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EXPLOSIVES SAFETY SUBMISSION

COMPLETION REPORT

MUNITIONS RESPONSE

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

SENECA ARMY DEPOT ACTIVITY,
ROMULUS, NEW YORK

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LIST OF ABBREVIATIONS

AFCEE	Air Force Center for Environmental Excellence
APHE	Armor Piercing High Explosive
ASR	Archive Search Report
BCT	Base Clean-up Team
BEC	Base Environmental Coordinator
BIP	Blown In Place
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CWM	Chemical Warfare Materials
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EM61-MK2	Electromagnetic Locator
EOD	Explosive Ordnance Disposal
ESS	Explosive Safety Submission
HE	High Explosive
IDA	Industrial Development Agency
IRFNA	Inhibited Red Fuming Nitric Acid
LAW	Light Anti-Tank Weapon
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MGFD	Munition with Greatest Fragment Distance
MPPEH	Material Potentially Presenting an Explosive Hazard
MSD	Minimum Separation Distance
NEW	Net Explosive Weight
OB/OD	Open Burning/Open Detonation
OD	Open Detonation

LIST OF ABBREVIATIONS (continued)

OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PAED	Public Access Exclusion Distance
QA	Quality Assurance
QC	Quality Control
RAB	Restoration Advisory Board
RTK GPS	Real Time Kinematics Global Positioning System
SEDA	Seneca Army Depot Activity
SRA	Saturated Response Area
SSHP	Site Safety and Health Plan
SUXO	Senior UXO Supervisor
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance

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 in 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 application, 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 Regulators 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 imposing 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 those 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 weapons 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, 4.3 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 on-site 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 §266.201.
Primary Explosives. 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 Exclusion Distance (PAED). The PAED is defined as longest distance of the hazardous fragment distance, inhabited building distance (IBD) for 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 weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 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., burial 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 in 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 from 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, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded 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 in 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.

1.1 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 at Seneca Army Depot in Romulus New York (Figure 1.1). This Completion Report summarizes and documents the ordnance removal activities performed by Parsons at the former Seneca Army Depot Activity (SEDA) sites included in this task order. These sites are the Former EOD Range (SEAD 57), the Former 3.5 inch Rocket Range (SEAD 46), the Former Rifle Grenade Range (SEAD 007-R-01), the Former EOD Area 2 and the Former EOD Area 3 (SEAD 002-R-001).

The main objective of this project was to complete the removal of Material Potentially Presenting an Explosive Hazard (MPPEH) from the four sites so that the property can be released by the U.S. Department of Defense (DOD) for transfer. The future use of the property is projected to fall under "Conservation/Recreation", which includes, but is not limited to, wildlife habitation, wildlife viewing, hiking/walking, and/or picnicking. Therefore, the Explosives Safety Submission (ESS) clearance depth was based on meeting the Public Access scenario for surface recreation. This report documents MPPEH removal activities completed to date for these properties.

All MPPEH removal activities were performed in accordance with the U.S. Department of Defense Explosive Safety Board (DDESB) approved ESS dated 8/18/2006, prepared by the Parsons as an amendment to the original ESS submitted in June of 1998. The revised ESS, together with this report and supporting documentation, is submitted as required by the original ESS.

1.2 BACKGROUND

SEDA is a former 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 plan entitled "Seneca Army Depot Reuse Plan and Implementation Strategy". This plan outlines the reuse potential of the installation for housing developments, industrial development, institutional and conservation/recreation uses upon transfer.

1.3 SITE DESCRIPTION

The four sites included under this task order make up an area of approximately 163 acres within the 10,587-acre SEDA property in Romulus, New York. The Site Map showing the sites included in this project and the locations of the storage magazines are presented on Figure 1-2.

Former 3.5-inch Rocket Range (SEAD 46)

SEAD 46 consists of approximately 45 acres on the north side of the Depot due east of the Ammunition Storage Area (Figure 1-3). Although the Archive Search Report (ASR) described SEAD 46 as a 3.5" Rocket Range, it is apparent based upon the findings of the intrusive investigation 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 Ordnance and Explosives Engineering Evaluation and Cost Analysis (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 (material potentially presenting an explosive hazard).

The majority of MPPEH recovered (M4071A 40mm practice grenades) were located at the south end, opposite the target berm. This probably reflects the site's use as a local training area in 1980's and 1990's.

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.

Former EOD Range (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 1-4). 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.

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 were mapped, 1,700 anomalies were

investigated and 954 recovered items 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. During the intrusive portion of the EE/CA investigation, all MD and MEC items identified were encountered between the ground surface and six inches below the surface.

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 SRA 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 SRA were found at SEAD 57. During the Shaw investigation a total of 75 anomalies were intrusively investigated at SEAD 57. From these 75 anomalies were four MPPEH items (a 75mm, a 75mm AP, a 105mm and an unknown bomb) were found and placed in storage for inspection and later disposal. 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 of heavy vegetation within the 1800 foot radius of SEAD 57 were partially investigated by clearing and grubbing ten foot wide transects every fifty feet in the heavily wooded area. Using this method Shaw cleared 17,000 liner feet of these transects using the "mag and flag" technique. This technique incorporates an instrument operator using an analog signal generated from the Schonstedt™ to detect the magnetic field generated by ferrous objects in the ground. When the instrument is passed through the magnetic field of the object it makes an audible sound. The operator than places a plastic pin flag at the location of the highest response from the instrument. The identified flag locations are later dug by the UXO Dig team. This method tends to return lower anomaly counts due to the nature of the instrument to detect ferrous only targets.

Grenade Range (SEAD 007-R-01)

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 1-5). The range contained wooden and armored vehicle targets, distance, boundary markers, and the range control tower (subsequently removed during this project). The ASR states that 40mm M407A1 and 35mm M73 sub-caliber practice 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 were reported to be present at the time of the ASR in 1998.

The OE EE/CA for the Grenade Range was finalized in February of 2004. During the OE EE/CA 65 100 X100 foot grids that made up 50% of the area was geophysical mapping at the Grenade Range using an EM-61 instrument. In addition to the 15 acres (65 grids), 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 grenade 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.

EOD Areas 2 and 3 (SEAD 002-R-01)

The EOD Area #2 and #3 (SEAD-002-R-01) are both located to the northwest of SEAD 46. EOD Area 2 is located on the western shore of the Duck Pond to the west of SEAD 46 as shown on Figure 1-6 and 1-7. 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 SEAD 13 - IRFNA site. The EOD Area 3 is located 250 feet to the north of the earthen berm in SEAD 46 as shown on Figure 1-7. The 2.5 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 PROJECT OBJECTIVES

The goal of this project was to identify and remove MPPEH from each of the four sites included in this task order so that the project sites can be released for transfer.

Site specific objectives include the following:

- Excavate the top six inches of soil from high density SRA anomaly areas (>600 anomalies per acre) created by saturated response in the geophysical data caused by Cultural Debris and Munitions Debris.
- Screen excavated soil to 5/8 of an inch to remove MPPEH and other oversize material from the excavated soil.
- Perform oversize sorting to separate the MPPEH and munitions debris (MD) from the cultural debris and organic oversize material generated by the screening process.
- Identify, investigate and remove MPPEH to a depth of 4 feet based on previous and newly conducted geophysical surveys.
- Remove and dispose of any remaining MD, MPPEH and cultural debris (CD) generated during the removal effort.

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
MUNITIONS RESPONSE

DEPT. ENVIRONMENTAL ENGINEERING

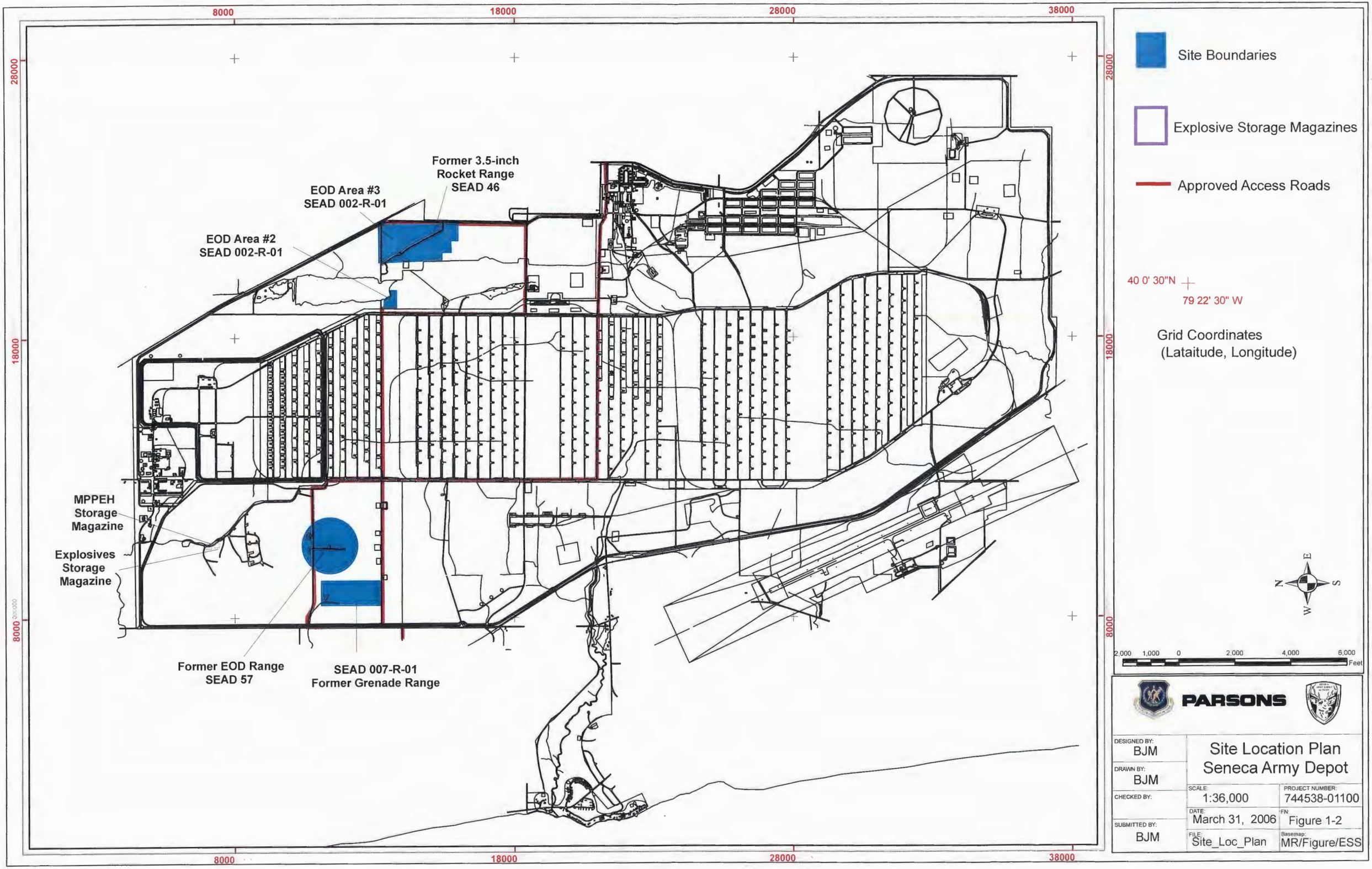
DWG NO. 744355-01000

FIGURE 1-1
LOCATION MAP

SCALE 1 INCH = 8 MILES, APPROX.

DATE March 31 2007

P:\PIT\Projects\Huntsville HTW\TO #26 Decision Docs for Completed Removals (67, 39, 40 & 122B)\ROD NFA (58, 63)\Figures\LOCMAP.CDR



PARSONS

DESIGNED BY: BJM	Site Location Plan Seneca Army Depot	
DRAWN BY: BJM		
CHECKED BY:	SCALE: 1:36,000	PROJECT NUMBER: 744538-01100
	DATE: March 31, 2006	FN: Figure 1-2
SUBMITTED BY: BJM	FILE: Site_Loc_Plan	Basemap: MR/Figure/ESS

1.5 PRIOR ORDNANCE AND EXPLOSIVES SITEWORK AND SUPPORT ACTIVITIES

The U.S Department of Defense Base Realignment and Closure Ordnance and Explosives Archives Search Report identified numerous sites including the four sites in this project for further consideration in 1998 (ASR 1998). In 2000, Parsons conducted an Ordnance Engineering Evaluation and Cost Assessment (February 2004) for all ordnance sites at Seneca Army Depot including the sites in this project. Additional investigation was conducted at SEAD 46 and 57 by the Shaw Group and the results were presented in the Geophysical Investigation Munitions Destruction Areas SEADs 46 & 57, Seneca Army Depot Activity, April 2005. The previous investigations defined the presence, density and extent of ordnance contamination at these sites. This information was used to support this project.

2.0 SITEWORK

All site work for the Munitions Response project can be broken down to two activities. The first is the geophysical mapping and intrusive investigations of selected targets know as the intrusive investigation and the second is the physical removal and sorting of SRA soil from areas where individual anomaly locations cannot be identified in the geophysical data.

2.1 MOBILIZATION

Parsons mobilized personnel, equipment, materials, and subcontractors to SEDA starting on May 7th 2006, to perform site work and MPPEH removal activities following the Notice to Proceed. The field team consisted of a Site Manager, Site Safety and Health Officer/Quality Control Officer (UXOQC), Geophysical data collection/Reacquisition teams, two Dig teams and a Senior UXO Supervisor (SUXOS). This included mobilization of ordnance removal subcontractor USA Environmental (USA), and site work subcontractor Sevenson Environmental Services Inc. (Sevenson)

The following list summarizes the primary equipment that was used for this project:

Sitework Equipment	Manufacturer
Excavators:	Hitachi, JD 450, Komatsu, Kobelco
Screening Plant:	1200 Powerscreen
65-ft. Conveyor:	M-65
Front-end Loader:	Volvo L90,
Bulldozer:	JD850
Off-Road Dump Truck:	Volvo A35C
Water Trucks:	Miscellaneous
Safety Booth:	Per ESS (App. D)
Belt Magnet:	Dings
Head Pulley Magnet:	Dings
Ferrous Only Metal Detectors:	Schonstedt GX72
Magnetometer:	Geometrics G858 Gradiometer
Geonics EM61-MKII:	Geometrics Canada
Global Positioning System:	Trimble RTK

All earthmoving equipment that was utilized during the MPPEH removal effort was fitted with 2-inch Plexiglas® protective shields in order to protect the operator from the possibility of unintentional detonations. The shields were applied over the existing equipment cab(s). The required thickness of 1.94 inches of Plexiglas® and 3/8 inch steel was calculated and approved by USAESCH, using THOR equations for fragment penetration from TM 5-1300 and by using the Q-D Most Probable Munitions, for the 37 millimeter (mm) Projectile and the MK II Grenade. These two items were established as the MPM based on the two previous investigations performed at the site. In

addition to the protective shields, sifting equipment, and safety booths were modified as necessary to meet the minimum plating requirements listed in the fragmentation data review forms provided by the Army.

2.2 SITE PREPARATION

Following mobilization of equipment and personnel, all open areas were mowed to 8 inches to allow the anomaly investigation team's unrestricted access to the work site. A weed killer was applied to the SEAD-57 high density anomaly area to remove vegetative matter that would hinder the screening process prior to the excavation of the material. The woods and transect investigation areas were cleared of heavy brush using a HYDROAX™.

The soil screening equipment was set up at SEAD 57 since 90 percent of the soil planned for excavation was situated there. Once the SEAD 57 screening equipment work area was established, the dig teams performed a surface sweep and investigated all the identified anomalies in the lay down area. After site setup was completed all other work zones and support zones were established to ensure that independent team separation distance of 200 foot distances could be maintained.

Site access and control to SEAD 57 and the Grenade Range was maintained through a central gate located east on the East West Patrol Road and outside the established limits of the 980 ft Public Access Exclusion Distance (PAED). Only essential personnel were allowed within this area during geophysical data collection, reacquisition, anomaly investigation, soil excavation and soil sifting operations. Non-essential personnel were not allowed on-site or within the PAED during active intrusive operations.

SEAD 46 and EOD Area #2 and Area #3 site access was controlled by a locked gate and security fence. The gate to EOD #2 is located within the ammo area on the former Romulus Road where it crosses the Duck Pond. SEAD 46 and EOD Area 3 have site access controlled at the gate located at the junction of Wastewater Treatment Plant No.2 road and the East Patrol Road. Both of the sites are located ½ mile from this gate which is well outside the established PAED for these sites.

2.3 SOIL EXCAVATION

The best method of MPPEH removal for high density anomaly areas was determined to be excavation of SRA soil followed by mechanical screening of the excavated material to remove MPPEH and MD from the excavated soil. This section describes the excavation process and the results. It should be noted that the mechanical screening process was abandoned after screening only 10 cubic yards due to reasons discussed below. Accordingly, the actual excavation and screened volumes are much less than originally anticipated.

Initially, excavation was planned for several areas at SEAD 46 and 57:

- A saturated response area northwest of the SEAD 46 backstop (SEAD 46 SRA);
- Front face of the back stop berm at SEAD 46 (SEAD 46 berm);
- SEAD 57 kick out area extending away from the SEAD 57 berm predominantly in the northwest direction to 250 feet (SEAD 57 kick out);

- Interior face of the SEAD 57 horseshoe berm (SEAD 57 berm); and
- A saturated response area north west of the SEAD 57 berm (SEAD 57 SRA).

Generally, soil was excavated to a depth of 6 inches unless otherwise indicated with equipment shielded according to requirements presented in Appendix D.

SEAD 46 SRA

Fourteen 3 foot by 10 foot test pits totaling 24 cys were excavated in the SEAD 46 SRA to investigate the source of the saturated geophysical response. These test pits revealed only non-military cultural debris (CD) such as broken pottery and glass, animal bones and rusted farm debris. It is believed that this area is a dump site that predates the creation of the Army depot likely placed there prior to 1942. The test pits were backfilled and a surface sweep of the area was performed by the SUXOS and dig teams to verify no MD/MPPEH was present within the boundaries of this SRA. It was confirmed and this area was considered free of MPPEH.

SEAD 46 Berm

Twelve inches of soil totaling 298 cys was excavated from the front face of the berm at SEAD 46. After the first foot of soil was removed, the dig teams and SUXOS swept the front face and remainder of the hill with a Fisher metal detector to determine if most of the metallic debris had been removed during the initial excavation. As a result of the sweep, only small arms (0.50 caliber bullets and other assorted bullets) and cultural debris were encountered. To further investigate this area, a deeper test pit was excavated in the center of the berm since soil staining was observed. A wooden stand was removed, and it is believed based on historic photographs that this test stand was used to hold the rocket motor of the 3.5 "rocket for function testing of the motor assembly. No 3.5" rocket warheads or motors were found at this site, only what appears to be the function tests stand built into the backstop. The SUXOS determined that no MPPEH was present in the SEAD 46 berm.

SEAD 57 Kick-out Area

Excavation was planned for an approximate 12 acre area surrounding the berm at SEAD 57. Initially, a small portion of the total area was excavated using a shielded excavator. The remainder of the area was not excavated due to the poor results of the screening process. A total of 532 cy of material was excavated and stockpiled. During excavation, aluminum fragments similar to those found outside the planned excavation area were found in the top six inches of the excavated material. These fragments were determined to be from the M-123 photo flash pyrotechnic. This device produces a 20 to 600 million candlepower flash when functioned and was designed to be used for aerial night photography. Its use at SEAD 57 is unknown but is assumed to be part of a confidence training exercise where the device was functioned in the demo berm and exercises were performed in the surrounding area. It was determined that these fragments are the result of a training exercise area for pyrotechnic devices and not a potential source of MPPEH based on the following criteria.

1. Based on the intrusive investigation and geophysical data interpretation indicates that the majority of the anomalies within the 400 foot radius of the demo berm radiate out from the center of the berm and are found in the top 6 inches of the soil.
2. The M123 photoflash device is a pyrotechnic flare and not a listed military explosive item.
3. The M123 device was functioned by military personnel as part of a training exercise and not part of a demolition operation greatly reducing the possibility of unexpended devices remaining onsite.

Of the 1274 aluminum MD fragments that make up 20% of all investigated anomalies at SEAD 57, from the M123 photoflash device found during the investigation, no intact items were encountered.

Since the non-ferrous items were not considered as potential MPPEH items, it was determined that investigations of the remaining areas that were not excavated would be investigated using a ferrous only detector. Use of a ferrous only detector allows the dig teams to distinguish and remove individual ferrous targets in the remaining saturated areas without mass excavation/screening. This effort is discussed later.

SEAD 57 Berm

Twelve inches of soil totaling 126 cy was removed from the interior of the SEAD 57 berm using a shielded excavator and performed under the supervision of the SUXOS and UXO Safety Officer (UXOSO). Following removal of the soil from the interior berm face, the entire berm (interior and exterior face) and interior floor was swept by the SUXOS using a Fisher all metal detector for any remaining MPPEH/MD.

The post-excavation sweep found evidence of pyrotechnic flares and an expended 155 mm artillery shell. The flares were later determined to be Mk25 drift signals that had been previously subjected to an open burning procedure, with only the empty case and the flotation chamber remain in tact. The 155 mm artillery shell consisted of the case only without the fuse or ojive. The entire top of the round had been previously subjected to a demolition procedure and the case was badly damaged from the rotating band to the top of the casing.

An additional two feet of soil was removed from the berm floor since this material had eroded from the interior face over time. Charcoal and charred soil was discovered in the center of the berm floor. This area was over excavated down to the bedrock to remove all of the burned material and stained soil. In the remains of this burn pit were several M73 LAW rocket motors, M25 drift signal cases and various linked ammunition all in the unfired blank configuration. The burn pit excavation totaled 42 cy of material.

All excavated material was transported to the SEAD 57 soil screening area for screening.

2.4 SOIL SCREENING AND PROCESSING

The objective of the soil screening process was to separate the MPPEH and MD from the excavated soil removed from SEAD 57 and 46 SRA. The previously excavated soil was removed from the stockpile area by a shielded loader was placed into a grizzly screen where all material greater than 6

inches would be retained as gross oversize material to be screened by the dig teams later. The remaining material passing the 6 inch screen would drop into a rotating tiller designed to break up soil clumps and homogenize the material before the 5/8 inch screen. The tilled material would then pass up an in feed conveyer to a vibrating 5/8-inch wire screen. The 5/8-inch screen was selected because the smallest munitions item found at either site was a 20mm projectile which has a least dimension of 0.78-inch which is larger than the 5/8-inch screen openings. The material from the tiller was passed onto a conveyor with an active cross belt magnet designed to remove ferrous material from the retained oversize material. The cross belt magnet would remove all large ferrous items from the conveyor and drop them into a steel container reducing the amount of material the teams would have to sort. Any smaller ferrous material that passed the 5/8 screen in the out-feed conveyor not removed by the cross belt magnet would be retained by a magnetic head pulley at the end of the final conveyor. The remaining non-ferrous soil and less than 5/8 remaining munitions debris that pass the magnetic separation system would be conveyed to a stockpile by a stack out conveyor. This material (less than 5/8 inch with ferrous material removed) would be the cleaned material ready for backfill.

The entire mechanical sorting operation was automated and only required the presence of one operator and one observer on the line. The operator was shielded from fragments in a shielded loader and maintained K24 blast overpressure distance, and fed soil into the initial grizzly screen. The processing line was observed by one UXO Technician located in a Blast Shield Protective Device (see Appendix B) located outside the K24 distance.

As a trial run for the screening plant, approximately 10 cys of stockpile material from the SEAD 57 berm was run through the plant to determine the optimum throughput for the separation process. Based on this test run, it was determined that the 5/8 inch screen needed to capture the 20mm projectile was not efficient at separating the soil fines from the oversize material. As the material passed the tiller and was moved up the input conveyor the soil clumped together causing the majority of the material soil, oversize, MD/MPPEH and soil clumps to be retained as oversize and very little soil actually passed through the 5/8 inch screen. For this reason, the mechanical separation process was abandoned.

Excavated Soil and Oversize Material Inspection

The stockpiled soil that was not screened (99%) and the oversize material from the test run was transported from the stockpile area to the lay down area and pushed out in 1 foot lifts using a shielded bulldozer and cleared by UXO Technicians using the Schonstedt GX-72 magnetometer to identify individual items within the excavated material.

2.5 GEOPHYSICAL MAPPING

Geophysical surveys were performed at the four sites in two separate mapping efforts to identify and target anomalies for intrusive investigation. In accordance with the ESS, the specific objective of the mapping effort was to identify all possible MPPEH items to a clearance depth of 4 feet based on meeting the detection limits of the geophysical prove out grid the results of this proveout are presented below in table 2-1.

Previously, EM61-MKII data collected by SHAW in April of 2005 at SEADs 46 and 57. SHAW identified 5746 anomalies in SEAD 46 and 57 that required investigation/removal.

As part of this project, geophysical mapping was performed at SEAD 57, SEAD 007-R-01 and SEAD 002-R-01 to supplement the previous data collection efforts. Surveys were completed using a Geometrics G858 gradiometer and EM61-MKII towed array. From this geophysical investigation, an additional 4256 targets were identified for investigation/removal resulting in 10,002 anomaly targets investigated during this removal effort. A breakdown by site of the investigated targets is presented in table 2-2.

Table 2 -1
Summary of Geophysical Proveout

Table 2-1
SENECA ARMY DEPOT ACTIVITY
MUNITIONS RESPONSE
GEOPHYSICAL PROVE-OUT RESULTS EVALUATION

GPO Grid	Seed Item ID	Easting	Northing	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in data?	Detected by Parsons
West GPO Grid	W-1	736178.4	1011702.9	2X24 pipe	18	0	horizontal	Yes	Yes
West GPO Grid	W-2	736191.6	1011710.4	2X18 pipe	6	295	45	Yes	Yes
West GPO Grid	W-3	736210.1	1011698.9	2X24 pipe	28	355	horizontal	Yes	Yes
West GPO Grid	W-4	736227.8	1011714.2	75mm projectile	17	0	vertical	Yes	Yes
West GPO Grid	W-5	736233.8	1011703.7	3" Stokes Mortar	8.5	305	horizontal	Yes	Yes
West GPO Grid	W-6	736248.5	1011713.6	75mm projectile	16	20	horizontal	Yes	Yes
West GPO Grid	W-7	736247.8	1011748.0	75mm projectile	39	346	45	Yes	Yes
West GPO Grid	W-10	736196.7	1011813.8	MK2 fragmentation grenade	13	220	horizontal	Yes	Yes
West GPO Grid	W-11	736173.3	1011847.5	3" Stokes Mortar	38	75	horizontal	Yes	Yes
West GPO Grid	W-12	736188.9	1011855.6	MK2 fragmentation grenade	18	15	horizontal	Yes	No
West GPO Grid	W-13	736263.4	1011836.8	MK2 fragmentation grenade	22	0	horizontal	No	Yes
West GPO Grid	W-14	736228.6	1011841.7	.5X3.5 PIPE	15	0	horizontal	Yes	No
West GPO Grid	W-15	736224.7	1011843.2	.5X3.5 PIPE	15	0	horizontal	Yes	No
West GPO Grid	W-17	736252.9	1011870.9	3" Stokes Mortar	8	not recorded	vertical	Yes	Yes
West GPO Grid	W-18	736169.6	1011904.8	.5X3.5 PIPE	18	not recorded	vertical	Yes	No
West GPO Grid	W-19	736168.1	1011905.3	.5X3.5 PIPE	16	90	horizontal	Yes	No
West GPO Grid	W-20	736212.4	1011911.9	75mm projectile	32	0	horizontal	Yes	Yes
West GPO Grid	W-21	736248.1	1011935.4	3" Stokes Mortar	41	90	45	Yes	Yes
West GPO Grid	W-22	736248.2	1011973.9	75mm projectile	35	0	horizontal	Yes	Yes
West GPO Grid	W-23	736198.2	1011976.6	75mm projectile	42	n/a	vertical	Yes	No
West GPO Grid	W-24	736173.6	1011955.2	simulated disposal pit, 7 (total) 75mm Mortars	36 to 48	not recorded	various	Yes	Yes
West GPO Grid	W-25	736237.9	1011936.0	.5X3.5 PIPE	19	90	horizontal	No	No
West GPO Grid	W-26	736237.9	1011943.0	.5X3.5 PIPE	23	90	horizontal	No	No
West GPO Grid	W-27	736237.9	1011954.0	.5X3.5 PIPE	22	90	horizontal	No	No
West GPO Grid	W-28	736237.9	1011961.0	.5X3.5 PIPE	19	90	horizontal	No	No
West GPO Grid	W-29	736237.9	1011974.0	.5X3.5 PIPE	19	90	horizontal	No	No

Notes
1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-1
SENECA ARMY DEPOT ACTIVITY
MUNITIONS RESPONSE
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GPO Grid	Seed Item ID	Easting	Northing	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in data?	Detected by Parsons
West GPO Grid	W-30	736237.9	1011980.0	.5X3.5 PIPE	7	n/a	vertical	Yes	Yes
West GPO Grid	W-8A	736207.5	1011755.9	2X24 pipe	25	235	45	Yes	Yes
West GPO Grid	W-8B	736204.7	1011759.9	2X24 pipe	26	330	45	Yes	Yes
West GPO Grid	W-9A	736238.7	1011777.5	75mm projectile	16	0	vertical	Yes	Yes
West GPO Grid	W-9B	736241.9	1011777.5	75mm projectile	26	185	horizontal	Yes	Yes
West GPO Grid	W-16	736202.7	1011890.7	60mm Mortar	31	not recorded	horizontal	Yes	No
South GPO Grid	S-1	738193.2	1009870.2	.5X3.5 PIPE	8	45	horizontal	Yes	Yes
South GPO Grid	S-2	738186.0	1009882.6	.5X3.5 PIPE	9	0	horizontal	Yes	Yes
South GPO Grid	S-3	738184.0	1009905.2	.5X3.5 PIPE	10	90	horizontal	Yes	No
South GPO Grid	S-4	738206.7	1009937.7	.5X3.5 PIPE	6	90	horizontal	Yes	Yes
South GPO Grid	S-5	738226.6	1009940.7	.5X3.5 PIPE	6	0	horizontal	Yes	No
South GPO Grid	S-6	738216.6	1009957.0	.5X3.5 PIPE	7	0	horizontal	Yes	Yes
South GPO Grid	S-7	738258.6	1009948.4	.5X3.5 PIPE	12	0	horizontal	Yes	No
South GPO Grid	S-8	738293.6	1009947.9	.5X3.5 PIPE	12	90	horizontal	Yes	Yes
South GPO Grid	S-9	738301.8	1009916.1	.5X3.5 PIPE	12	45	horizontal	Yes	Yes
South GPO Grid	S-10	738285.3	1009889.5	.5X3.5 PIPE	11	n/a	vertical	Yes	Yes
South GPO Grid	S-11	738246.6	1009892.4	.5X3.5 PIPE	12	n/a	vertical	Yes	Yes
South GPO Grid	S-12	738197.3	1009884.9	.5X3.5 PIPE	12	n/a	vertical	Yes	Yes
South GPO Grid	S-13	738169.8	1009912.0	1.25X5 PIPE	15	90	horizontal	Yes	Yes
South GPO Grid	S-14	738165.9	1009928.0	1.25X5 PIPE	15	0	horizontal	Yes	Yes
South GPO Grid	S-15	738218.1	1009925.0	1.25X5 PIPE	15	0	horizontal	Yes	No
South GPO Grid	S-16	738345.9	1009934.2	2X17 PIPE	24	90	20	Yes	Yes
South GPO Grid	S-17	738338.2	1009939.1	2X5 PIPE	15	n/a	vertical	Yes	Yes
South GPO Grid	S-18	738326.5	1009924.5	2X5 PIPE	15	n/a	vertical	Yes	Yes
South GPO Grid	S-19	738274.7	1009917.7	75MM	21	0	horizontal	Yes	Yes
South GPO Grid	S-20	738273.8	1009918.9	1.25X5 PIPE	7	n/a	vertical	Yes	Yes
South GPO Grid	S-21	738242.3	1009931.0	75MM	21	0	horizontal	Yes	Yes

Notes
1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-1
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MUNITIONS RESPONSE
GEOPHYSICAL PROVE-OUT RESULTS EVALUATION

GPO Grid	Seed Item ID	Easting	Northing	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in data?	Detected by Parsons
South GPO Grid	S-22	738263.2	1009923.4	75MM	21	135	horizontal	Yes	Yes
South GPO Grid	S-23	738220.9	1009908.5	1.25X5 PIPE	11	n/a	vertical	Yes	Yes
South GPO Grid	S-24	738219.0	1009910.5	75MM	22	90	horizontal	Yes	Yes
South GPO Grid	S-25	738216.5	1009915.6	1.25X6 PIPE	15	n/a	vertical	Yes	Yes
South GPO Grid	S-26	738214.9	1009920.8	2X7.5 PIPE	19	n/a	vertical	Yes	Yes
South GPO Grid	S-27	738210.7	1009919.8	2X7.5 PIPE	16	90	horizontal	Yes	Yes
South GPO Grid	S-28	738212.0	1009927.4	2X7.5 PIPE	15	90	horizontal	Yes	Yes
South GPO Grid	S-29	738184.9	1009935.4	75MM	30	0	horizontal	Yes	No
South GPO Grid	S-30	738175.7	1009941.1	75MM	24	45	not recorded	Yes	Yes
South GPO Grid	S-31	not recorded	not recorded	empty back-filled hole	20	n/a	n/a	No	No
South GPO Grid	S-32	738180.4	1009921.1	2X18 PIPE	16	n/a	vertical	Yes	Yes
South GPO Grid	S-33	738182.6	1009922.0	Two 2X7.5	12	0	horizontal	Yes	Yes
South GPO Grid	S-34	738184.8	1009921.5	2X18 PIPE	4	n/a	vertical	Yes	Yes
South GPO Grid	S-35	738184.4	1009923.8	2X18 PIPE	5	45	not recorded	Yes	Yes
South GPO Grid	S-36	738182.6	1009925.4	2X18 PIPE	4	80	not recorded	Yes	Yes
South GPO Grid	S-37	738181.2	1009923.5	2X18 PIPE	15	n/a	vertical	Yes	Yes
South GPO Grid	S-38	738198.5	1009913.7	empty back-filled hole	24	n/a	n/a	No	No
South GPO Grid	S-39	738197.9	1009911.5	empty back-filled hole	24	n/a	n/a	No	No
South GPO Grid	S-40	738301.7	1009925.5	2X18 PIPE	17	60	horizontal	Yes	Yes
South GPO Grid	S-41	738318.9	1009937.3	2X18 PIPE	17	n/a	vertical	Yes	Yes
South GPO Grid	S-42	738326.4	1009934.5	2X18 PIPE	18	90	45	Yes	Yes
South GPO Grid	S-43	738347.7	1009919.8	2X18 PIPE	20	0	45	Yes	Yes
South GPO Grid	S-44	738354.1	1009909.9	2X22 PIPE	24	90	horizontal	Yes	Yes
South GPO Grid	S-45	738314.7	1009913.8	2X22 PIPE	20	0	horizontal	Yes	Yes
South GPO Grid	S-46	738216.8	1009946.0	2X24 pipe	25	0	20	Yes	Yes
South GPO Grid	S-47	738194.4	1009950.9	2X18 PIPE	12	0	80	Yes	Yes
South GPO Grid	S-48	738189.1	1009953.1	1.25X6 PIPE	11	0	horizontal	Yes	No

Notes
1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-1
SENECA ARMY DEPOT ACTIVITY
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GEOPHYSICAL PROVE-OUT RESULTS EVALUATION

GPO Grid	Seed Item ID	Easting	Northing	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in data?	Detected by Parsons
South GPO Grid	S-49	738184.6	1009956.9	1.25X5 PIPE	11	90	horizontal	Yes	No
South GPO Grid	S-50	738189.6	1009959.6	1.25X5 PIPE	11	90	horizontal	Yes	Yes

Notes
1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-2

Summary of Targets by Category

	Munitions Response Site			
	SEAD 57	SEAD 46	SEAD 007-R-01	SEAD 002-R-01
Munitions Debris	2828	586	708	6
MEC	2	-	-	-
MPPEH	38	15	220	1
Cultural Debris	3578	1009	969	42
Dig Totals	**6446**	**1610**	**1897**	**49**

The target list presented in Table 2-2 above represents the minimum number of reacquired target locations that were investigated during geophysical anomaly investigation and clearing activities. In addition to this target list, a total 224,000 square feet of woods transect (listed on Table 2-6 in Appendix D) and 2.1 acres of mag and flag area were investigated at EOD #3 Figures 1-2, 1-3, 1-4 and 1-5 show the locations of woods transects and all identified anomalies targeted for investigation.

2.6 GEOPHYSICAL PROVEOUT

Previously established grids consisting of numerous seed items were established during subsequent geophysical survey efforts at Seneca. The prove-out grids contain a number of different objects of a variety of sizes that reflect the expected items and depth to be encountered at the areas covered under this task order. This test grid procedure is utilized to determine peak detection and cut-off levels for each of the four areas former activities. The geophysical data collected over two of the three existing prove-out grids used previously during the EE/CA and Time Sensitive Geophysical Investigation was compared to the previous data collection for depth of detection and positional accuracy. Results of this investigation are presented in Table 2-1 in this section.

2.7 ANOMALY INVESTIGATION

Intrusive investigations of identified anomalies based on collected geophysical data were performed using two, three-man teams of pre-qualified UXO technicians working under the supervision of the Senior UXO Supervisor (SUXOS). The identified geophysical anomaly locations from the collected geophysical data were converted from X, Y coordinates to a local coordinate system based in the State Plane system for Central New York (North American Datum 1983, Central New York). The northing and easting locations were uploaded to the Trimble 5700 DGPS survey equipment to be physically located by a surveyor in the field. Once the identified location was found, the surveyor places a plastic pin flag at the location +-.5 feet. This pin flag had the anomaly ID written on the flag so the anomaly could be identified when it was reached in the field by the teams. After the location was marked out the reacquisition team returned to the location with the EM61 MKII set up to verify that the location and anomaly response were accurate for the selected anomaly. If the anomaly location had a similar response to the original data collection, the anomaly and response were entered into the hand held PDA to be added to the "anomalies to be investigated" list. This process verified that all anomalies that the dig teams were sent to investigate were relevant and no positioning or processing error was encountered in the data collection process.

Once all of the identified anomalies for a given grid were reacquired and verified in the field, the three man dig team of UXO technicians swept the area within 24 inches of the flagged locations to remove any MPPEH/MD that was located on the surface. The anomaly location was than investigated by hand digging the anomaly to identify its source. The results of the investigation were than recorded on electronically on the PDA All spoils material was left on the surface to allow for post investigation QC inspection of the open excavation. When the dig team identified the source of the anomaly, the results of the investigation for that anomaly ID was recorded in the PDA where the result was stored

until it was uploaded to the database at the end of the day. If MPPEH was encountered during the investigation it was sandbagged and moved to the storage bunker at the end of the day. All cultural debris and MD were removed from the area and placed in the scrap bin to be disposed of upon completion of the project as non-hazardous scrap metal.

All anomalies targeted anomalies were investigated by the dig teams for each of the four sites covered in this investigation. During the anomaly investigation summary process, the anomaly ID number, material type (MPPEH, MD, cultural debris, or non-contacts), location from pin flag, and depth information were recorded by the UXO technicians on the PDA and updated the database at the end of each day.

A summary of the anomaly investigation results is provided in the appendix on Table 2-3. A total of 10,002 anomalies were intrusively investigated by the dig teams

In all, a total of 10,002 identified anomalies were intrusively investigated. The breakdowns of items by type were MPPEH (279), MD (4,423), cultural debris (4,405), QA seed items (86), and no contacts (807). The MPPEH items were further investigated and only two MEC items were identified. The MPPEH items found at the four sites are listed in Table 2-3. This table lists the item found, depth grid number, and Anomaly ID number. Out of a total of 10,002 anomalies, only two items were identified as MEC. Of the 279 MPPEH items found during the removal effort, all MEC and MPPEH were encountered in the top 10 inches. Table 2-3 shows a list of the MPPEH items recovered during this investigation. The two items from SEAD 57 were reclassified as MD after they were vented during the disposal process. These two items that were classified as MEC were one fused and unfired 37mm projectile and a fused and one MKII Grenade. A list of all 10,002 anomalies and the result of the investigation are listed in Appendix A on Table 2-4.

Insert Table 2-3 MPPEH table

Table 2-3

Seneca Army Depot - Munitions Response and CERCLA Closure

MPPEH Items Encountered During Intrusive Investigations 5/7/06 to 10/16/06

Anomaly Investigation Generated MPPEH

SEAD 57	Contractor	Date investigated	Classification	Quantity	Depth (in)	Final Disposition	Location
20mm Projectile	Parsons	6/8/2006	MPPEH	3	6	Disposal 6/21/05	SEAD 57
20mm	Parsons	6/8/2006	MPPEH	1	3	Disposal 6/21/05	SEAD 57
20mm	Parsons	6/8/2006	MPPEH	1	2	Disposal 6/21/05	SEAD 57
BLU 26B	Parsons	6/20/2006	MPPEH	1	5	Disposal 6/14/06	SEAD 57
BLU 3	Parsons	6/20/2006	MPPEH	1	3	Disposal 6/21/05	SEAD 57
BLU 18B	Parsons	6/14/2006	MPPEH	1	0	Disposal 6/21/05	SEAD 57
BLU 63	Parsons	6/15/2006	MPPEH	1	3	Disposal 6/21/05	SEAD 57
WAAMPM BLU 54	Parsons	6/14/2006	MPPEH	1	3	Disposal 6/21/05	SEAD 57
2.36 inch Rocket warhead	Parsons	6/20/2006	MPPEH	1	4	Disposal 6/21/05	SEAD 57
M127 - Signal Ground	Parsons	6/20/2006	MPPEH	1	6	Disposal 9/27/06	SEAD 57
20mm Projo	Parsons	6/19/2006	MPPEH	4	6	Disposal 9/27/06	SEAD 57
37mm APT	Parsons	6/21/2006	MPPEH	4	6	Disposal 9/27/06	SEAD 57
40mm TPT	Parsons	6/20/2006	MPPEH	4	0	Disposal 9/27/06	SEAD 57
3" Stokes Mortar	Parsons	8/9/2006	MPPEH	1	2	Disposal 9/27/06	SEAD 57
3" Stokes Mortar	Parsons	7/5/2006	MPPEH	1	0	Disposal 9/27/06	SEAD 57
MK 25 Signal (drift)	Parsons	7/5/2006	MPPEH	1	5	Disposal 9/27/06	SEAD 57
MK 5 Nose Fuse	Parsons	7/5/2006	MPPEH	1	0	Disposal 9/27/06	SEAD 57
SEAD 46							28
75mm Projo	Parsons	8/23/2006	MPPEH	1	8	Disposal 9/27/06	SEAD 46
75mm Projo	Parsons	9/5/2006	MPPEH	1	10	Disposal 09/05/06	SEAD 46
MK-5 AT (UK)	Parsons	8/28/2006	MPPEH	1	2	Disposal 9/27/06	SEAD 46
Type 93 (Japan)	Parsons	8/28/2006	MPPEH	1	4	Disposal 9/27/06	SEAD 46
MK7A2 (USA)	Parsons	8/28/2006	MPPEH	1	6	Disposal 9/27/06	SEAD 46
M10 Landmine fuse	Parsons	8/28/2006	MPPEH	1	4	Disposal 9/27/06	SEAD 46
30MM TP	Parsons	8/23/2006	MPPEH	4	2	Disposal 9/27/06	SEAD 46
M103 Nose Fuse	Parsons	8/29/2006	MPPEH	1	2	Disposal 9/27/06	SEAD 46
M123 Tail Fuse	Parsons	8/23/2006	MPPEH	1	3	Disposal 9/27/06	SEAD 46
VT Nose Fuse	Parsons	8/23/2006	MPPEH	1	5	Disposal 9/27/06	SEAD 46
M27 Star Flare (Aircraft)	Parsons	8/23/2006	MPPEH	5	3	Disposal 9/27/06	SEAD 46
M48 Fuse	Parsons	7/5/2006	MPPEH	1	0	Disposal 9/27/06	SEAD 46
M60 Rifle Smoke Grenade	Parsons	8/23/2006	MPPEH	3	2	Disposal 9/27/06	SEAD 46
EOD #2							22
Electric Squibb	Parsons	8/3/2006	MPPEH	1	4	Disposal 9/27/06	EOD2
M16 APERS	Parsons	8/30/2006	MPPEH	1	0	Disposal 9/27/06	EOD2
SEAD 57N							2
MKII Grenade	Parsons	10/3/2006	MEC	1	6	Disposal 10/16/06	SEAD 57
37mm HEAT	Parsons	10/3/2006	MEC	1	4	Disposal 10/16/06	SEAD 57
2.36 inch Rocket warhead	Parsons	10/3/2006	MPPEH	5	5	Disposal 10/16/06	SEAD 57
20mm	Parsons	10/3/2006	MPPEH	10	7	Disposal 10/16/06	SEAD 57
GRENADE RANGE							17
37mm APT	Parsons	10/10/2006	MPPEH	2	4	Disposal 10/16/06	GR
57mm APT	Parsons	10/10/2006	MPPEH	3	3	Disposal 10/16/06	GR
2.36 inch Rocket warhead	Parsons	10/10/2006	MPPEH	1	4	Disposal 10/16/06	GR
M73 - Sub caliber round	Parsons		MPPEH	220	9	Disposal 9/27/06	GR
							226
						Total	293

2.8 GEOPHYSICAL QUALITY CONTROL / QUALITY ASSURANCE

The UXO QC/Safety Supervisor conducted a QA/QC audit in accordance with the work plan QA/QC requirements. This audit included placing items at the sites prior to data collection to determine if they could be relocated and a surface and subsurface check of a minimum of 10% of the anomalies investigated. In order to accomplish this, 10% of the investigated anomalies were revisited by the UXO QC and screened with the Fisher ID Exel™ all metal detectors to verify the dig teams had removed the item causing the anomaly from the location.

The UXO QC/Safety Supervisor inspected 10% of the anomalies that were investigated during geophysical quality control clearance activities within the specified grid using a Fisher ID Exel™ all metal detectors in accordance with the pass/fail criteria outlined in the project's work plan Section 3.4.7 (Analog instrument QC Survey). The pass/fail criteria for the final clearance specified that a grid would failed if, during the QC audit, a MPPEH item was found. Based on this requirement, all of the grids passed Parsons Analog QC inspection.

Throughout the subsequent 10% QC checks of the investigated locations, only one location had a piece of MD that was not removed by the dig team investigation. As a corrective action, all the anomalies that the team had investigated that day were revisited to confirm they were cleared by the team and passed subsequent QC.

Geophysical Survey QA was be performed by placing Stimulant seed items in the geophysical mapping survey area at the anticipated depth of detection. The seed items were aluminum and ferrous sections of 1 inch by 3 inch steel and 1.6 inch by 3 inch aluminum pipe stimulant items and were placed at known locations to provide a QA check of the identification, removal and detection procedure. The seed items were buried at the anticipated depth ranges of the anomalies to be investigated 6 to 12 inches. The locations of the buried items were surveyed in using the GPS at the time of burial and a table was made of the seed item locations and orientation table 2-5. As part of the geophysical data processing, the chosen anomaly target locations were compared to the Northing and Easting location of the seed items. The detection of a known item location was compared to the known (surveyed) location of the seed item. This process allowed a running QA check of the geophysical data location accuracy and target response threshold.

Some seed items were buried by the Army prior to the Shaw data collection effort and some were buried by Parsons at start of the geophysical data collection in May 2006 at SEAD 57 and SEAD 007-R-01 Table 2-5 in Appendix C shows the location, depth and orientation of each seed item that was placed in each area. At the SEAD 007-R-01, a mix of 65 aluminum and ferrous stimulant items were placed prior to data collection. All 65 items were identified during data collection and subsequently located during intrusive investigations.

At SEAD 57, 60 aluminum and ferrous stimulant items were placed prior to geophysical data collection. During data collection, all 60 of the items were identified in the data but only six were investigated due to the high density of aluminum MD at the site.

3.0 ORDNANCE AND EXPLOSIVES DEMILITARIZATION AND DISPOSAL

All MD and scrap metal items collected by UXO technicians on a daily basis, were transferred to a staging area, inspected by both the SUXOS and UXO QC Supervisor, and placed into locked storage area for temporary storage. At the time of final disposal, all MD items were inspected a total of four times. Once by UXO technicians upon initial recovery, a second time prior to being transferred to the secure storage area. The third and fourth inspection was performed by the Senior UXO Supervisor (SUXOS), and again by the Senior QC (UXOQCS) Supervisor prior to being transferred to drums where a 1348-1A Form was issued for each drum in storage. These procedures were performed in accordance with AFCEE R4 guidelines for the collection and disposal of Range Residue and Resource Recovery (R4).

3.1 INTENTIONAL DETONATIONS

Disposal operations for any encountered MPPEH were conducted at the Open Detonation Hill (OD) to the north of the former Open Burning Grounds (OBG). All disposal of MPPEH was conducted in accordance with "Procedures for Demolition of Multiple Rounds (Consolidate Shots) on MPPEH Sites", dated August 1998 and approved by DDESB on 27 October 1998. Explosives Consumption Records are included in Attachment D-3 in Appendix D. A table showing the suspected MPPEH items and the date they were vented is included as Table 2-3.

All demolition explosives were transferred from the Army to Parsons/USA Environmental and kept in a secure storage bunker provided by the Army. All explosives were inspected weekly while in storage and transported in accordance with the State of New York's Department of Labor, Industrial Rule 39 and the Department of Treasury, Bureau of Alcohol, Tobacco, and Firearms (ATF) regulations.

3.2 OTHER DEMILITARIZATION PROCEDURES

All projectiles and intact MD were demilitarized by either explosive venting or by the removal/deformation of the rotating bands and fuse wells following inspections. During MPPEH disposal operations, the UXO Safety Officer soaked and cleaned the mud from all projectiles to positively identify the item as either MPPEH or MD. All items that were identified as target practice or TPT were removed from the explosive venting procedure and were classified as MD needing further demilitarization (i.e., removal of rotating bands prior to disposal off-site).

Following detonation of all MPPEH items and , open burning of small arms, and/or physical removal demilitarization procedures, all cultural debris and scrap metal items were disposed of off-site. A total of 4,180 pounds of non-MD scrap metal was disposed of off-site. A total of 618 lbs. of aluminum MD and 2,689 pounds of ferrous MD scrap metal are currently drummed and is currently being stored onsite. A 1348-1A and chain of custody form has been issued for each of these drums and will be completed when a certificate of destruction is completed for this material.

Demobilization

Demobilization occurred in November 2006 following completion of the 10% QC inspection for all four sites.

3.3 CONCLUSIONS

Between May 2006 and November 2006, Parsons performed munitions removals operations in accordance with the revised ESS requirements. In general, the results of the munitions removal project performed at Seneca Amy Depot for SEAD 46, SEAD 57, SEAD 007-R-01 and SEAD 002-R-01, indicate that all MPPEH has been cleared from these sites. A total of two of the 10,002 identified anomalies which were investigated were found to be MEC. This indicates that these sites were free of MEC with the exception of an area north of SEAD 57 which may be indicative of the kick out from the Open Detonation Grounds. The Army believes that no additional munitions response activities are required at these sites. The conclusions from each individual site are provided below.

SEAD 57 (Former EOD Range)

The only MEC items encountered during this project were found north of SEAD 57 including one fused unfired 37mm projectile in Grid 57 K-16 and a MKII grenade located in 57K-18 as shown on Figure 1-4c. These items are believed to be kick out items from the Open Detonation Grounds located to the north of SEAD 57. This hypothesis is supported by the fact that most ferrous MD items at SEAD 57 were found north of Building T011 and were not found within the high density 400 foot kick out radius from the SEAD 57 berm. Figure 1-4c identifies all ferrous and aluminum MD items that were recovered as part of the SEAD 57 investigation. In this figure, the ferrous MD items are shown. The pattern of the aluminum MD clearly radiates out from the center of the SEAD 57 berm in a circular pattern. The ferrous MD also can be generally seen in a similar radial pattern originating from the north where the Open Detonation Grounds is located. This figure supports the contention that the two ferrous MEC items were generated as kick out from the area north of SEAD 57 and not a result of activities that took place at SEAD 57. The 43 other MPPEH items (listed on table 2-3) found at SEAD 57 were all determined to be MD upon venting of the items during the disposal process. SEAD 57 is considered cleared of MPPEH.

SEAD 46 (Former 3.5-inch Rocket Range)

During the investigation of SEAD 46, 22 suspected MPPEH items were found from the 1,611 geophysical anomalies investigated. All 22 suspected items were found to be MD after they were vented. No MEC items were found at SEAD 46. The locations of the MD suggest that the SEAD 46 berm was not used as a target for anything other than small arms practice. The MD items are actually found in areas located away from the berm. Based on the discovery of inert landmines and a sign that identifies the area as a practice minefield for EOD and military training exercises, this was most likely the use of the site. There is no evidence that it was used as a rocket range as previously identified. Based on the results of the past three investigations SEAD 46 is considered cleared of MPPEH.

SEAD 002-R-01 (EOD Areas 2 and 3)

Two suspected MPPEH items (an electric Squibb) were found at EOD Area 2 and it was later determined to be expended. The second item a M16 APERS was found by the survey team conducting a boundary survey of the pond low water mark. This item was found without a fuse but due to the mud and debris that filled the case the item was vented to dispose of any explosive residue that may have remained. At EOD Area 3, no MPPEH items were found during the geophysical anomaly investigation or the expanded handheld investigation of the unmapped area. SEAD 002-R-01 is considered cleared of MPPEH.

SEAD 007-R-01 (Grenade Range)

During the anomaly investigation of the Grenade Range, a total of 226 potential MPPEH items were found. All potential MPPEH was related to the M73 Practice LAW Rocket. The 40mm practice grenade found at this site has an inertia driven expelling system with no explosive material. The M73 Practice LAW Rocket has a 1.5 gram spotting charge of Composition Mix M80 and a rocket propellant of Composition M7. The 1.5 gram spotting charge is designed to produce only a flash, smoke and noise at the time of impact initiated by an inertia driven firing pin. Of the 220 M73 Sub-caliber rounds found none were found to have the rocket motor intact all had been functioned previously. Based on these reasons, all of the potential MPPEH items were reclassified as MD. All 220 of these rounds were brought to the demolition area and disposed of by detonation. SEAD 007-R-01 is considered cleared of MPPEH.

4.0 REFERENCES

U.S. Army Engineer Division. Huntsville, Alabama. July 1998-June 1999. *Explosive Safety Submission, Ordnance and Explosive Removal at the Open Burning Grounds*, Seneca Army Depot Activity, Romulus, New York.

U.S. Army Corps of Engineers, June 2001, EP 385-1-05a, *Basic Safety Concepts and Considerations for Ordnance and Explosives Operations.*

Air Force Center for Environmental Excellence, January 2002 *Range Residue Resource and Recovery (R4)*

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

b. PAM 385-64, Ammunition and Explosive Safety Standards dated 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. Department of Defense Explosives Safety Board (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.

d. DOD6055.9 STD "DOD Ammunition and Explosives Safety Standards" October 5, 2004, under Secretary of Defense for Acquisition, Technology & Logistics.

APPENDIX A

FIGURES

749000 749500 750000 750500

1007500 1007000 1006500 1006000 1005500

EOD Area #3

SEAD-46 BERM

749000 749500 750000 750500

997750

748750

Investigation Results

- Munitions Debris
- MPPEH items (Reclassified as MD)
- ARMY SEED Items
- Small Arms debris
- Cultural Debris

Grid Coordinates (New York State Plane, Central)

SRA Excavated Area

Woods Transect Investigation

N W E S

1611

100 50 0 100 200 300 Feet

PARSONS

DESIGNED BY: BJM	Munitions Removal Summary SEAD 46		
DRAWN BY: BJM			
CHECKED BY:	DATE: January 22, 2007	PROJECT NUMBER 745054-03300	
SUBMITTED BY: BJM	AERIAL PHOTOGRAPH 1989 2ft. Resolution	FN: Figure 1-3	
	FILE SEAD_46.APR	SCALE 1:2,500	

Munitions Debris	322
Removed MPPEH	16
Small Arms	212

738300.000
738800.000
739300.000
1010500.000
1010000.000
1009500.000
1009000.000
1008500.000

SEAD-57
Berm

250 Foot Radius

Munitions Response Summary

- SEAD 57 400f oot radius
- EM-61MKII Data Collection Area

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

N
W E
S

80 40 0 80 160 Feet

PARSONS

DESIGNED BY: BJM	EM-61MKII Data Collection Area SEAD 57
DRAWN BY: BJM	Print Date: March 31 2006 / FN: Figure 1-4a
CHECKED BY:	Areal Photograph: 1989 - 2 ft resolution / PROJECT NUMBER: 745054-03300
SUBMITTED BY: BJM	FILE: O:Seneca/MR/Parsons/S57 / SCALE: 1:2,250

738800.000

1009500.000

1009000.000

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

SEAD 57 grid network

Magnetometer Data Collection Area

N
W E
S

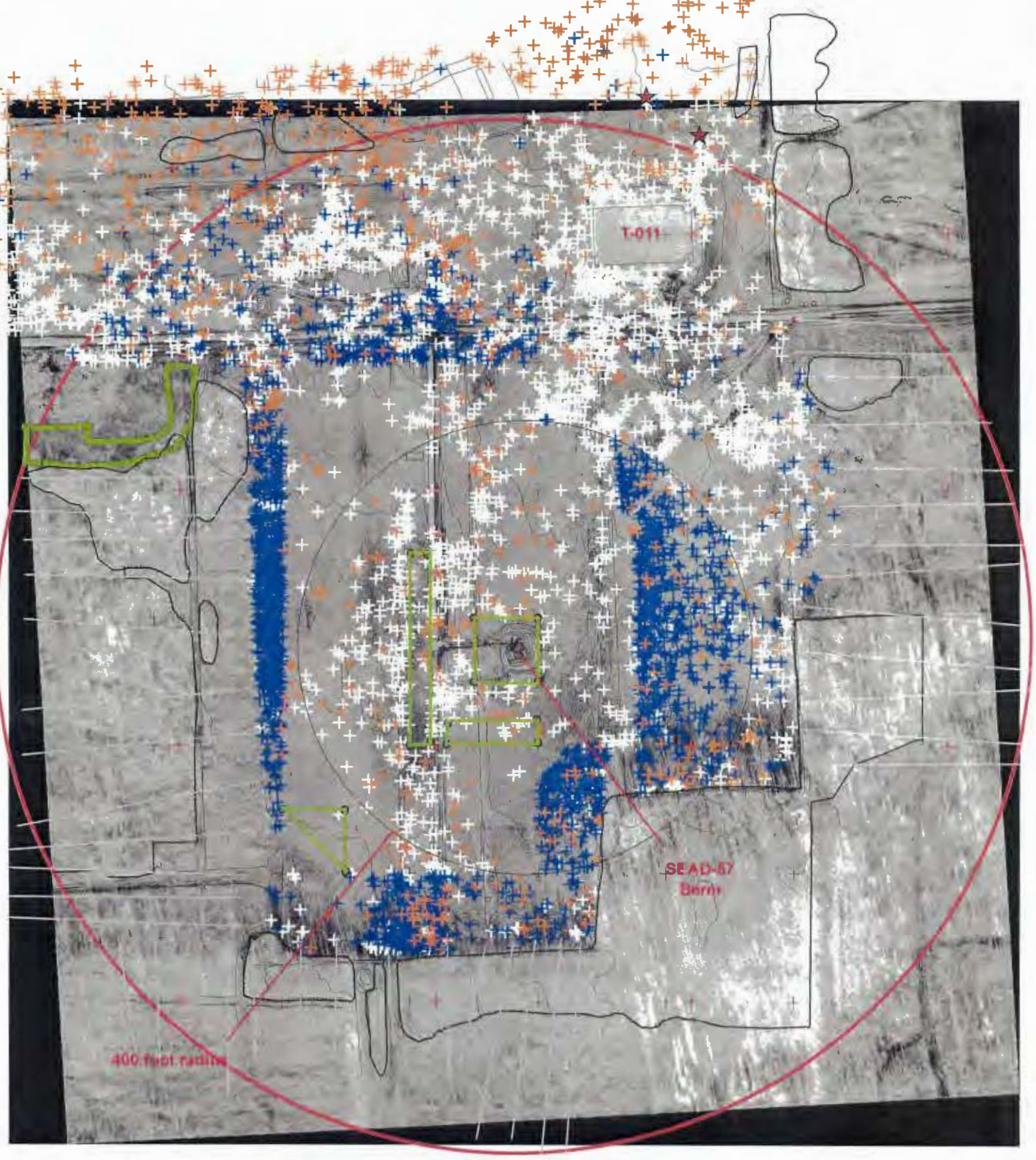
50 25 0 50 100 Feet

PARSONS

DESIGNED BY: BJM	Magnetometer Data Collection Area SEAD 57	
DRAWN BY: BJM	Print Date: March 31, 2007	FN: Figure 1-4b
CHECKED BY:	Aerial photograph: 1989, 2-ft. Resolution	PROJECT NUMBER: 744538-03300
SUBMITTED BY: BJM	FILE: O:Seneca/MR/Parsons/S57	SCALE: 1:1,000

737800.000 738300.000 738800.000 739300.000 739800.000

1010500.000 1010000.000 1009500.000 1009000.000 1008500.000 1008000.000



Munitions Response Summary

- SEAD 57 1000 foot radius
- SEAD 57 MEC
  1- 37mm (fused and unfired)
  1-MKII grenade (fuse intact)
- Aluminium Munitions Debris
- Ferrous Munitions Debris
- Trash and Cultural Debris

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

limit of 6 inch excavation

Woods Ttansect Investigation Area

N W E S

100 50 0 100 200 Feet

PARSONS

DESIGNED BY: BJM	Munitions Removal Summary SEAD 57	
DRAWN BY: BJM		
CHECKED BY:	Print Date: March 31 2006	FN: Figure 1-4c
SUBMITTED BY: BJM	Areal Photograph: 1989 - 2 ft resolution	PROJECT NUMBER: 745054-03300
	FILE: O:Seneca/MR/Parsons/557	SCALE: 1:3,000

+ Location of 40 mm M781 practice grenade

+ Location of M73 Subcaliber LAW

Location of Cultural Debris

Location of Target

Firing Point and Observation Tower

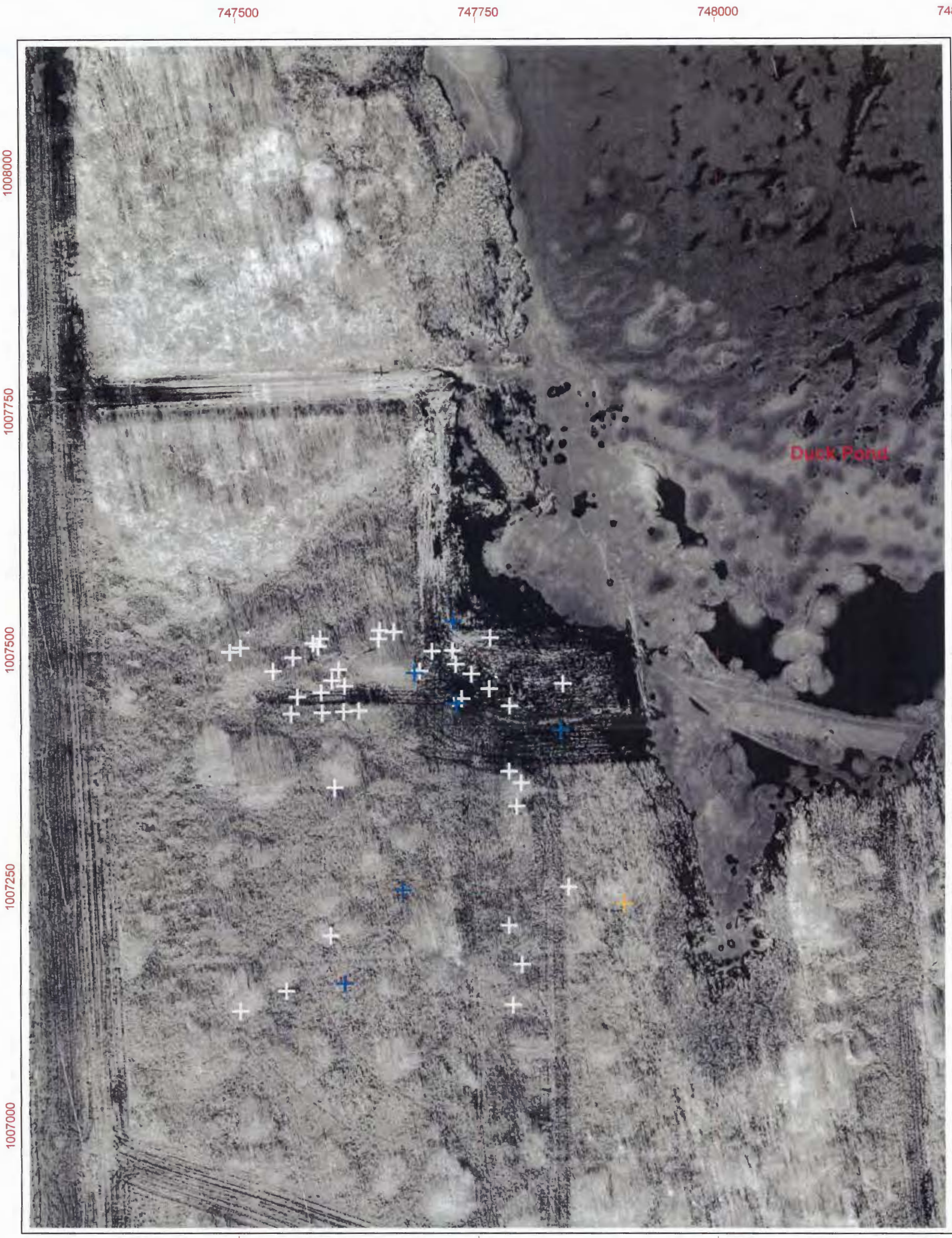
997750 + Grid Coordinates (New York State Plane, Central)
748750

N
W E
S

110 55 0 110 220 Feet

PARSONS

DESIGNED BY: BJM	Munitions Response Summary Grenade Range SEAD 007-R-01	
DRAWN BY: BJM		
CHECKED BY:	DATE: March 31, 2007	PROJECT NUMBER: 744538-01100
	AREIAL PHOTOGRAPH: 1989 2ft. Resolution	FN: Figure 1-5
SUBMITTED BY: BJM	FILE: GR_RNG.APR	SCALE: 1:1,495.197



+ MPPEH reclassified as MD
+ Munitions Debris
✚ Cultural Debris

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

N W E S

80 40 0 80 Feet

PARSONS

DESIGNED BY: BJM	Munitions Removal Summary EOD# 2 SEAD 002-R-01	
DRAWN BY: BJM		
CHECKED BY:	DATE PRINTED: March 31, 2007	PROJECT NUMBER: 745054-03300
	AREIAL PHOTOGRAPH: 1989 2 ft Resolution	FN: Figure 1- 6
SUBMITTED BY: BJM	FILE: EOD2.APR	SCALE: 1:1,000

749000 749500 750000 750500

1007500 1007000 1006500 1006000 1005500

EOD Area #3

Investigation Results

- Munitions Debris
- MPPEH items (Reclassified as MD)
- ARMY SEED Items
- Small Arms debris
- Cultural Debris

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

EOD #3 Investigation Area

Woods Transect Investigation

30 15 0 30 60 90 Feet

N W E S

PARSONS

DESIGNED BY: BJM	Munitions Removal Summary SEAD 002-R-01 EOD #3	
DRAWN BY: BJM		
CHECKED BY:	DATE: March 31, 2007	PROJECT NUMBER: 745054-03300
	AERIAL PHOTOGRAPH: 1989 2ft. Resolution	FN: Figure 1-7
SUBMITTED BY: BJM	FILE: SEAD_46.APR	SCALE: 1:700

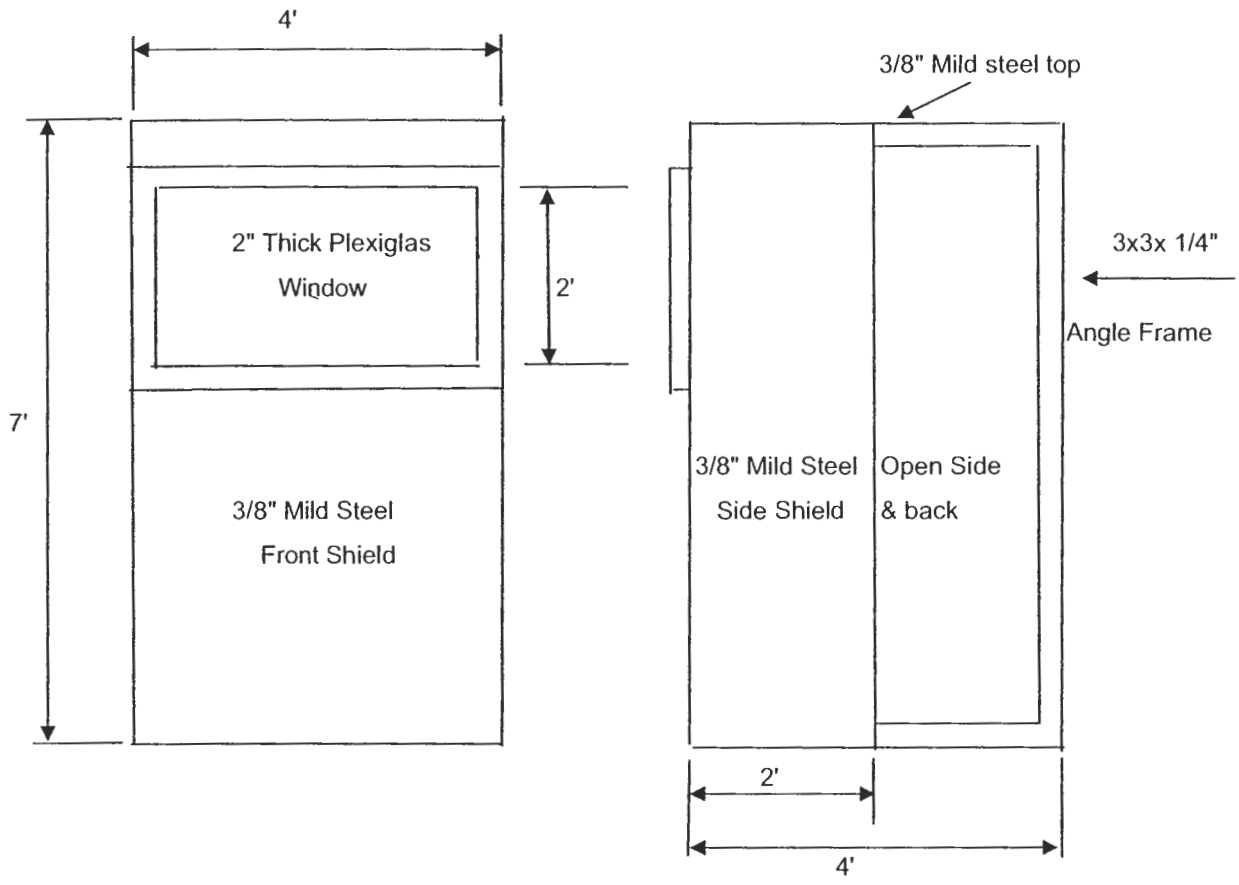
APPENDIX B

DATABASE TABLE OF INTRUSIVE INVESTIGATION AT SENECA ARMY DEPOT

See Electronic Copy

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	DODIC:	
Munition:	37 mm MK II (0.053lb)	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:	37 mm	Date Record Retired:	
Tertiary Database Category:	TNT		

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	0.05300
Diameter (in):	1.4567
Max Fragment Weight (lb):	0.024500
Critical Fragment Velocity (fps):	3302

Theoretical Calculated Fragment Range

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

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	16
Inhabited Building Distance (09 psi), K50 Distance:	20
Intentional MSD (0065 psi), K328 Distance:	131

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:	0.024500
Critical Fragment Velocity (fps)SB:	3302
Kinetic Energy 106 (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:

Max Fragment Weight (lb)W:	0.024500
Critical Fragment Velocity (fps)W:	3302
Kinetic Energy 106 (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 E

GEOPHYSICAL QUALITY ASSURANCE SEED ITEM EVALUATION

Table 2-5

SENECA ARMY DEPOT ACTIVITY

GEOPHYSICAL QUALITY ASSURANCE SEED ITEM RESULTS EVALUATION

Location	Seed Item ID	Northing	Easting	Elevation	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in EM data?	Detected Mag Data	Anomaly ID	Comments
SEAD-57	S57-seed001	1009540.153	738687.376	743.324	1.6 x 3 Al	6	90		Yes			
SEAD-57	S57-seed002	1009505.236	738675.289	742.309	1.6 x 3 Al	6	90		Yes			
SEAD-57	S57-seed003	1009439.477	738660.295	740.779	1.6 x 3 Al	6	180	Vertical	Yes			
SEAD-57	S57-seed004	1009393.735	738663.918	740.138	1.6 x 3 Al	3	45		Yes			
SEAD-57	S57-seed005	1009393.734	738663.78	740.06	1 x 3 Fe	6	180		Yes	Yes		
SEAD-57	S57-seed006	1009187.373	738596.437	739.536	1.6 x 3 Al	6	90		Yes			
SEAD-57	S57-seed007	1009081.039	738636.353	738.017	1.6 x 3 Al	6	0	Vertical	Yes			
SEAD-57	S57-seed008	1009016.455	738679.623	737.938	1.6 x 3 Al	3	45		Yes			
SEAD-57	S57-seed009	1008958.522	738720.381	737.838	1.6 x 3 Al	6	90		Yes			
SEAD-57	S57-seed010	1008882.057	738775.025	738.043	1.6 x 3 Al	6	0		Yes			
SEAD-57	S57-seed011	1008826.35	738794.817	737.804	1.6 x 3 Al	3	0	Vertical	Yes			
SEAD-57	S57-seed012	1008823.258	738861.536	737.881	1.6 x 3 Al	3	90		Yes			
SEAD-57	S57-seed013	1008841.862	738907.091	738.75	1.6 x 3 Al	3	0	Vertical	Yes			
SEAD-57	S57-seed014	1008899.992	738925.144	738.762	1 x 3 Fe	6	45		Yes	Yes		
SEAD-57	S57-seed015	1008974.969	738944.021	738.75	1.6 x 3 Al	6	80	45	Yes			
SEAD-57	S57-seed016	1009055.569	738984.624	739.897	1 x 3 Fe	6	80		Yes	Yes		
SEAD-57	S57-seed017	1009096.678	739040.633	741.095	1.6 x 3 Al	4	25	45	Yes			
SEAD-57	S57-seed018	1009155.494	739082.916	741.098	1.6 x 3 Al	6	60		Yes			
SEAD-57	S57-seed019	1009193.795	739194.195	740.084	1.6 x 3 Al	6	70		Yes		K08-127	
SEAD-57	S57-seed020	1009238.494	739259.623	740.032	1.6 x 3 Al	6	0	Vertical	Yes		P57M08-106	
SEAD-57	S57-seed021	1009266.849	739311.5	739.602	1.6 x 3 Al	6	0		Yes			
SEAD-57	S57-seed022	1009343.086	739219.649	740.59	1.6 x 3 Al	4	90		Yes		P57K10-097	
SEAD-57	S57-seed023	1009381.987	739175.989	741.04	1.6 x 3 Al	6	45		Yes			
SEAD-57	S57-seed024	1009374.91	739096.957	741.49	1 x 3 Fe	6	180		Yes	Yes		
SEAD-57	S57-seed025	1009366.698	739017.527	740.897	1.6 x 3 Al	6	180	30	Yes		J10-012	
SEAD-57	S57-seed026	1009388.143	738981.704	740.861	1 x 3 Fe	6	70		Yes	Yes	I11-043	
SEAD-57	S57-seed027	1009436.924	738939.067	740.543	1.6 x 3 Al	6	0	Vertical	Yes			
SEAD-57	S57-seed028	1009408.979	738883.451	739.972	1 x 3 Fe	6	140		Yes	Yes	I11005	
SEAD-57	S57-seed029	1009363.441	738831.597	739.229	1 x 3 Fe	6	180		Yes	Yes		
SEAD-57	S57-seed030	1009301.043	738838.645	739.433	1 x 3 Fe	6	120		Yes	Yes		
SEAD-57	S57-seed031	1009273.314	738808.809	738.95	1.6 x 3 Al	4	180		Yes			

Notes

1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-5

SENECA ARMY DEPOT ACTIVITY

GEOPHYSICAL QUALITY ASSURANCE SEED ITEM RESULTS EVALUATION

Location	Seed Item ID	Northing	Easting	Elevation	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in EM data?	Detected Mag Data	Anomaly ID	Comments
SEAD-57	S57-seed032	1009236.831	738774.981	738.662	1.6 x 3 Al	6	180		Yes			Alum Scrap found in hole
SEAD-57	S57-seed033	1009195.46	738739.26	738.56	1.6 x 3 Al	6	60	45	Yes			
SEAD-57	S57-seed034	1009119.641	738744.727	737.819	1.6 x 3 Al	6	200	45	Yes		G08-040	
SEAD-57	S57-seed035	1009042.146	738747.87	737.241	1 x 3 Fe	6	140		Yes	Yes	G08-010	
SEAD-57	S57-seed036	1008952.616	738789.967	737.212	1.6 x 3 Al	6	60		Yes			
SEAD-57	S57-seed037	1009076.578	738855.785	738.03	1.6 x 3 Al	6	10		Yes			Alum Scrap found in hole
SEAD-57	S57-seed038	1009133.233	738874.663	739.344	1.6 x 3 Al	6	330		Yes			Alum Scrap found in hole
SEAD-57	S57-seed039	1009250.911	738936.271	740.173	1 x 3 Fe	6	0	Vertical	Yes	Yes	I10-021	
SEAD-57	S57-seed040	1009256.749	739047.689	740.885	1.6 x 3 Al	6	120		Yes			
SEAD-57	S57-seed041	1009277.069	739161.273	740.951	1.6 x 3 Al	6	210		Yes			
SEAD-57	S57-seed042	1009454.039	739195.921	741.93	1.6 x 3 Al	6	90	45	Yes		P57K10-033	
SEAD-57	S57-seed043	1009513.1	739118.585	742.523	1.6 x 3 Al	6	0		Yes			
SEAD-57	S57-seed044	1009536.783	739005.134	742.696	1.6 x 3 Al	6	40	45	Yes			
SEAD-57	S57-seed045	1009568.248	738882.624	741.924	1 x 3 Fe	6	40		Yes	Yes		
SEAD-57	S57-seed046	1009513.08	738817.304	739.771	1.6 x 3 Al	6	300		Yes			
SEAD-57	S57-seed047	1009460.89	738753.535	739.418	1.6 x 3 Al	6	40		Yes		G11-027	
SEAD-57	S57-seed048	1009376.218	738740.932	738.407	1.6 x 3 Al	6	180	45	Yes		G10-047	
SEAD-57	S57-seed049	1009277.96	738714.808	738.645	1.6 x 3 Al	6	0	Vertical	Yes			
SEAD-57	S57-seed050	1009301.414	738633.169	737.801	1.6 x 3 Al	6	340		Yes			
SEAD-57	S57-seed051	1009402.129	738624.509	738.666	1.6 x 3 Al	6	0	45	Yes			
SEAD-57	S57-seed052	1009538.381	738731.459	740.311	1.6 x 3 Al	6	0		Yes			
SEAD-57	S57-seed053	1009583.12	738823.683	741.153	1 x 3 Fe	6		Vertical	Yes	Yes		
SEAD-57	S57-seed054	1009517.005	738897.246	740.974	1.6 x 3 Al	6	70		Yes			
SEAD-57	S57-seed055	1009476.105	739007.908	742.201	1.6 x 3 Al	6	180	45	Yes			
SEAD-57	S57-seed056	1009447.655	739140.356	742.125	1.6 x 3 Al	6	180		Yes			
SEAD-57	S57-seed057	1009443.763	739279.456	741.517	1.6 x 3 Al	6		Vertical	Yes		P57M10-082	
SEAD-57	S57-seed058	1009595.676	739143.145	743.044	1.6 x 3 Al	3	255		Yes			Anomaly found 6 ft North of
SEAD-57	S57-seed059	1009602.57	739046.284	743.297	1.6 x 3 Al	6	0	Vertical	Yes			
SEAD-57	S57-seed060	1009615.141	738948.61	743.369	1.6 x 3 Al	6	0		Yes			

Notes

1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-5

SENECA ARMY DEPOT ACTIVITY

GEOPHYSICAL QUALITY ASSURANCE SEED ITEM RESULTS EVALUATION

Location	Seed Item ID	Northing	Easting	Elevation	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in EM data?	Detected Mag Data	Anomaly ID	Comments
Grenade Range	GR-seed01	1007920.18	737545.312	726.233	1.5 x 3 Steel	7	230		Yes	NA	GRD3-009	
Grenade Range	GR-seed02	1007979.329	737499.866	725.369	1.5 x 3 Steel	10	0		Yes	NA	GRC3-110	
Grenade Range	GR-seed03	1008050.526	737517.3	725.346	1.6 x 3 Al	6	260		Yes	NA	GRD4-012	
Grenade Range	GR-seed04	1008118.368	737556.614	723.949	1.5 x 3 Steel	6	0	Vertical	Yes	NA	GRD4-017	
Grenade Range	GR-seed05	1008173.162	737497.732	723.162	1.5 x 3 Steel	8	320	45	Yes	NA	GRC4-054	
Grenade Range	GR-seed06	1008221.129	737483.075	723.218	1.6 x 3 Al	8	160	45	Yes	NA	GRC4-051	
Grenade Range	GR-seed07	1008272.961	737520.423	724.743	1.5 x 3 Steel	6	260		Yes	NA	GRD5-001	
Grenade Range	GR-seed08	1008334.99	737544.064	724.606	1.5 x 3 Steel	6	245		Yes	NA	GRD5-028	
Grenade Range	GR-seed09	1008399.142	737470.198	723.588	1.5 x 3 Steel	8	0	45	Yes	NA	GRC5-144	
Grenade Range	GR-seed10	1008495.034	737506.297	721.439	1.5 x 3 Steel	8	260		Yes	NA	GRD5-020	
Grenade Range	GR-seed11	1008558.515	737470.684	721.246	1.6 x 3 Al	8	350	45	Yes	NA	GRC6-185	
Grenade Range	GR-seed12	1008635.154	737499.597	722.957	1.5 x 3 Steel	6	0	Vertical	Yes	NA	GRC6-121	
Grenade Range	GR-seed13	1008677.023	737464.682	722.714	1.5 x 3 Steel	8	310		Yes	NA	GRC6-160	
Grenade Range	GR-seed14	1008728.029	737490.721	722.965	1.5 x 3 Steel	8		Vertical	Yes	NA	GRC6-156	
Grenade Range	GR-seed15	1008746.17	737445.767	722.814	1.5 x 3 Steel	8	40	30	Yes	NA	GRC6-152	
Grenade Range	GR-seed16	1008776.737	737408.471	721.956	1.6 x 3 Al	6	160	45	Yes	NA	GRC7-002	
Grenade Range	GR-seed17	1008706.559	737352.4	720.186	1.5 x 3 Steel	8	120	45	Yes	NA	GRC6-134	
Grenade Range	GR-seed18	1008650.312	737323.323	719.905	1.6 x 3 Al	8		Vertical	Yes	NA	GRC6-092	
Grenade Range	GR-seed19	1008588.89	737398.789	720.879	1.5 x 3 Steel	8		Vertical	Yes	NA	GRC6-120	
Grenade Range	GR-seed20	1008528.478	737373.947	719.834	1.5 x 3 Steel	8	150		Yes	NA	GRC6-020	
Grenade Range	GR-seed21	1008464.472	737344.358	720.915	1.5 x 3 Steel	8	90		Yes	NA	GRC5-181	
Grenade Range	GR-seed22	1008409.661	737317.358	720.761	1.5 x 3 Steel	8	0	45	Yes	NA	GRC5-001	
Grenade Range	GR-seed23	1008330.473	737373.935	722.619	1.6 x 3 Al	8	0	45	Yes	NA	GRC5-123	
Grenade Range	GR-seed24	1008191.89	737373.824	722.398	1.5 x 3 Steel	6	80		Yes	NA	GRC4-044	
Grenade Range	GR-seed25	1008130.351	737434.388	723.83	1.5 x 3 Steel	6	80		Yes	NA	GRC4-057	
Grenade Range	GR-seed26	1008050.764	737410.782	724.443	1.5 x 3 Steel	8	130	30	Yes	NA	GRC4-061	
Grenade Range	GR-seed27	1007999.848	737367.046	724.128	1.5 x 3 Steel	8	60		Yes	NA	GRGAP-015	
Grenade Range	GR-seed28	1007956.185	737332.331	724.3	1.5 x 3 Steel	8	0	45	Yes	NA	GRC3-086	
Grenade Range	GR-seed29	1007900.714	737322.413	724.171	1.5 x 3 Steel	8		Vertical	Yes	NA	GRC3-048	
Grenade Range	GR-seed30	1007878.334	737427.008	725.254	1.5 x 3 Steel	8	0		Yes	NA	GRC3-122	

Notes

1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

Table 2-5

SENECA ARMY DEPOT ACTIVITY

GEOPHYSICAL QUALITY ASSURANCE SEED ITEM RESULTS EVALUATION

Location	Seed Item ID	Northing	Easting	Elevation	Description (units are inches unless otherwise noted)	Depth (inches)	Orientation (degrees clockwise from grid north)	Inclination (degrees from vertical unless otherwise noted)	Detected in EM data?	Detected Mag Data	Anomaly ID	Comments
Grenade Range	GR-seed31	1007840.829	737244.629	724.416	1.5 x 3 Steel	6	330		Yes	NA	GRB3-89	
Grenade Range	GR-seed32	1007866.257	737200.049	724.478	1.6 x 3 Al	8	95		Yes	NA	GRB3-102	
Grenade Range	GR-seed33	1007878.936	737153.891	724.629	1.5 x 3 Steel	8		Vertical	Yes	NA	GRB3-108	
Grenade Range	GR-seed34	1007914.874	737081.649	725.016	1.5 x 3 Steel	8	110		Yes	NA	GRB3-030	
Grenade Range	GR-seed35	1007976.893	737044.338	724.272	1.6 x 3 Al	6	250	45	Yes	NA	GRB3-034	
Grenade Range	GR-seed36	1008022.668	737083.795	724.017	1.5 x 3 Steel	8	220	10	Yes	NA	GRB4-027	
Grenade Range	GR-seed37	1008068.632	737126.214	723.596	1.5 x 3 Steel	8	280		Yes	NA	GRB4-019	
Grenade Range	GR-seed38	1008116.611	737183.875	722.755	1.5 x 3 Steel	8	210	45	Yes	NA	GRB4-012	
Grenade Range	GR-seed39	1008155.772	737234.497	721.687	1.5 x 3 Steel	8	270		Yes	NA	GRB4-066	
Grenade Range	GR-seed40	1008199.424	737271.416	721.633	1.6 x 3 Al	8		Vertical	Yes	NA	GRC4-023	
Grenade Range	GR-seed41	1008233.464	737223.491	721.717	1.5 x 3 Steel	8	330		Yes	NA	GRB4-041	
Grenade Range	GR-seed42	1008245.997	737173.2	722.083	1.5 x 3 Steel	6	290		Yes	NA	GRB4-047	
Grenade Range	GR-seed43	1008277.134	737121.522	721.771	1.5 x 3 Steel	8		Vertical	Yes	NA	GRB5-116	
Grenade Range	GR-seed44	1008292.86	737042.134	721.694	1.6 x 3 Al	8	330	45	Yes	NA	GRB5-121	
Grenade Range	GR-seed45	1008339.604	737012.801	721.216	1.5 x 3 Steel	8	15		Yes	NA	GRB5-123	
Grenade Range	GR-seed46	1008382.389	737050.977	721.34	1.5 x 3 Steel	6		Vertical	Yes	NA	GRB5-091	
Grenade Range	GR-seed47	1008409.2	737100.924	720.408	1.5 x 3 Steel	8	30	30	Yes	NA	GRB5-074	
Grenade Range	GR-seed48	1008454.281	737169.3	720.029	1.6 x 3 Al	8	40	10	Yes	NA	GRB5-038	
Grenade Range	GR-seed49	1008478.234	737227.666	719.352	1.5 x 3 Steel	8		Vertical	Yes	NA	GRB5-042	
Grenade Range	GR-seed50	1008507.815	737273.68	719.688	1.6 x 3 Al	8	18	45	Yes	NA	GRC6-056	
Grenade Range	GR-seed51	1008561.94	737158.792	719	1.5 x 3 Steel	8	317		Yes	NA	GRB6-175	
Grenade Range	GR-seed52	1008598.317	737112.67	719.707	1.5 x 3 Steel	8	240	45	Yes	NA	GRB6-049	
Grenade Range	GR-seed53	1008609.435	737043.249	719.764	1.5 x 3 Steel	8	330		Yes	NA	GRB6-038	
Grenade Range	GR-seed54	1008606.752	736986.282	718.611	1.5 x 3 Steel	8	15		Yes	NA	GRA6-011	
Grenade Range	GR-seed55	1008621.087	736934.833	718.087	1.5 x 3 Steel	8	260	45	Yes	NA	GRA6-001	
Grenade Range	GR-seed56	1008523.749	736944.856	718.936	1.5 x 3 Steel	8		Vertical	Yes	NA	GRA6-021	
Grenade Range	GR-seed57	1008414.403	736944.842	719.134	1.5 x 3 Steel	8	160		Yes	NA	GRA6-24	
Grenade Range	GR-seed58	1008234.749	736951.009	719.78	1.5 x 3 Steel	8	170		Yes	NA	GRA4-002	
Grenade Range	GR-seed59	1008108.945	736968.101	721.242	1.5 x 3 Steel	8		Vertical	Yes	NA	GRA4-001	
Grenade Range	GR-seed60	1007982.124	736978.471	722.446	1.5 x 3 Steel	8	260	10	Yes	NA	GRA3-002	
Grenade Range	GR-seed61	1007837.528	737039.834	724.681	1.5 x 3 Steel	8	185		Yes	NA	GRB3-026	
Grenade Range	GR-seed62	1007790.509	737142.611	725.515	1.5 x 3 Steel	8	310	45	Yes	NA	GRB3-010	
Grenade Range	GR-seed63	1007785.546	737245.662	725.082	1.5 x 3 Steel	8	250	30	Yes	NA	GRB3-089	
Grenade Range	GR-seed64	1007773.731	737322.135	724.301	1.5 x 3 Steel	8	195		Yes	NA	GEB3-009	
Grenade Range	GR-seed65	1007816.125	737489.861	725.803	1.5 x 3 Steel	8	280	30	Yes	NA	GRC3-128	

Notes

1-Coordinates are U.S. State Plane, NY Central, units are U.S. survey feet

APPENDIX F

WOODS TRANSECT INVESTIGATION SUMMARY

Table 2-6
SEAD 57 Woods Transect Investigation
Explosives Safety Submission Completion Report
Seneca Army Depot Activity

Transect #	A Linear Width (ft)	B Linear Width (ft)	Linear Length (ft)	Area (sq ft)	Median Width (ft)	Total Anomalies	Munitions Debris
South Transect							
S-1	10	10	490.4	4,904	for Trapezoid area	28	2
S-2	10	10	414.1	4,141		7	1
S-3	10	10	401	4,010		20	0
S-4	10	10	405.2	4,052		37	3
S-5	10	10	251.3	2,513		39	1
S-6	10	10	272.1	2,721		33	3
S-7	23	23	195.1	4,487		37	1
S-8	17.3	12.9	216.4	3,268	15.1	33	1
S-9	10	15	227.7	2,846	12.5	27	2
S-10	19.1	10	251.9	3,665	14.55	20	0
S-11	15.6	10	302.9	3,877	12.8	14	0
S-12	10	10	232.1	2,321		23	0
S-13	10	10	234.5	2,345		17	0
West Transect							
W-1	10	10	481.21	4,812		17	13
W-2	15.5	10	463.4	5,908	12.75	21	21
W-3	10	10	492.6	4,926		19	13
W-4	10	10	499.6	4,996		37	37
W-5	10	10	483.7	4,837		33	32
W-6	10	10	468.4	4,684		49	39
W-7	10	10	497.11	4,971		54	49
W-8	10	10	485.2	4,852		57	53
W-9	10	10	494	4,940		42	31
W-10	10	10	482.5	4,825		19	6
W-11	10	10	501.8	5,018		29	21
W-12	10	10	492.2	4,922		67	54
W-13	10	10	512.5	5,125		95	20
W-14	10	10	278	2,780		54	19
East Transect							
E-1	12	12	255.11	3,061			
E-2	12	12	322.51	3,870		11	1
E-3	12	12	335.47	4,026		5	0
E-4	12	12	356.43	4,277		12	1
E-5	12	12	350.11	4,201		12	0
E-6	12	12	342.23	4,107		8	0
E-7	12	12	389.2	4,670		18	1
E-8	12	12	449.42	5,393		13	0
E-9	10	10	483.28	4,833		9	0
E-10	10	10	452.29	4,523		6	0
E-11	10	10	439.21	4,392		5	0
E-12	10	10	443.19	4,432		9	0
E-13	10	10	438.36	4,384		3	0
		Total Area (sq ft)		**168,916**	**Total Anomalies**	**1039**	
		Total Area (Acres)		**4**	**Total Munitions Debris**		**425**

Table 2-6
SEAD 46 Woods Transect Investigation
Explosives Safety Submission Completion Report
Seneca Army Depot Activity

Transect #	A Linear Width (ft)	B Linear Width (ft)	Linear Length (ft)	Area (sq ft)	Total Anomalies	Munitions Debris
East Transects						
E-02	10	10	126.2	1,262		
E-03	10	10	130.2	1,302	47	6
E-05	10	10	128.8	1,288	44	9
E-06	10	10	137.1	1,371	34	6
E-09	10	10	344	3,440		
E-13	10	10	420.2	4,202	51	20
E-15	10	10	162.5	1,625		
E-18	10	10	113.2	1,132	11	2
E-21	10	10	575.6	5,756		
E-23					23	0
E-24	10	10	565.3	5,653		
E-31	10	10	670.11	6,701	35	8
E-35	10	10	580.4	5,804	43	3
E-36	10	10	583.7	5,837		
North Transects						
N-01	EOD #3					
N-02	EOD #3					
N-03	EOD #3					
N-04	EOD #3					
N-05	EOD #3					
N-06	EOD #3					
N-07	10	10	113.4	1,134		
N-08	10	10	264	2,640	57	4
N-10	10	10	150.2	1,502		
N-11	20.2	20.2	125	2,525		
N-13	10	10	174.1	1,741	89	0
		Total Area (sq ft)		**54,915**	**Total Anomalies**	**Total MD**
		Total Area (Acres)		**1.1**	**434**	**58**