577.39	1006332.79	0	40mm practice	OE
46E7-13	749521.57	1006376.77	0	40mm practice, scrap	OE
46E7-15	749484.86	1006371.89	12	40mm practice	OE
46E7-16	749487.23	1006377.07	3	40mm practice	OE
46E7-17	749498.92	1006379.73	10	40mm practice	OE
46E7-2	749584.94	1006343.16	4	Bomb fuze	OE
46E7-20	749486.04	1006392.9	12	Bomb fuze	OE
46E7-24	749564.36	1006395.12	4	40mm practice	OE
46E7-30	749484.56	1006422.07	8	40mm practice	OE
46E7-31	749523.65	1006429.18	3	M123 Fuze	OE
46E7-5	749540.67	1006337.24	5	40mm practice (2)	OE
46E7-6	749487.52	1006339.9	6	40mm practice	OE
46E7-7	749526.02	1006358.26	4	40mm practice	OE
46E7-9	749505.88	1006364.04	6	40mm practice	OE
46F13-10	749678.4	1007055.54	0	40mm practice	OE
46F13-7	749657.39	1006985.73	0	40mm practice	OE
46F15-22	749659.89	1007310.15	2	40mm practice	OE
46F15-23	749672.34	1007316.38	2	40mm practice	OE
46G13-17	749724.58	1007013.76	4	40mm practice	OE
46G13-20	749722.05	1007038.19	2	40mm practice	OE
46G13-24	749725.06	1007052.84	3	40mm practice	OE
46G13-27	749723.42	1007067.75	2	40mm practice	OE
46G13-28	749755.98	1007074.46	0	40mm practice	OE
46G13-29	749783.75	1007076.79	2	40mm practice	OE
46G13-30	749780.6	1007096.4	2	40mm practice	OE
46G13-35	749697.29	1007108.99	1	40mm practice	OE
46G5-1	749690.18	1006125.97	12	40mm practice	OE
46G5-12	749745.8	1006164.58	8	40mm practice	OE
46G5-13	749735.09	1006172.21	1	40mm practice	OE
46G5-17	749722.96	1006201.81	6	40mm practice	OE
46G5-18	749734.85	1006190.06	6	40mm practice	OE
46G5-2	749709.55	1006124.94	4	40mm practice	OE
46G5-21	749769.64	1006210.18	2	40mm practice	OE
46G5-3	749706.32	1006138.15	4	40mm practice	OE
46G5-4	749689.3	1006142.7	6	40mm practice	OE
46G5-44	749730.15	1006291.28	0	40mm practice	OE
46G5-5	749685.19	1006156.8	8	40mm practice	OE
46I2-45	749892.53	1006006.21	12	40mm practice	OE
46I5-1	749886.38	1006137.76	2	40mm practice	OE
46I5-13	749904.25	1006176.61	6	40mm practice	OE
46I5-14	749896.52	1006183.45	2	40mm practice	OE
46I5-15	749908.7	1006194.55	4	40mm practice	OE

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UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
46I5-16	749919.66	1006196.71	4	40mm practice	OE
46I5-17	749958.5	1006190.49	8	40mm practice	OE
46I5-21	749965.81	1006202.94	6	40mm practice	OE
46I5-24	749913.71	1006212.69	2	40mm practice	OE
46I5-26	749890.97	1006215.8	4	40mm practice	OE
46I5-27	749884.48	1006212.28	6	40mm practice	OE
46I5-28	749918.31	1006224.33	4	40mm practice	OE
46I5-30	749933.01	1006250.35	4	40mm practice	OE
46I5-32	749899.72	1006240.33	4	40mm practice	OE
46I5-33	749889.7	1006241.55	6	40mm practice	OE
46I5-38	749922.2	1006284.41	8	40mm practice	OE
46J1-37	749984.36	1005908.65	1	Slap flare	OE
46J1-43	749999.57	1005950.32	0	40mm practice	OE
46J1-46	750035.07	1005952.24	1	40mm practice	OE
46J1-60	750059.57	1005989.1	0	40mm practice	OE
46J4-12	749988.7	1006070.43	0	40mm practice	OE
46J5-23	750061.89	1006250.12	3	40mm practice	OE
46J5-3	750023.94	1006147.27	4	40mm practice	OE
46J5-30	750038.81	1006261.59	4	Al frag, fuze	OE
46J5-38	750015.18	1006274.17	3	40mm practice	OE
46J5-4	750035.53	1006125.22	2	40mm practice	OE
46J5-42	750021.5	1006318.05	5	40mm practice	OE
46J5-6	750058.99	1006176.17	10	40mm practice	OE
46K5-11	750181.5	1006143.25	4	40mm practice	OE
46K5-12	750120.7	1006149.37	12	40mm practice	OE
46K5-22	750135.59	1006168.7	8	40mm practice	OE
46K5-23	750156.04	1006175.52	6	40mm practice	OE
46K5-24	750164.24	1006177.88	12	Flare	OE
46K5-27	750169.36	1006189.7	12	40mm practice	OE
46K5-28	750174.65	1006194.15	8	40mm practice	OE
46K5-29	750182.32	1006211	6	40mm practice	OE
46K5-30	750144.43	1006184.69	8	40mm practice	OE
46K5-31	750112.66	1006183.15	12	40mm practice	OE
46K5-33	750085.78	1006211.42	6	40mm practice	OE
46K5-36	750132.59	1006219.36	8	40mm practice	OE
46K5-4	750143.52	1006124.06	10	40mm practice	OE
46K5-40	750121.76	1006256.63	12	40mm practice	OE
46K5-41	750136.12	1006254.68	12	40mm practice	OE
46K5-42	750159.12	1006247.71	12	40mm practice	OE
46K5-43	750181.14	1006247.71	7	Flare	OE
46K5-48	750137.37	1006262.2	8	Fuze	OE
46K5-49	750139.88	1006268.19	8	Fuze	OE
46K5-5	750140.18	1006135.19	6	40mm practice	OE
46K5-6	750162.57	1006139.92	12	40mm practice	OE
46K5-62	750096.68	1006304.25	6	40mm practice	OE
46K5-67	750174.43	1006310.11	6	40mm practice	OE
46K5-7	750169.81	1006133.8	6	40mm practice	OE
46K5-8	750174.82	1006125.59	3	40mm practice	OE
46K7-10	750156.61	1006320.72	2	Flare	OE
46L1-10	750283.29	1005775.43	5	40mm practice	OE
46L1-19	750195.62	1005827.02	4	MK2 grenade	OE
46L1-20	750277.83	1005837.03	6	40mm practice	OE
46L1-21	750282.49	1005836.47	6	40mm practice	OE
46L1-22	750272.19	1005854.24	4	40mm flare	OE
46L1-23	750285.45	1005856.5	3	40mm practice	OE
46L1-24	750277.13	1005871.45	4	40mm practice	OE
46L1-37	750240.47	1005907.62	4	40mm practice	OE
46L1-4	750257.51	1005732.3	6	40mm practice	OE
46L1-41	750197.34	1005933.72	4	40mm practice	OE
46L1-45	750193.36	1005958.05	6	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
46L1-5	750260.75	1005737.52	1	40mm practice	OE
46L1-50	750227.47	1005971.44	10	40mm practice	OE
46L1-53	750266.73	1005999.18	6	40mm practice	OE
46L1-59	750195.05	1006022.97	8	40mm flare	OE
46L1-61	750207.57	1006045.02	6	40mm practice	OE
46L1-68	750194.89	1006094.98	9	Flare	OE
57F6-11	738744.78	1008711.94	4	105mm	OE
57F6-33	738675.43	1008780.81	0	MK75 fuze	OE
57F6-66	738672.59	1008758.54	6	CS grenade	OE
57H5-19	738885.17	1008684.66	4	Slap flare	OE
57H5-5	738888.02	1008649.07	6	MK25 fuze	OE
57J11-83	739113.6	1009260.3	0	30mm projectile	OE
57L10-79	739259.93	1009300.02	0	Trainer/Ptab 2.5 M/Soviet bomblet	OE
57L9-68	739288.41	1009102.47	2	MK25 - smoke fuze	OE
57M18-4	739400.04	1009943.95	1	20mm	OE
57MP-276	738755.28	1010632.47	6	SLAP FLARE	OE
57MP-282	738750.89	1010710.83	6	2.36 ROCKET WITH HEAD	OE
57MP-283	738754.26	1010720.96	4	2.36 ROCKET WITH HEAD	OE
57MP-285	738743.13	1010753.87	5	2.36 ROCKET WITH HEAD	OE
57MP-301	738850.32	1010561.05	4	2.36 ROCKET WITH HEAD	OE
57MP-307	738851.32	1010518.22	5	2.36 ROCKET MOTOR WITH HEAD	OE
EA2A1-1	747672.57	1007309.84	0	Slap Flare	OE
EA2MP-5	747849.35	1007320.82	3	Slap flare	OE
EA2MP-6	747851.49	1007330.9	2	Slap flare	OE
EA3A1-3	749433.31	1007379.11	12	M-2 fuze lighter, frag	OE
EA3B3-1	749519.25	1007592.1	1	Slap flare	OE
EA3D1-1	749765.04	1007365.48	0	Rifle grenade - illum. - expended	OE
EA3D1-2	749789.91	1007373.68	2	Rifle grenade - illum. - expended	OE
EM-1	737536.62	1008646.02	0	40mm practice	OE
EM-17	737536.79	1008790.26	0	40mm practice	OE
EM-2	737578.47	1008638.26	0	40mm practice	OE
EM-22	737492.59	1008821		40mm practice	OE
EM-24	737510.05	1008857.85		40mm practice	OE
EM-3	737589	1008637.01	4	40mm practice	OE
EM-4	737590.25	1008643.39		Sub-caliber round	OE
EM-5	737588.37	1008685.9		40mm practice grenade (piece)	OE
EM-7	737510.01	1008698.93		40mm practice	OE
EM-8	737497.54	1008741.18		40mm practice	OE
GRA1-10	737189.23	1008028.22	2	40mm practice same anom. as GRD3-1	OE
GRA1-11	737133.65	1008042.44	3	40mm practice	OE
GRA1-13	737162.09	1008050.01	2	40mm practice	OE
GRA1-14	737140.69	1008052.49	4	40mm practice	OE
GRA1-15	737131.17	1008054.97	2	40mm practice	OE
GRA1-16	737157.26	1008024.96	2	40mm practice	OE
GRA1-17	737146.82	1008059.86	2	40mm practice	OE
GRA1-18	737149.43	1008065.48	2	40mm practice	OE
GRA1-19	737188.44	1008069.39	2	40mm practice	OE
GRA1-2	737061.95	1008054.33	2	40mm practice	OE
GRA1-20	737179.44	1008072.52	2	40mm practice	OE
GRA1-21	737163.91	1008084.66	2	35mm subcaliber round	OE
GRA1-24	737124.38	1008073.05	2	40mm practice	OE
GRA1-25	737121.38	1008077.48	2	40mm practice	OE
GRA1-26	737124.9	1008079.96	3	40mm practice	OE
GRA1-27	737147.34	1008090.01	2	40mm practice	OE
GRA1-28	737136.78	1008090.01	2	40mm practice	OE
GRA1-3	737109.83	1008042.45	2	40mm practice	OE
GRA1-30	737108.12	1008094.32	2	40mm practice	OE
GRA1-32	737111.6	1008060.07	2	40mm practice	OE
GRA1-33	737128.74	1008060.9	2	40mm practice	OE
GRA1-4	737124.83	1008039.06	3	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRA1-5	737127.12	1008009.95	2	35mm subcaliber round and nail	OE
GRA1-7	737141.34	1008024.96	2	40mm practice	OE
GRA1-8	737164.31	1008004.99	2	35mm subcaliber round	OE
GRA1-9	737186.23	1008018.95	2	35mm subcaliber round	OE
GRA2-3	736982.07	1008367.22	2	40mm practice	OE
GRA7-2	736984.98	1008674.67	3	40mm practice	OE
GRB10-10	737049.91	1008941.47	1	35mm subcaliber round	OE
GRB10-23	737094.18	1008916.71	1	40mm practice	OE
GRB10-26	737221.67	1008931.66	2	40mm practice	OE
GRB10-28	737171.25	1008968.19	1	40mm practice	OE
GRB10-3	737080.27	1008906.92	2	40mm practice	OE
GRB10-33	737206.09	1008994.36	3	40mm practice	OE
GRB10-35	737289.47	1008908.55	4	40mm practice	OE
GRB10-36	737283.4	1008919.26	3	40mm practice	OE
GRB10-37	737271.69	1008941.81	2	40mm practice	OE
GRB10-38	737268.65	1008949.04	3	40mm practice	OE
GRB10-39	737246.1	1008953.96	3	40mm practice	OE
GRB2-10	737086.86	1008278.47	3	40mm practice	OE
GRB2-11	737074.08	1008291.4	2	40mm practice	OE
GRB2-15	737079.6	1008339.16	1	40mm practice	OE
GRB2-16	737082.47	1008343.33	2	40mm practice	OE
GRB2-2	737052.37	1008155.49	2	40mm practice	OE
GRB2-5	737075.04	1008230.68	2	40mm practice	OE
GRB2-6	737080.06	1008235.42	2	40mm practice	OE
GRB2-7	737087.53	1008232.12	3	35mm subcaliber round	OE
GRB2-8	737089.97	1008238.73	1	40mm practice	OE
GRB2-9	737075.61	1008246.2	2	40mm practice	OE
GRB5-30	737067.33	1008572.84	3	40mm practice and wire	OE
GRB5-32	737038.96	1008579.78	1	40mm practice	OE
GRB5-33	737024.99	1008579.92	3	35mm subcaliber round	OE
GRB7-12	737011.01	1008654.76	2	35mm subcaliber round	OE
GRB7-40	737021.04	1008750.8	1	40mm practice	OE
GRB7-50	737044.26	1008803.57	1	35mm subcaliber round	OE
GRB7-7	737004.93	1008624.37	1	40mm practice	OE
GRC2-1	737186.53	1008102.23	1	35mm subcaliber round	OE
GRC2-10	737092.91	1008119.27	1	40mm practice	OE
GRC2-101	737171.2	1008366.64	1	40mm practice	OE
GRC2-102	737149.95	1008369.76	0	35mm subcaliber round	OE
GRC2-103	737144.95	1008370.3	0	35mm subcaliber round	OE
GRC2-104	737132.49	1008368.13	2	40mm practice	OE
GRC2-106	737111.11	1008369.35	2	40mm practice	OE
GRC2-110	737095	1008379.64	2	40mm practice	OE
GRC2-111	737116.79	1008382.75	3	40mm practice	OE
GRC2-112	737124.64	1008381.27	0	35mm subcaliber round (2)	OE
GRC2-113	737139.94	1008377.34	2	40mm practice	OE
GRC2-114	737154.96	1008377.61	1	35mm subcaliber round	OE
GRC2-116	737131.28	1008386.27	2	35mm subcaliber round	OE
GRC2-117	737129.92	1008392.77	2	40mm practice	OE
GRC2-119	737145.08	1008398.59	1	40mm practice	OE
GRC2-12	737121.9	1008133.97	2	35mm subcaliber round	OE
GRC2-120	737135.34	1008399.14	3	40mm practice	OE
GRC2-121	737112.6	1008399.68	4	40mm practice	OE
GRC2-122	737107.46	1008398.87	3	40mm practice	OE
GRC2-123	737092.43	1008400.08	2	40mm practice	OE
GRC2-124	737124.78	1008396.02	4	40mm practice	OE
GRC2-125	737119.91	1008399.95	3	40mm practice	OE
GRC2-14	737164.59	1008125.94	2	40mm practice	OE
GRC2-16	737187.51	1008131.42	2	40mm practice	OE
GRC2-17	737181.44	1008130.83	2	40mm practice	OE
GRC2-18	737174.97	1008131.42	2	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRC2-19	737187.51	1008142.98	4	40mm practice	OE
GRC2-2	737143.83	1008104.97	2	40mm practice	OE
GRC2-22	737169.88	1008164.33	3	40mm practice	OE
GRC2-23	737145.79	1008175.89	3	40mm practice	OE
GRC2-24	737109.95	1008164.33	4	40mm practice	OE
GRC2-25	737096.63	1008163.16	1	40mm practice	OE
GRC2-26	737111.71	1008173.73	2	40mm practice	OE
GRC2-27	737104.86	1008173.15	1	40mm practice	OE
GRC2-28	737093.7	1008174.91	2	40mm practice	OE
GRC2-29	737168.99	1008188.8	2	40mm practice	OE
GRC2-3	737158.52	1008112.42	2	40mm practice	OE
GRC2-30	737164.93	1008190.7	1	35mm subcaliber round	OE
GRC2-31	737145.03	1008186.91	3	40mm practice	OE
GRC2-32	737130.01	1008184.47	2	40mm practice	OE
GRC2-33	737112.41	1008184.47	3	40mm practice	OE
GRC2-34	737089.27	1008185.82	1	40mm practice	OE
GRC2-35	737097.52	1008190.83	2	40mm practice	OE
GRC2-36	737104.42	1008193.81	4	40mm practice	OE
GRC2-37	737136.23	1008195.3	3	40mm practice	OE
GRC2-38	737137.45	1008202.2	4	40mm practice	OE
GRC2-39	737148.28	1008205.45	4	35mm subcaliber round	OE
GRC2-4	737127.19	1008100.27	4	40mm practice	OE
GRC2-40	737157.35	1008196.79	6	40mm practice	OE
GRC2-42	737176.84	1008195.98	2	40mm practice	OE
GRC2-43	737149.9	1008210.6	2	35mm subcaliber round	OE
GRC2-44	737104.97	1008211.95	2	40mm practice	OE
GRC2-45	737106.86	1008221.56	1	40mm practice	OE
GRC2-46	737157.48	1008219.53	1	40mm practice	OE
GRC2-47	737182.11	1008226.17	3	40mm practice	OE
GRC2-48	737167.5	1008225.08	3	40mm practice	OE
GRC2-49	737162.9	1008226.71	3	40mm practice	OE
GRC2-5	737121.11	1008103.99	2	40mm practice	OE
GRC2-50	737147.47	1008226.98	1	40mm practice	OE
GRC2-51	737110.92	1008229.42	3	40mm practice	OE
GRC2-52	737118.23	1008235.24	1	40mm practice	OE
GRC2-54	737154.37	1008235.1	1	35mm subcaliber round	OE
GRC2-55	737182.39	1008235.51	2	40mm practice	OE
GRC2-56	737157.41	1008243.26	4	40mm practice	OE
GRC2-57	737144.55	1008242.32	1	40mm practice	OE
GRC2-58	737137.51	1008239.88	2	40mm practice	OE
GRC2-59	737132.51	1008245.29	1	40mm practice	OE
GRC2-6	737119.94	1008113.2	2	40mm practice	OE
GRC2-61	737112.34	1008241.23	12	35mm subcaliber round and 40mm practice	OE
GRC2-62	737114.91	1008249.49	2	40mm practice	OE
GRC2-63	737107.47	1008251.12	1	40mm practice	OE
GRC2-64	737136.3	1008256.39	4	35mm subcaliber round	OE
GRC2-65	737155.38	1008257.34	2	35mm subcaliber round	OE
GRC2-67	737175.01	1008268.44	3	40mm practice	OE
GRC2-68	737187.46	1008274.81	2	40mm practice	OE
GRC2-7	737108.19	1008100.47	2	40mm practice	OE
GRC2-70	737101.24	1008268.99	2	40mm practice	OE
GRC2-71	737107.47	1008275.21	3	40mm practice	OE
GRC2-72	737139.95	1008280.49	2	40mm practice	OE
GRC2-75	737182.45	1008282.52	2	40mm practice	OE
GRC2-78	737170	1008297.32	3	40mm practice	OE
GRC2-79	737134.94	1008299.48	2	40mm practice	OE
GRC2-8	737112.5	1008112.22	6	40mm practice	OE
GRC2-80	737127.5	1008300.97	3	40mm practice	OE
GRC2-81	737112.48	1008294.34	2	40mm practice	OE
GRC2-82	737089.33	1008307.06	2	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRC2-85	737178.93	1008307.47	2	40mm practice	OE
GRC2-86	737170	1008322.5	2	40mm practice	OE
GRC2-88	737104.22	1008321.14	2	40mm practice	OE
GRC2-9	737103.88	1008106.93	1	40mm practice	OE
GRC2-90	737110.04	1008334	2	40mm practice (2)	OE
GRC2-91	737099.89	1008339.42	2	40mm practice	OE
GRC2-92	737109.9	1008341.45	1	40mm practice	OE
GRC2-93	737124.93	1008341.18	3	40mm practice	OE
GRC2-94	737162.42	1008332.65	1	40mm practice	OE
GRC2-95	737171.89	1008336.31	6	40mm practice	OE
GRC2-96	737171.07	1008346.74	2	40mm practice	OE
GRC2-97	737144.95	1008347.96	3	40mm practice	OE
GRC2-99	737119.91	1008348.5	1	40mm practice	OE
GRC5-10	737134.01	1008422.59	1	40mm practice	OE
GRC5-101	737301.8	1008482.31	1	40mm practice	OE
GRC5-13	737093.46	1008431.99	4	35mm subcaliber round	OE
GRC5-15	737110.07	1008445.06	1	35mm subcaliber round	OE
GRC5-17	737095.42	1008443.96	1	35mm subcaliber round	OE
GRC5-19	737154.28	1008431.99	3	40mm practice	OE
GRC5-20	737166.12	1008435.05	2	40mm practice	OE
GRC5-30	737296.45	1008440	1	40mm practice	OE
GRC5-32	737303.42	1008421.3	2	40mm practice	OE
GRC5-33	737310.38	1008415.56	2	40mm practice	OE
GRC5-35	737315.63	1008407.61	1	40mm practice	OE
GRC5-5	737120.94	1008405	2	40mm practice	OE
GRC5-56	737353.81	1008500.22	1	40mm practice	OE
GRC5-58	737314.48	1008474.31	1	40mm practice	OE
GRC5-60	737308.86	1008451.58	2	40mm practice	OE
GRC5-67	737299.24	1008466.44	1	40mm practice	OE
GRC5-8	737164.05	1008412.57	6	40mm practice	OE
GRC5-9	737157.7	1008420.02	1	40mm practice	OE
GRC6-78	737376.18	1008517.82	1	40mm practice	OE
GRC6-79	737380.78	1008504.94	2	40mm practice	OE
GRC6-80	737363.03	1008502.5	2	40mm practice	OE
GRC6-81	737353.55	1008501.42	2	40mm practice	OE
GRC6-82	737349.62	1008507.38	3	40mm practice	OE
GRC6-83	737355.04	1008529.07	2	40mm practice	OE
GRC6-85	737329.37	1008522.56	1	40mm practice	OE
GRC6-88	737313.11	1008522.56	2	40mm practice	OE
GRC6-89	737307.01	1008527.71	2	40mm practice	OE
GRC6-90	737310.13	1008510.09	2	35mm subcaliber round	OE
GRC6-91	737309.72	1008500.06	3	40mm practice	OE
GRC6-92	737302.68	1008502.5	3	40mm practice	OE
GRC6-94	737300.37	1008525	1	40mm practice	OE
GRC6-95	737296.85	1008532.45	2	40mm practice	OE
GRC7-2	737107.96	1008603.91	3	40mm practice	OE
GRC7-3	737100.52	1008612.26	1	40mm practice	OE
GRC7-36	737107.13	1008698.73	4	40mm practice	OE
GRC7-4	737135.36	1008611.21	2	35mm subcaliber round	OE
GRC7-42	737122.43	1008719.52	2	35mm subcaliber round	OE
GRC7-52	737107.47	1008814.39	6	40mm practice	OE
GRC7-53	737127	1008830.38	1	40mm practice	OE
GRC7-54	737092.45	1008836.94	3	35mm subcaliber round	OE
GRC7-55	737110.03	1008841.41	1	40mm practice	OE
GRC7-56	737117.47	1008847.81	4	40mm practice	OE
GRC7-58	737095.58	1008871.05	3	40mm practice	OE
GRC7-7	737125.39	1008623.87	2	35mm subcaliber round	OE
GRD1-23	737322.07	1008020.71	3	40mm practice	OE
GRD1-24	737319.4	1008025.67	2	40mm practice	OE
GRD1-25	737318.19	1008034.91	3	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRD1-26	737323.28	1008044.83	2	40mm practice	OE
GRD1-27	737315.91	1008052.33	2	40mm practice	OE
GRD1-28	737345.38	1008038.26	2	35mm subcaliber round and 40mm practice	OE
GRD1-29	737346.32	1008030.36	2	40mm practice	OE
GRD1-30	737355.16	1008039.87	2	40mm practice	OE
GRD1-31	737358.24	1008034.51	1	40mm practice (2)	OE
GRD1-32	737339.35	1008017.5	2	40mm practice	OE
GRD1-33	737351.81	1008017.23	2	40mm practice	OE
GRD1-35	737366.41	1008002.36	2	40mm practice	OE
GRD1-36	737365.25	1008018.05	2	40mm practice	OE
GRD1-37	737374.49	1008029.44	2	35mm subcaliber round	OE
GRD1-38	737364.98	1008046.05	2	40mm practice	OE
GRD1-39	737371.27	1008042.3	2	40mm practice	OE
GRD1-40	737384.67	1008052.35	2	40mm practice (2)	OE
GRD1-41	737385.34	1008034.8	2	40mm practice	OE
GRD1-43	737383.19	1008012.43	2	40mm practice	OE
GRD1-44	737395.65	1008012.7	0	35mm subcaliber round	OE
GRD1-46	737415.34	1008047.66	2	40mm practice	OE
GRD1-47	737434.63	1008026.09	2	40mm practice	OE
GRD1-50	737420.96	1008094.31	1	35mm subcaliber round	OE
GRD1-51	737400.6	1008070.6	2	35mm subcaliber round	OE
GRD1-52	737391.36	1008074.89	2	40mm practice	OE
GRD1-54	737382.79	1008099.94	0	40mm practice	OE
GRD1-55	737339.79	1008099.27	1	40mm practice	OE
GRD1-56	737360.69	1008090.56	2	40mm practice	OE
GRD1-57	737342.21	1008086.41	2	40mm practice	OE
GRD1-58	737360.42	1008077.97	2	40mm practice	OE
GRD1-60	737358.68	1008072.34	2	40mm practice	OE
GRD1-61	737380.38	1008067.38	2	40mm practice	OE
GRD1-62	737420.69	1008054.79	2	40mm practice	OE
GRD1-63	737399.26	1008056.53	4	40mm practice	OE
GRD1-64	737378.9	1008062.43	2	40mm practice	OE
GRD1-65	737368.32	1008063.1	2	40mm practice	OE
GRD1-66	737348.63	1008056.67	2	40mm practice (2)	OE
GRD1-67	737337.21	1008056.56	3	40mm practice	OE
GRD1-68	737331.45	1008064.87	2	40mm practice	OE
GRD1-70	737311.1	1008077.33	2	40mm practice	OE
GRD1-71	737310.16	1008085.37	2	40mm practice	OE
GRD1-76	737293.82	1008072.37	5	40mm practice	OE
GRD1-96	737365.23	1008028.9	2	40mm practice	OE
GRD4-10	737261.75	1008120.03	3	40mm practice	OE
GRD4-100	737232.44	1008375.57	4	40mm practice	OE
GRD4-105	737271.3	1008233.25	3	40mm practice	OE
GRD4-11	737245.04	1008127.9	2	40mm practice	OE
GRD4-12	737285.04	1008129.83	2	40mm practice	OE
GRD4-14	737285.04	1008142.2	3	40mm practice	OE
GRD4-15	737270.1	1008137.87	2	40mm practice	OE
GRD4-16	737245.04	1008128.06	2	40mm practice	OE
GRD4-17	737246.17	1008134.81	3	40mm practice	OE
GRD4-18	737239.42	1008133.85	2	40mm practice	OE
GRD4-19	737234.92	1008140.76	2	40mm practice	OE
GRD4-2	737207.45	1008109.75	2	40mm practice	OE
GRD4-20	737215	1008144.77	2	40mm practice	OE
GRD4-21	737197.49	1008140.76	3	40mm practice	OE
GRD4-23	737207.45	1008158.27	3	40mm practice	OE
GRD4-24	737205.04	1008165.34	2	40mm practice	OE
GRD4-25	737233.8	1008164.22	3	40mm practice	OE
GRD4-26	737251.63	1008157.95	2	40mm practice	OE
GRD4-28	737255.83	1008176.09	1	40mm practice	OE
GRD4-29	737279.97	1008185.97	1	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRD4-3	737215.32	1008107.98	3	40mm practice	OE
GRD4-30	737284.18	1008196.02	3	40mm practice	OE
GRD4-31	737261.34	1008196.67	3	40mm practice	OE
GRD4-32	737270.08	1008201.53	3	40mm practice	OE
GRD4-33	737262.63	1008202.82	3	40mm practice	OE
GRD4-34	737225.53	1008203.63	2	40mm practice	OE
GRD4-35	737211.28	1008196.18	1	35mm subcaliber round	OE
GRD4-36	737195.08	1008188.08	3	40mm practice	OE
GRD4-37	737215	1008199.1	3	40mm practice	OE
GRD4-38	737215	1008209.63	2	40mm practice	OE
GRD4-39	737197.51	1008210.6	2	40mm practice	OE
GRD4-4	737224.96	1008107.34	6	40mm practice	OE
GRD4-40	737266.84	1008212.55	4	40mm practice	OE
GRD4-41	737287.42	1008214.82	3	35mm subcaliber round	OE
GRD4-42	737246.11	1008218.22	2	40mm practice	OE
GRD4-43	737207.55	1008222.43	3	40mm practice	OE
GRD4-44	737202.53	1008224.05	2	35mm subcaliber round	OE
GRD4-45	737192.49	1008224.7	2	40mm practice	OE
GRD4-46	737284.99	1008224.21	4	40mm practice	OE
GRD4-47	737290.01	1008228.27	2	40mm practice	OE
GRD4-48	737286.83	1008233.03	2	40mm practice	OE
GRD4-49	737249.08	1008229.79	3	40mm practice	OE
GRD4-5	737232.51	1008112.64	4	40mm practice	OE
GRD4-50	737240.01	1008230.6	2	40mm practice	OE
GRD4-52	737214.41	1008240.48	1	40mm practice	OE
GRD4-53	737207.45	1008241.13	3	40mm practice	OE
GRD4-54	737200.81	1008240.97	2	35mm subcaliber round	OE
GRD4-55	737198.21	1008249.4	2	40mm practice (2)	OE
GRD4-56	737246.65	1008242.1	1	40mm practice	OE
GRD4-57	737283.26	1008245.83	3	40mm practice	OE
GRD4-58	737268.52	1008258.63	3	40mm practice	OE
GRD4-59	737255.08	1008262.85	2	40mm practice	OE
GRD4-6	737223.84	1008120.35	4	40mm practice	OE
GRD4-60	737248.76	1008266.57	2	40mm practice	OE
GRD4-61	737225.59	1008263.66	2	40mm practice	OE
GRD4-62	737219.92	1008253.61	2	40mm practice	OE
GRD4-63	737213.93	1008257.17	2	40mm practice	OE
GRD4-64	737192.54	1008260.9	3	40mm practice	OE
GRD4-65	737205.02	1008264.3	3	40mm practice	OE
GRD4-66	737205.02	1008269.81	3	40mm practice	OE
GRD4-67	737210.2	1008269.81	1	40mm practice	OE
GRD4-68	737210.85	1008275	2	5.56 blank and 35mm subcal	OE
GRD4-69	737224.62	1008277.92	2	40mm practice	OE
GRD4-7	737250.02	1008113.44	6	40mm practice	OE
GRD4-70	737266.74	1008282.78	1	40mm practice	OE
GRD4-71	737275	1008283.75	2	40mm practice	OE
GRD4-72	737281.81	1008273.86	2	40mm practice	OE
GRD4-73	737283.91	1008281.64	1	40mm practice	OE
GRD4-74	737278.73	1008294.12	1	40mm practice	OE
GRD4-75	737219.27	1008283.75	1	40mm practice	OE
GRD4-76	737207.61	1008280.51	2	35mm subcaliber round	OE
GRD4-77	737205.02	1008285.53	2	35mm subcaliber round	OE
GRD4-78	737207.45	1008291.85	4	40mm practice	OE
GRD4-79	737290.2	1008296.84	2	40mm practice	OE
GRD4-8	737287.45	1008100.1	2	40mm practice	OE
GRD4-80	737288.58	1008308.67	2	40mm practice	OE
GRD4-81	737277.57	1008305.11	3	35mm subcaliber round	OE
GRD4-82	737268.82	1008307.54	2	40mm practice	OE
GRD4-83	737280	1008310.78	2	40mm practice	OE
GRD4-86	737226.21	1008302.68	2	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRD4-88	737216.65	1008326.33	2	40mm practice	OE
GRD4-89	737211.31	1008325.69	2	40mm practice	OE
GRD4-9	737285.04	1008108.3	1	40mm practice	OE
GRD4-90	737222.49	1008329.74	1	40mm practice	OE
GRD4-91	737242.41	1008329.9	3	40mm practice	OE
GRD4-93	737257.48	1008344.81	1	35mm subcaliber round	OE
GRD4-94	737204.99	1008336.38	4	35mm subcaliber round	OE
GRD4-95	737204.99	1008346.91	2	40mm practice	OE
GRD4-96	737194.95	1008345.45	0	5.56 blank and 40mm practice	OE
GRD7-11	737256.47	1008662.02	2	40mm practice	OE
GRD7-15	737215.07	1008683.03	1	40mm practice	OE
GRD7-16	737199.59	1008678.18	1	40mm practice	OE
GRD7-17	737206.47	1008688.35	1	35mm subcaliber round	OE
GRD7-18	737191.31	1008697.11	1	35mm subcaliber round	OE
GRD7-27	737227.57	1008730.09	4	40mm practice	OE
GRD7-29	737271.65	1008737.6	1	40mm practice	OE
GRD7-31	737250.08	1008758.56	2	40mm practice	OE
GRD7-32	737212.56	1008772.32	1	40mm practice	OE
GRD7-33	737189.89	1008759.49	2	40mm practice	OE
GRD7-34	737250.14	1008804.32	2	40mm practice	OE
GRD7-35	737211.68	1008816.83	6	40mm practice	OE
GRD7-36	737287.66	1008819.64	3	40mm practice	OE
GRD7-37	737285.79	1008824.02	2	40mm practice	OE
GRD7-38	737277.66	1008834.34	2	40mm practice	OE
GRD7-39	737257.18	1008837.62	1	40mm practice	OE
GRD7-40	737246.08	1008852.48	2	40mm practice	OE
GRD7-41	737217.62	1008855.29	4	40mm practice	OE
GRD7-44	737286.41	1008754.72	1	40mm practice	OE
GRE10-1	737327.75	1008913.39	3	40mm practice	OE
GRE10-11	737479.51	1008910.99	1	40mm practice	OE
GRE10-19	737485.62	1008951.55	3	40mm practice	OE
GRE10-22	737415.27	1008960.84	2	40mm practice	OE
GRE10-23	737407.13	1008954.51	3	40mm practice	OE
GRE10-25	737455.8	1008967.57	4	40mm practice	OE
GRE10-3	737386.66	1008940.11	2	40mm practice	OE
GRE10-4	737378.18	1008937.51	3	40mm practice	OE
GRE10-5	737399.89	1008911.28	2	40mm practice	OE
GRE10-7	737450.09	1008900.42	2	40mm practice	OE
GRE10-8	737451.56	1008925.07	1	40mm practice	OE
GRE10-9	737445.57	1008930.39	2	40mm practice	OE
GRE2-10	737374.89	1008125.05	2	35mm subcaliber round	OE
GRE2-11	737371.87	1008119.43	2	35mm subcaliber round	OE
GRE2-119	737301.09	1008304.35	3	40mm practice (3)	OE
GRE2-12	737364.89	1008118.34	2	40mm practice	OE
GRE2-120	737309.85	1008303.8	2	40mm practice	OE
GRE2-121	737312.32	1008299.96	2	40mm practice	OE
GRE2-125	737334.09	1008302.16	1	40mm practice	OE
GRE2-127	737349.84	1008304.07	1	40mm practice	OE
GRE2-129	737321.7	1008313.22	1	40mm practice	OE
GRE2-13	737355.71	1008120.53	1	40mm practice	OE
GRE2-130	737308.17	1008315.71	2	40mm practice (3)	OE
GRE2-131	737302.38	1008315.29	1	40mm practice	OE
GRE2-133	737308.59	1008326.47	1	40mm practice	OE
GRE2-134	737297.41	1008327.85	1	40mm practice	OE
GRE2-135	737301.14	1008331.16	3	40mm practice	OE
GRE2-136	737319.63	1008327.3	1	40mm practice	OE
GRE2-137	737334.94	1008325.23	1	40mm practice	OE
GRE2-138	737365.99	1008318.33	1	40mm practice	OE
GRE2-139	737374.82	1008329.51	2	40mm practice	OE
GRE2-14	737364.48	1008129.84	2	40mm practice (2)	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRE2-140	737359.92	1008333.1	2	40mm practice	OE
GRE2-141	737339.36	1008333.23	1	40mm practice (2)	OE
GRE2-142	737331.22	1008335.3	2	40mm practice	OE
GRE2-143	737335.36	1008340.14	1	40mm practice	OE
GRE2-144	737344.19	1008341.65	2	35mm subcaliber round	OE
GRE2-145	737359.64	1008339.03	2	40mm practice	OE
GRE2-146	737366.27	1008345.1	2	40mm practice	OE
GRE2-147	737382	1008344.28	1	40mm practice	OE
GRE2-149	737354.81	1008354.49	2	40mm practice	OE
GRE2-15	737367.35	1008125.87	2	40mm practice	OE
GRE2-150	737326.11	1008344.55	2	40mm practice	OE
GRE2-151	737327.35	1008348.97	1	40mm practice	OE
GRE2-152	737328.46	1008354.35	3	40mm practice	OE
GRE2-153	737309.83	1008343.72	3	40mm practice (2)	OE
GRE2-155	737317.56	1008355.73	3	40mm practice (2) and 35mm subcaliber round	OE
GRE2-156	737312.31	1008360.29	2	40mm practice	OE
GRE2-157	737301.97	1008353.25	2	40mm practice (2)	OE
GRE2-159	737366.81	1008363.21	2	40mm practice	OE
GRE2-16	737347.36	1008124.23	2	40mm practice	OE
GRE2-162	737347.35	1008365.42	1	35mm subcaliber round	OE
GRE2-163	737349.69	1008369.83	1	35mm subcaliber round	OE
GRE2-164	737342.38	1008372.04	1	40mm practice	OE
GRE2-165	737337.41	1008375.63	1	40mm practice	OE
GRE2-166	737329.82	1008368.45	2	40mm practice	OE
GRE2-169	737315.88	1008365.97	2	40mm practice	OE
GRE2-17	737336.27	1008120.53	2	40mm practice	OE
GRE2-18	737324.9	1008121.21	1	40mm practice	OE
GRE2-187	737347.49	1008317.22	1	40mm practice	OE
GRE2-190	737297.69	1008245.77	3	40mm practice	OE
GRE2-192	737321.19	1008116.59	2	40mm practice	OE
GRE2-2	737319.83	1008111.9	2	40mm practice	OE
GRE2-24	737327.37	1008142.99	0	35mm subcaliber round	OE
GRE2-25	737374.89	1008140.12	2	40mm practice	OE
GRE2-26	737312.44	1008149.57	3	40mm practice	OE
GRE2-27	737289.57	1008151.49	3	40mm practice	OE
GRE2-3	737324.9	1008108.34	2	40mm practice	OE
GRE2-30	737365.61	1008155.56	3	40mm practice	OE
GRE2-5	737342.02	1008110.26	2	40mm practice	OE
GRE2-54	737304.81	1008202.68	2	35mm subcaliber round	OE
GRE2-56	737297.41	1008200.9	2	40mm practice	OE
GRE2-57	737319.87	1008208.02	1	40mm practice	OE
GRE2-58	737346.99	1008204.46	2	40mm practice	OE
GRE2-59	737351.23	1008205.01	2	35mm subcaliber round	OE
GRE2-60	737357.39	1008208.02	6	Blank 2.23, 40mm practice (2)	OE
GRE2-61	737385.02	1008211.72	6	40mm practice	OE
GRE2-62	737337.36	1008209.66	1	40mm practice	OE
GRE2-63	737322.3	1008212.95	2	40mm practice	OE
GRE2-64	737291.76	1008215.82	2	40mm practice	OE
GRE2-65	737332.43	1008216.92	2	40mm practice	OE
GRE2-66	737355.3	1008219.66	3	40mm practice	OE
GRE2-67	737387.35	1008224.45	2	40mm practice	OE
GRE2-68	737374.89	1008226.51	1	40mm practice (2)	OE
GRE2-69	737361.74	1008229.52	2	40mm practice	OE
GRE2-7	737376.8	1008110.39	2	40mm practice	OE
GRE2-71	737344.48	1008231.71	2	40mm practice	OE
GRE2-72	737338.6	1008234.86	2	40mm practice	OE
GRE2-73	737328.87	1008224.86	3	40mm practice	OE
GRE2-74	737313.81	1008227.33	4	40mm practice (2)	OE
GRE2-75	737307.37	1008227.47	2	40mm practice	OE
GRE2-76	737302.03	1008226.51	2	35mm subcaliber round	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRE2-78	737299.29	1008237.19	2	40mm practice (2)	OE
GRE2-79	737307.37	1008232.4	2	40mm practice (2)	OE
GRE2-8	737384.88	1008100.26	2	Same as GRED1-4 - 40mm practice	OE
GRE2-80	737309.84	1008238.43	2	40mm practice (3)	OE
GRE2-81	737304.91	1008238.84	2	40mm practice (2)	OE
GRE2-9	737380.64	1008119.71	3	40mm practice	OE
GRE7-1	737298.9	1008603.72	3	40mm practice	OE
GRE7-23	737335.91	1008706.12	1	40mm practice	OE
GRE7-24	737330.12	1008706.73	2	40mm practice	OE
GRE7-25	737330.12	1008714.49	1	40mm practice	OE
GRE7-30	737332.56	1008729.78	1	40mm practice	OE
GRE7-33	737320.09	1008738.76	1	40mm practice	OE
GRE7-42	737370.05	1008809.93	3	40mm practice	OE
GRE7-43	737360	1008818.91	2	40mm practice	OE
GRF2-1	737400.33	1008099.61	3	35mm (M73)	OE
GRF2-10	737411.48	1008166.33	6	40mm practice	OE
GRF2-11	737394.92	1008174.54	2	40mm practice	OE
GRF2-13	737479.94	1008197.41	5	40mm practice	OE
GRF2-14	737443.3	1008197.7	3	40mm practice	OE
GRF2-15	737400.2	1008193.89	6	40mm practice	OE
GRF2-18	737416.18	1008211.63	1	40mm practice	OE
GRF2-19	737437.58	1008213.69	2	40mm practice	OE
GRF2-2	737420.81	1008099.46	2	35mm subcaliber round	OE
GRF2-20	737447.49	1008227.02	0	40mm practice	OE
GRF2-21	737416.71	1008223.21	1	35mm subcaliber round	OE
GRF2-22	737397.06	1008235.97	1	40mm practice	OE
GRF2-24	737456.58	1008246.23	6	40mm practice	OE
GRF2-25	737407.47	1008251.95	1	35mm subcaliber round	OE
GRF2-27	737451.31	1008263.68	2	35mm subcaliber round	OE
GRF2-28	737457.46	1008271.16	2	40mm practice	OE
GRF2-29	737439.98	1008279.13	2	40mm practice	OE
GRF2-30	737432.51	1008279.43	4	40mm practice	OE
GRF2-31	737405.68	1008275.17	1	35mm subcaliber round	OE
GRF2-33	737422.54	1008292.04	4	40mm practice	OE
GRF2-36	737416.67	1008305.09	3	40mm practice	OE
GRF2-37	737404.95	1008299.66	4	40mm practice	OE
GRF2-4	737396.85	1008111.95	2	40mm practice	OE
GRF2-40	737409.64	1008319.17	1	35mm subcaliber round	OE
GRF2-41	737392.34	1008325.77	2	35mm subcaliber round	OE
GRF2-42	737452.45	1008331.78	3	40mm practice	OE
GRF2-43	737424.98	1008346.27	4	40mm practice	OE
GRF2-48	737410.76	1008363.57	4	35mm subcaliber round	OE
GRF2-50	737414.42	1008374.28	3	35mm subcaliber round	OE
GRF2-51	737438.17	1008393.34	3	35mm subcaliber round	OE
GRF2-52	737404.98	1008395.44	1	40mm practice	OE
GRF2-53	737410.55	1008396.17	1	40mm practice	OE
GRF2-54	737452.48	1008398.23	3	40mm practice	OE
GRF2-55	737447.65	1008399.99	3	40mm practice	OE
GRF2-56	737419.31	1008383.9	3	40mm practice	OE
GRF2-6	737406.29	1008138.68	2	40mm practice	OE
GRF2-7	737474.98	1008140.86	2	40mm practice	OE
GRF2-8	737417.47	1008154.66	6	40mm practice	OE
GRF2-9	737399.9	1008153.21	5	40mm practice	OE
GRF5-16	737412.45	1008474.93	1	40mm practice	OE
GRF5-3	737404.98	1008403.96	1	35mm subcaliber round	OE
GRF5-5	737389.78	1008410.23	1	40mm practice	OE
GRF5-6	737402.58	1008421.03	1	40mm practice	OE
GRF6-1	737457.76	1008502.24	1	40mm practice	OE
GRF6-10	737418.73	1008522.31	1	35mm subcaliber round and 40mm practice	OE
GRF6-13	737424.73	1008527.75	0	35mm subcaliber round	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

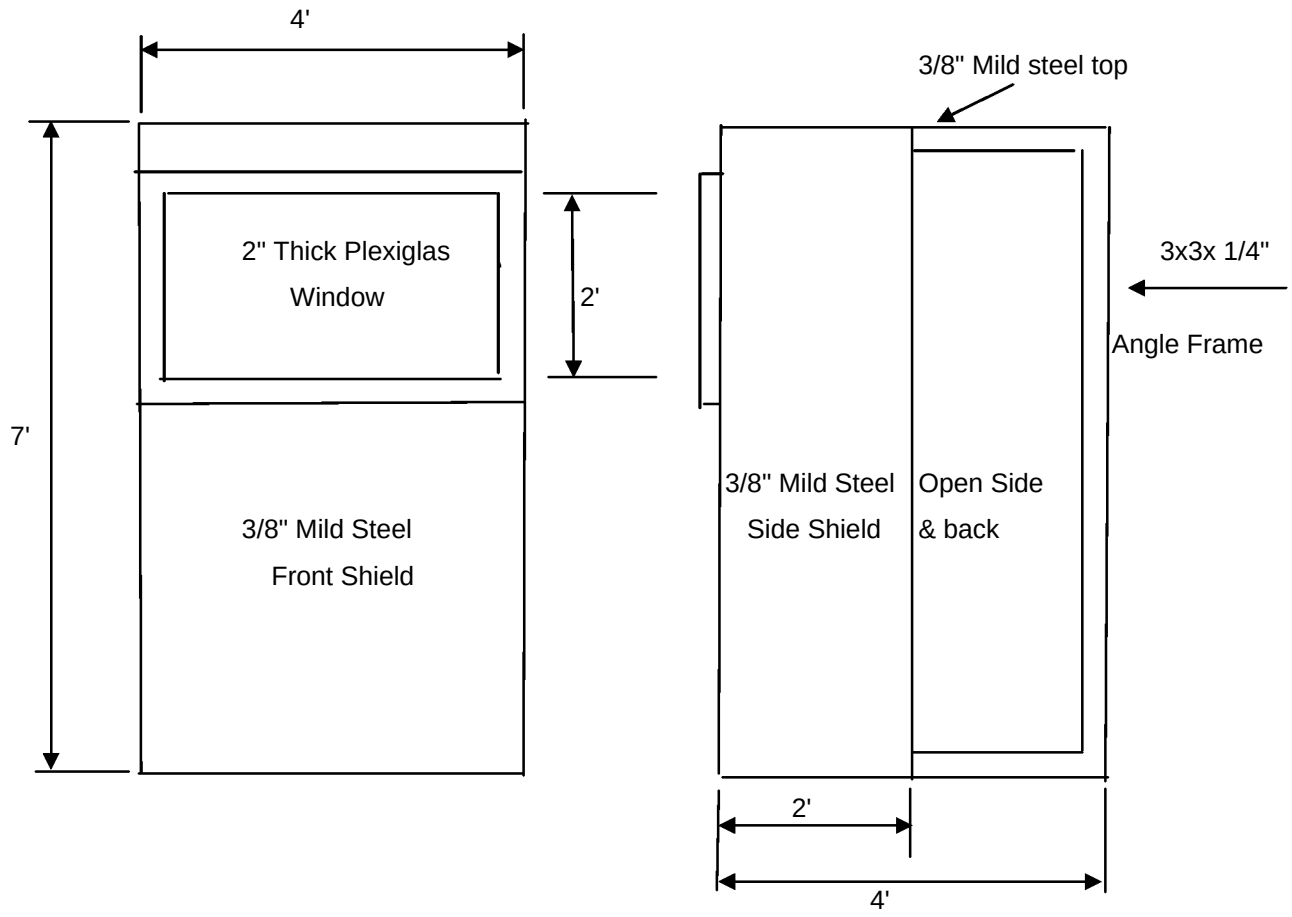
Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRF6-14	737437.83	1008529.84	1	40mm practice	OE
GRF6-26	737447.73	1008545.31	1	35mm subcaliber round	OE
GRF6-3	737418.73	1008512.28	2	40mm practice	OE
GRF6-4	737413.72	1008514.78	1	35mm subcaliber round	OE
GRF6-43	737479.61	1008569.86	4	40mm practice	OE
GRF6-54	737411.31	1008582	3	40mm practice and bolt	OE
GRF6-8	737436.71	1008519.8	2	40mm practice	OE
GRF7-1	737396.23	1008607.98	2	35mm subcaliber round	OE
GRF7-11	737450.08	1008634.51	5	40mm practice	OE
GRF7-13	737450.08	1008644.93	2	40mm practice	OE
GRF7-16	737397.65	1008651.25	5	40mm practice	OE
GRF7-17	737467.44	1008658.36	2	40mm practice	OE
GRF7-20	737432.62	1008662.18	2	40mm practice	OE
GRF7-21	737446.04	1008664.07	1	40mm practice	OE
GRF7-22	737470.2	1008669.6	3	40mm practice	OE
GRF7-23	737437.2	1008681.45	3	40mm practice	OE
GRF7-24	737447.62	1008687.61	2	40mm practice	OE
GRF7-25	737433.25	1008694.08	1	40mm practice	OE
GRF7-27	737412.72	1008701.04	3	40mm practice	OE
GRF7-28	737406.09	1008704.83	3	35mm subcaliber round	OE
GRF7-30	737470.2	1008707.51	12	40mm practice	OE
GRF7-31	737462.78	1008706.09	2	40mm practice	OE
GRF7-32	737456.94	1008701.35	3	40mm practice (2)	OE
GRF7-36	737430.19	1008717.37	2	40mm practice	OE
GRF7-37	737402.71	1008717.84	4	40mm practice	OE
GRF7-38	737418.35	1008724.47	2	40mm practice	OE
GRF7-4	737446.44	1008609.71	4	40mm practice (2)	OE
GRF7-40	737468.88	1008731.58	2	35mm subcaliber round	OE
GRF7-45	737414.08	1008736.95	2	35mm subcaliber round	OE
GRF7-46	737410.13	1008745.17	3	40mm practice	OE
GRF7-47	737395.76	1008741.53	2	40mm practice	OE
GRF7-5	737475.81	1008599.92	8	40mm practice and pieces of scrap	OE
GRF7-50	737457.51	1008765.7	6	40mm practice and pieces of scrap	OE
GRF7-51	737455.77	1008772.81	2	40mm practice	OE
GRF7-52	737437.61	1008769.34	3	40mm practice	OE
GRF7-53	737480.09	1008774.71	3	40mm practice	OE
GRF7-54	737425.13	1008774.17	2	35mm subcaliber round	OE
GRF7-55	737420.08	1008773.38	2	35mm subcaliber round	OE
GRF7-6	737472.66	1008620.45	2	40mm practice	OE
GRF7-61	737477.4	1008795.65	1	40mm practice	OE
GRF7-62	737465.24	1008798.02	6	40mm practice	OE
GRF7-64	737446.77	1008827.88	3	40mm practice	OE
GRF7-65	737435.08	1008832.46	3	40mm practice	OE
GRF7-66	737462.62	1008844.09	2	40mm practice	OE
GRF7-68	737475.73	1008870.94	1	40mm practice	OE
GRF7-69	737390.61	1008867.62	2	40mm practice	OE
GRF7-7	737447.71	1008616.03	3	40mm practice	OE
GRF7-70	737390.76	1008888.47	3	40mm practice	OE
GRF7-72	737427.72	1008893.05	2	40mm practice	OE
GRF7-73	737452.54	1008730.71	1	40mm practice	OE
GRF7-74	737394.97	1008854.9	3	40mm practice	OE
GRF7-8	737441.07	1008619.98	2	40mm practice	OE
GRF7-9	737435.86	1008631.98	3	40mm practice	OE
GRG1-2	737506.69	1008040.76	1	40mm practice	OE
GRG2-2	737550.7	1008139.34	3	40mm practice	OE
GRG2-3	737588.44	1008157.5	2	40mm practice	OE
GRG2-4	737492.57	1008233.03	3	35mm subcaliber round	OE
GRG2-5	737497.43	1008234.31	3	35mm subcaliber round	OE
GRG2-7	737522.45	1008276.07	1	40mm practice	OE
GRG2-8	737532.56	1008311.75	1	40mm practice	OE

APPENDIX C
UXO AND OE RECOVERED
SENECA ARMY DEPOT ACTIVITY OE EE/CA

Anomaly ID	Easting (State Plane - ft)	Northing (State Plane - ft)	Approx Depth (inches)	COMMENT	CATEGORY
GRG5-1	737495.44	1008595.24	1	35mm subcaliber round	OE
GRG5-2	737490.94	1008569.33	1	40mm practice	OE
GRG5-23	737567.08	1008526.29	1	35mm subcaliber round	OE
GRG5-28	737567.4	1008488.27	3	40mm practice	OE
GRG5-29	737542.61	1008479.03	3	40mm practice	OE
GRG5-30	737589.72	1008415.46	1	35mm subcaliber round	OE
GRG5-31	737546.25	1008404.69	2	40mm practice	OE
GRG5-32	737523.03	1008406.49	2	40mm practice	OE
GRG5-6	737581.28	1008559.41	2	40mm practice	OE
GRG5-7	737546.81	1008555.58	3	40mm practice	OE
GRMP-47	737245.58	1007762.99	1	40mm practice	OE
GRMP-5	737123.89	1007972.49	2	40mm practice	OE
GRMP-50	737300.03	1007827.91	4	40mm practice	OE
GRMP-52	737332.48	1007769.87	3	40mm practice	OE
GRMP-54	737232.45	1007870.63	3	40mm practice	OE
GRMP-55	737235.75	1007889.07	4	40mm practice	OE
GRMP-56	737330.35	1007897.87	3	40mm practice	OE
GRMP-58	737157.39	1007990.72	3	40mm practice	OE
GRMP-59	737293.53	1008002	5	40mm practice	OE
GRMP-6	737069.41	1007945.75	2	40mm practice	OE
GRMP-60	737342.35	1007995.86	1	35mm subcaliber round	OE
GRMP-61	737351.7	1007999.43	2	40mm practice	OE
GRMP-62	737329.15	1007955.7	2	40mm practice	OE
GRMP-63	737374.53	1007997.78	2	40mm practice	OE
GRMP-64	737367.11	1007980.45	2	40mm practice	OE
GRMP-65	737369.31	1007954.32	2	40mm practice	OE
GRMP-67	737359.13	1007913.61	4	40mm practice	OE
GRMP-68	737357.48	1007902.6	2	40mm practice	OE
GRMP-7	737111.97	1007902.78	2	40mm practice	OE
GRMP-70	737383.33	1007899.85	4	40mm practice	OE
GRMP-71	737364.98	1007762.83	3	40mm practice	OE
GRMP-85	737239.84	1007951.93	2	40mm practice	OE
GRMP-86	737305.7	1007907.33	2	40mm practice	OE
GRMP-87	737337.38	1007956.37	3	40mm practice	OE
GRMP-88	737352.57	1007870.86	2	40mm practice	OE
GRMP-89	737352.03	1007755.04	2	40mm practice	OE
GRMP-94	737307.56	1007478.96	1	35mm subcaliber round	OE

APPENDIX C

BLAST SHIELD DIAGRAM



MPM 37 mm MK II (.053lb)

Horizontal range of Max. Wt. Fragment 980ft

Intentional MSD K328 Distance 131 ft

Plexi-Glass min thickness 1.94 inches

Mild Sreel Thickness 0.37 inches

Minimum Separation Distance 200 ft

Notes:

1 All mild steel

2 All welded construction

3 Plexiglas bolted to frame

4 Back, bottom and 1/2 of side open.

PARSONS

Seneca Army Depot

Blast Shield for Processing @ Site 57

SK 2 3/23/2006

APPENDIX D

FRAGMENTATION DATA REVIEW FORMS

FRAGMENTATION DATA REVIEW FORM

Category:	HE Rounds
Munition:	37 mm M8 (0.0538)
Primary Database Category:	projectile
Secondary Database Category:	37 mm
Tersiary Database Category:	TNT
DODIC:	
Date Record Created:	7/30/2004
Last Date Record Updated:	7/30/2004
Individual Last Updated Record:	Orull
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	0.05300
Diameter (in):	1.4567
Max Fragment Weight (lb):	0.0245000
Critical Fragment Velocity (fps):	3302

Theoretical Calculated Fragment Range

Range to no More Than 1 Hazardous Fragment/600 Square Feet (ft):	200
Vertical Range of Maximum Weight Fragment (ft):	754
Horizontal Range of Maximum Weight Fragment (ft):	980

Overpressure Distances

Inhabited Building Distance (1.2 psi), K40 Distance:	16
Inhabited Building Distance (.09 psi), K50 Distance:	20
Intentional MSD (.0065 psi), K328 Distance:	134

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	2.00
Mild Steel:	0.37
Hard Steel:	0.30
Aluminum:	0.79
LEXAN:	3.25
Plexi-glass:	1.94
Bullet Resist Glass:	1.51

Required Sandbag Thickness

Max Fragment Weight (lb)/SB:	0.0245000
Critical Fragment Velocity (fps)/SB:	3302
Kinetic Energy 1/2K (lb-ft2/s2)/SB:	0.1336
Required Wall, Roof Sandbag Thickness (in)/SB:	12
Expected Maximum Sandbag Throw Distance (ft)/SB:	25
Minimum Separation Distance (ft)/SB:	200

Water Containment System and Minimum Separation Distance(s)

Max Fragment Weight (lb)/W:	0.0245000
Critical Fragment Velocity (fps)/W:	3302
Kinetic Energy 1/2K (lb-ft2/s2)/W:	0.1336
Water Containment System:	5 gal carboys/ inflatable pool
Minimum Separation Distance (ft)/W:	200/200

◄ ► Print This Form Close Form

FRAGMENTATION DATA REVIEW FORM

Category:	Grenades & Mines	DODIC:	B571
Munition:	40 mm M383 (grenade)	Date Record Created:	7/30/2004
		Last Date Record Updated:	7/30/2004
Primary Database Category:	projectile	Individual Last Updated Record:	Crull
Secondary Database Category:	40 mm	Date Record Retired:	
Tertiary Database Category:	RDX		

Munition Information and Fragmentation Characteristics

Explosive Type:	RDX
Explosive Weight (lb):	0.12000
Diameter (in):	1.5580
Max Fragment Weight (lb):	0.000438
Critical Fragment Velocity (fps):	7707

Theoretical Calculated Fragment Range

Range to No More Than 1 Hazardous Fragment/600 Square FeetA (ft):	NA
Vertical Range of Maximum Weight Fragment (ft):	280
Horizontal Range of Maximum Weight Fragment (ft):	344

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	22
Inhabited Building Distance (09 psi), K50 Distance:	27
Intentional MSD (0065 psi), K328 Distance:	177

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	1.30
Mild Steel:	0.32
Hard Steel:	0.26
Aluminum:	0.72
LEXAN:	2.87
Plexi-glass:	1.55
Bullet Resist Glass:	1.11

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.003314
Critical Fragment Velocity (fps)SB:	7707
Kinetic Energy 106 (lb-ft2/s2)SB:	0.0984
Required Wall _Roof Sandbag Thickness (in)SB:	12
Expected Maximum Sandbag Throw Distance (ft)SB:	25
Minimum Separation Distance (ft)SB:	200

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.003314
Critical Fragment Velocity (fps)W:	7707
Kinetic Energy 106 (lb-ft2/s2)W:	0.0984
Water Containment System:	5 gal carboys/ inflatable pool
Minimum Separation Distance (ft)W:	200/200

◄ ► Print This Form Close Form

APPENDIX B

STANDARD OPERATING PROCEDURES FOR DEMOLITION/DISPOSAL OPERATIONS

OE SECTOR
Standing Operating Procedure (SOP)

Demolition Operations

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No. 1
February, 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO Timothy J. Mustard, CIH 05/18/05
(Signature) **(Date)**

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of demolition/disposal operations on sites contaminated with Munitions and Explosives of Concern (MEC).

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of demolition/disposal operations on an MEC contaminated site. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of demolition/disposal operations:

- Parsons Corporate Safety and Health Program;
- EP 385-1-95a, Basic Safety Concepts and Considerations for OE Operations;
- EP 1110-1-17, Establishing a Temporary OB/OD Site for Conventional Ordnance and Explosives Projects;
- EP 1110-1-18, Ordnance and Explosives Response;
- EM 1110-1-4009, Ordnance and Explosives Response;
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- DoD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives;
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards;
- AR 385-64, Ammunition and Explosive Safety;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- TM 60A-1-1-31, EOD Disposal Procedures;
- AR 190-11, Physical Security of Arms, Ammunition and Explosives;
- ATF 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations; and
- Applicable sections of DOT, 49 CFR Parts 100 to 199.

4.0 Responsibilities

4.1 Project Manager

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 Senior UXO Supervisor

The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during demolition activities, and shall visit

demolition locations to ensure that demolition operations are carried out in a safe, clean, efficient and economical manner**.**

4.3 UXO Technician III (Demolition Supervisor)

A designated UXO Tech III shall act as the Demolition Supervisor (DS). There may be more than one DS assigned to a project site due to conducting simultaneous operations and divergent sites. The demolition activities shall be conducted under the direct control of the DS, who will have the responsibility of supervising all demolition operations assigned to him. The DS shall be responsible for training all on-site UXO demolition personnel on his team regarding the nature of the materials handled, the hazards involved and the precautions necessary to conduct a safe demolition operation. The DS will also ensure that the Daily Operational Log, Demolition Shot Records and inventory records are properly filled and accurately depict the demolition events and demolition material consumption for each day's operations. The DS shall be present during all demolition operations.

4.4 UXO Safety Officer

The UXO Safety Officer (UXOSO) for the site is responsible for ensuring that all demolition operations are being conducted in a safe and compliant manner, and is required to be present during all demolition operations. The only exception to this rule is when the project site has multiple sites conducting concurrent munitions response (MR) operations, and it is impossible for the UXOSO to be present at each shot. In that event a demolition team safety officer will be designated. This individual will report to the UXOSO and assume the UXOSO's responsibilities at the designated demolition operation. In this situation, the UXOSO will conduct periodic safety audits of the demolition teams and assist the demolition team's safety officers in the performance of their duties. The UXOSO or demolition team safety officer will inspect the demolition shot(s) for hazards and then assisted by the DS and UXO Tech IIs, will inspect each demolition pit and an area of up to 250 feet in radius after each demolition shot to ensure that no kick-outs of hazardous MEC components or other hazardous items has occurred.

4.5 UXO Quality Control Specialist

The UXO Quality Control Specialist (UXOQCS) is responsible for inspecting, the Daily Operational Log, the Demolition Shot Record and the inventory of MEC and demolition material. The UXOQCS will check the pit/demolition site with a magnetometer and large metal fragments exceeding the pass/fail requirements of the SOW will be removed.

5.0 GENERAL OPERATIONAL AND SAFETY PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in operations on MEC contaminated sites shall be familiar with the potential safety and health hazards associated with the conduct of demolition/disposal operations, and with the work practices and control techniques used to reduce or eliminate these hazards. During demolition operations, general safety provisions listed below will strictly followed by all demolition personnel. Non-compliance with the general safety provisions will result in disciplinary action, to include termination of employment if warranted.

- All safety regulations applicable to demolition range activities and the destruction of MEC materials involved shall be complied with.

- Demolition of any kind is prohibited without the express permission from the client.

- The quantity of MEC to be destroyed will be determined by the range limit, with the Net explosive weight (NEW) of the demolition explosives factored into the total NEW.

- In the event of an electrical storm, or heavy snow or dust storms, immediate action will be taken to cease all demolition range operations and evacuate the area.

- In the event of a fire or unplanned explosion, if possible, put out the fire. If unable to do so, notify fire and police departments and evacuate the area. If injuries are involved, remove victims from danger, administer first aid and seek medical attention.

- The DS is responsible for reporting all injuries and accidents that occur to the UXOSO.

- Demolition team personnel will not tamper with any safety devices or protective equipment.

- Any defect in demolition material or an unusual condition that is not covered by this SOP will be reported immediately to the DS and UXOSO.

- Demolition procedures shall be conducted in accordance with this SOP and applicable references in section 3.0.

- Adequate fire protection and first aid equipment shall be provided at all times.

- All personnel engaged in the destruction of MEC shall wear under and outer garments made of close-weave natural fiber, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.

- Care will be taken to minimize exposure to the smallest number of personnel, for the shortest time, to the least amount of hazard, consistent with safe and efficient operations.

- Work locations will be maintained in a neat and orderly condition.

- All demolition hand tools shall be maintained in a good state of repair.

- Each heavy equipment and/or vehicle operator will have in his possession a valid operator's permit, i.e., state driver’s license, certificate of training for backhoe./excavator etc.

- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions or MEC. If bulk or binary explosives are being handled then rubber gloves, such as Nitrile, will be worn

- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
  - When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles; and
  - Be sure you have good footing and hold, and lift with a smooth, even motion.
- The demolition range shall be provided with telephone and/or radio communication.
- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
  - Exhaust systems shall be kept in good mechanical repair.
  - Lighting systems shall be an integral part of the vehicle.
  - One 20 BC rated portable fire extinguisher shall be, if possible, mounted on the vehicle outside of the driver's cab or two 10BC fire extinguishers, with one inside the cab and the other near the front portion of the vehicle bed, nearest the driver.
  - Wheels of carriers must be chocked and brakes set during loading and unloading.
  - No demolition material or MEC shall be loaded into or unloaded from, motor vehicles while the engine is operating.
- Motor vehicles and MHE used to transport demolition material and MEC shall be inspected prior to use to determine that:
  - Fire extinguishers are filled and in good working order.
  - Electrical wiring is in good condition and properly attached.
  - Fuel tank and piping are secure and not leaking.
  - Brakes, steering and safety equipment are in good condition.
  - The exhaust system is not exposed to accumulations of grease, oil, gasoline, or other fuels, and has ample clearance from fuel lines and other combustible materials.
- A red warning flag, such as a "Bravo Flag", a windsock, or rag will be displayed at the entrance to the demolition range and, if applicable, the entrance gate shall be locked when demolition work is in process. This is only applicable if a open detonation (OD) range has been established with demo pits for all shots.
- Unless otherwise directed, all demolition shots will be tamped with a minimum of two feet of clean earth/dirt.

- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range before material is detonated. It shall be the responsibility of the observer to order the DS to suspend firing if any aircraft, vehicles or personnel are sighted approaching the general demolition area.

- Two-way radios shall not be operated on the demolition range while the shot is primed or during the priming process. The charts shown in Attachment 1 of this SOP shall be used for determining the safe distances from transmitter antennas.

- No Demolition operation will be left unattended during the active portion of the operation (i.e., during the burn or once any explosives or MEC are brought to the range).

- A minimum area of 200 feet in diameter shall be cleared of dry grass, leaves and other extraneous combustible materials around the demolition shot/pit area.

- No demolition activities will be conducted if there is less than a 2,000-foot ceiling or if wind velocity is in excess of 20 mph.

- Demolition-shots must be fired during daylight hours (i.e., between 30 minutes after sunrise and 30 minutes before sunset).

- No more than two persons shall ride in a truck transporting demolition material or MEC, and no person shall be allowed to ride in the trailer/bed.

- Vehicles shall not be refueled when carrying demolition material or MEC, and must be 100 feet from magazines or trailers containing such items before refueling.

- All explosive vehicles will be cleaned of visible explosive and other contamination before releasing the vehicles for other tasks.

- Prior to conducting any other task, personnel shall wash their face and hands after handling demolition material or MEC.

- At the demolition site, prior to “check-out” procedures, all blasting caps will be stored in approved containers and separated a minimum of 50 feet “downwind” from all other explosives until they are needed.

- Demolition shots/pits shall be spaced at least 50 feet apart, with no more than 10 shots/pits prepared for a series of shots at any one time.

6.0 SPECIAL REQUIREMENTS FOR DEMOLITION ACTIVITIES

The following safety and operational requirements shall be followed during demolition range operations. Any deviations from this procedure shall be allowed only after receipt of

written approval from the PM and the UCACE. Failure to adhere to the requirements and procedures listed in the paragraphs below could result in serious injury or death; therefore complete compliance with these requirements and procedures will be strictly enforced.

6.1 General Requirements

The general demolition range/shot requirements listed below shall be followed at all times:

- Attachment 1 of this SOP, Explosive Hazards Tables, will be adhered to in all demolition operations.

- Attachment 2 of this SOP, "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites," will be followed when destroying multiple munitions by detonation.

- Attachment 3 of this SOP, “Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions” may be used when fragmentation throws and fire is a concern.

- Material awaiting destruction shall be stored at not less than intra-line distance, based on the largest quantity involved, from adjacent explosive materials and from explosives being destroyed. The material shall be protected against accidental ignition or explosion from fragments, grass fires, burning embers or detonating impulses originating in materials being destroyed.

- MEC or bulk explosives, acceptable to move, and destroyed by detonation can be detonated in a pit not less than three feet deep and covered with earth which protrudes not less than two feet above existing ground level. The components should be placed on their sides or in a position to expose the largest area to the influence of the demolition material. The demolition material should be placed in intimate contact with the item to be detonated and held in place by tape or earth packed over the demolition materials. The total NEW to be destroyed below ground at one time shall not exceed the range limit.

- Prevailing weather condition information will be obtained from the U.S. Weather Service and the data logged in the Demolition Shot Log before each shot or round of shots.

- All shots shall be dual primed.

- A minimum of 30 seconds will be maintained between each detonation.

- Detonations will be counted to ensure detonation of all shots. After each series of detonations, a search shall be made of the surrounding area for unexploded MEC. Items such as lumps of explosives or unfuzed ammunition may be picked up and prepared for the next shot. Fuzed ammunition or items that may have internally damaged components will be detonated in place, if possible.

- After each-detonation and at the end of each day's operations, surface exposed munitions debris, shall be recovered from the demolition range and disposed of in accordance with contracted procedures, as well as all applicable environmental regulations. All collected munitions debris metal will be 100% inspected for absence of explosive materials by demolition range personnel and certified by the SUXOS and the UXOQCS.

- When operated in accordance with the conditions of this procedure the demolition range/shot should not present a noise problem to the surrounding community. However, if a noise complaint is received, the name, address and phone number of the complainant should be recorded and reported to the site manager, who report it to the USACE.

- Whenever possible, during excavation of demolition pits contour the ground so that runoff water is channeled away from the pits. If demolition operations are discontinued for more than two weeks, the pits should be back filled until operations resume.

- Upon completion of the project, all disturbed demolition areas will be thoroughly inspected for MEC. According to the SOW, the site may have to be leveled and seeded to establish a permanent vegetative cover to inhibit erosion. If necessary, this will be coordinated with the contractor representative. At a minimum, the holes/pits will be filled in and contoured.

- Prior to and after each shot, the Demolition Shot Record is to be filled out by the DS with all applicable information.

6.2 Electric Detonator Use

The following requirements are necessary when using electric detonators and blasting circuits:

- Electric detonators and electric blasting circuits may be energized to dangerous levels from outside sources such as static electricity, induced electric currents and radio transmission equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of an electric detonator and explosive charges of which they form a part. Demolition Team radios will not be operated while the pit/shot is primed or during the priming process.

- Demolition team members handling detonators will first ground themselves by bending down and touching the ground, which will discharge any static electricity.

- The shunt shall not be removed from the leg wires of the detonator until the continuity check.

- When uncoiling or straightening the detonator leg wires; keep the explosive ends of the detonator pointing away from the body and away from other personnel. When straightening the leg wires, do not hold the detonator itself; rather hold the detonator leg wires approximately one inch from the detonator body. Straighten the leg wires by hand, do not throw or wave the wires through the air to loosen them.

- Prior to use, the detonators shall be tested for continuity. To conduct the test, place the detonators in a pre-bored hole in the ground or place them in a sand bag and walk facing away from the detonators and stretch the wires to their full length, or to 25 feet, whichever is less, being sure to not pull the detonators from the hole or sand bag. With the leg wires stretched to their full length, test the continuity of the detonators one at a time by un-shunting the leg wires and attaching them to the galvanometer and checking for continuity. After the test, re-shunt the wires by twisting the two ends together. Repeat this process for each detonator until all detonators have been tested. This process shall be accomplished at least 50 feet down wind from any MEC/demolition materials and out of the personnel and vehicle flow patterns. In addition, all personnel on the demolition range/shot shall be alerted prior to the test being conducted.

  NOTE: When testing the detonator, prior to connecting the detonator to the firing circuit, the leg wires of the detonator must be shunted by twisting the bare ends of the wires together immediately after testing. The wires shall remain short circuited until time to connect them to the firing line.

- At the power source end of the blasting circuit, the ends of the firing line wires shall be shorted or twisted together (shunted) at all times, except when actually testing the circuit or firing the charge. The connection between the detonator and the circuit firing wires must not be made unless the power end of the firing wires are shorted and grounded or the firing panel is off and locked.

- The firing line will be checked using pre-arranged hand signals or through the use of two-way radios if the demolition pit/shot is not visible from the firing point. If radios are used, communication shall be accomplished a minimum of 50 feet from the demolition pit/shot and detonators. The firing line will be checked for electrical continuity in both the open and closed positions, and will be closed and shunted prior to connecting the detonator leg wires.

- MEC to be detonated or vented shall be placed in the demolition pit/shot and the demolition material placed/attached in such a manner as to ensure the total detonation and/or venting of the MEC. A section of detonation cord, time fuze, or Non-El shock tube will extend from the demolition material to a point outside the tamping material. Once the MEC and demolition material are in place and the shot has been tamped, the detonators will be connected to the demolition material. Prior to handling detonators that are connected to the firing line, personnel shall ensure that they 0nce again ground themselves. The detonators will then be carried to the demolition pit/shot with the end

of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-El, etc., ensuring that the detonator is not covered with tamping material to allow for ease of recovery/investigation in the event of a miss-fire.

- Prior to making connections to the blasting machine, the entire firing circuit shall be tested with a galvanometer for electrical continuity and ohmic resistance to ensure the blasting machine has the capacity to initiate the shot.

- The individual assigned to make the connections at the blasting machine or panel will not complete the circuit at the blasting machine or panel and will not give the signal for detonation until satisfied that all personnel in the vicinity have been evacuated to a pre-determined distance as computed by CEHNC-ED-CS-S or the default distance found in DoD 6055.9-STD. When in use, the blasting machine or its actuating device shall be in the blaster's possession at all times. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.

- Prior to initiating a demolition shot(s), a warning will be given, the type and duration of such will be determined by the prevailing conditions at the demolition range/shot. At a minimum, this should be an audible signal using a siren, air horn or megaphone, which is sounded for a one minute duration, five minutes prior to the shot and again one minute prior to the shot.

6.3 Detonating Cord Use

The following procedures are required when using detonating cord (det cord):

- Det cord should be cut using approved crimpers and only the amount required should be removed from inventory.

- When cutting det cord, the task should be performed outside the magazine.

- For ease of inventory control, only remove det cord in one-foot increments.

- Det cord should not be placed in clothing pockets or around the neck, arm or waist, and should be transported to the demolition location in either an approved "day box" or a cloth satchel, depending upon the magazine location and proximity to the demolition area.

- When ready to "tie in" either the det cord to demolition materials, or det cord to detonator, the det cord will be connected to the demolition material and secured to the MEC. The cord is then strung out of the hole/tamping material and secured in place with soil, being sure to leave a one-foot tail exposed outside the hole/tamping material.

- Once the hole is filled or tamping in place, make a loop in the det cord large enough to accommodate the detonator, place the detonator in the loop and secure it with tape. The detonator's explosive end will face down the det cord toward the demolition material or parallel to the main line.

- In all cases, ensure there is sufficient det cord extending out of the hole/tamping material to allow for ease of detonator attachment and detonator inspection/replacement should a misfire occur.

- If the det cord detonators are electric, they will be checked, tied in to the firing line and shunted prior to being taped to the loop as described above. If the det cord detonators are non-electric, the time/safety fuse will be prepared with the igniter in place prior to taping the detonators to the det cord loop. If the det cord detonators are Non-El, simply tape the detonators into the loop as described above.

- In the event that a time/safety fuse is used, and an igniter is not available and a field expedient initiation system must be used (i.e., matches), do not split the safety fuse until the detonator is taped into the det cord loop.

6.4 Shock Tube Splicing Procedures

The high reliability of the shock tube initiating system is due to the fact that all of the components are sealed and unlike standard non-electric priming components, cannot be easily degraded by moisture. Cutting the shock tube makes the open end vulnerable to moisture and foreign contamination, therefore care must be taken to prevent moisture and foreign matter from getting in the shock tubes exposed ends. Some general rules to follow are listed below.

- After cutting a piece of shock tube, either immediately tie a tight overhand knot in one or both cut ends or splice one exposed end and tie off the other.

- Always use a sharp knife or razor blade to cut shock tube so as to prevent the tube from being pinched or otherwise obstructed.

- Always cut shock tube squarely across and make sure the cut is clean.

- Use only the splicing tubes provided by the manufacturer to make splices

- Every splice in the shock tube reduces the reliability of the priming system; therefore keep the number of splices to a minimum.

6.4.1 Shock Tube Assembly

Step 1. If you are using a new role of shock tube cut off the sealed end, dispose of the small piece IAW local laws as they relate to flammable material and proceed to the directions listed in Step 3. If you are using a pre-assembled shock tube/detonator assembly proceed to Step 1 in paragraph 6.4.2.

Step 2. If you are using a previously cut piece of shock tube, using a sharp knife or razor blade cut approximately 18 inches from the previously cut end, whether or not it was knotted IAW the above guidance. Dispose of the 18-inch piece of shock tube IAW local regulations.

Step 3. Using a sharp knife or razor cut the sealed end off of the detonator assembly and dispose of the small piece as above.

Step 4. Loosely tie the two shock tube ends to be sliced together in a square knot, leaving at least a two-inch free end of each end of the shock tube beyond the knot. Push the shock tube lightly to tighten the knot, but not so tight as to significantly deform the shock tube.

Step 5. Push one of the shock tube ends to be spliced firmly into one of the precut splicing tubes provided by the manufacturer, at least ¼ inches. Push the other shock tube end firmly into the other end of the splicing tube at least ¼ inches.

Step 6. Spool out the desired length of shock tube and cut it off with a sharp knife or razor blade.

Step 7. Immediately seal off the shock tube remaining on the spool by tying a tight overhand knot in the cut off end.

6.4.2 Firing Assembly Setup

Step 1. Lay out the required length of shock tube from demo area to firing point.

Step 2. If there are multiple items to be destroyed using bunch block(s), supplied by the manufacturer, lay out lead lines at demo site to the shot(s) and secure the bunch block with a sandbag, or some other item which will keep it from moving. Figure 1 illustrates the procedure.

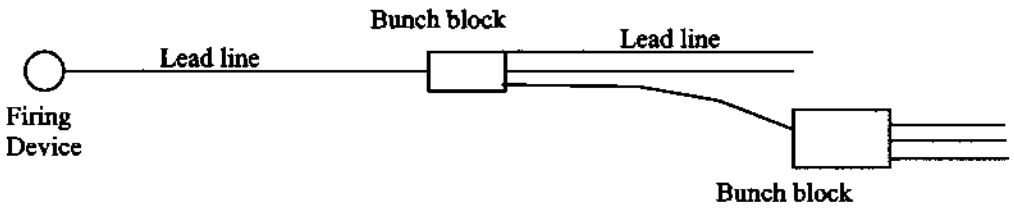


Figure 1

Note: No more than six leads may be used from any one bunch block.

Step 3. If the detonator assembly has not been attached yet then using the splicing tube, splice the detonator assembly to the shock tube lead line as explained in the splicing instructions above.

Step 4. If this is a non-tamped shot place the detonator assembly into the demolition material. If the shot is to be tamped then prepare the demolition material with a detonating cord lead long enough to stick out of the tamping at least one foot.

Step 5. Tape the detonator assembly to the detonating cord lead as shown in Figure 2.

Step 6. Clear the area IAW the approved demolition plan, return to the firing position.

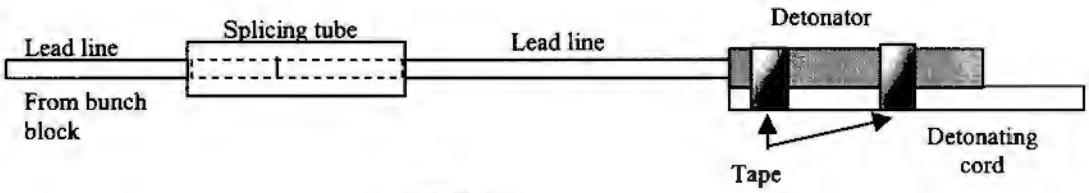


Figure 2

Step 7. Insert a primer into the firing device and connect the shock tube lead line to the firing device ensuring that the shock tube is properly seated in the firing device.

Step 8. Proceed IAW the approved demolition procedures.

6.5 Time/Safety Fuse Use

The following procedures are required when using a time/safety fuse:

- Prior to each daily use, the burn rate for the time/safety fuse must be tested to ensure the accurate determination of the length of time/safety fuse needed to achieve the minimum burn time of five minutes needed to conduct demolition operations.
- To ensure both ends of the time/safety fuse are moisture free, use approved crimpers to cut six inches off the end of the time/safety fuse roll and place the six inch piece in the time/safety fuse container.
- If quantity allows, accurately measure and cut off a six foot long piece of the time/safety fuse from the roll, and take the six-foot section out of the magazine and attach a fuse igniter.
- In a safe location, removed from demolition materials and MEC, ignite the time/safety fuse, measure the burn time from the point of initiation to the "spit" at the end, and record the burn time in the DS's Log.
- To measure the burn time, use a watch with a second hand, stop watch or chronograph.
- To calculate the burn rate in seconds per foot, divide the total burn time (in seconds) by the length (in feet) of the test fuse.
- Whenever using time/safety fuse, for demolition operations, the minimum amount of fuse to be used will be the amount needed to permit a minimum burn time of five minutes.

6.6 Perforator Use

The following procedures are required when using perforators:

- Only remove from inventory the number of perforators required to perform the task.

- Transport perforators in an approved "day box", cloth satchel or plastic container, depending upon magazine location and proximity to the demolition operations.

- When ready to use, place the det cord through the slot on the perforator and knot the det cord, ensuring the cord fits securely and has good continuity with the perforator.

- Once the det cord is secure, place the perforator in the desired location and secure it in place.

- Proceed from this point as described in paragraph 6.3.

6.7 Use of Two-Component Explosives

The following procedures are required when using two-component (binary) demolition materials:

- Only remove from inventory the amount of two-component required to perform the task.

- When transporting the solid and liquid, they need only be placed apart in the bed of a truck.

- Do not mix the solid and liquid components until certain that it will be used, since the resulting mixture is classified as a Class 1.1 explosive by Department of Transportation.

- When mixing the solid and liquids components, follow the manufacturer's instructions, while being sure to wear rubber gloves and goggles. Mix components in an area away from other demolition materials, the MEC, and if possible, sheltered from the wind.

- Once the components have been mixed, it is essential that the lid to the solid bottle be put on securely as soon as possible after mixing to prevent evaporation of the liquid.

- Attach the det cord as recommended by the manufacturer, place the assembled unit in the desired location in the hole/shot and secure the unit.

- Proceed from this point as described in paragraph 6.3.

6.8 Demolition Range/Shot Inspection Schedule

The demolition range inspection schedule outlined in Table 6-1 will be followed at all sites where demolition operations are being conducted. This inspection shall be conducted by the UXOSO and will be documented in the Site Safety Log. If any deficiencies are noted, demolition operations shall be suspended and the deficiency reported to the SUXOS and DS. Once the deficiencies are corrected, demolition operations may be resumed.

Table 6-1 - Demolition Range Inspection Schedule

Check List Item	Inspection Schedule	Check List Item	Inspection Schedule
Site and Explosive Carrier Vehicle	Weekly or Prior to Use	Personal Protective Equipment	Prior to Use
Range Access/Egress Route	Weekly or Prior to Use	Circuit Testing Device	Prior to Use
Entrance Gate/Lock	Weekly or Prior to Use	Demolition Site	Prior to Use
Storage Trailer/Magazine	Daily, Prior to Use and After Use	Operating Equipment	Prior to Use
Fire Extinguishers	Daily, Prior to Use and After Use	Hospital Route	Prior to Use

7.0 METEOROLOGICAL CONDITIONS

In order to control the effects of demolition operations and to ensure the safety of site personnel, the following meteorological limitations and requirements shall apply to demolition operations:

- Demolition operations will not be conducted during electrical storms or thunderstorms.
- No demolition operations shall be conducted if the surface wind speed is greater than 20 miles per hour.
- Demolition operations will not be conducted during periods when visibility is less than one mile caused by, but not limited to, dense fog, blowing snow, rain, sand or dust storms.
- Demolition shall not be carried out on extremely cloudy days that are defined as: overcast (more than 80% cloud cover) with a ceiling of less than 2,000 feet.
- Demolition operations will not be conducted during any atmospheric inversion condition (low or high altitude).
- Demolition operations will not be conducted during periods of local air quality advisories.
- Demolition operations will not be initiated until 30 minutes after sunrise, and will be secured at least 30 minutes prior to sunset.

8.0 PRE-DEMOLITION/DISPOSAL PROCEDURES

8.1 Pre-Demo/Disposal Operational Briefing

It is the belief of Parsons that the success of any operation is dependent upon a thorough brief, covering all phases of the task, which is presented to all affected personnel. The DS will brief all personnel involved in range/shot operations in the following areas:

- Type of MEC being destroyed.
- Type, placement and quantity of demolition material being used.
- Method of initiation (electric, non-electric or Non-El).
- Means of transporting and packaging MEC, if applicable.
- Route to the disposal site.
- Emergency procedures.
- Equipment being used (i.e., galvanometer, blasting machine, firing wire, etc.).
- Misfire procedures.
- Post shot clean up of range.

8.2 Pre-Demo/Disposal Safety Briefing

The UXOSO and DS will conduct a safety brief for all personnel involved in range operations in the following areas:

- Care and handling of explosive materials.
- Personal hygiene.
- Two-man rule and approved exceptions.
- Potential trip/fall hazards.
- Horseplay on the range.
- Stay alert for any explosive hazards.
- Location of emergency shelter (if available).
- Vehicle parking (vehicles must be oriented out of the site for immediate departure, with keys in the ignition).
- Location of emergency vehicle (keep engine running).
- Wind direction (to assess potential toxic fumes).
- Location of first aid kit and fire extinguisher.
- Route to nearest hospital or emergency aid station.
- Type of communications in event of an emergency.
- Storage location of demolition materials and MEC awaiting disposal.

8.3 Task Assignments

Individuals with assigned tasks will report the completion of the task to the DS. The types of tasks that may be required are:

- Contact local Police, Fire department, USCG and FAA as required.
- Contact hospital/emergency response personnel if applicable.
- Secure all access roads to the range/shot area.

- Visually check range/shot area for any unauthorized personnel.
- Check firing wire for continuity and shunt.
- Prepare designated pits/shots as required.
- Check continuity of detonators.
- Check time/safety fuse and its burn rate.
- Designate a custodian of the blasting machine, fuse igniters or Non-El initiator.
- Secure detonators in a safe location.
- Place MEC in pit, if applicable, and place charge in desired location.

8.4 Preparing Explosive Charge for Initiation

To prepare the explosive charge for initiation, the procedures listed below will be followed:

- Ensure firing wire is shunted.
- Connect detonator to the firing wire.
- Isolate or insulate all connections.
- Prime the demolition charge.
- Place demolition charge on MEC.
- Depart to firing point (if using non electric firing system, obtain head count, pull igniters and depart to designated safe area).
- Obtain a head count, and test blast machine for proper operation.
- Give one-minute duration warning signal, using a bullhorn or siren, five minutes prior to detonation, and again at one minute prior to detonation.
- Check the firing circuit with a galvanometer.
- Yell **"fire in the hole"** three times (or an equivalent warning) and take cover.
- If using electric firing system connect firing wires to blasting machine and initiate charge.
- Remove firing wires from blasting machine and shunt.
- Remain in designated safe area until DS announces **"All Clear"**. This will occur after a post-shot waiting period of 5-minutes and the UXOSO has and inspected the pit(s)/shot(s).

9.0 POST DEMOLITION/DISPOSAL PROCEDURES

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so, and follow the below listed procedures:

- After the **"All Clear"** signal, check pit/shot for low orders or kick outs.
- Check pit with a magnetometer and remove any large fragmentation.
- Any MEC items, failing to be properly disposed of, discovered during the post demolition procedures, will be destroyed prior to the end of the day.
- Back fill hole as necessary.
- Police up all equipment.
- Notify police, fire, etc. that the operation is complete.

10.0 MISFIRE PROCEDURES

A thorough check of all equipment, firing wire and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below shall be followed.

10.1 Electric Misfires

To prevent electric misfires, one technician will be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check firing line and blasting machine connections and make a second initiation attempt.
- If unsuccessful, disconnect and connect to another blasting machine (if available) and attempt to initiate charge.
- If unsuccessful, commence a 60-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the UXOSO will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires from the leg wires, connect a new detonator to the firing circuit, check the replacement detonator for continuity, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

10.2 Non-Electric Misfires

Working on a non-electric misfire is the most hazardous of all operations. Occasionally, despite all painstaking efforts, a misfire will occur. Investigation and corrective action should be undertaken only by the technician that placed the charge, using the following procedure:

- If charge fails to detonate at the determined time, initiate a 60-minute wait period plus the time of the safety fuse, i.e., 5-minute safety fuse plus 60 minutes for a total of 65 minutes.
- After the wait period has expired, the designated technician will proceed down range to inspect the firing system. A safety observer must watch from a protected area.
- Prime the shot with a new non-electric firing system and install a new fuse igniter.
- Follow normal procedures for initiation of the charge.

10.3 Non-EL Misfire

The most common cause of misfires is known as "black tube failure". The shock tube propagates up to the detonator but the detonator fails to function, or there is a crimp in the line

causing the shock wave to be interrupted. The following steps will be taken in the event of a misfire:

- If the shock tube fails to propagate and the tube remains clear, remove the shock tube from the firing device, cut off six inches of the shock tube, insert a new primer, re-insert the shock tube ensuring that it is properly seated and re-fire. If when you activate the firing device and the shock tube gets blown out of the firing device without activating, cut off six inches of the shock tube, replace the primer and re-insert the shock tube into the firing device.

- If the primer functioned properly and the shock tube was heard or seen to fire, observe the standard one-hour waiting period prior to going downrange.

- After the one-hour waiting period has passed, proceed downrange and check the first component in the priming train i.e. splice, bunch block or detonator assembly. Repeat this process till you reach the detonator assembly. As you conduct this inspection and discover the problem, replace the firing train, which functioned (tube is no longer clear) with a new one and ensure that all the connections are correct and secure.

- After the system has been checked and repaired/replaced return to the firing point and repeat the firing process.

10.4 Detonating Cord Misfire

Parsons uses det cord to tie in multiple demolition shots and to ensure that electric detonators are not buried. Since det cord initiation will be either electrical or non-electrical, the procedures presented in paragraphs 10.1, 10.2, or 10.3, as appropriate to the type of detonator used, will be used to clear a det cord misfire. In addition, the following will be followed:

- If there is no problem with the initiating system, wait the prescribed amount of time and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection simply attach a new initiator and follow the appropriate procedures in paragraph 6.0.

- If the initiator detonated and the cord did not, inspect the cord to ensure it is det cord and not time fuze. Also, check to ensure there is PETN in the cord at the connection to the initiator.

- It may be necessary to uncover the det cord and replace it. This must be accomplished carefully to ensure that the demolition charge and the MEC item are not disturbed.

10.5 Perforator Misfire

The use of perforators is considerably safer than the use of C-4 and many other demolition materials. If the perforator is not initiated properly, it could malfunction. Since the perforator is covered with tamping material, det cord is used as the initiator. Therefore, in the event of a misfire, the procedures presented in paragraph 10.4 will be followed, along with the items presented below:

- If everything went but the perforator, one of four things has occurred:

    1. Det cord grain size was insufficient to initiate the perforator;

- Check to ensure the grain size of the det cord is sufficient, with 80-grain size or greater being the recommended size.

    2. The det cord was dislodged from the perforator when placing tamping materials;

- If the det cord connection to the perforator was the problem, ensure that the next connection is secure (use duct tape if necessary).

    3. The perforator was defective;

    4. The perforator was moved during the placement of tamping materials.

- If it is evident that the perforator was moved, ensure it is properly secured for the next shot.

- If cord size and connection are sufficient, replace the perforator, leaving the defective one on the shot.

11.0 RECORD KEEPING REQUIREMENT

To document demolition operations and the destruction of MEC, the following record keeping requirements shall be met:

- Parsons and/or its subcontractors will obtain and maintain all required permits.

- The DS will ensure the accurate completion of the logs, and the SUXOS and UXOQCS will monitor the entries in the log for completeness, accuracy and compliance with meteorological conditions.

- The DS shall enter the appropriate data on the Demolition Shot Record, to reflect the MEC destroyed, and shall complete the appropriate information on the Magazine Data Card, which indicates the demolition materials used.

- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed of as munitions debris or munitions constituents.

- Parsons and/or its subcontractors will retain a permanent file of all Demolition Records, including permits, Magazine Data Cards, training records, inspector reports, waste manifests if applicable, and operating logs.

- Copies of ATF License and any state or local permits must be on hand.

12.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposure to the hazards associated with MEC demolition/disposal operations. These requirements will be implemented unless superseded by site specific requirements stated in the Accident Prevention Plan (APP):

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1. Steel-toed safety boots will not be worn by demolition team personnel conducting demolition/disposal operations, unless a toe crush hazard exists, in which case personnel will wear boots with plastic or fiber toed safety toes;

2. Unless a serious head, eye or face hazard exists, demolition team personnel will not be required to wear hard hats, safety glasses or face shields when conducting operations involving the handling of demolition explosives or MEC, except as stated previously; and

3. In the event that a serious head, eye or face hazard does exist, demolition team personnel will wear the required PPE, but positive restraining means shall be required to secure the PPE to the head, face etc. and prevent it from falling and causing an accidental detonation.

13.0 AUDIT CRITERIA

The following items related to demolition/disposal operations on an MEC contaminated site will be audited to ensure compliance with this SOP:

1. The Demolition Shot Record
2. The Site Daily Operational and Safety Logs;
3. The MEC Operations Daily/Weekly Report;
4. The Safety Training Attendance Forms, for the initial site hazard training;
5. The Safety Training Attendance Forms, for the Daily Tailgate Safety Briefings;
6. The Daily Safety Inspection and Audit Log.

14.0 ATTACHMENTS

The following attachment to this SOP will be reviewed by all UXO-qualified personnel participating in demolition/disposal activities.

- Attachment l Explosive Hazards Tables

- Attachment 2 "Procedures for Demolition of Multiple Rounds Consolidated Shots on Ordnance and Explosives (OE) Sites"

- Attachment 3 Use of Sandbags for Mitigation of Fragmentation and Blasts Effects due to Intentional Detonation of Munitions (HNC-ED-CS-S-98-7)

- Attachment 4 Use of Water for Mitigation of Fragmentation and Blasts Effects due to Intentional Detonation of Munitions (HNC-ED-CS-S-00-3)

- Attachment 5 Weapon Specific Fragmentation Characterization (DDESB TP 16)

ATTACHMENT 1

EXPLOSIVE HAZARDS TABLES

INTRODUCTION

The following tables are to be used during demolition operations, and will be used to calculate minimum safe distances as they relate to mobile RF, television and FM broadcasting transmitters.
Tables 1-1 and 1-2 are to be used for determining the minimum safe distances to be maintained from different types of radio and television transmitters when electric detonators are in use.

Table 1-1 – Minimum Safe Distance from Transmitter Antennas

Average or Peak Transmitter Power in Watts	**Minimum Distance to Transmitter in Feet /Meters**
0 –30	30 / 98.4
31 – 50	50 / 164.1
51 – 100	110 / 360
101 – 250	160 / 525
251 – 500	230 / 755
501 – 1,000	305 / 1,000
1,001 – 3,000	480 / 1,575
3,001 – 5,000	610 / 2,001
5,001 – 20,000	915 / 3,002
20,001 – 50,000	1,530 / 5,020
50,001 – 100,000	3,050 / 10,007
100,001 – 400,000	6,100 / 20,014
400,001 – 1,600,000	12,200 / 40,028
1,600,001 – 6,400,000	24,400 / 80,056
Note: When the transmission is a pulsed or pulsed continuous wave type and its pulse width is less than 10 microseconds, the power column indicates average power. For all other transmissions, including those with pulse widths greater than 10 microseconds, the power column indicates peak power.	

Source: DA PAM 385-64, Table 6-3.

Table 1-2 – Safe Separation Distance Equations

	Un-Sheilded Munitions		Sheilded Munitions	
	Frequency	Formula	Frequency	Formula
	≤2.3 KHz	$D = 0.093 \times (PG)^{0.5}$	≤73 KHz	$D = 0.093 \times (PG)^{0.5}$
	2.3 KHz – 0.45 MHz	$D = 39.7 \times F \times (PG)^{0.5}$	73 KHz – 0.45 MHz	$D = 126 \times F \times (PG)^{0.5}$
	0.45 MHz – 400 MHz	$D = 18 \times (PG)^{0.5}$	0.45 MHz – 400 MHz	$D = 0.6 \times (PG)^{0.5}$
	400 MHz – 75 GHz	$D = (7137 / F) \times (PG)^{0.5}$	400 MHz – 2.4 GHz	$D = (226 / F) \times (PG)^{0.5}$
	>75 GHz	$D = 0.093 \times (PG)^{0.5}$	>2.4 GHz	$D = 0.093 \times (PG)^{0.5}$

Where:

D = Safe distance to the transmitter in feet (multiply feet by 0.305 to obtain meters)
P = Output power of the transmitter in watts
G = Numerical gain of transmitter antenna
F = Frequency in MHz (divide KHz by 1,000 to obtain MHz, and multiply GHz by 1,000 to obtain MHz)

To properly use this table, the following assumptions are made:

1. NO-FIRE CURRENT = 10 mA.
2. SAFETY FACTOR = 10 dB or 3.16 numerical).
3. EED'S LEADS = Tuned to match the transmitter's frequency.
4. SHEILDING = If metallic, it provides a minimum of 30 dB or 32 times (numerical) of shielding. Non-metal packs provide no shielding..
5. At no time should personnel or munitions be exposed to more than 200 volts/ meter (rms).

Source: DA PAM 385-64, Table 6-4.

ATTACHMENT 2

PROCEDURES FOR DEMOLITION OF MULTIPLE ROUNDS (CONSOLIDATED SHOTS) ON ORDNANCE AND OE SITES

ATTACHMENT 3

MITIGATION OF BLAST AND FRAGMENTATION USING SANDBAGS

ATTACHMENT 4

MITIGATION OF BLAST AND FRAGMENTATION USING WATER

ATTACHMENT 5

WEAPON SPECIFIC FRAGMENTATION CHARACTERIZATION (DDESB TP 16)

OE SECTOR
Standing Operating Procedure (SOP)

Barricade Operations

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No. 1
February, 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO _____ 05/18/05
(Signature) **(Date)**

1.0 Purpose

The use of the Barricade System (BS), consisting of the Open Front Barricade (OFB), Enclosed and Miniature Open Front Barricade (MOFB), will be selected based on its mitigation capabilities and applicability to the specific munitions response (MR) site. The applicable BS is to be used when non-esential personnel and/or structures are within the established exclusion zone, based on the sites most probable munitions (MPM).

2.0 Scope

All personnel performing operations utilizing the BS shall comply with this SOP, which is not a stand-alone document, and shall become familiar with associated documents and/or manuals related to its use.

3.0 Regulatory References

- CEHNC EP 385-1-95a, Basic Concepts and Considerations for Ordnance and Explosive Operations
- HNC-ED-CS-S-99-1, Open Front and Enclosed Barricades
- HNC-ED-CS-S-98-8, Miniature Open front Barricade

4.0 Responsibilities

4.1 UXO Safety Officer

The UXOSO ensures that all operations involving the BS are being conducted in accordance with the Site Specific Work Plan, and this SOP. The UXOSO will ensure that all personnel using the BS are appropriately trained on the hazards associated with its use and to document the training.

4.2 UXO Tech III (UXO Team Leader)

The UXO Tech III is responsible for the maintenance, proper use and inspection of the BS and will ensure that all team members receive a safety briefing prior to employing the selected BS. He will also ensure that all team members are familiar with this SOP and its requirements when employing the BS.

5.0 Operations

The BS will be used in the following manner:

- The BS will be used to investigate suspect ordnance items in areas where establishment of the minimum safe distance (MSD) is not possible, i.e., near the installation boundary or areas in close proximity to occupied structures, roadways or rail lines.

- The BS will be erected with the suspect UXO a minimum of six inches inside of the open front. The enclosed end of either the MOFB or the OFB will face the area to be protected.

- The plates will be installed one at a time, and slowly lowered into the BS, not dropped, being cautious not to pinch fingers while installing the plates.

- The BS will be completely erected prior to any investigation or excavation of the suspect item. The BS will be transported to and from the site on a trailer or in a pickup truck and moved between excavation sites by Bob-Cat or backhoe when terrain and vegetation permit.

- When transporting the BS by hand, a minimum of four (4) individuals will be used and to minimize weight, the aluminum plates will be removed.

- The mainframe and plates will be inspected prior to each use for damage, cracks, dents, bends, etc.

- The BS will not be used within 200 feet of non-essential personnel or occupied structures.

- Only one person will occupy the BS during excavations and investigations.

WARNINGS:

- The largest munition that the MOFB is designed for is the M-374, 81mm mortar, HE. The largest munitions that both the OFB and Enclosed Barricades are designed for is the M-107, 155mm projectile, HE.
- Care should be used when installing and removing plates, severe injury to fingers can occur if care and proper clearance is not maintained. An overhead hazard may exist when entering and exiting the BS due to head clearance.

6.0 Personnel Protective Equipment

Personnel Protective Equipment (PPE), those handling the BS will consist of leatherwork gloves, steel toed boots and if the plates are being lifted any higher than shoulder height hard hats will be worn. Additional PPE requirements will be in accordance with the Site Specific Work Plan.

OE SECTOR
Standing Operating Procedure (SOP)

Heavy Equipment Operations

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No. 1
February, 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO Timothy S. Mustard, CIH **05/18/05**
(Signature) **(Date)**

1.0 INTRODUCTION

The purpose of this SOP is to provide the minimum procedures and safety and health requirements applicable to the operation of heavy equipment, hereinafter referred to as earth moving machinery (EMM).

2.0 Scope

This standing operating procedure (SOP) contains information specific to the operation of EMM. It will include manuals and publications relevant to operation, lubrication and preventive and scheduled maintenance of the EMM that may be leased, purchased or otherwise employed on the site. It is incumbent upon all designated operators to familiarize themselves with this SOP and to periodically review it an effort to remain current with safe EMM operations.

3.0 REFERENCES

Procedures and information contained in this document were obtained from the below listed references:

- USACE EM 385-1-1, Safety and Health Requirements Manual;
- USACE EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations;
- USACE EP 1110-1-18, Engineering and Design;
- OSHA Regulation 29CFR1926, Subpart P, Appendix A and 29CFR1926.652, Subpart P, Appendix F, Safety and Health Requirements for Construction;
- AR 385-55, Prevention of Motor Vehicle Accidents;
- DA Pam 385-16, System Safety Engineering and Management; and
- Parsons I & T Policies and Procedures for Health and Safety

4.0 EMM Operations

4.1 Team Composition

The minimum team make-up will be:

- One qualified operator, either a UXO Technician or Non-UXO trained individual;
- One ground guide, UXO Technician I or II, (the EMM Safety Observer can fill this role and that of safety Observer if conditions permit); and
- One EMM Safety Observer, UXO Technician III.

4.1.1 Team Leader

An UXO Technician III (Team Leader) will serve as the EMM Team Leader and overall Safety Observer, directing the site personnel and equipment during the operation. Depending on the complexity of the operation, he may also serve as the backup guide. The EMM Team Leader will be trained, as a competent person when required. (See paragraph 6-4, this SOP).

4.1.2 Ground Personnel

Team members working on EMM operations will be qualified through non-the-job training (OJT) and will perform such tasks as magnetometer checks, manual excavation and checks of the excavation for UXO items. When using a UXO Tech I for manual excavation, a UXO Technician III must be present to supervise.

4.1.3 Equipment Operators

All site personnel, regardless of affiliation, who operate EMM equipment, will be qualified through documented formal training, equivalent previous employment experience or OJT. Documentation of this training will be kept on file at the site. The operator, when engaged in EMM operations, will perform daily inspection and maintenance functions (See figure 1), or as directed by the operator's manual for that specific equipment.

4.1.4 Use of Non-UXO Personnel

Use of Non-UXO personnel as operators on UXO sites is authorized. There is no requirement for additional safety barriers or shielding during the operation, IAW USACE EP 385-1-95a. When the operation has come within one foot of the UXO item or anomaly being investigated, unless the operator has been designated essential personnel, the Non-UXO operator must move outside the pre-designated Minimum Safe Distance (MSD), until recalled by the EMM UXO Technician III.

4.2 Equipment Procedures

The hazards associated with heavy equipment involve moving parts and exposure to possible pinch points. Safe operating procedures for each type of equipment or activity must be reviewed and followed. Safety protection, including equipment guards, which must not be removed, shall be provided to mitigate this problem. Site personnel operating or working within close proximity to heavy equipment will wear hard hats, eye protection, steel-toed boots, and hearing protection (as necessary).

Heavy equipment used on the site must meet the requirements of OSHA, DOT, and general industry standards. The operator will be responsible for completing daily written inspections of all heavy equipment and provide copies of the inspection as well as required certifications to the Site Manager (SM). All personnel who operate equipment must use any safety devices, such as seat belts, that the equipment is equipped with during operation. All operators will follow the following heavy equipment operating rules:

- Only personnel trained in the operation of heavy equipment are permitted to operate such equipment;

- Personnel may only operate equipment for which they have received training and certification. Trainees may operate heavy equipment, but only under competent supervision;

- Before operating any heavy equipment, the operator must conduct a pre-operational check of the piece of equipment. Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked daily and maintained in good working order throughout the duration of its use. If it is found to be unsafe, the operator must report the condition immediately to the appropriate supervisor, and the piece of equipment placed in an unserviceable status until it has been repaired or replaced.

- The operators of heavy equipment will complete a daily inspection form (See Figure 1).

- All heavy equipment will not be backed up unless the vehicle has a reverse signal alarm audible above the surrounding noise level, backup warning lights, or the vehicle is backed up using a ground guide.

- Heavy equipment will be provided with necessary safety equipment including seat belts, roll-over protection, emergency shut-off during roll-over, backup warning lights, and audible alarms as applicable.

- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment.

- Special consideration must be given to the proper functioning of tires, horns, lights, batteries, controllers, lift systems (including forks, chains, cable and limit switches), brakes, and steering mechanisms;

- All heavy equipment must be operated at an authorized safe speed, consistent with conditions, and at a safe distance from other vehicles. Heavy equipment must be under positive control at all times;

- No riders other than the driver are permitted on heavy equipment at any point;

- When heavy equipment is left unattended, loads must be lowered, controls neutralized, power shut off, and brakes set. Wheels should be chocked if the equipment is parked on an incline.

- Backhoe support struts (downriggers) shall be equipped with cleated pads for use in soft sandy soil rather than rubber pads (for hard surfaces).

- When working near a backhoe or excavator, field personnel will maintain sight contact with the operator. Field personnel shall not work within the swing radius of the equipment while the equipment is operating. The swing radius will be defined with traffic cones, barrier tape, or other suitable means, such as inscribing the radius on the soil surface using the backhoe bucket.

- Personnel will not cross the demarcated line without first establishing eye contact with the operator. The operator will cease vehicle operations and remove his hands and feet from the controls and/or turn the equipment off, before allowing personnel access to the area within the swing radius. Operations will resume only after all personnel have left the area within the swing radius.

5.0 Personnel Protective Equipment (PPE)

Modified Level D PPE will be required for personnel engaged in EMM operations. Clothing items will be:

- Coveralls or work clothing as prescribed by APP;
- Work gloves, leather or canvas, as prescribed by APP;
- Safety glasses - as wind conditions and airborne particulate matter dictates;
- Hardhats;
- Highly Visible Safety Vests;
- Work Boots, steel toe - Sturdy and of sufficient height to aid in ankle support;
- Hearing Protection - Will be determined through a Noise Survey (Sound Level Meter) for any EMM equipment brought on site. Until the survey is completed and the degree of attenuation determined, personnel on the EMM team will wear appropriate hearing protection; and
- Dust Masks - as wind conditions and airborne particulate matter dictates.

NOTE: *If the EMM equipment is being used for the clearance in support of other operations, PPE will be IAW that specific matrix (i.e. rat nests - Hanta Virus SOP or CWM projects).*

6.0 General Safety Precautions

6.1.1 Underground Utilities

Utilities companies shall be contacted within established or customary local response times advised of the proposed work and asked to locate underground utilities (sewer, telephone, electric, water, gas or any other utility) prior to start of actual excavation. When these locations cannot be established, the excavation may proceed, provided the EMM operation does so with caution, and only after site personnel, using detection equipment, have made an attempt to locate utilities. While the excavation is opened, and underground utilities exposed, they shall be protected, supported or removed as necessary to safeguard workers.

6.1.2 Exposure to Vehicle Traffic

EMM team members exposed to vehicular traffic shall be provided and wear warning vests or other suitable garment with a highly visible (reflector) material. Traffic direction paddles or saw horse type barricades may also be required to halt or redirect vehicular traffic around the excavation site.

6.1.3 Exposure to Falling Loads

No worker shall be permitted underneath loads handled by lifting or digging equipment. Workers are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling material.

6.1.4 Equipment Warning Device

All EMM equipment will be equipped with an audile warning system that sounds when the equipment is backing up. EMM equipment needing to be moved adjacent to an excavation or approach the edge, and the operator does not have a clear and direct view of the edge, will institute a warning system, such as barricades, stop logs or arm and hand signals from the safety observer.

6.1.5 Loose Rock or Soil

Workers will be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. All equipment or materials will be placed at least 2 feet (.61m) from the edge of excavations, or by use of retaining devices that are sufficient to prevent the equipment or material from falling or rolling into the excavation. Also scaling the excavation face to remove loose rock or soil and the installation of protective barriers at intervals on the face to stop or contain falling material will be used when appropriate.

6.1.6 Cave-In

Excavations will be protected from cave-ins by adequate protective systems (sloping and benching or shielding and support).

6.1.7 Operation of EMM

EMM will not be operated without a spotter. This includes moving, repositioning, and using the front and rear attachments. Prior to starting an excavation, a safety arc will be etched in the ground with the front or rear boom, fully extended. If operating on a hard surface, the safety arc will be marked on the ground, with bright spray paint. Prior to anyone entering the safety arc, the operator will:

- Swing the boom fully to one side;
- Lower the bucket to the ground;
- Place engine in idle speed; and
- Hold his hands clear of the controls or in the “Hands Up” position.

6.2 UXO Precautions

All EMM operations will adhere to the MSD as described in the site Work Plan. The lateral distances will be maintained when conducting EMM operations on a UXO site. These distances may be reduced or extended by the USACE Site Safety Representative, based on an assessment of site history, size of site, expected UXO, terrain features or other such factors that may apply. The following distances shall apply as applicable:

- 200 feet minimum or the K-50 factor distance (whichever is greater) from non-UXO trained site personnel, unrelated to the operation.

- 200 feet minimum or the K-50 factor distance (whichever is greater) from another EMM operation or other manual intrusive operations.

- All EMM excavations will be conducted offset laterally for the suspected UXO item or anomaly being investigated.

- The EMM will uncover no more than six (6) inches of earth per dig.

- The EMM will not be used to excavate closer than 12 inches from UXO.

- Suspend all operations immediately upon approach of an electrical storm.

- Observe the hazards of electromagnetic radiation (EMR) precautions when working in the vicinity of electrically initiated or susceptible UXO.

- Do not handle any MEC unnecessarily.

- Incorporate appropriate property protective measures for shock and fragmentation when conducting MEC operations.

6.3 Equipment Safety Precautions

All EMM operators will conduct familiarization and OJT with the EMM equipment prior to any excavation operation. All EMM equipment on site will have:

- Roll-Over Protection (ROP) and certificate on file at site.

- Back-up Warning System.

- 5A:BC fire extinguisher.

- Site Radio.

- Operator's Manual and Lubrication Order.

6.4 Training

6.4.1 Competent Person

The EMM Team Leader will serve, as the "Competent Person", for all EMM operations. The Project Health and Safety Officer (PHSO) or the OE Group Certified Industrial Hygienist (CIH) will conduct this training, during the site specific training. This training will be documented and kept on file at the site. Minimum elements of training will include:

- Review of OSHA Regulation for Safety and Health Requirement for Construction/Excavations – *OSHA Regulation 29CFR1926, Subpart P, Appendix A and 29CFR1926.652, Subpart P, Appendix F*, (Annex A of this SOP)

- Proper Shoring and Sloping Techniques
- Soil classification and evaluation at the excavation site.
- Responsibilities of a Competent Person.

Heavy Equipment Inspection Report

Date:	**Vehicle Make:**	**Rental/Lease/Private** *(circle one)*
Lic Plate #:	**Veh VIN#:**	
Starting Mileage/Hours for Week:	**Ending Mileage/Hours for Week:**	
General Vehicle Inspection		

Check { } with R for repair needed; X for OK; / for adjustment made

1. Windshield { }	**3. Vehicle Interior { }**
2. Vehicle Exterior { }	**4. Leaks { }**
5. Lights: a. Headlights { } d. Brake Lights { } b. Tail lights { } e. Back-up Alarm { } c. Turn Signals { }	
6. Brakes { }	**10. Belts { }**
7. Horn { }	**11. Defroster { }**
8. Tires/Tracks (Tread wear/pressure) { }	**12.Radiator/Hoses** (DON'T check when hot) { }
9. Windshield Wipers/Washer { }	**13. Battery { }**
14. Fluid Levels: (Circle approximate level) a. Oil Full 1qt low Added_____ b. Coolant: Full Need coolant Added_____ c. Transmission: Full 1pt low Added_____ d. Fuel: Full ½ ¼ Empty	e. Hydraulic Fluid Full 1qt low Added_____ f. Grease Fittings Full Added_____ g. ROPS Certificate Yes No
Comments/Repairs/Service(s) Needed: Next Service @_____hrs	

Figure 1

Annex A

Soil Classification for EMM Operations

1.0 Soil Types

The following soil types may be encountered in the course of excavating soil. A knowledge of soil characteristics of the soil types is beneficial to understanding the hazards associated with each.

- **Cemented Soil** – A soil in which a chemical agent, such as calcium carbonate, holds the particles together whereas a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

- **Cohesive Soil** – A fine grained soil (clay) or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side-slopes and is "plastic" when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

- **Dry Soil** – A soil that does not exhibit visible signs of moisture content.

- **Fissured Soil** – A soil material that has a tendency to break along definite planes of fracture with little resistance or a material that exhibits open cracks, such as "tension cracks", in an exposed surface.

- **Granular Soil** – Means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

- **Layered System** – Means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

- **Moist Soil** – Means a condition in which a soil looks and feels damp. Moist cohesive soils can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

- **Plastic Soil** – means a property of a soil, which allows the soil to be deformed or molded without cracking, or appreciable volume change.

- **Saturated Soil** – Means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a penetrometer or sheer vane.

2.0 Soil classification

If personnel are to enter the excavation, the soils of the excavation must be classified to determine the design of the appropriate protective system. Each soil and rock deposit at an excavation site must be classified by a competent person, as either stable rock, Type A, Type B, or Type C soil.

The soil classification results must be made based on the results of at least one visual test (tension cracks or signs that the soil has been previously disturbed) and one manual test (use of pocket penetrometer or shear-vane to measure unconfined compression strength). The definitions of the various soil classifications are presented below.

- **Stable Rock** is natural solid mineral matter that can be excavated with vertical sides and will remain intact while exposed.
- **Type A Soils** are cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of Type A cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. A soil cannot be classified as Type A if it is fissured; subject to vibration from traffic, pile driving, or similar effects; has previously been disturbed, is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater; or has seeping water.
- **Type B Soils** are cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of other Type B soils are: angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than 4H:1V (only if the material would be classified as a Type B soil).
- **Type C Soils** are cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less. Other Type C soils include: granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H:1V) or greater.

Table 1-1
Maximum Allowable Slopes

Soil or Rock Type	**Maximum Allowable Slopes (H:V) for Excavations less than 20 feet in depth**
Stable Rock	Vertical (90 deg.)
Type A	¾:1 (53 deg)
Type B	1:1 (45 deg)
Type C	1 ½:1 (34 deg)

Exception: Simple slope excavations, which are open 24 hours, or less (short term) and 12 feet or less in depth shall have a maximum allowable slope of ½:1.

Annex B

Refresher Examination for EMM Operations

EMM EQUIPMENT REFRESHER EXAM

LOCATION_____

NAME_____DATE_____

ORGANIZATION_____

Circle the correct answer or fill in the blank

1. When performing preventive/pre-operational maintenance on EMM equipment, with out a lubrication chart, where should you look for grease fittings?

a. Behind the wheels.
b. At every pivot point.
c. On the bucket teeth.
d. At a local service station.

2. Before starting to excavate what should you check for?

a. Underground utilities.
b. Overhead utilities.
c. Endangered wildlife habitats and vegetation, as outlined in the Work Plan.
d. All the above.

3. ROPS stands for?

a. Read Operational Standards.
b. Round Off Posts Stops.
c. Roll Over Protection System.
d. Roll Or Push Slowly.

4. According to Corps Safety Concepts how close can you excavate to UXO?

a. 6”.
b. 1’.
c. 1 ½’.
d. 2’.

5. What simple safety rule must be followed to make ROPS effective?

a. Wear gloves.
b. Wear hardhat.
c. Wear seatbelt.
d. Wear pantyhose.

6. The type soil most likely to collapse?

a. A.
b. B.
c. C.
d. D.

7. If the excavation is below 5' deep what precaution must be taken before a man can enter the hole?

a. Get a ladder.
b. Get a harness.
c. Get a tape measure.
d. Sloping or engineer approved shoring.

8. In type "C" soil what is the minimum slope required? (Slope to depth)

a. 1:1
b. 1 ½:1
c. 2:1
d. 3:1

9. What should you as an operator do to protect ground personnel?

a. Mark the maximum arc of the bucket.
b. Remove hands and feet from controls before allowing entry into the arc.
c. Have "eye contact" between operator and assistant.
d. Signal the assistant that it is okay to enter the arc.
e. All of the above.

10. According to the COE Safety Concepts what is the minimum safe separation distance that multiple backhoes can operate from each other?

a. 100'.
b. 200'.
c. Same as intrusive team separation.
d. Both b and c are correct.

11. When the backhoe is delivered who is responsible for loading and unloading.

a. Owner.
b. Renter.
c. Government
d. Home Depot

12. Before accepting delivery you should.

a. Check fluids.
b. Operate all controls then check for leaks.
c. Check all safety equipment.
d. Check for proper routing of hoses.
e. All the above.

13. How many people can ride on the backhoe?

_____.

14. How many people can you lift in the front bucket for tree trimming?

_____.

15. What is the minimum distance you can pile your spoil from the edge of the excavation?

a. 1’
b. 2’
c. 3’

d. 4’

OE SECTOR
Standing Operating Procedure (SOP)

MEC Reconnaissance Operations

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No.1
February 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO _____ 05/18/08
(Signature) **(Date)**

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of Munitions and Explosives of Concern (MEC) Reconnaissance (MECR) operations on sites contaminated with unexploded ordnance (UXO).

2.0 SCOPE

This SOP applies to all site personnel involved in MECR operations regardless of affiliation. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

3.0 REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of MECR operations:

- Parsons Corporate Safety and Health Program;
- 29 CFR 1910, OSHA General Industry Standards;
- EP 385-1-95a, CEHNC Basic Safety Concepts and Considerations for OE Operations;
- EM 1110-1-4009, Ordnance and Explosive Response;
- EM 385-1-1, USACE, Safety and Health Requirements Manual; and
- AR 385-10, Army Safety Program

4.0 RESPONSIBILITIES

4.1 UXO Safety Officer

The Parsons UXOSO will implement all safety requirements. He is responsible for safe conduct of operations within all exclusion areas/site work areas and has the authority to halt field operations if a situation warrants it. He provides UXO escort services for all non-UXO personnel and monitors all investigative activity and provides specialist support for identification of MEC.

4.2 UXO Technician III

UXO Technician III supervises the conduct of all onsite activities directly related to MEC operations. He supervises other UXO Technicians in the identification of MEC, including but not limited to fuzes and determining fuze condition. He oversees the operation and maintenance of military and civilian magnetometers and prepares required MECR administrative reports.

4.3 UXO Technician II

UXO Technician II assists in the conduct of all onsite activities related to MEC operations. He is required to identify MEC items, including fuzes and determine fuze condition. He will operate and maintain military and civilian magnetometers, operate navigational/locating equipment and collect required data.

4.4 Other Team Member(s)

UXO Sweep personnel. Sweep personnel assist UXO technicians in the MECR operations only under direct supervision of a qualified UXO technician II or above. This position requires site and job specific training (which will include ordnance recognition, safety precautions, donning and doffing personnel protective equipment, etc.), but does not require UXO technician qualifications. Sweep personnel will conduct visual and/or instrument assisted UXO search activities and perform field maintenance on both military and civilian magnetometers. UXO Sweep personnel are not involved in the excavation of anomalies and are forbidden from handling MEC.

5.0 OPERATIONAL PROCEDURES

5.1 General

All reconnaissance activities involving assessment of possible MEC will be conducted in accordance with the requirements of the U.S. Army Engineering and Support Center, Huntsville, *EP 385-1-95a and EM 1110-1-4009.* Plans shall be based upon the minimum number of personnel, exposed for the minimum amount of time, to the minimum amount of UXO consistent with efficient operations and maximum safety.

5.2 Procedures

To ensure safety of all field personnel, a UXO Technician III will provide a surface sweep and subsurface evaluation using a magnetometer, to provide a cleared route into and out of each area. The UXO Technician(s) will utilize one of the listed pieces of equipment to screen the walking path and sampling locations for surface and shallow buried UXO. Both pieces of equipment are handheld units and are highly sensitive to surface and shallow burial locations of likely UXO.

5.2.1 Types of MECR operations:

5.2.1.1 Type A (Static) Reconnaissance

The site has been surveyed, staked and vegetation removed. Search areas, grids, are laid out in accordance with the site Work Plan (normally 100’ x 100’). The MECR crew starts at the Southwest corner, traveling in an easterly direction, alternating sweep paths from North to South, until the crew has completed the grid at the Southeast corner; while sweeping a 5-foot surface path, with selected magnetometer equipment, and recording all data, as described in the Work Plan.

5.2.1.2 Type B (Meandering Path) Reconnaissance

The site may not have been surveyed, staked or vegetation removed. Search areas, grids, are selected from information collected on previous site visits or from GIS mapping, in accordance with the site Work Plan. The MECR crew will begin sweeping a 5-foot surface path, with selected magnetometer equipment; centered on the southern end of the transect or line; and traveling in a northerly direction, or as described in site specific Work Plan, until the transect or line is completed. Crewmembers must always be in sight of other team members, depending on the vegetation and the predicted past use of the area. Data must be recorded, as described in the Work Plan.

TABLE 5-1 Location Equipment

Equipment Type	Equipment Performance
Schonstedt® GA-52/CX Gradiometers ®	A flux-gate magnetic gradiometers, which detect materials, with ferrous iron content. The GA-52CX uses an audible tone to indicate the intensity of the magnetic signal. The GA-52CX does not digitally record geophysical or global positioning data and are thus called "analog" geophysical instruments. The GA-52CX magnetometers will be used to perform "mag and flag" type surveys in areas that cannot be surveyed using the digital techniques. They will also be used to assist in anomaly reacquisition and analog quality control surveys**.**
Foerster Minex 2FD	A frequency domain electromagnetic analog instrument used for "mag and flag" or "mag and dig" type surveys. The detector utilizes two different operating frequencies simultaneously and is microprocessor controlled in operation for ground exclusion balance, sensitivity adjustment, detection and false alarm signals

Note: Separation distance of 75 feet will be maintained between detection equipment, approaching vehicles and any equipment, which interferes with the instrument

5.2.2 Magnetometer Calibration Point

The MECR team will select an area within the work site that is relatively free of ferrous interference, the placement of a calibration point. Actual size (length and width) of the point will be as long and as wide as necessary to place the calibration anomalies in the ground and not interfere with each other. Those sites that have geophysical prove outs constructed can be used as the magnetometer calibration point.

The calibration anomalies are selected from the Most Probable Munitions (MPM) listing. Inert MEC items, which have been verified, or non-MEC items, of similar size and mass, will be used. The items are buried as stated in the SOW or in a manner illustrated below. The type of ordnance buried is solely dependent upon the MPM and other known ordnance at site.

5.3 Personnel Qualifications:

- Magnetometer operators will be familiar with the operation of the detection equipment.
- UXO personnel are certified by CEHNC-Huntsville
- All Site personnel are OSHA qualified, both 40-hr and current 8-hr Refresher, IAW 29 CFR 1910.120
- All Site personnel operating a vehicle maintain a current state driver's license.

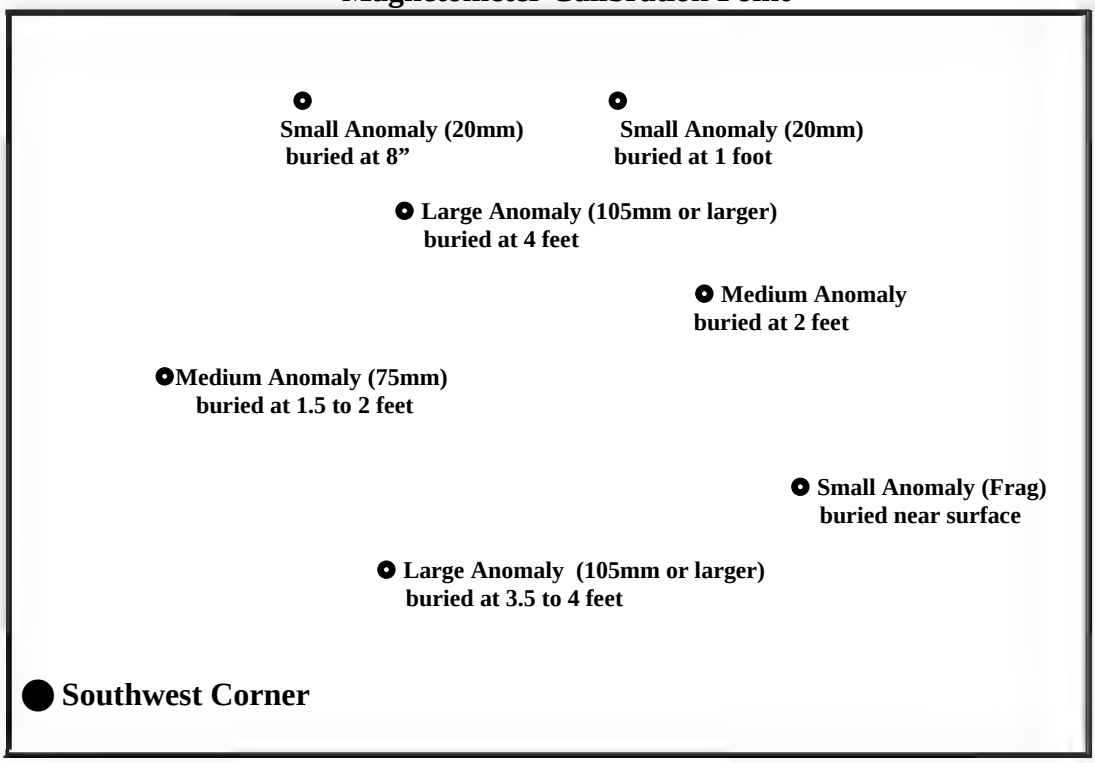
5.4 Calibration of Equipment

5.4.1 Magnetometers: The selected equipment will be calibrated and maintained either daily or IAW manufacturer's suggestion, at the calibration point. The operator will sign the Calibration Log after each calibration. (See Figure 1)

5.4.2 Global Position Systems (GPS): The selected equipment will be calibrated and maintained either daily or IAW manufacturer's suggestion, as described in the Work Plan.

5.4.3 Data Collection System: The selected equipment will be calibrated and maintained either daily or IAW manufacturer's suggestion, as described in the Work Plan.

Table 5-2
Magnetometer Calibration Point



Note: Not to scale. This is an example only

5.5 Site Control

All personnel on-site will follow the guidelines of this SOP.

- Work zones and access points: Site access control will be implemented by the UXOSO and will be accomplished through a program that limits movement and activities of personnel and equipment at the project site.
- Site map delineating work zones: A site map will be used by the UXOSO during the Daily Operational Briefings to inform the workers of the location of hazardous areas on the site, the assembly areas to be used in the event of a site evacuation, and any other information relevant to the day's activities.
- Site security (physical and procedural) description:
- It is anticipated that the site team will be the only personnel on the site.

5.6 Communications

On-site communications will be achieved orally with a contingency for hand signals, and off-site communications will be by cellular phone. All activities will cease, in the event that a field member cannot be accounted for.

6.0 SAFETY PROCEDURES

6.1 General

Using common sense and following safe practices can reduce hazards due to normal site activities. Personnel should keep the guidelines listed below in mind when conducting field activities.

1. Horseplay or fighting is prohibited.
2. Eating, drinking, smoking, chewing gum, tobacco or any other hand-to-face activities are prohibited on the site except in designated areas after face and hands have been washed.
3. When required to sit or kneel on the ground, avoid contaminated surfaces.
4. Placing equipment on contaminated surfaces should be avoided.
5. Climbing on or over obstacles is prohibited. Stacks of materials can be unstable and could cause injury.
6. Open flames of any type are prohibited on site, except in designated areas.
7. Only authorized employees may enter the work site. Visitors must check in with the UXOSO, receive an appropriate safety briefing, and must be escorted by UXO/qualified personnel at all times while on the site.
8. Hazard assessment is a continuous process. Personnel must be aware of their surroundings and constantly be aware of the UXO, chemical and physical hazards that are or may be present.
9. Team members will be familiar with the physical characteristics of each site including wind direction, site access, and the location of communication devices and safety/emergency equipment.
10. Detection or appearance of unusual liquids, odors or discolored soil could indicate the presence of contaminants and should be reported to the UXOSO immediately.
11. Non-UXO qualified personnel will receive site-specific UXO recognition training before participation in site activities.
12. Non-UXO qualified personnel will not touch or disturb any object which could potentially be MEC related, and will immediately notify the nearest UXO qualified person of the presence of the object.
13. Non-UXO qualified personnel will be escorted on site by UXO qualified personnel at all times, until the area is cleared.

6.2 MEC Related Hazards

During all aspects of the MECR operation, site personnel may encounter potential MEC hazards, which are discussed in detail in the Accident Prevention Plan (APP) for the specific project and EP 385-1-95a

.

6.3 Biological Hazards

During all aspects of the operation, site personnel may encounter potential biological hazards, which are discussed in detail in the APP.

6.4 Physical Hazards

During all aspects of the operation, site personnel may encounter potential physical hazards, which are discussed detail in the APP.

6.6 Emergency Procedures

A minimum of two (2) personnel who are trained in First Aid and CPR will be onsite at all times that fieldwork is being performed. If an emergency develops on site, the procedures delineated herein and the APP are followed. Emergency conditions exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure;
- A condition occurs that is more hazardous than anticipated; and/or
- Fires, explosions, structural collapses/failures, and/or unusual weather conditions (thunderstorms, lightning, high winds, etc.) occur.

7.0 PERSONNEL PROTECTIVE EQUIPMENT

7.1 General

Personnel working in close proximity to the established work zones will be required to wear OSHA Level D protection. Level D should be worn only if the activity in which personnel are engaged does not have the potential for splash, immersion or any other contact with hazardous substances. This will consist of at a minimum:

- Work clothes or coveralls (cotton).
- Leather Work gloves.
- Work boots (non-metallic safety toe if foot hazards exists).
- Safety glasses.
- Snake Chaps (if necessary).
- Two-way radio.

Personnel working away from active field investigations will not be required to wear safety glasses or safety boots.

8.0 REPORTS AND LOGS

Site personnel assigned specific tasks will complete required reports and logs, as described in the Work Plan.

Do you have any recommendations or procedures to reduce the incidence of back and shoulder injuries associated with MEC reconnaissance?

OE SECTOR
Standing Operating Procedure (SOP)

Vehicle Operations

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No. 1
February, 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO Timothy J. Mustard, CIH 05/18/05
(Signature) **(Date)**

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the operations involving the use of on and off-road motor vehicles.

2.0 SCOPE

This SOP applies to all site personnel, to include contractor and subcontractor personnel, involved in the conduct of operations involving motor vehicles. This SOP is not intended to contain all requirements to ensure regulatory compliance. Consult documents listed in Section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements directly apply to vehicle operations. References used in preparation of the document are listed below:

- Applicable sections of OSHA Construction Industry Standard 29 CFR, Part 1926.601;
- Applicable sections of Department of Transportation 49 CFR, Parts 100-199; and 571
- USCAE Engineer Manual (EM) 385-1-1, Section 18.
-

4.0 RESPONSIBILITIES

4.1 Project Manager

The Project Manager (PM) will be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into plans, procedures, and training for sites where vehicular equipment is to be used.

4.2 Site Manager

The Site Manager (SM) will ensure that this SOP is implemented for motor vehicle operations. The SM will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings, and that information related to its daily implementation is documented in the Site Operations Log.

4.3 UXO Safety Officer

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety hazards and mitigation techniques associated with this SOP are discussed during the initial Site Specific Safety Training. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial, and continued, compliance with this SOP and

other regulatory guidelines. The UXOSO will also compile a monthly total of mileage or hours of usage of all site vehicles, post those totals predominately in the Site Field Office and report them to the Parsons OE Sector Administrative Assistant (See Figure 1).

4.4 Vehicle Operators

All personnel operating a vehicular piece of equipment will posses a valid drivers license, proof of proficiency on the item in question, i.e., certificate of training, and strictly adhere to the procedures stipulated in this SOP.

5.0 PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in motor vehicle operations shall be familiar with the potential safety hazards associated with the operation of vehicular equipment, and with the work practices and mitigation techniques to be used to reduce or eliminate these hazards.

5.1 General Requirements

Motor Vehicle shall mean any vehicle propelled by a self-contained power unit, or equipment designed for use on paved roads. **All-purpose utility vehicle (APUV)** shall mean any four-wheeled or greater, vehicle propelled by a self-contained power unit, designed for off-road use, such as a Gator, or MULE. From this point forward the term vehicle shall constitute both motor vehicle and APU vehicles unless otherwise stated.. Every individual operating a vehicle shall possess a permit (as required by state or federal law) valid for the equipment being operated. No vehicle shall be placed in service until it has been inspected and found to be in a safe operating condition (See Figure 2).

All vehicles shall be inspected and maintained IAW the manufactures recommendations and this SOP. Vehicles being used shall be checked at the beginning of each day to ensure that all parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The parts, equipment, and accessories of concern include service brakes, including trailer brake connections; parking system (hand brake); emergency-stopping system (brakes); tires; horn; steering mechanism; coupling devices; seat belts and lap-shoulder restraints; operating controls; and safety devices. These requirements also apply to equipment such as lights, reflectors; windshield wipers, defrosters, fire extinguishers and first aid kits, where such equipment is requjired. Vehicles not meeting safe operating conditions shall be removed from service, repaired or replaced, and re-inspected prior to being placed back in service.

All vehicles operated between sunset and sunrise shall have the following:

- Two headlights, one on each side;
- Directional signal lights, both front rear;
- Rear Brake Lights, one on each side, and
- Rear Back-up Lights, one on each side

All vehicles, except APUV's, trailers or semi-trailers, having a gross weight of 5,000 pounds or less, shall be equipped with service brakes and manually-operated parking brakes. Service and parking brakes shall be adequate to control the movement of, to stop, and to hold the vehicle under all conditions of service. Service brakes on trailers and semi-trailers shall be controlled from the driver's seat of the prime mover.

Braking systems on every vehicle shall be designed as to be in approximate synchronization on all wheels and develop the required braking effort on the rearmost wheels first, unless the vehicle is equipped with an "Anti-lock Braking System" (ABS). The design shall also provide for application of the brakes by the driver of the prime mover. Exceptions to this are vehicles in tow by an approved tow bar hitch.

Every motor vehicle shall be equipped with the following:

- A working speedometer
- A fuel gauge
- An audible warning device (horn)
- A windshield equipped with an adequate powered windshield wiper
- An operable defrosting and defogging system
- Adequate rear view mirror, or mirrors
- Cabs, cab shields, and other protection to protect the driver from hazards of falling or shifting materials/loads
- Non-slip surfaces on steps
- Safety glass in windshields, windows, and doors
- No cracked or broken glass
- All towing devices that are structurally adequate for the weight drawn, and properly mounted
- A power-operated starting device
- One fire extinguisher, rated at 5 BC units (project provided)
- One First Aid Kit and other appropriate first aid equipment (project provided)

All trailers will be equipped as follows:

- A locking device, or double safety system, shall be provided on every fifth wheel mechanism and tow bar arrangement, which will prevent the accidental separation of towed and towing vehicles;
- Every trailer shall be coupled with safety chains or cables to the towing vehicle. Such chain or cable shall prevent the separation of the vehicles in the event of failure of the tow bar;
- While unhooked from the towing vehicle, all trailers shall be equipped with the approved and adequate wheel chocks to prevent roll-back; and
- A manufacturer's attached support leg system at or near the tongue of the trailer to prevent trailer collapse. In event the trailer is not equipped with a support leg system; the use of intact "cinder blocks" may be used. **Note:** Once the "cinder blocks" are observed with cracks or become broken, they will be replaced and not used again as a support leg.

All buses, trucks, and combination of vehicles with a carrying capacity of 12 tons or greater, when operated on public highways, shall be equipped with emergency equipment required by state laws but not less than those listed below:

- One red flag, not less than 12 inches square, and 3 reflective markers, which shall be available for immediate use, in case of emergency stops;
- Two approved wheel chocks for each vehicle, or each unit of a combination of vehicles;
- One fire extinguisher rated at 20 BC units or two 10 BC rated units, being required for flammable cargoes, including explosives and Munitions and Explosives of Concern (MEC);
- Vehicle exhaust control, so as to present no hazard to the operator, passengers, or other personnel; and
- All rubber-tired motor vehicles should be equipped with fenders. However mud flaps may be used in lieu of fenders, whenever motor vehicle equipment is not designed for fenders.

5.2 Safe Operating Rules

No vehicle shall be driven at a speed greater than the posted speed limit, with due regard for weather, traffic, intersections, width, and character of the roadway, type of vehicle, and any other existing conditions. The operator must, at all times, and under all conditions, have the vehicle under such control as to be able to bring it to a complete stop within the clear distance ahead. To accomplish this, the operator shall follow the safe operating rules presented below:

- No vehicle shall be driven on a downgrade with gears in neutral or with clutch disengaged;
- Every vehicle, upon approaching an unguarded railroad crossing or drawbridge, shall sloe down to a speed as to permit stopping before reaching the nearest track or the edge of the bridge, and shall proceed only if the course is clear;
- No vehicle shall be stopped, parked, or left standing on any road, or adjacent thereto, or in any area in such a manner, as to endanger the vehicle, other vehicles, equipment, or personnel using or passing that area;
- No vehicle shall be left unattended until the motor has been shut off, the key removed (unless the WP directs otherwise), the parking brake set, and the gear engaged in park (automatic) or placed in neutral (manual);
- If stopped on a hill or grade, front wheels shall be turned or hooked into the curb or the wheels securely chocked;
- Personnel shall not be permitted to get between a towed and towing vehicle, until the towing vehicle has been placed in park, parking brake set, and engine turned off;
- When backing or maneuvering buses, trucks, or truck/trailer combination not equipped with an audible backing warning device, the operator will use a ground guide. All other vehicle types, when backing or maneuvering, will check the area and sound their horn;
- Operators of vehicles transporting personnel, explosives, or flammable or toxic substances shall stop at railroad crossings or drawbridges, and shall not proceed

until the route is determined to be clear. A stop shall be required at a crossing within a business or residential district that is protected by a watch person, traffic officer, or by a traffic signal giving positive indication to approaching vehicles;
- When a bus, truck, or truck/trailer combination is disabled or parked on the traveled portion of a highway or the shoulder adjacent thereto, red flags shall be displayed during the daytime and reflector, flares, or electric lights at night (An exception may be made in residential or business sections or municipalities);
- The principles of defensive driving shall be practiced at all times;
- Seat belts and lap-shoulder restraints will be installed and worn IAW 49 CFR 571 (DOT);
- If the windshield wipers are in use due to rain, headlights will be activated; and
- During high winds, extreme care is required when opening vehicle doors, hoods and hatches. High winds can rip vehicle doors and rear hatches from a persons grasp causing damage and injury. Site personnel should select an area or park the vehicle in such a manner that provides a windbreak. Vehicles should not be left with doors, hoods or hatches open.

5.3 Transportation of Personnel

The number of passengers in passenger-type vehicles shall not exceed the number of seats with approved seat belts. Trucks used to transport personnel shall be equipped with a seating arrangement that is securely anchored, a rear gate, a guardrail, and steps or ladders for mounting and dismounting. The beds of trucks which are not equipped with the appropriate safety devices, as described in this paragraph, will not be used to transport personnel unless absolutely necessary, and never on a public highway, unless it is an emergency. Additional personnel transportation requirements are listed below:

- All tools and equipment shall be guarded, stowed, and secured when transported with personnel;
- No person will be permitted to ride with arms or legs outside of the truck's body, in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck, or on the cargo load;
- All motor vehicles transporting personnel during cold or inclement weather shall be enclosed;
- No explosives, flammable materials (except normal fuel supply), or toxic substances shall be transported in the cabs of any vehicle or beds of vehicles being used to transport personnel;
- No vehicle transporting personnel shall be moved until the driver has ascertained that all individuals are seated, belted, the guardrail and rear gate are in place, and doors are closed; and
- Getting on or off any vehicle while in motion is prohibited.

5.4 Fueling

All vehicles shall be shut off during fueling operations, operators and passengers will refrain from using cellular telephones, and no smoking or open flames will be permitted within 50 feet of fueling operations. Care should be taken not to spill fuel, and only that fuel recommended by the vehicle manufacturer shall be used. When fueling from a portable fuel tank system, the vehicle and portable tank will be bonded to each other (Example of this – using

"jumper" cables to connect the tank and vehicle). During fueling, when there is a potential for fuel contact with the skin, especially during cold weather, personnel will wear protective gloves, as specified in the SSHP.

5.5 Loading

Drivers of trucks and similar vehicles shall leave the cab, if the cab of the vehicle being loaded is exposed to danger from suspended or overhead loading operations, unless the cab is adequately protected. No motor vehicle shall be loaded so as to obscure the driver's view ahead or to either side, or to interfere with the safe operation of such vehicle. All vehicles carrying loads which project more than 4 feet beyond the rear of the vehicle shall carry a red light at or near the end of the projection at night, or when atmospheric conditions restrict visibility. During daylight periods, or other non-restricted conditions, a red flag not less than 12 inches square shall be used. The load shall be distributed, checked, tied down, or secured.

5.6 All-Terrain Vehicles

During the operation of all-purpose utility vehicles (APUV's), every operator shall possess a valid state driver's license and have completed, as a minimum, an approved on-site APUV training course prior to operation of the vehicle. See USACE EM 385-1-1, Section 18D for additional information. The operation of APUV's shall be conducted according to the procedures listed below:

- The manufacturer's recommended payload shall not be exceeded at any time;
- Gloves and an approved motorcycle helmet with face shield or goggles shall be worn at all times while operating an APUV;
- APUV's are to be used on off-road terrain and gravel and dirt roads, never on a public road;
- APUV's shall be driven during daylight hours only;
- Only four-wheel, or greater, APUV's shall be used;
- Passengers are prohibited on APUV's, unless they are designed to acommadate additional passengers, i.e., additional seats, and any passenger shall be required to wear a motorcycle helmet with fact shield or goggles; and
- All APUV's shall be equipped with warning signal devices and a horn.

5.7 Maintenance

All vehicles will be maintained IAW the manufacturer's requirements and guidelines. All vehicles will be inspected prior to operation and on a weekly basis for safety and basic operational equipment for deficiencies and parts needing repair. These will be brought to the attention of both the operator's supervisor and the UXOSO. Vehicles requiring repair or manufacturers required maintenance (except of oil changes, lubrication or tire rotation) will be repaired and dead-lined until the repairs are made.

All vehicles will be cleaned weekly and trash will be removed on a daily basis from inside the cab and truck bed. Excessive trash inside the operator's or passenger's compartment is unsafe and a health hazard for others. Excessive build up of mud inside the motor vehicle's wheel wells preclude the operator to observe any vehicle deficiencies and cause unsafe vehicle operations. All motor vehicles at Parsons sites will display a clean and up-kept appearance at all times, regardless of the site's operation, unless otherwise directed by local water restrictions.

5.8 Log Books and Operating Manuals

All motor vehicles will have their Operating Manuals and Log Books, for those vehicles, with the vehicle at all times. The log book will be up-to-date and complete.

ATTACHMENTS

- Figure 1 – Parsons Form D0038.xls (Monthly Mileage Report)
- Figure 2 – Parsons Form (Weekly Vehicle Inspection)
- Figure 3 – Parsons Activity Hazard Analysis (All-Terrain Vehicles)

Weekly Vehicle Inspection Report

Date:	**Vehicle Make:**	**Rental/Lease/Private** *(circle one)*
Lic Plate #:	**Veh VIN#:**	
Starting Mileage for Week:	**Ending Mileage for Week:**	
General Vehicle Inspection		

Check { } with R for repair needed; X for OK; / for adjustment made

1. Windshield { }	**3. Vehicle Interior { }**
2. Vehicle Exterior { }	**4. Leaks { }**

5. Lights:

a. Headlights	**{ }**	d. Brake Lights	**{ }**
b. Tail lights	**{ }**	e. Back-up Lights	**{ }**
c. Turn Signals	**{ }**	f. Interior Lights	**{ }**

6. Brakes { }	**10. Belts { }**
7. Horn { }	**11. Defroster { }**
8. Tires (Tread wear/pressure) **{ }**	**12.Radiator/Hoses** (DON'T check when hot) **{ }**
9. Windshield Wipers/Washer { }	**13. Battery { }**

14. Fluid Levels: (Circle approximate level)

a. Oil	Full	1qt low		Added
b. Coolant:	Full	Need coolant		Added
c. Transmission:	Full	1pt low		Added
d. Fuel:	Full	½	¼	Empty

Comments/Repairs/Service(s) Needed:

Figure 2

Certification of Task Hazard Assessment

TASK NAME: ALL TERRAIN VEHICLE (ATV)

1.0 PRINCIPAL TASK STEPS		
Principal Steps: 1. Accepted/Inspected at Site 2. Placed in Operation 3. Vehicle Maintenance	**Potential Site Hazards** (See 1.1 list): Vehicle Safety A1-2, B1-3, C, D1-2, F, H2-4, J1, K1-3 Vehicle Safety	**Recommended Controls** (See 1.2 list): A through D A through O A through D

1.1 Potential Hazards: Items checked are known or anticipated site hazards, or may occur as a result of site operations **(Check Appropriate Box)**

A ( ) Thermal Stress A1( ) Heat Stress A2( ) Cold Stress B( ) Biological Hazards B1( ) Toxic/Hazardous plants B2( ) Hazardous animals/insects B3( ) Hanta Virus, when present C( ) Vehicle traffic in work area(s) D( ) Fire Hazards D1( ) Vegetation (high grass areas) D2( ) Flammable Liquids	E( ) Manual Lifting Hazards F( ) Slip, trip or fall G( ) Chemical Hazards G1( ) Respiratory G2( ) Skin H( ) Vehicle Operations H1( ) High Noise (>85 dBA) H2( ) Overhead Hazards H3( ) Pinch Points Hazards H4( ) Hot Surfaces	J( ) Radiation J1( ) UV J2( ) Ionizing K( ) MEC Environment K1( ) Potential MEC items K2( ) Unplanned Detonation K3( ) Near Surface

1.2 Recommended Controls:

A. Observe all MEC safety precautions and use safe work practices, IAW EP 385-1-95a, Basic Safety Concepts for O&E Operations, Jun01 and EM 385-1-1, Safety and Health Requirements Manual.
B. All ATV Equipment will be inspected and tested, in accordance with manufacturer's recommendations and certified in writing by a component person prior to being placed in use, IAW Section 18, EM 385-1-1.
C. All ATV operators will be licensed and trained by a recognized accredited ATV Training Course or in-house resource that is certified as a Trainer by an accredited organization, prior to operations of the vehicle.
D. Wear the appropriate PPE for the task being performed.
E. Use recognized hand and arm signals to communicate between the operators. Cease any operation, when this fails.
F. Maintain safe and appropriate separation distances between ATV, when traveling as a group.
G. ATVs will be used only off road, unless equipped for paved road use by manufacturer.
H. ATVs will only be operated during daylight hours, unless equipped for night use by manufacturer.
I. Only ATVs with four or more wheels may be used.
J. The manufacturer's recommended payload will not be exceeded at any time.
K. Passengers are prohibited on Class I ATVs (Class I ATV – single seat centered over the engine).
L. All ATVs will be equipped with mufflers, spark arrester, tail lights, stop lights and an audible signal device (horn).
M. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When transporting equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.
N. Be alert. Mark, avoid, and report any suspect MEC items.
O. Do not handle wildlife. Review characteristics of potential toxic/poisonous plant life known in the area.

2.0 DEGREE OF OVERALL TASK HAZARD: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	**Physical Hazard:**	**Biological Hazard:**
( ) Low ( ) Serious ( ) Moderate ( ) Unknown	( ) Low ( ) Serious ( ) Moderate ( ) Unknown	( ) Low ( ) Serious ( ) Moderate ( ) Unknown

3.0 PROTECTIVE MEASURES: Items checked will be used to control or mitigate the above mentioned hazards

( ) Tailgate Safety Briefing ( ) Specialized Training ( ) Proper operations of equipment ( ) Equipment Safety hazards ( ) Personal protective equipment Other: _____	( ) Engineering Controls ( ) Lockout/Tag Out ( ) Site Control Zones ( ) Communications ( ) Establishing Safe Work Areas ( ) Designate Smoking/Break Area ( ) Proper use of vehicles ( ) Proper use of seat belts Other: _____	( ) Administrative Controls ( ) Rotate Workers ( ) Limit Exposure Time ( ) Decontamination **( )** Wash Hands at break regardless of activity Other: _____

TASK NAME: ALL TERRAIN VEHICLE (ATV)

4.0 Applicable SOPs/Programs: Site Specific Safety/ Health Plan (SSHP)

5.0 PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment

Level of Protection	( ) A ( ) B	( ) C ( ) D	( ) Modified
Respiratory Protection	( ) SCBA ( ) Airline Respirator	( ) Full face APR ( ) ½ face APR	( ) Cartridge Type _____ ( ) No respirator needed
Protective Clothing	( ) Fully encapsulated ( ) Tyvek F, with hood	( ) Saranex ( ) Coveralls, Cotton	( ) Work Clothes ( ) Other:
Gloves (specify inner/outer)	( ) Nitrile ( ) Butyl	( ) Neopene ( ) Latex	( ) Leather ( ) Cotton
Head/Face/Eye/Ear Protection	( ) Safety Glasses–ANSIZ87.1 ( ) Ear plugs or muffs	( ) Safety goggles ( ) Wire or Nylon Face Shield	( ) Hard Hat ( ) Other:
Foot/Leg Protection	( ) Work Boots ( ) Steel-toed boots	( ) Steel Toe covers ( ) Snake Leggings	( ) Chemical over boots ( ) Kevlar Leg Chaps
Other Protection	( ) Motor Cycle Helmet w/full face shield or goggles	( ) Hi-Visibility Vests	

5.1 PPE Modifications Required: Elevated PPE posture when dealing with suspected "Hanta Virus" locations.

6.0 Training Requirements

6.1-UXO personnel are EOD trained and approved by CEHNC-Huntsville
6.2-All Site personnel are OSHA qualified, both 40-hr and current 8-hr Refresher, IAW 29 CFR 1910.120
6.3- All Site personnel operating a vehicle maintain a current state driver's license.
6.4- UXO identification and safety precautions training for all Site Personnel. (Performed by UXOSO)
6.5-ATV operators will provide a copy of their qualifications and competency to the UXOSO, prior to any equipment operation.
6.6-Daily Safety and Operations Briefing. (Performed by UXOSO)
6.7-All Site personnel will attend "Site Specific Training" for safe work practices and hazard protection, IAW SSHP. (Performed by UXOSO).
6.8-Site personnel will be briefed on Material Safety Data Sheets (MSDS) for fuels and oils. (Performed by UXOSO)
6.9-Knowledge of emergency response and notifications IAW SSHP.
6.10-Maintain equipment IAW manufacturer's specifications and operate IAW owner's manual.

7.0 Equipment to be used and Inspection Requirements

Type	**Inspection Frequency (Daily/Weekly/Monthly)**		
Heavy Equipment (checks will be done prior, during and after operation)	Daily by Operator	Weekly as needed	Monthly as needed
First Aid Kits	Daily by Team Leader	Weekly by UXOSO for missing items	Monthly by UXOSO for expired items
Communications Equipment	Daily by Team Leader	Weekly by Team Leader	Monthly, as needed
Communication Checks w/radios (Cellular phones as back-up)	Twice Daily with all site elements. All "operations" will cease until communications have been re-established with at least another site element to relay information		
Fire Extinguishers	Daily by Team	Weekly by UXOSO	Monthly by UXOSO

8.0 Certification: The control methods, PPE and other procedures used in the conduct of this task have been selected as a result of a hazard assessment conducted by the individual identified below:

Printed Name: **Edward Grunwald, C.I.H., Project Safety and Health Officer** **Date: 01/20/05**

OE SECTOR

Standing Operating Procedure (SOP)

Explosive Storage and Transportation (ESAT)

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Revision No. 1
February 2005

Reviewed by:

Michael Short
OE Sector Operations Manager: _____ _____
(Signature) **(Date)**

Approved by:
Timothy Mustard, C.I.H.
OE Sector PHSO Timothy S. Mustard, CIH 05/18/05
(Signature) **(Date)**

1.0 INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, accountability, and transportation of demolition material and munitions and explosives of concern (MEC).

2.0 SCOPE

This SOP applies to all site personnel involved in the acquisition, receipt, storage, handling, inventory and transportation of demolition material and MEC. It is to be followed by all Parsons and subcontractor personnel involved in any activity involving demolition material.

3.0 REFERENCES

Procedures and information contained in this document were obtained from the below-listed references:

- AR 190-11, Physical Security of Arms, ammunition and Explosives;
- AR 385-10, The Army Safety Program;
- AR 385-16, System Safety Engineering and Management;
- AR 385-64, Ammunition and Explosives Safety Standards;
- ATF P 5400.7, ATF-Explosives Law and Regulations;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- DoD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives;
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards;
- EP 385-1-95a, CEHNC Basic Safety Concepts and Considerations for Ordnance and Explosives Operations;
- EM 385-1-1, USACE Safety and Health Requirements Manual; and
- EM 1110-1-4009, CEHNC Ordnance and Explosives Response

4.0 RESPONSIBILITIES

4.1 Project Manager

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS) or site manager (SM), is responsible for the initial quantity and type of demolition material ordered. This initial requisition should be of sufficient quantity to support the project for a minimum 90-day period. In the event the project is scheduled to run for less than 90 days, every effort will be made to place one requisition meeting the anticipated needs.

4.2 UXO Safety Officer

The Parsons UXO Safety Officer (UXOSO) is responsible for determining the specific site requirements for licensing, permitting, and placards. The UXOSO is also responsible to ensure the handling, storage, transport, and use of demolition material is in accordance with the approved work plan, SOPs, and federal, state and local regulations.

4.3 UXO Quality Control Specialist

The Parsons UXO Quality Control Specialist (UXOQCS) will oversee all subsequent requisitions of demolition material and will review all Purchase Order Requests (POR) for demolition material to ensure that approved Explosive Siting and Explosive Management Plans are not violated. The UXOQCS is also responsible for the inspection and auditing of the entire operation and reporting any findings to the PM. These inspections will include the acquisition procedure, documentation, storage, and transport.

4.4 Senior UXO Supervisor

The Parsons or subcontractor Senior UXO Supervisor (SUXOS) is responsible for acquiring the initial quantity and type of demolition material, submit all subsequent requests for demolition material and conduct periodic inspections of the magazine storage areas and their contents.

4.5 Vehicle driver

The vehicle driver will, at a minimum, be a UXO Tech III qualified and have a valid driver's license. This is to ensure that the driver is both experienced with and knowledgeable of demolition material. For additional transportation requirements see section 8.0.

5.0 ACQUISITION

5.1 Requisitions

Prior to ordering demolition materials, the OE Sector Purchase/Receipt Authorization List (Figure 1) must be completed and forwarded to the explosive distributor(s), along with a copy of the Parsons and/or UXO subcontractor's BATF License. Prior to the initial acquisition of explosives, Parsons must have received work plan approval from the Contracting Officer. The commercial explosives identified in Table 1 are the items approved for use. Upon approval of the WP, the initial acquisition will be processed and must be on site prior to commencing intrusive activities and all subsequent shipments must arrive in such a manner to ensure there is no break in operations.

5.2 Receipt

Only those individuals named on the Authorization list may sign for explosives from the shipper. In order to ensure that the quantity shipped is the same as the quantity listed on the shipping documents, either the SUXOS or UXOQCS, or in his absence the UXOSO, will inventory the shipment prior to signing for it.

5.3 Shipping Documents

The explosive supplier's Bill of Lading (B/L) and the freight company's shipping document generally accompany explosive shipments. The initial inventory will include reconciling the two documents with the actual shipment. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company-shipping document will be attached to a copy of the

POR and the PO. One copy of each of the four documents will be kept on file on site and one complete copy forwarded to the corporate office.

Figure 1 - Explosives Purchase / Receipt / Authorization List

Explosives Purchase / Receipt / Authorization List

Street Address and County: (Home Office)

Street or Post Office Box Address and County: (Field Office)

Federal License #: Expiration Date:

The following individuals are agents, employees, or representatives of the undersigned, and are authorized to order or acquire explosive materials on behalf of Parsons.

Name and Home Address	Driver's License No.	Soc. Sec. Number	Place of Birth

The undersigned certifies the foregoing information to be true and correct to the best of his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to Parsons.

OE Sector Operations Manager and Date (Type or print)	Signature and Date

Table 1 - DOD Hazard Classifications for Commercial Explosives

DOT EX #	NOMENCLATURE	DOD HAZARD CLASS	DATE
9806054	Cord, Detonating	1.1D	02 Dec 98
9303282	Cord Detonating, Commercial	1.1D	14 Jan 98
9207009A	Cord, Detonating	1.4D	04 Apr 00
9202035	Cord, Detonating, Commercial	1.1D	19 Sep 97
8210044	Cord, Detonating	1.1D	12 Jan 99
9709010	Cap, Blasting, Electric, Instant	1.4B - Only when in DOT packaging	27 Jan 99
9707051	Cap, Blasting, Non-electric	1.4B – Only when in DOT packaging	2 Dec 98
9303278	Cap, Non-electric, Commercial	1.1B	14 Jan 98
9104118	Cap, Blasting, Electric, Commercial	1.4B	19Sep 97
8511062	Cap, Blasting, Non-electric, Commercial	1.4B	27 Oct 97
9803207	Detonator, with Fuse Assembly	1.1B	12 Jan 99
9303277	Detonator, Cap, Electric, Commercial	1.4B	04 Apr 00
8912113	Demo Charge, C-4, Commercial	1.1D	27 Jan 99
9608031	Booster, 1 LB	1.1D	14 Jan 98
9308432	Booster, Pentolite	1.1D	14 Jan 98
8611125	Booster, Pentex	1.1D	14 Jan 98
9303285	Booster, Cast. Austin	1.1D	14 Jan 98
9508033	Fuse Lighter, Commercial	1.4S	27 Oct 97
9201092	Fuse, Time, safety	1.4S	2 Dec 98
8311105	Fuse, Safety, Commercial	1.4S	27 Oct 97
9404156	Shock Tube, Shock Star MS	1.4S	14 Jan 98
9106259	Shock Tube, Excel MS	1.4S	14 Jan 98
9608028	Shaped Charge, Commercial	1.4D	19 Sep 97
9405290	Shaped Charge, Commercial	1.4D	10 Mar 99
9409002	Shaped Charge, commercial	1.4D	27 Oct 97
8601111	Shaped Charge, Commercial	1.4S	10 Mar 99

Note: CEHNC-OE-S-P maintains supporting documentation.

5.4 Receipt Discrepancies

Upon receipt, the type, quantity, and lot number of each item will be checked against the manifest and entered on the Magazine Data Card(s) (Figure 2). In the event there is a discrepancy between the amount shipped and the amount received, the SUXOS or the UXOQCS will immediately contact the explosive supplier and inform him of the discrepancy. It then is the responsibility of the supplier and shipper to rectify the situation and inform Parsons of the

results. The supplier and/or shipper must then correct their documents and forward them to the site. In any event, only the amount received will be entered on the Magazine Data Card(s), which will be kept in the magazine and annotated for each transaction.

5.5 Reporting Lost or Stolen Explosives

5.5.1 Loss or theft of explosives will be reported as required in 27 CFR Part 55, Sub part C paragraph 55.30. ATF Form 5400.5 will be completed, within 24 hours and forwarded to the ATF, with a copy to the contracting officer. A copy of this form is provided in Figure 5.

5.5.2 The following individuals will be notified immediately upon discovery of theft of explosive:

- Site Manager, Project Manager and USACE Safety Representative
- USACE Project Manger and Contracting Officer
- Bureau of Alcohol, Tobacco and Firearms (ATF) at 1-800-800-3855
- Project subcontracted UXO firm or supplier of explosives

6.0 STORAGE AND SECURITY

Approved explosive storage facilities may be provided at the site, either by the U.S. Army Corps of Engineers (USACE) or by the installation. Parsons will use the existing magazines for explosive storage and comply with local storage criteria and procedures. The SUXOS and/or UXOQCS will prepare Magazine Data Card(s) (Figure 2). If no explosives storage facilities are available, Parsons will:

- Use approved BATF Type 2 structures;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in *DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards;*
- Install sufficient magazines to comply with the explosive compatibility requirements, (i.e., bulk explosives, initiating explosives);
- Establish security, such as fencing, to prevent unauthorized access and/or theft, as required.

Figure 2 - Magazine Data Card

				MAGAZINE DATA CARD				
Product Code / FSN:		Nomenclature:			Site Name: Address:			
Date Code / Lot Number		Hazard Class	UN or NA	Quantity / Case:				
Date	Bill of Lading /Voucher Number	Received From	Quantity Received	Quantity Issued	Issued To	Current Balance	Initials	
							Issuer	Receiver

6.1 Exterior Construction

BATF Type 2 magazines are required to have the exterior and doors to be constructed of not less than 3/16-inch steel and lined with at least two inches of hardwood. Magazines with top openings will have lids with water-resistant seals, or which overlap the sides by at least one inch when in a closed position.

6.2 Hinges and Hasps

Hinges and hasps will be attached to doors by welding, riveting, or bolting with the nuts on inside of door. Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked.

6.3 Locks

Each door will be equipped with two padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers or five blades, and a casehardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

6.4 Signage/Placards

ATF and DoD require that all magazines be appropriately posted for content hazard class, fire fighting hazard, and an emergency notification list. Magazines will be placarded in accordance with *DoD 4145.26M and DA Pam 385-64*. In most instances, this will require a Fire Division Class 1 for the recovered UXO storage magazines and a Fire Division Class 3 for the demolition material, excluding detonators, which are Fire Division Class 4. If in doubt label the contents with the next highest hazard. In the event there are two different fire division or hazard class items in the same magazine, use the higher hazard division/class placard.

6.5 Lightning Protection

Appropriate lightning protection will be installed on all site(s), IAW *DA Pam 385-64, Chapter 6, paragraph 6-13; Table 6-1 and 6-2 and Chapter 12, paragraphs 12-5, 12-8:*

- A qualified person will conduct a resistivity test, over several points of the proposed site. Test boring will be used for deciding on an adequate earth electrode system. The minimum resistance is 25 ohms measured on a Ground Resistance Tester (*Biddle Ground Megger®).*
- An Earth Electrode Subsystem will be placed at uniform intervals around the protected facility as required; grouping of earth electrodes on one side of a facility is prohibited. Earth electrodes will be set not less than 3 feet or more than 8 feet from the structure(s).
- Grounding Rods will not be less than ¾" in diameter and 10 feet in length. Rods will be copper-clad steel, solid copper or stainless steel and free of paint or other non-conductive coating. The minimum number of rods for the facility is two, yet may be increased to assist in the reduction of resistivity. Rods will be located clear of paved surfaces, walkways and roadways and will be driven into the ground so that the tops are at least 12" below finished grade. In the event of shallow topsoil over bedrock or dense coral preventing the burial of rods, use extended down conductors or buried open plates, as described in *Chapter 3 of National Fire Protection Association 780.*
- Bonding is used to reduce the possibility of a side flash and to ensure lightning current produces no electrical potential differences. For a building 36 feet in height or less, a bonding strap is required for large masses of metal (400 in sq) located on the exterior (door), or within the facility.

- Lightning warning systems provide a positive, reliable means of continuously monitoring and recording atmospheric voltage gradient. For those sites without a lightning warning system, the UXOSO will establish criteria for terminating ammunition and explosive operations and evacuate the facility to the MSD distance, as outlined in the Work Plan.
- Periodical inspections and test requirements for the grounding system will be accomplished every 6 months for visual inspections and every 24 months for electrical tests. The grounding system will have a resistance of 25 ohms or less and the bonding strap 1 ohm or less. The results of these tests will be kept on file at the site.

Sites that do not need a Lightning Protection System (LPS) must meet the following requirements, in accordance with *EM 1110-1-4009, Chapter 11*.

- The magazine is constructed of metal that is 3/16-inch steel or larger.
- The magazine is grounded as described in Figure 3.
- The magazine is located at least 7.0 feet from the nearest fence. Figure 3 is an example of a typical site not requiring an LPS.

6.6 Fencing Protection

Appropriate fencing (physical security) protection will be installed on all site(s), in accordance with *AR 190-11, paragraph 5-3:*

- Fence Fabric will be of chain link (galvanized, aluminized or plastic coated woven steel) 2-inch square mesh 9-gauge diameter wire, including coating.
- Posts, bracing and other structure members will be located on the inside of the fence fabric. Galvanized steel or aluminized wire-ties equal in gauge to fencing will be used to secure the fence fabric to the posts or other structural members.
- The minimum height of the fence fabric will be 6 feet without an outrigger.
- The bottom of the fence fabric will extend to within 2 inches of firm ground. A 9-gauge retaining wire, of the same material as the fence, will be interwoven along the bottom portion of the fence from post to post, in order to prevent anyone from pushing the fence in at the bottom. Surfaces will be stabilized in areas where loose sand, shifting soils, or surface waters may cause erosion and thereby assist an intruder in penetrating the fenced area. Where surface stability is not possible or is impracticable, concrete curbs, sills or other suitable type anchoring devices, extending below ground level will be provided.
- The barrier will have a minimum number of vehicular and pedestrian gates, consistent with the operational requirements. These gates will be structurally comparable to the adjacent fence. Gates will be provided with an approved lock and hinge pins and hardware will be welded or otherwise modified to prevent easy removal.

6.7 Emergency Notification List

An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency, will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives, as well as the site manager and UXOSO if they are not on the authorized signature list.

6.8 Compatibility

Explosive compatibility will be maintained in accordance with *DA PAM 385-64 and TM9-1300-206.* Table 2 lists the various storage compatibility groups and Table 3 is the storage compatibility chart. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested IAW DOD 6055.9-STD., and then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items.

6.9 Key Control

Magazines will remain locked except when receipts and issues are being made. The two locks on the magazines will require two different keys to unlock. The SUXOS will keep one key and the second key will be kept by the UXOQCS, or in his absence, the UXOSO. This procedure ensures that no one individual can gain access to the magazines.

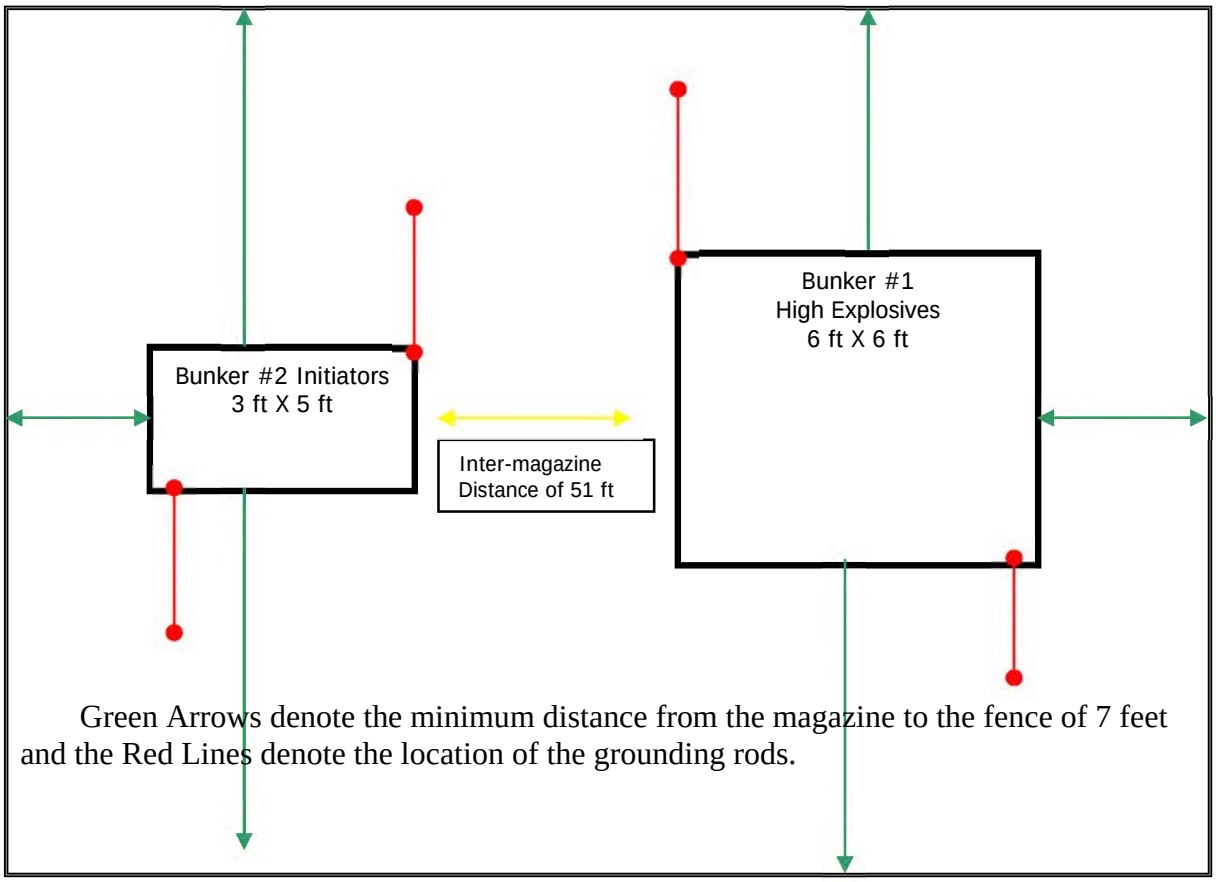
6.10 Inspection

At the start of each workday, a physical check will be made of the magazine storage area to ensure security has not been compromised.

6.11 Security

Physical security of the explosive storage location, if on a military installation, is provided by the installation. Parsons provides security of the explosive storage location on civilian property, which consists of the required fencing and daily inspections excluding non-work days unless the magazine is considered to be vulnerable to being vandalized.

Figure 3 - Typical Layout of a Non-LPS Storage Site



Notes: Based on *Table C9.T5, DOD 6055.9STD a* minimum of 51 feet for inter-magazine distance (100 lbs NEW) is required (yellow arrow). The fenced area is 1,520 square feet, based on 76ft in length and 20ft wide. It is recommended that a single magazine, equipped with an attached detonator outrigger be used whenever possible in order to decrease the size of the fenced area required.

Table 2 - Storage Compatibility Groups

STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION	
GROUP A	
Cyclonite (RDX), dry	Mercury fulminate, wet
HMX, dry	PETN, dry
Lead azide, wet	RDX (cyclonite), dry
Lead styphnate, wet	Tetracene, wet
GROUP B	
Fuses (except chemically-actuated fuses containing ampules which may initiate, directly or indirectly, explosives and explosives-loaded components which are assembled in the conventional manner to form the finished explosive fuse).	Detonators
	Mines, practice, AP, M17
	Percussion elements
	Primer detonators
GROUP C	
Ammunition, blank and saluting, cannon	Cartridge, 90mm, canister, AP
Ammunition, .50 caliber, except API/incendiary	Cartridges, practice, over 40mm
Ammunition, 20mm, practice and high pressure test	Catapults, aircraft ejection seat, M3A1, M4A1, M5
Ammunition, 25mm, with inert projectile	Charge, propelling, not assembled to projectiles EC powder
Ammunition, 27mm, caseless	Detonating cord (primacord)
Ammunition, 30mm, ball and high pressure test	Nitrocellulose
Ammunition, 30mm, practice and training	Fuel (solid), emergency power unit
Ammunition, 37mm and 40mm, TP and AP	Propellant
Ammunition, 40mm, practice, M407A1, M382, and M385	Rockets, practice, 3.5-inch
Benite	Rocket motors, M3, M5, M6, M10, M13, M26, M30, M37, M42, M53, M66; Pershing 1st and 2nd stages; Spartan 1st, 2nd, and 3rd stages
Baron potassium nitrate	
GROUP D	
Adapter booster	Explosive D
Ammonium nitrate, except in original shipping container or equivalent	Explosives, cratering
Ammonium perchlorate, except when particle size is over 15 microns and in original shipping container or equivalent	Grenades, rifle, AT (except pentolite loaded)
Ammonium picrate (Explosive D)	HMX, wet
Bangalore torpedoes	Mine, APERS, MN, M14 (w/integral fuse)
Baratol	Mines, antipersonnel (bounding type
Black powder, bulk	Mines, antipersonnel (cast iron block)

Table 2 – Storage Compatibility Groups (Cont'd)

Bombs, demolition	Mines, HEAT Nitrocellulose wet 8-30% water exposed to detonation hazards at less than intra line distance
Bombs, fragmentation	Nitroguanidine
Bombs, general purpose	Nitrostarch Octol
Boosters	PBX
Boosters, auxiliary	pentolite
Bursters	PETN, wet
Charge, demolition, snake	Picratol
Charge, springing earth rod, blast driven	Picric acid
Charge, supplementary, HE	Projectiles, HE, fuzed or unfused
Compositions A, A-2, A-3, A-4, B, B-3, C, C-2, C-3, and C-4	RDX (Cyclonite), wet
Cutter, cable M1	Rocket heads, HE and HEAT (except pentolite loaded) w/o motors
Cyclonite (RDX), wet	Shaped charges
Cyclotol	Tetranitrocarbazole (TNC)
Demolition Blocks	Tetryl
Destructor, HE, M10	Tetrytol
Detonating cord (primacord) exposed to detonation hazard at less than intra line distance	TNT
Dynamite	Tritonal
Ednatol	Torpex

Table 2 – Storage Compatibility Groups (Cont'd)

GROUP E	
Ammunition, HEP	Ammunition, fixed and semifixed, 90mm through 106mm, loaded with ammonal, amatol, Explosive D, composition B or TNT
Ammunition, 20mm, HE, HEI and functional packs containing HE and HEI	Cartridge, heavy mortar, over 81mm (including 81mm M56), except chemical loaded
Ammunition, 30mm, HEDP	Cartridge, light mortar, 81mm or less (excluding 81mm M56), except chemical loaded
Ammunition, 37mm, HE	Redeye guided missiles, packaged 3 complete rounds w/launcher
Ammunition, 40mm, HE, RDX loaded	
Ammunition, 40mm, HE, M406, M386, M441, and M463	Rockets, HEAT, 3.5-inch, complete round
Ammunition, 57mm through 81mm, except WP smoke, HEP and blank	Rockets, HE, 2.75-inch (in LAU-3/A rocket launcher)
GROUP F	
Grenades, hand offensive	Grenades, fragmentation
GROUP G	
Ammunition, .50 caliber API and incendiary	Grenades, hand, CN1, ABC, M25A1, w/fuse C12
Ammunition, 20mm, API	Grenades, hand, CM1, ABC, M25A2, w/fuse C12
Ammunition, 20mm, incendiary and functional packs containing incendiary, except those containing HE or HEI	Grenades, illuminating and incendiary
Ammunition, 40mm, riot control and pyrotechnic loaded, except WP smoke	Grenades, practice, w/spotting charge
Bombs, photoflash	Grenades, rifle, smoke, XM48E1 and M22 and M23
Cartridge, igniter, M2	Grenades, smoke (except WP and PWP)
Cartridge, illuminating	Grenades, riot control, CS1, M25A2
Cartridge, photoflash	Igniter, spotting charge
Cartridge cases, primer (w/o propellant)	Igniters for rocket motors (e.g., M12, M18, M20 and M29)
Charge, igniter assembly, for practice hand grenades	Ignition cartridge for trench mortar ammunition
Charge, spotting, APR practice, M8	Illuminating compositions (consolidated in final press operations)
Chemical ammunition, Group B, tear or smoke producing, w/explosive components, over 40mm	Mines, practice, w/spotting charge and/or fuse
Chemical ammunition, Group B, tear or smoke producing, w/o explosive components	Nuclear fire marker device 11-F2

Table 2 – Storage Compatibility Groups (Cont'd)

Chemical ammunition, Group D, containing flammable solids, except for TEA or TPA, w/o explosive components	Photoflash powder
Chemical ammunition, Group D, fixed or semi-fixed rounds, containing flammable solids, except for TEA or TPA	Primers, artillery and cannon, percussion and electric
Clusters, incendiary bomb, M31 and M32 (w/o fuzing components)	Projectiles, illuminating
Destroyer, file, M4	Rocket, riot control agent, CS, 2.75-inch FFAR, MX99
Detonation, simulator, explosive M80	Simulators, M110, M115, M116, M117, M118, M119 and XM142
Grenade, hand, smoke, HC, M8	Smoke pots
Grenades, hand, CN, M7A1, w/fuse M201A1	Spotting charges (cartridge for miniature practice bombs)
Grenades, hand, CS, M7A3, w/fuse M210A1	
GROUP H	
Chemical ammunition, Group C	Grenade rifle, WP, M19
Grenades, WP	
GROUP J	
Chemical ammunition, Group D, containing flammable liquids or gels, with or w/o explosive components	Chemical ammunition, Group D, fixed and semifixed rounds, containing flammable liquids or gels with or without explosive components
GROUP K	
Chemical ammunition, Group A, with or without explosive components	Chemical ammunition, Group B, with or without explosive components, designed for toxic or incapacitating effects greater than lachrymation
Rockets, toxic chemical agents, complete rounds	

Table 2 – Storage Compatibility Groups (Cont'd)

GROUP L	
Aluminum powder	Fuzes, chemically-actuated, containing ampoules which may initiate directly or indirectly, explosives and explosives loaded components which are assembled in the conventional manner to form the finished explosive fuse
Ammonium nitrate	Magnesium powder
Ammonium perchlorate	Grenades, rifle, AT (pentolite loaded)
Ammunition, pentolite loaded	Nitrates (inorganic), except ammonium nitrate (in original shipping container or equivalent)
Chemical Ammunition, Group A, without explosive components	Perchlorates
Chemical ammunition, Group B, without explosive components, designed for toxic or incapacitating effects more severe than lachrymation	Peroxides, solid
Chemical ammunition, Group D, TEA or TPA components	Rocket heads, pentolite loaded, w/o motors
Chlorates	Zirconium (types I and II, spec. FED 1665)
DNT	
GROUP S	
Ammunition, 40mm, canister and multiple projectile	Fuse lighters
Ammunition, small arms, less than .50 caliber	Fuse safety
Explosive bellows	Squibs commercial
Firing devices	

Table 3 - Storage Compatibility Chart

Groups	A	B	C	D	E	F	G	H	J	K	L	N	S
A	**X**	**Z**											
B	**Z**	**X**	**Z**	**Z**	**Z**	**Z**	**Z**					**X**	**X**
C		**Z**	**X**	**X**	**X**	**Z**	**Z**					**X**	**X**
D		**Z**	**X**	**X**	**X**	**Z**	**Z**					**X**	**X**
E		**Z**	**X**	**X**	**X**	**Z**	**Z**					**X**	**X**
F		**Z**	**Z**	**Z**	**Z**	**X**	**Z**					**Z**	**X**
G		**Z**	**Z**	**Z**	**Z**	**Z**	**X**					**Z**	**X**
H								**X**					**X**
J									**X**				**X**
K										**Z**			
L													
N		**X**	**X**	**X**	**X**	**Z**	**Z**					**X**	**X**
S		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**			**X**	**X**

Notes:

1. The marking “X” at the intersection of the above chart indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted per Note 2 below.
2. The marking “Z” at an intersection of the above chart indicates that, when warranted by operational considerations or magazine non-availability, and when safety is not sacrificed, these groups may be combined in storage.
3. The marking “U” on the above chart indicates that leaking toxic chemical munitions of one agent type, i.e., GB, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
4. Equal numbers of separately packaged components of complete rounds of any single type of ammunition may be stored together. When so stored, compatibility is that of the assembled rounds; i.e., WP Filler in Group H, HE Filler in Groups D, E, or F, as appropriate.
5. Group K required not only separate storage from other groups, but also requires that munitions having different toxic chemical agent fillers be stored separately from each other.
6. Ammunition designated “PRACTICE” by NSN and nomenclature may be stored with the fully loaded ammunition it simulates.

7.0 INVENTORY

Upon receipt and verification of explosive demolition material, the Magazine Data Card(s) is/are filled out and kept in the magazine on top of the listed item. A duplicate copy is maintained by the UXOQCS or SUXOS and kept on file in the site office.

7.1 Usage Inventory

Following each occurrence of a receipt or issue of explosive material, the UXOQCS will conduct a joint inventory in conjunction with the demo team leader, drawing out or returning the explosives. Only those items issued/returned will be inventoried and the two sets of Magazine Data Cards will be appropriately annotated.

7.2 Monthly Inventory

The last work day of each month, the UXOQCS, and SUXOS or the USACE Safety Specialist and UXOSO will conduct an inventory and record results on the two sets of Magazine Data Cards.

7.3 Discrepancies

In the event there is a discrepancy during any inventory, the item will be recounted a minimum of two additional times. If a discrepancy still exists, the USACE PM, Contracting Officer, and BATF will be telephonically notified with a written report submitted within 24 hours of the discovery.

7.4 Procedures for Return to Storage of Explosives not Expended

Explosives that were issued for use but were not needed will be returned daily to the magazines at the completion of disposal operations. The Demolition Team Leader will return the unused explosives to the storage magazine and revise the Magazine Data Card(s) and Explosives Use Record (Figure 4).

7.5 Disposal of Remaining Explosives

Parsons is required by BATF to account for all explosives purchased and used. At project completion, the UXOQCS and PM will conduct an economic analysis of the disposition alternatives for the unused explosives. A written request to the CEHNC Contracting Officer will be made listing the alternatives and requesting disposition of the unused explosives. Based on that decision, the unused explosives will be transferred or disposed of as directed. For Firm Fixed Priced (FFP) contracts this is not required. The unused explosives will be disposed of as determined by the PM and UXOQCS.

Figure 4 – Explosives Usage Record

Explosive Usage Record

Team Number: Date: Project Name:

Team Leader: Work Areas & Grid Numbers:

Explosives Issued Signature of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended Signature of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned Signature of SUXOS:

Item	Quantity	Lot Number	Checkers Initials

The signatures in each section of this document indicate that the items listed in that section were in fact issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

8.0 Transportation

Transportation of MEC will comply with all Federal, state, and local regulations. Permits are not required under CERCLA for on-site or on Federal installation transportation of

demolition material or MEC. Off-site transportation of demolition material or MEC will not be accomplished until coordination and approval has been received from the USACE Contracting Officer. Off-site shipment of demolition material or MEC will be made using commercial carriers approved to transport ammunition and explosives. For off-site shipment:

- MEC will be packaged in accordance with *49 CFR parts 172 and 173*, if possible; if not possible the MEC will be transported in such a manner as to not move or touch other MEC items.
- Drivers will be provided with Emergency Response Information, Figure 6;
- Vehicles will be inspected using the Motor Vehicle Inspection Form (Figure 7), and, if applicable, be properly placarded;
- Compatibility requirements will be observed;
- The load shall be well braced and, except when placed in an enclosed vehicle, covered with a fire-resistant tarpaulin.

8.1 General Highway Transport

In most instances, the following data presented is sufficient to meet the requirements for explosive transport.

8.2 Commercial Motor Vehicle Requirements *(49CFR Part 383.5)*

Commercial motor vehicle (CMV) means a motor vehicle, or a combination of motor vehicles, used in commerce to transport passengers or property if the motor vehicle

- Has a gross combination weight rating of 11,794 or more kilograms (26,001 pounds or more), inclusive with a towed unit with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds); or
- Has a gross vehicle weight rating of 11,794 or more kilograms (266,001 pounds or more); or
  - Is designed to transport 16 or more passengers, including the driver; or
  - Is of any size and is used in the transportation of materials found to be hazardous for the purposes of the Hazardous Materials Transportation Act, and which require the motor vehicle to be placarded under the *Hazardous Materials Regulations (49 CFR part 172, subpart E).*

FIGURE 5
ATF FORM 5400.5, REPORT OF THEFT OR LOSS-EXPLOSIVE MATERIALS

Form Approved, OMB No. 1512-0065 (04/30/96)

DEPARTMENT OF THE TREASURY
BUREAU OF ALCOHOL, TOBACCO AND FIREARMS
REPORT OF THEFT OR LOSS-EXPLOSIVE MATERIALS

DATE

Upon discovery of any theft or loss of any of your explosive materials:
-First, call ATF toll free at 1-800-800-3855 (or call ATF collect at 1-800-800-3855 if you are in Alaska, Guam, Hawaii, Puerto Rico or the Virgin Islands) to report the theft or loss;
-Second, call your local law enforcement office to report the theft or loss; and
-Third, complete this form and attach any additional sheets or invoices necessary to provide the required information, and mail to the nearest ATF office listed on the reverse. We suggest you retain a copy of the completed form. Please complete each item as applicable, to the best of your ability.
NOTE: Section 842(k), 18 U.S.C. Chapter 40, states, "It shall be unlawful for any person who has knowledge of the theft or loss of any explosive materials from his stock to fail to report such theft or loss within twenty-four hours of discovery to the Secretary and to appropriate local authorities." Codified at 27 C.F.R. Section 55.30.

1. NAME, ADDRESS AND TELEPHONE NUMBER OF PERSON MAKING REPORT (include corporate or business name, if applicable)

2. Location of theft or loss (if different from item 1)

3. THEFT OR LOSS	DATE	TIME
a. DISCOVERED		
b. OCCURRED (Show approximate if exact is not known)		
c. REPORTED TO ATF BY TELEPHONE		
d. REPORTED TO LOCAL AUTHORITIES		

4. NAME AND ADDRESS OF LOCAL AUTHORITY TO WHOM REPORTED

5. EXPLOSIVE MATERIALS LOST OR STOLEN (Attach invoices or additional sheets, if necessary)

a. MANUFACTURER OR BRAND NAME (Include date and shift code)	b. QUANTITY (Pounds of Explosives, Number of Caps)	C. TYPE AND DESCRIPTION (Dynamite, Blasting Agents, Detonators, etc. Include for each type, size, MS delay or length of leg wire, as applicable)

6. THEFT OR LOSS OCCURRED FROM (Check applicable box)
☐ PERMANENT MAGAZINE ☐ PORTABLE MAGAZINE ☐ TRUCK ☐ WORK SITE ☐ OTHER (Explain)

7. ENTRY TO MAGAZINE MADE THROUGH (Complete if applicable)
☐ DOOR ☐ ROOF ☐ FLOOR ☐ FOUNDATION
☐ WALL ☐ CEILING ☐ VENTS ☐ OTHER (Explain)

8. NUMBER AND TYPE OF LOCKS FORCED (Complete if applicable)

9. OTHER INFORMATION PERTINENT TO THE THEFT OR LOSS

10. SIGNATURE AND TITLE OF PERSON MAKING REPORT

11. FEDERAL EXPLOSIVE LICENSE OR PERMIT IF ANY

FOR ATF USE ONLY

DATE RECEIVED	TIME RECEIVED	UNIQUE IDENTIFIER

ATF F 5400.5 (1-93) PREVIOUS EDITIONS ARE OBSOLETE

Figure 6 – Emergency Response Information

SHIPPING PAPER AND EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS					
THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS					
Date Prepared:	Date of Travel:			Page_____of_____	
Proper Shipping Name	**Hazard**	**ID No.**	**PG**	**Qty/Units**	**Weight**
Emergency notification. In all cases of accident, incident, breakdown or fire, prompt notification must be given. **FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM**					
Remarks:					
Certification: This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.					
Signature of Shipper Representative:	Signature of Vehicle Operator(s):				
24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:				

Figure 6 – Emergency Response Information (Cont'd)

EMERGENCY RESPONSE INFORMATION

Guide Number 46 and 50 from the U.S. Department of Transportation Emergency Response Guide Book P 5800.6 are reproduced hereon. These guides are applicable to Hazard Class 1 Materials (Explosives).
Mark an X in the appropriate box:

☐ **USE GUIDE 46 FOR EXPLOSIVES (1.1), (1.2), (1.3), (1.5), AND (1.6)**

☐ **USE GUIDE 50 FOR EXPLOSIVES (1.4)**

For all other hazardous materials or substances, annotate appropriate Emergency Response Guide Book Guide Number in the block below, and attach a copy of the guide number page or pages.

Guide Numbers:

GUIDE 46 (ERG 93)

POTENTIAL HAZARDS

FIRE OR EXPLOSION:
May explode and throw fragments 1 mile or more if fire reaches cargo.

HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION

If fire reaches cargo, do not fight fire.

If you know or suspect that heavily-encased explosives, such as bombs or artillery projectiles are involved, stop all traffic and begin to evacuate all persons, including emergency responders, from the area in all directions for 5000 feet (1 mile) for rail car or 4000 feet (3/4 mile) for tractor/trailer.

When heavily-encased explosives are not involved, evacuate the area for 2500 feet (½ mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE

Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID

Call emergency medical care.
Use first aid treatment according to the nature of the injury.

GUIDE 50 (ERG 93)

POTENTIAL HAZARDS

FIRE OR EXPLOSION:
May explode and throw fragments 1/3 mile or more if fire reaches cargo.

HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION

If fire reaches cargo, do not fight fire.

Stop all traffic and begin to evacuate all persons, including emergency responders, from the area for 1500 feet (1/3 mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE

Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID

Call emergency medical care.
Use first aid treatment according to the nature of the injury.

SUPPLEMENTAL INFORMATION

Packages bearing the 1.4S label contain explosive substances or articles that are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments; effects are usually confined to immediate vicinity of packages.

If fire threatens cargo area containing packages bearing the 1.4S label, consider initial isolation of at least 50 feet in all directions. Fight fire with normal precaution from a reasonable distance.

8.3 CDL Requirements

As long as site personnel are not using vehicles that weigh more than 26,000 pounds and are not transporting any materials that must be placarded under the DOT Hazardous Materials Regulations (i.e., they are only transporting 1.4 explosives), then the vehicle being used need not be classified as a CMV and the operator of the vehicle need not have a Commercial Driver's License (CDL). This is the typical situation for site personnel since they usually transport relatively small quantities of 1.4 demolition materials. However, if a CDL is required, the PM or UXOSO will ensure that the requisite license/permits are obtained.

8.4 Federal Installations/On-Site

Transportation of demolition material and MEC on-site and on Federal installations will comply with the following:

- Vehicles will be inspected per occurrence and will be properly placarded;
- Explosives will be transported in closed vehicles whenever possible. When using an open vehicle, explosives will be covered with a flame resistant tarpaulin (except when loading/unloading);
- Vehicle engine will not be running. Wheel chocks and brakes set when loading/unloading explosives;
- Beds of vehicles will have either a plastic bed liner, dunnage, or sandbags to protect the explosives from contact with the metal bed and fittings;
- Vehicles transporting explosives will have a first aid kit, two 10 ABC rated fire extinguishers, and communications capabilities;
- Initiating explosives, such as detonators, will remain separated from other high explosives during loading, unloading, and while on vehicles;
- Compatibility requirements will be observed;
- Operators transporting explosives will have a valid drivers license; and
- Drivers will comply with posted speed limits, but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 mph.

8.5 Off-Site Transportation of Explosives over Public Highway

8.5.1 DOT Certificate of Registration

As long as only 1.4 explosives or less than 55 net explosive weight (NEW) of 1.1, 1.2, or 1.3 explosives are transported by personnel, DOT certificates of registration for individuals involved in the transportation of demolition materials are not required.

8.5.2 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of all other explosive compatibility groups except A and L. To determine the compatibility of the materials typically transported by site personnel, check the Material Data Sheets presented in Attachment 1.

8.6 General Placard Requirements

Those munitions response sites that require placards will accomplish this IAW 49 CFR 172.504. The placard requirements listed below will apply to explosives transportation, if applicable:

> "(a) Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 4 and 5, in accordance with other requirements and exceptions."
>
> "(c) Exceptions for less than 454 kg (1,001 pounds). Except for bulk packaging and hazardous materials subject to § 172.505, when hazardous materials covered by Table 5 of this section are transported by highway or rail, placards are not required on:
>
> (1) A transport vehicle or freight container which contains less than 454 kg (1,001 lbs.) aggregate gross weight of hazardous materials covered by Table 5 of paragraph (e) of this section; or
>
> (2) A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded."

The exceptions provided in paragraph (c) provided above do not prohibit the display of placards in the manner prescribed in this subpart, if not otherwise prohibited (see § 172.502), on transport vehicles for freight containers, which are not required to be placarded.

Table 4: General Placard Requirements

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Section Ref. (§)
1.1	Explosives 1.1	172.523
1.2	Explosives 1.2	172.524
1.3	Explosives 1.3	172.525
2.3	Poison Gas	172.532
4.3	Dangerous When Wet	172.528
6.1 PG I, inhalation hazard only)	Poison	172.542
7 (Radioactive Yellow III label only)	Radioactive	172.544

Table 5: General Placard Requirements

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Section Ref. (§)
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525
2.1	Flammable Gas	172.532
2.2	Non-Flammable Gas	172.528
3	Flammable	172.542
Combustible liquid	Combustible	172.544
4.1	Flammable Solid	172.546
4.2	Spontaneously Combustible	172.547
5.1	Oxidizer	172.550
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled).	Organic peroxide	172.552
6.1 (PG I or II, other than Zone A or B inhalation hazard).	Poison	172.554
6.1 (PG III)	Keep Away from Food	172.553
6.2	(None)	
8	Corrosive	172.558
9	Class 9	172.560
ORM-D	(None)	

8.7 Documentation

Any time demolition material or MEC are being transported, this chapter to include the completed copies of documents described below will be in the vehicle.

- Instructions for Motor Vehicle owners (Emergency Response Information) - Figure 6.
    - Only those items, which are being transported, will be entered in the form with the applicable qty/units and weight columns completed. It is imperative that the NEW limitations of 55 lbs not be exceeded. All required data will be entered on the front and the Guide 50 block should be checked on the back of the form.
- Explosives Purchase/Receipt/Transport Authorization List - Figure 1
    - The form will be completed ensuring the pertinent data for all those transporting explosives is included on the form. As with the other required forms, this one will be part of the transport paperwork. Only the route shown will be used unless there is an emergency or the route is blocked.

- Any deviation from the planned route will be reported to and coordinated with the UXOSO.

- Motor Vehicle Inspection Checklist - Figure 7.
    - The form is to be completed prior to placing any explosives in the vehicle and will accompany the shipment.

- BATF Permit/License.
    - A copy of the current BATF license will accompany the vehicle and be readily available.

9.0 FIRE PROTECTION PLAN

9.1 Explosive Storage Area (ESA)

In the event of a fire at or near the ESA, all site personnel will be evacuated to a distance outside the approved Inhibited Building Distance (IBD), as stated in Chapter 4, of the approved Site Work Plan. An honest attempt to fight the fire will be made with all available fire-fighting equipment on hand. A reasonable decision will be made by the UXOSO when these means have been exhausted and any further attempts will endanger site personnel. At no time will anyone attempt to evacuate the explosives from the ESA; should the bunker door be open at the time, it will be shut and secured if time permits.

The UXOSO will meet the responding local fire department and brief them on the following –

- Total Quantity of Explosives, by hazard classification, inside the ESA
- Time the fire started
- The amount of time the bunkers have been engulfed by flames

All spark emitting devices, matches and flame producing items will not be carried into the ESA. These items will be left outside in a designated location.

9.2 General Housekeeping

Periodic housekeeping (bi-weekly or as needed) will be conducted around and in the ESA. Vegetation will be cut and maintained to a level that will not propagate the spread of a fire. All trash will be removed from the fencing around the ESA.

Figure 7 - Explosive Vehicle Inspection Form

EXPLOSIVE VEHICLE INSPECTION FORM			
This form must be filled out for any vehicle carrying explosives, prior to loading.			
DRIVERS NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	**SAT.**	**UNSAT.**	**COMMENT**
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			
INSPECTION RESULTS (INSPECTOR INITIAL)			
ACCEPTED:			
REJECTED:			
REMARKS			
DRIVERS SIGNATURE/DATE			INSPECTORS SIGNATURE/DATE

Attachment 1

Material Data Sheets

CORD DETONATING (1.4D) (UN0289)

New Explosive Weight (New)

FORMULA: .00229 OZ = 1 Grain
80 gr. X .00229 = .1832 oz.
.1832 oz. Per ft. x 100' = 18.32 oz. Total Net Explosive Weight / 100 feet

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:
CORD DETONATING, FLEXIBLE UN0289 1.4D

CFR 49 172.101 TABLE OF HAZMAT MATERIAL
CORD DETONATING, FLEXIBLE UN0289 1.4D

CFR 49 173.63 (a)

Packaging Exceptions

(a) Cord, Detonating (UN0065), having an explosive content not exceeding 6.5g (0.23 ounces) per 30 centimeter length (one linear foot) may be offered for transportation domestically and transported as Cord, detonating (UN0289), Division 1.4 Compatibility Group D (1.4D) explosives, if the gross weight of all packages containing Cord, detonating (UN0065), does not exceed 45 kg (99 pounds) per:

(1) Transport vehicle, freight container, or cargo-only aircraft;

UN0065 and UN0289 Use Packaging Instruction #139
Research and Special Programs Administration, DOT § 173.62

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
139 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of CORD DETONATING flexible must be fastened securely. 2. For UN 0065 and UN 0289, inner Packagings are not required when they are fastened securely in coils.	Bags ..... Plastics Receptacles ..... Fiberboard Metal Plastics Wood Reels ..... Sheets ..... Paper Plastics	Not necessary	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Plywood (1D). Fibre (1G). Plastics, removable head (1H2).

SHAPE CHARGE (1.4S) (UN0441)

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

CHARGES, SHAPED, COMMERCIAL W/O DETONATOR UN0441 1.4S

CFR 49 172.101 TABLE OF HAZMAT MATERIAL

CHARGERS, SHAPED, COMMERCIAL WITHOUT DETONATOR UN0441 1.4S

CFR 49 173.62

Packaging & Instructions #137

49 CFR ch. 1 (10-97 Edition) § 173.62

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
137 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440, and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked "This Side Up". When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation. 2. For UN 0065 and UN 0289, inner Packagings are not required when they are fastened securely in coils.	Bags ..... Plastics Boxes ..... Fiberboard Tubes ..... Fiberboard Metal Plastics Dividing partitions in the outer Packagings.	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G).

DETONATOR, NON-ELECTRIC (1.4B) (UN0267)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, NON-ELECTRIC UN0267 1.4B

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, NON-ELECTRIC UN0267 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously.

CFR 49 173.63 (g)

Packaging Exceptions

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1 g of explosive (excluding ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;

(2) IME Standard 22 container is used as the outer packaging;

(3) No more than 1000 detonators in one outer packaging; and

(4) Each inner packaging is marked "1.4B Detonators" or "1.4S Detonators", as appropriate.

DETONATOR, ELECTRIC (1.4B) (UN0244)

HAZARDOUS CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, ELECTRIC UNO244 1.4B

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, ELECTRIC UN0255 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional detonators in the outside packaging that explode may not exceed 25 grams.

CFR 49 173.63 (f) & (g)

Packaging exceptions:

(f) Detonators containing no more than 1g explosive (excluding ignition and deadly charges) that are electric blasting caps with leg wires four feet long or longer, delay connectors in plastic sheaths, or blasting caps with empty plastic tubing twelve feet long or longer, may be packed as follows, in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container or compartment is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) No material may be loaded on top of the IME Standard 22 container and no material may be loaded against the outside door of the IME standard 22 compartment.

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1g of explosive (excluding) ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) Each inner packaging is marked "1.4B Detonators" or "1.4S Detonators", as appropriate.

CFR 49 173.62 SPECIAL PACKING REQUIREMENTS FOR EXPLOSIVES
(Explosives Table) UN0267 PI# 131

Research and Special Programs Administration, DOT § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
131 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0029, 0267, and 0455, bags and reels may not be used as inner packagings. 2. For UN 0030, 0255, and 0455, inner packagings are not required when detonators are packed in pasteboard tubes, or when their leg wires are wound on spools with the caps either placed inside the spool or securely taped to the wire on the spool, so as to restrict freedom of movement of the caps and to protect them from impact forces. 3. For UN 0360, 0361, and 0500, detonators are not required to be attached to the safety fuse, metal-clad mild detonating cord, detonating cord, or shock tube, inner packagings are not required if the packing configuration restricts freedom of movement of the caps and protects them from impact forces.	Bags ..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Reels	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G). Plastics, removable head (1H2).

CFR 49 173.63 PA PACKAGING EXCEPTIONS (Enclosure 1)
(g) (2) IME Standard 22 container
Publication: Institute of Makers of Explosives SLP #22 May 1993
Publication: Guide for the Use of the IME 22 Container Oct. 1, 1993

IGNITER, M2/M60 F/TIME BLASTING FUSE (1.4S) (UN0131)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

LIGHTERS, FUSE 1.4S UN0131

CFR 172.101 TABLE OF HAZARDOUS MATERIALS

LIGHTER, FUSE 1.4S UN0131

CFR 173.62

Packaging Instruction #142

49 CFR ch. I (10-97 Edition) § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
142	Bags ..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Sheets ..... Paper Trays, fitted with dividing partitions plastics	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G). Plastics, removable head (1H2).

FUSE, BLASTING TIME M700 (1.4S) (UN0105)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

FUSE, SAFETY UN0105 1.4S

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

FUSE, SAFETY UN0105 1.4S

CFR 49 173.62

Packing Instructions #140

Research and Special Programs Administration, DOT § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
140 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. If the ends of UN 0104 are sealed, no inner packagings are required. 2. For UN 0101, the packaging must be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps. 3. For UN 0101, steel or aluminum boxes or drums must not be used.	Bags ..... Plastics Reels ..... Sheets ..... Paper, kraft Plastics	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G).

Attachment 2

Motor Vehicle Inspection
DoD Form 626