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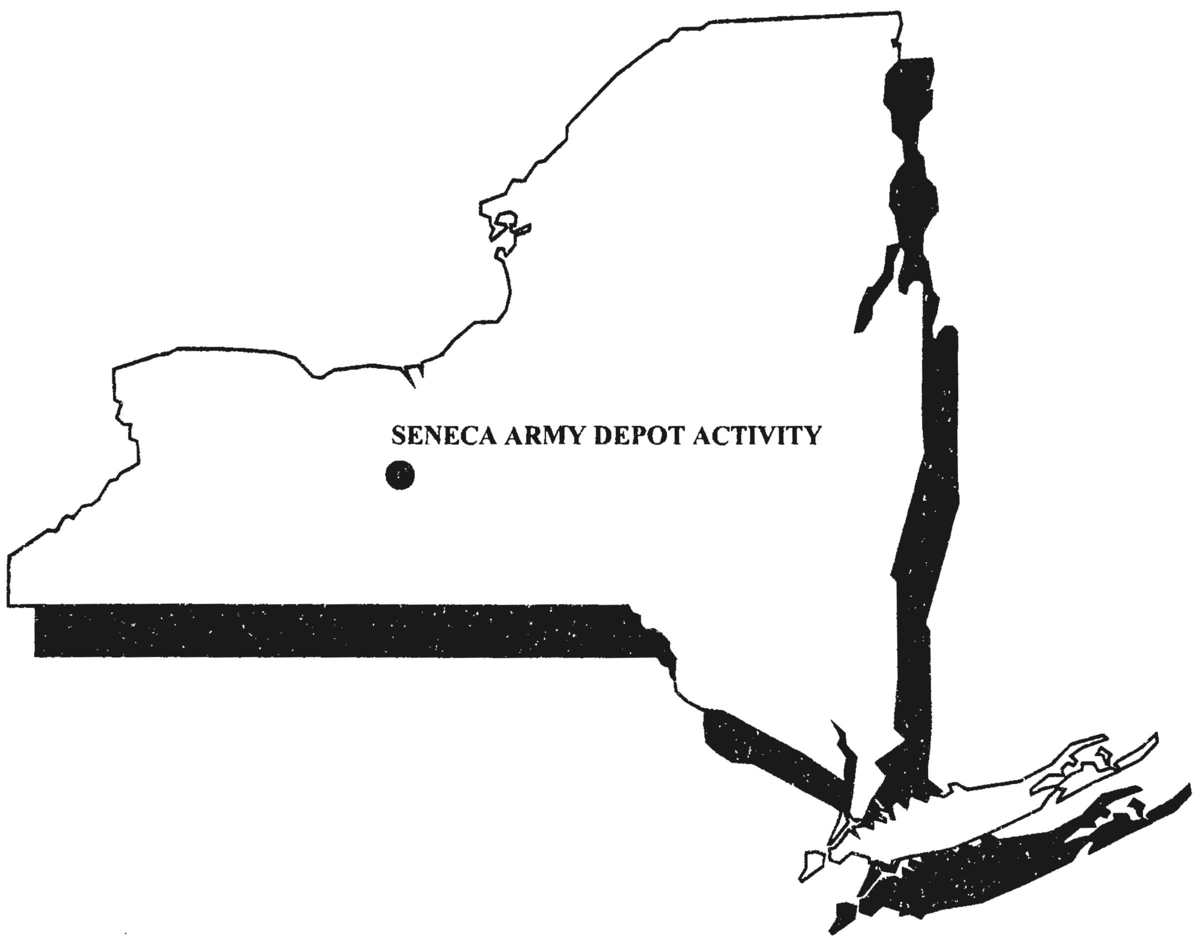

FINAL

ORDNANCE AND EXPLOSIVES ENGINEERING EVALUATION/COST ANALYSIS WORKPLAN

CONTRACT NO. DACA87-95-D-0018
TASK ORDER 0052

JUNE 8, 2000

Work Plan

Ordnance and Explosives

Engineering Evaluation/Cost Analysis

Seneca Army Depot Activity

Seneca, New York

Prepared for

U.S. Army Corps of Engineers

Huntsville Center

Contract No. DACA87-95-D-0018

Delivery Order 0052

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INTRODUCTION

1.1 Project Authorization

1.1.1 Parsons Inc. received Contract No. DACA87-95-D-0018, Delivery Order No. 52, from the U.S. Army Corps of Engineers, Huntsville Center USAESCH, to conduct an Engineering Evaluation/Cost Analysis (EE/CA) at the former Seneca Army Depot SEAD Seneca, New York. The EE/CA will implement ordnance and explosives (OE) risk management actions in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and in substantial compliance with the National Contingency Plan (NCP). In accordance with the NCP on-site actions will not require Federal, State, or local permits. The EE/CA will adhere to the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS) and relevant U.S. Army regulations and guidance for OE programs

1.2 Purpose and Scope

1.2.1 The purpose of the EE/CA is to characterize OE concentration and location, identify potential safety problems associated with the OE, study risk management alternatives, recommend proposed alternatives, and document the selection of the selected alternative for the site. The objective of this EE/CA project is to select the most appropriate response action necessary to reduce public safety risk associated with OE/UXO that may exist within the former SEAD.

1.2.2 This Work Plan (WP) details the OE remedial activities as stipulated in the USAESCH Statement of Work (SOW) for Delivery Order No. 0052 (see Appendix A). The EE/CA will focus on conventional OE/UXO risks requiring non-time-critical removal actions (NTCRAs) within the boundaries of the SEAD. The objective of this WP is to present the site background, objectives, procedures, personnel, and equipment to be used for the EE/CA activities. During the EE/CA, site characterization efforts involving data collection will be conducted to determine or classify those portions of the site that are contaminated or potentially contaminated with OE/UXO and to estimate the type and density of OE/UXO contamination.

1.2.3 This WP describes the major components of the work that will be conducted to complete the EE/CA for the SEAD, which include the following:

- Review historical records, including the Archives Search Report (ASR) and other data that may be provided by the USAESCH;

- Prepare a WP (this document) for the field investigation that specifically includes the following sections or subplans: a Technical Management Plan (TMP); Explosives Management Plan (EMP); Explosives Siting Plan (ESP); Geophysical Investigation Plan (GIP); Site Safety and Health Plan (SSHP); Location Surveys and Mapping Plan (LSMP); Work, Data, and Cost Management Plan; Quality Control (QC) Plan; and an Environmental Resources Protection Plan (ERPP);
- Establish a GIS database for the site;
- Perform a geophysical investigation;
- Perform intrusive investigation;
- Dispose of any conventional OE encountered;
- Prepare a safety risk evaluation (SRE) as part of an OE Impact Analysis report;
- Provide technical support to the government for meetings; and
- Provide project management.

1.3 WP Organization

1.3.1 This WP is organized to provide each of the applicable required subplan components as specified in the SOW. Plans not applicable to the project include the Sampling and Analysis Plan and the Investigation Derived Waste Plan. No known usage of chemical warfare materiel (CWM) has been identified in association with the former depot; therefore, these plans are not applicable. In addition, no government property is expected to be used on this job under the supervision of Parsons personnel or participating subcontractors, so no property management plan is included. Table 1.1 outlines the Sections and Appendices to be included in this document.

Table 1.1

Work Plan Outline

Chapter 1. Introduction

Chapter 2. Technical Management Plan

Chapter 3. Explosives Management Plan

Chapter 4. Explosives Siting Plan

Chapter 5. Geophysical Investigation Plan

Chapter 6. Site Safety and Health Plan

Chapter 7. Location Surveys and Mapping Plan

Chapter 8. Work, Data and Cost Management Plan

Chapter 9. Quality Control Plan

Chapter 10. Environmental Protection Plan

Appendices.

Appendix A Scope of Work

Appendix B SSHP

Appendix C Geophysical Prove-Out Report

Appendix D Schedule

Appendix E Institutional Analysis Work Plan

Appendix F Impact Analysis Work Plan

Appendix G Explosive Safety Distance Calculations

Appendix H Response to Comments

1.4 Project Location

1.4.1 SEAD is a 10,587 acre military facility in Seneca County, Romulus, New York, that has been owned by the United States Government and operated by the Department of the Army since 1941. Figure 1-1 shows a map of SEAD within the state of New York. The site is located approximately 40 miles south of Lake Ontario. The facility is located in an uplands area, at an elevation of approximately 600 feet above Mean Sea Level (MSL), that forms a divide separating two of the New York Finger Lakes: Cayuga Lake on the east and Seneca Lake on the west. Sparsely populated farmland covers most of the surrounding area. New York State Highways 96 and 96A adjoin SEAD on the east and west boundaries, respectively.

1.5 Historical Site Summary

1.5.1 When the Army arrived in Seneca, New York, in 1941, the nearly 10,000 acres in Central New York State were abundant farmland. In June 1941, the War Department approved the munitions project, and in July 1941 construction for the SEAD began. Construction workers completed nearly 500 storage igloos and six aboveground magazines by the end of the year (Johnson 1984). With the construction of the administrative area, ammunition facilities, warehouses, utility structures and a few housing quarters completed in 1943, the SEAD began its primary mission of receipt, storage, maintenance and supply of ammunition. This included all classes of ammunition and explosives except chemical ammunition other than smoke. More exact descriptions of the history of the areas of interest are given below.

1.5.2 Established in 1941, the Demolition Pits served as the grounds for conducting ammunition disassembly detonation and burning. This included numerous types of ammunition, components, guided missiles and explosives. An Explosive Scrap Furnace supported the detonation operation at the site. The burn pads functioned as the burning area for ammunition and ordnance contaminated material such as bulk explosives, pyrotechnics, artillery projectiles, fuzes, machine gun ammunition, and projectiles using TNT (Organizational Manual 1961; Metcalf 1989). The nine burn pads were used for trash containing contamination from propellants. explosives and pyrotechnics. The Demolition Pits and Burning Pads together comprise 90 acres of demolition area at SEAD.

1.5.3 The Explosive Ordnance Disposal (EOD) Area has been active since 1941 and bomb squad training occurred there for many years (Parsons Engineering 1995a). Depot personnel performed detonations of conventional ammunition and explosives weighing less than 5 pounds (Parsons Engineering 1996a). The Ammunition Disassembly Plant buildings are also near the EOD area. The Army built them in the 1940's and 1950's. Army Reserve and National Guard troops utilized a Grenade Range near the EOD Range. All evidence indicates the troops used practice/training grenades only.

1.5.4. The original Popping Plant, Building S311, was built during 1942 and 1943. The Abandoned Deactivation Furnace is located in this building. An additional Popping Plant, Building 367 was built near the original one in 1961. The existing Deactivation Furnace was active in Building 367 from 1962 through 1989. Cartridge cases having a live primer were popped and rendered inert (History 1943).

1.5.5 A Small Arms Range (a.k.a. 3.5" Rocket Range) is located on the northeastern portion of SEAD. A large berm is currently present. In addition to small arms, to include tracers and blanks, 3.5 inch rockets are reported to have been used there (Parsons Engineering 1996b).

1.5.6 Construction on the Liquid Propellant Test Laboratory, Building 606, began in July 1955 (Warren 1955). Laboratory personnel conducted operational or functional testing of explosive devices. These tests are believed to have occurred on the concrete foundation northwest of Building 606. Since 1976, herbicides and pesticides have been stored in Building 606 (Parsons Engineering 1995b). Construction of the Fuze Storage Building, in connection with Eastman Kodak Company and Picantinny Arsenal, began in September 1955 (Warren 1955).

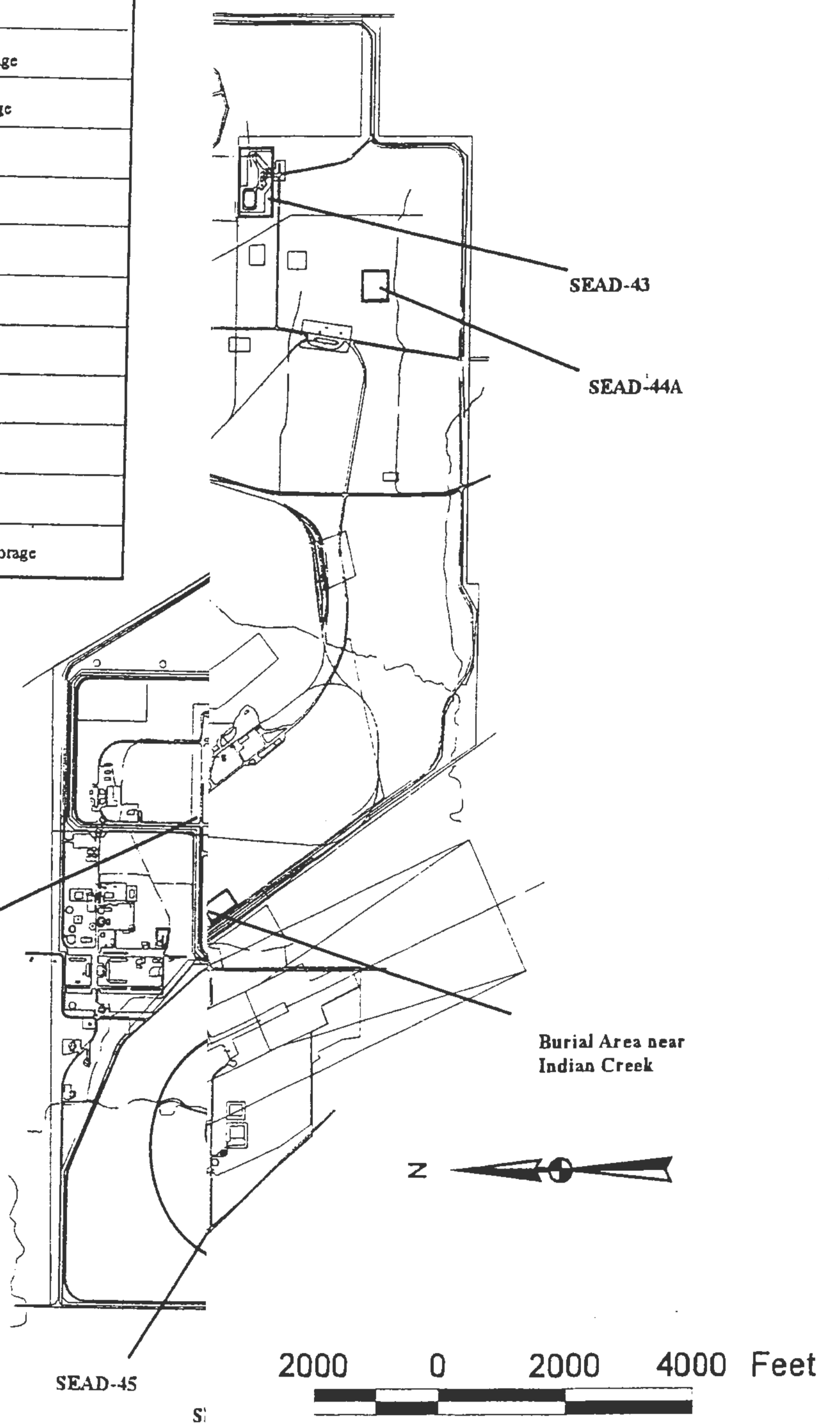
1.5.7 Existing structures at SEAD include 519 igloos, 8 standard magazines, 2 inert magazines, 2 small arms warehouses and 19 general-purpose warehouses. National Guard and Army Reserve units currently conduct annual training at SEAD (Seneca Army Depot Activity 1994). The DOD placed SEAD on the BRAC list in 1995.

1.6 Topography and Climate

1.6 SEAD is located on mostly flat terrain. A few of the sites have small, gently rolling hills. The overall site slopes gradually to the west towards Seneca Lake.

1.6.1 A cool climate exists at SEAD with temperatures ranging from an average of 23°F in January to 69°F in July. Marked temperature differences are found between daytime highs and nighttime lows during the summer and portions of spring and autumn. Precipitation is unusually well distributed, averaging approximately 3 inches per month. This precipitation is derived principally from cyclonic storms that pass from the interior of the country through the St. Lawrence Valley. Lakes Seneca, Cayuga, and Ontario provide a significant amount of the winter precipitation and moderate the local climate. The average annual snowfall is approximately 100 inches. Wind velocities are moderate, but during the winter months there are numerous days with sufficient winds to cause blowing and drifting snow. The most frequently occurring wind directions are westerly and west southwesterly. Daily precipitation data, measured at the Aurora Research Farm in Aurora, New York have been summarized and tabulated for the period of 1957 to 1991. The maximum 24-hour precipitation measured at this station during this period was 3.9 inches on September 26, 1975.

SITE	DESCRIPTION
SEADs 16 and 17	Popping Plants
SEAD-43	Function Test Range
SEAD-57	Former EOD Range
SEAD-45	Open Detonation Grounds
Demo Range	Demolition of Projectiles
Burial Area near Indian Creek	Rumored Burial
Grenade Area	Grenade Training
SEAD-53	Munitions Storage
SEAD-46	Small Arms Range 3.5" Rocket Range
EOD Area #3	Unknown
EOD Area #2	Area under Water
SEAD-44A	Liquid Propellant Storage



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 1-1
SENECA ARMY DEPOT MAP
WITH AREAS TO BE SURVEYED

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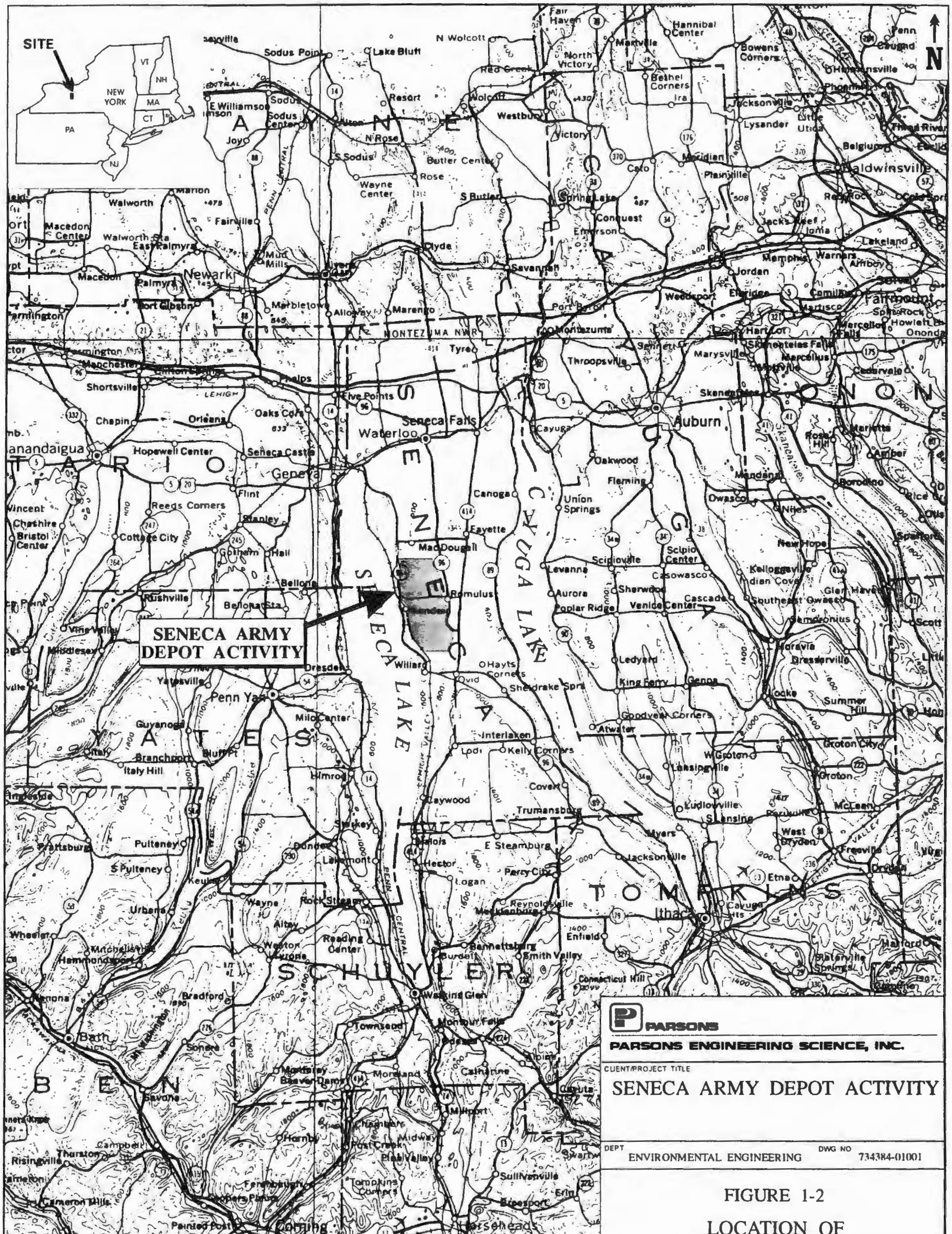

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING

DWG NO 734384-01001

FIGURE 1-2

LOCATION OF SENECA ARMY DEPOT ACTIVITY

SCALE 1"= 8 MILES APPROX.

DATE OCTOBER 1999

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SECTION 2

TECHNICAL MANAGEMENT PLAN

2.1 Project Objectives and Scope

2.1.1 Project Objectives

2.1.1.1 The objective of this project is to prepare an EE/CA that recommends and justifies appropriate OE response alternatives for identified sites at the former Seneca Army Depot. This objective will be accomplished by characterizing the density and type of OE, analyzing risk management alternatives, and recommending feasible OE risk reduction alternatives for the site.

2.1.2 Project Scope

2.1.2.1 The project scope involves the geophysical and intrusive assessment of ten sites, as described in the Scope of Work. The number of grids for each site and the grid size was chosen in the Scope of Work to provide sufficient coverage to show the likely existence of UXO's or to prove that no UXO's are likely to exist at each sites. The exact details of each site are described in the Geophysical Investigation Plan.

2.1.2.2 Grids of 100' x 100' size will be laid out on each site for all areas that can be cleared effectively; 50' x 100' or 50' x 50' grids may be utilized for areas that cannot be readily cleared. Grid locations will be chosen to optimize sampling in portions of the site most likely to contain ordnance, while providing sufficient coverage of the entire area. Grid locations will be approved by Quantitech Inc. for statistical sampling validity using the program UXOCALC and other appropriate statistical analysis software.

2.2 Project Organization

2.2.1 Several organizations are directly involved in the former Seneca Army Depot project. The technical team consists of the USACE, Parsons, USA Environmental, and QuantiTech, Inc. (QuantiTech). The roles of these team members are described below.

2.2.1 U.S. Army Engineer District, New York

2.2.1.1 CENAN is the lead agency for this project. CENAN responsibilities include review of project plans and documents, obtaining rights-of-entry to properties in the investigation areas, working with the news media and the public, and coordinating with State and local regulatory agencies on issues pertaining to protection of ecological and cultural resources.

2.2.2 U.S. Army Engineering and Support Center, Huntsville

2.2.2.1 USAESCH is the implementing agency for execution of this project and provides technical expertise for OE activities. USAESCH responsibilities include procurement of A/E services, direction of the EE/CA contractor, and coordination of document reviews. As the project manager, USAESCH is responsible for directing the EE/CA contractor and controlling the budget and schedule.

2.2.3 Parsons Inc.

2.2.3.1 Parsons is the prime contractor to USAESCH and will provide overall engineering support and services for the EE/CA. Parsons is responsible for performance of the activities detailed in the SOW (Appendix A). Parsons is also responsible for schedule and budget control. Parsons will provide overall engineering support and services for this project. Parsons will provide personnel to perform the geophysical survey of the grids and evaluate the data. Parsons will also provide the geographic information system (GIS) services including incorporation of the survey data, geophysical investigation data, and intrusive investigation data. Parsons is under contract to USAESCH. USAESCH's Contracting Officer directs all work to be performed by Parsons and its subcontractor.

2.2.4 USA Environmental, Inc.

2.2.4.1 USA is a subcontractor to Parsons. As such, USA will provide all UXO services needed to conduct the field investigation. Services provided by USA will include establishing and surveying the grid locations identified by Parsons, conducting surface clearance of the grids, meandering path areas, and access routes, clearing brush from the grids, performing magnetometer reacquisition of selected anomalies, and conducting the intrusive investigations. USA will be responsible for all UXO operations, including handling, detonating, and disposing of OE. USA will provide properly trained and qualified personnel for all UXO operations.

2.2.5 QuantiTech, Inc.

2.2.5.1 QuantiTech is a subcontractor to Parsons. QuantiTech will assist Parsons in selection of sample grid locations during the field investigation and by providing technical support as needed. QuantiTech's primary responsibility will be conducting risk assessment modeling to produce an Impact Analysis of the sites being studied.

2.3 Project Management

2.3.1 Subcontractor Management

2.3.1.1 Parsons is the prime contractor on this project and has subcontracted with other firms as necessary for specific services required for conducting the EE/CA. Parsons will take all reasonable steps to assure subcontractor compliance with budget and schedule requirements. Subcontractors will adhere to all applicable safety and health and QC requirements. The project SSHP (Appendix B) of this WP specifies individual requirements for OE/UXO safety and health referenced in the SOW and other USAESCH health and safety requirements. Field investigation, subcontractors assigned to field activities will be required to submit weekly status reports that include information as it pertains to the field investigation tasks.

2.3.2 Management of Field Operations Logistics

2.3.2.1 Parsons will establish a field office trailer within the former Seneca Army Depot for use by the Parsons field representatives and the USA SUXOS. Parsons will also designate an area near the field trailer for USA to establish a test strip for daily geophysical equipment testing. Parsons will conform to job site security requirements and other regulations. The location of the field trailer supports subcontractor activities for other ongoing investigations at the former Seneca Army Depot. As a result, power and phone services are already present and require only billing modifications. The trailer also already has a FAX machine; email will be added for messages and geophysical file transfer. In addition, a semi-permanent structure is present at the proposed trailer site with accessible sanitary service.

2.3.3 Field Work Mapping

2.3.3.1 The geophysical surveyors and intrusive investigators will adhere to the standard format defined in the SOW (Appendix A) in the submittal of maps, field notes, and digital files.

2.3.4 Office Hours/Holidays

2.3.4.1 The field staff will work a maximum of 40 hours per week on OE-related activities because of the risk associated with OE operations. If daylight hours permit, the workweek will consist of four 10-hour days per week (Monday-Thursday), except Parsons- and USA-observed holidays. If daylight hours are insufficient to support 10-hour workdays, the work week will consist of five 8-hour days (Monday-Friday). Parsons and USA will schedule personnel to provide adequate coverage of their operations. Work may occasionally be scheduled other than at these times due to factors such as adverse weather conditions.

2.4 Project Personnel

2.4.1 Personnel performing work in support of the EE/CA will meet the qualifications required by DID OT-25.

2.4.1 Project Manager

2.4.1.1 The Parsons Project Manager (PM) is responsible for communicating with USAESCH and CENAN all aspects of the project including overseeing the overall performance of all individuals on the project team, coordinating all contract and subcontract work, and resolving problems. The PM is also responsible for controlling the contractual cost and schedule targets. The PM will coordinate the implementation of site characterization activities, geographic information system (GIS) activities and data management effort, and coordinate the preparation of the EE/CA report. The PM will interface directly with subcontractors to keep subcontractors advised of scope of work, schedule, and budget. The PM is also responsible for ensuring that the subcontractor cost is within budget and schedule commitments are achieved.

2.4.2 Site Manager

2.4.2.1 The Parsons Site Manager will manage all field investigation activities under the direction of the Parsons PM. Specific responsibilities include scheduling daily safety meetings, scheduling and coordinating field team activities, and submitting a daily activities report to the

Parsons PM. The Site Manager will be responsible for direct oversight of subcontractor activities during the field investigation and will review the subcontractors' weekly status reports. The Site Manager will coordinate with the PM as necessary to take corrective actions to assure that budgets and schedules are enforced during the field investigation. Site Manager duties will also include enforcing compliance with the SSHP and general daily field operating procedures. The Site Manager will report all QC failures and corrective actions to the PM and QA Manager. The Site Manager must have appropriate training under CFR 1910.120.

2.4.3 QA Manager

2.4.3.1 The QA Manager is independent of the project team and is responsible for reviewing all QA/QC procedures to be used in the project, reviewing subcontractor system audits and QC procedures to ensure compliance with the project QC guidelines in the WP, performing a quality review to ensure the quality of deliverables from the project team to USAESCH, and interaction and communication with subcontractor and USAESCH QA personnel.

2.4.4 UXO Quality Control Specialist

2.4.4.1 The UXO Quality Control Specialist (UXOQCS) monitors a project's performance in accordance with safety protocols and UXO technical compliance. The UXOQCS provides guidance, as required, and performs scheduled reviews of documentation (Daily logbooks, QC reports, field progress reports, instrument calibration and technical findings). The UXOQCS meets the USACE requirements as a graduate of the U.S. Naval School of Explosive Ordnance Disposal; 40-hour and 8-hour Hazardous Waste Site Worker; Supervisor courses in accordance with 29 CFR 1910.120; and has at least 15 years of EOD experience, 10 of which have been in supervisory EOD positions. Three years of documented OE contractor experience may be substituted for 3 years of active duty EOD experience. The UXOQCS ultimately reports directly to the QC & PM Manager. UXOQCS. The UXOQCS can serve concurrently as the UXOSO when the number of workers in the exclusion zone is less than 15 people. The UXOSO responsibilities include:

- Works with the UXOSO to insure compliance to the SSHP;
- Oversee the calibration and maintenance of safety and UXO instrumentation;
- Perform audits and inspections;
- Reviews and signs off daily logbooks, QC reports;
- Conducts weekly inventory of demolition materials.

2.4.5 Project Safety Officer

2.4.5.1 The Project Safety Officer is responsible for the development, implementation and oversight of the SSHP. The Project Safety Officer reports to the Project Manager. The PSO meets the USACE requirements of being a board certified Industrial Hygienist with at least two years of hazardous waste site experience.

2.4.6 UXO Site Safety Officer

2.4.6.1 The Site Safety Officer (UXOSO), reports to the Site Manager and PSO. The UXOSO may serve concurrently as the UXOQCS. The UXOSO meets the USACE requirements as a graduate of the U.S. Naval School of Explosive Ordnance Disposal; 40-hour and 8-hour Hazardous Waste Site Worker; Supervisor courses in accordance with 29 CFR 1910.120; and has at least 15 years of EOD experience, 10 of which have been in supervisory EOD positions. Three years of documented OE contractor experience may be substituted for 3 years of active duty EOD experience. The UXOSO is responsible for:

- Coordinating and observing site operations;
- Enforcing the project SSHP (a copy will be provided in the office trailer);
- Explosive safety;
- Fire prevention;
- Industrial safety;
- Conducting daily safety audits and assuring equipment calibrations are accomplished in accordance with factory specifications;
- Environmental safety;
- Chemical material surety and safety;
- USA participation in Site Employee Medical Monitoring Program;
- Daily safety briefings;
- Visitor access and entry control to the project site;
- Coordinating with local emergency response agencies;
- Complying with Code of Federal Regulations (CFR), the Occupational Safety and Health Administration (OSHA), and USACE safety protocols;
- Complying with specific state and local ordinances, as required;
- Daily inspection of emergency equipment;
- Maintaining the site emergency vehicle and supplies; and
- Monitoring activities, reports, and document deviations from established procedures.

2.4.7 UXO Contractor Personnel

2.4.7.1 UXO personnel required for this project will include EOD-qualified UXO Technicians III and specialists (provided by USA), all of whom possess a minimum of 3 years of relevant U.S. military EOD experience and meet USAESCH qualification requirements. Non-UXO qualified personnel will not perform any handling of OE/UXO at any time or under any conditions. Any additional personnel who may be assigned to the project field team will meet the qualifications required in the DID OT-025. The following paragraphs describe the specific responsibilities of OE contractor personnel assigned to the project team.

2.4.7.1 UXO Project Manager

2.4.7.1.1 The UXO Subcontractor PM is responsible for communication with and execution of all instructions received from the Parsons PM, managing all project OE work, overseeing the performance of all individuals on the OE project team, coordinating contract work, and overseeing OE-specific task identification and resolutions. The UXO Subcontractor PM is also responsible for achieving the subcontract cost and schedule requirements. The UXO Subcontractor PM will coordinate the preparation of detailed work order specifications and schedules as required by the Parsons PM. The UXO Subcontractor PM will also schedule field efforts, identify the UXO technical and site personnel to accomplish the specific tasks as defined in the WP, implement project quality and safety procedures, and direct UXO personnel to achieve successful and timely completion of the WP tasks. The UXO Subcontractor PM will promptly implement approved and authorized changes to ongoing work orders, as necessary.

2.4.7.2 Senior UXO Supervisor

2.4.7.2.1 The Senior UXO Supervisor (SUXOS) is USA's most senior OE-qualified on-site representative. The SUXOS will monitor all aspects of the field project, including subcontractor site activities, to ensure efficient performance of the approved WP and SSHP. The SUXOS has the authority to temporarily stop work to correct safety deficiencies. The SUXOS makes daily progress reports to the UXO PM and is also responsible for monitoring on-site project expenditures, finances, and equipment use and maintenance. Internally, the SUXOS reports directly to the UXO PM. The SUXOS meets the USACE requirements as a graduate of the U.S. Naval School of Explosive Ordnance Disposal; 40-hour and 8-hour Hazardous Waste Site Worker; Supervisor courses in accordance with 29 CFR 1910.120; and has at least 15 years of EOD experience, 10 of which have been in supervisory EOD positions. Three years of documented OE contractor experience may be substituted for 3 years of active duty EOD experience. The SUXOS is directly responsible for:

- Project site work;
- Coordination with subcontractor activities/work on-site;
- Compliance with all safety and work related standard operating procedures (SOPs), including the SSHP;
- Meeting schedule time lines and budgetary control amounts;
- Compliance with all federal and state regulations;
- Coordination with the Site Safety Officer (SSO) to ensure all site safety considerations are enforced; and
- Equipment and on-site vehicles (used by U.S.A.)

2.4.7.3 UXO Technician III

2.4.7.3.1 The UXO Technician III takes daily direction from and reports directly to the SUXOS. The UXO Technician III directs the action of an OE team in accordance with the approved WP and the daily verbal direction of the SUXOS. The UXO Technician III maintains continuous communication with the SUXOS during the performance of OE operations and has the authority to temporarily stop the performance of work to resolve and correct any unsafe condition. The UXO Technician III is a graduate of the U.S. Naval Explosive Ordnance Disposal School, 40-hour and 8-hour Hazardous Waste Site Worker, and Site Supervisor courses in accordance with 29 CFR 1910.120; the UXO Technician III has at least 10 years EOD/UXO experience, 3 years of which must be active duty military EOD experience. Duties/responsibilities include:

- Supervision of the direct OE field operations for assigned tasks;
- Task/team compliance with all safety and work related SOPs, including SSHP;
- Meeting schedules on task/team time lines and budgetary control amounts;
- Coordination with the UXOSO to ensure that all site safety considerations are enforced;
- Conducts air quality monitoring as directed by the UXOSO;
- Task/team assigned equipment and vehicles;
- Conduct and documents daily task specific tailgate safety meetings with OE team;
- Supervision of assigned personnel.

2.4.7.4 UXO Technician II

2.4.7.4.1 Under the direct supervision of the UXO Technician III, the UXO Technician II is responsible for the safe and efficient performance of OE field operations, including the location, identification, removal and disposal of OE in accordance with the approved WP and SSHP. The UXO Technician II is authorized to temporarily stop the performance of work to immediately alert the UXO Technician III of an unsafe condition. Internally, the UXO Technician II reports to the UXO Technician III. The UXO Technician II is a graduate of the U.S. Naval School of Explosive Ordnance Disposal and a 40-hour Hazardous Waste Site Worker course, in accordance with 29 CFR 1910.120. The UXO Technician II has more than 3 years of active duty military EOD experience, or was an UXO Assistant with at least 5 years documented military EOD and contractor OE experience.

2.5 OE Planning and Operations

2.5.1 This plan outlines the procedures USA Environmental, Inc. (USA) will use to perform ordnance and explosives (OE) operations at SEAD. This plan is based on information provided by the prime contractor, Parsons Inc. and the OE EE/CA SOW.

2.5.1 Operations in OE/UXO Areas

2.5.1.1 USA will perform operations in a systematic manner using proven operating techniques and methods. USA will begin mobilization following notification in writing of approval of this work plan and receipt of notification to proceed from Parsons. USA will systematically build and establish its operational capability at SEAD. The objective of this phase is to ensure that the proper attention is dedicated to coordinating with the prime contractor and moving to the operational phase as soon as practical. Actions performed during this phase include:

- Identify/procure, package, ship, and inventory project equipment;
- Coordinate with Parson's project manager for communications and other support;
- Finalize operating schedules.

2.5.2 Scope of Work

2.5.2.1 USA will provide unexploded ordnance (UXO) support and other services to Parsons during operations at SEAD. This support will include:

- Vegetation and surface OE clearance of sampling grids;
- UXO escort during survey and marking of operating sites and sampling grids;
- Excavation and identification of subsurface targets identified by geophysical survey;
- Disposal of UXO and UXO related scrap.

2.5.3 Site Specific Training

2.5.3.1 As part of the mobilization process, USA will perform site specific training for all personnel assigned to this project. The purpose of this training is to ensure that all personnel fully understand the procedures and methods USA will use to perform operations at SEAD, their individual duties and responsibilities, and any and all safety and environmental practices/procedures associated with operations. All personnel will be trained as they arrive. Training topics/issues and training responsibilities are as follows:

2.5.3.2 Prior to deployment, the SUXOS will receive operational briefings on his duties and responsibilities, and will review the work and safety plans. Prior to the start of operations Parsons crews and subcontractors will receive ordnance recognition and UXO safety precautions. This training will be performed by the SUXOS and the UXOSO. All personnel will receive training on the individual equipment they will operate while on-site. The SUXOS will review Parsons Work Plan, Site Safety and Health Plan (SSHP) and Site Specific Environmental Protection Plan (EPP). Prior to mobilization, all USA UXO personnel will receive HAZWOPER 40 hours (or eight hour refresher) training as required.

2.5.3.3 All USA UXO personnel on site will have completed a pre-placement or annual physical examination that complies with the requirements of 29 CFR 1910.120 and have been certified as fit to work by an Occupational Physician certified in Occupational Medicine by the American Board of Preventive Medicine, or who by necessary training and experience is board eligible. All USA personnel on-site are in the USA medical surveillance program.

Documentation as to the medical qualifications of personnel are on file on site and be provided to the contracting officer. All personnel are screened for drugs in accordance with the USA Drug/Alcohol Abuse Program.

2.5.4 General Site Practices

2.5.4.1 All operational activities at the SEAD will be performed under the supervision and direction of qualified UXO personnel. Non-UXO qualified personnel will be prohibited from performing operations unless they are accompanied and supervised by a UXO Technician. Throughout operations, USA will strictly adhere to the following general practices. Detailed safety precautions and procedures are in Appendix B.

2.5.4.1 Work Hours

2.5.4.1.1 Operations will be conducted during daylight hours only. USA will work to Parsons schedule; either four 10-hour days or five 8-hour days as required.

2.5.4.2 Site Access

2.5.4.2.1 USA, in conjunction with Parsons will control access into UXO operating areas and will limit access to only those personnel necessary to accomplish the specific operations or who have a specific purpose and authorization to be on the site. No hazardous operations will be conducted when unauthorized persons are in the vicinity.

2.5.4.3 Handling of UXO

2.5.4.3.1 If required, UXO items will be handled by qualified UXO personnel only. Non-UXO site personnel will be emphatically instructed and closely supervised to ensure they do not handle any UXO. UXO related scrap will not be handled or touched unless a UXO Technician has first checked it.

--THIS POLICY WILL BE STRICTLY FOLLOWED--

2.5.4.4 Safety Training/Briefing

2.5.4.4.1 USA will routinely conduct two distinct safety meetings and briefings: daily general briefing and daily tailgate safety briefing. In addition, the SUXOS may hold a safety stand-down at any time he notes any degradation of safety or a safety issue that warrants a review.

2.5.4.4.1 Daily General Briefing

2.5.4.4.1.1 The daily general briefing will be conducted for all personnel at the Parsons's command post (CP) prior to beginning work. The briefing will cover general hazards for the project and any new safety issues or hazards that were identified since the last briefing. This briefing will be conducted by the SUXOS, UXOQCS, and the UXOSO.

2.5.4.4.2 Daily Tailgate Briefing

2.5.4.4.2.1 The UXO Technician III will conduct OE team tailgate safety briefings. A written record of this training and the signatures of personnel attending the training will be maintained by the UXOSO. The training will focus on the specific hazards anticipated at each work site during that day's operations and the safety measures that will be used to eliminate or mitigate those hazards. It will also refer to other operations within the area whose proximity may have safety ramifications. As work progresses and team locations change within a site, or from site-to-site, any corresponding changes in ingress/egress routes and emergency evacuation routes will also be reviewed during this tailgate briefing.

2.5.4.4.3 Visitor Safety Briefing

2.5.4.4.3 Site visitors must receive a safety briefing prior to entering the operating area and must be escorted at all times by a qualified UXO trained person. All visitors entering must sign in at the Parsons field office.

2.5.4.5 Environmental Awareness

2.5.4.5.1 The promotion of environmental awareness will be ongoing as part of safety and operational briefs.

2.5.5 Safety and Environmental Violations

2.5.5.1 Safety violations or unsafe acts will be immediately reported to Parsons's Project Manager. Failure to comply with safety rules/regulations or failure to report violations may result in immediate termination of employment. Reckless interference with sensitive species or blatant disregard for environmental issues will likewise not be tolerated and may lead to termination of employment.

2.5.6 Work Clothing and Field Sanitation

2.5.6.1 Work clothing will be appropriate for the conditions encountered as directed by the UXOSO. In most cases this will be Level D PPE. This will include short or long sleeve cotton coveralls or work clothing. Footwear will be sturdy work boots or rubber boots as appropriate (i.e., lug sole and of sufficient height for ankle support). Brush team personnel wear steel-toed boots when using chain saws or weed eaters. UXO personnel will not wear steel toe safety boots when using magnetometers. Hand protection will consist of leather or canvas work gloves. Rubber inner or outer gloves may be required where increased protection is needed. Safety glasses, face shields, respirators, hearing protection, hard hats and protective chaps or aprons are available and worn when engaged in activities where their use is prudent or required. In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

2.5.6.2 The team(s) will be outfitted with field decontamination equipment, which will consist of containers of wash water, paper towels and soap. Prior to commencing operations each day, these facilities will be in place and ready for use in the vicinity of the work area as needed. Good housekeeping and decontamination measures will be practiced.

2.5.7 Compliance with Plans and Procedures

2.5.7.1 USA will conduct operations at SEAD in a systematic manner using proven operating methods and techniques. All activities will be conducted under the direction, supervision and observation of the SUXOS. All personnel will strictly adhere to approved plans and established procedures. When operational parameters change and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel in close liaison with the Parsons representative. Any new course of action or desired change in procedures will be submitted with justification for approval as required. Approved changes will be implemented in a manner that will ensure uniformity in procedures and end product quality on the part of the UXO team.

2.5.8 Chemical Munitions

2.5.8.1 If, during site operations, USA personnel encounter a suspected toxic chemical munition or CWM they will immediately withdraw upwind, outside of the fragmentation zone of the ordnance, to a safe location and contact Parsons who will notify the appropriate agencies. USA will secure the site, with two UXO Technicians, until the arrival of the Technical Escort Unit (TEU) or Military Explosive Ordnance Disposal (EOD).

2.5.9 Location Surveys and Mapping

- USA will provide two UXO Technician II escorts to support location surveys and mapping. The escorts will: perform a visual surface ordnance survey of the areas prior to survey crews entering the operating areas. The escorts will enter the areas in advance of the survey crews and visually search the area for surface UXO or indicators of UXO/OE. Any surface UXO/OE encountered will be marked, the location recorded, and reported for disposal. The UXO Technicians will check, using a magnetometer, for subsurface anomalies prior to installation of any survey stakes or temporary marker.

2.5.10 Site Preparation

2.5.10.1 USA will provide site preparation consisting of surface UXO/OE clearance and vegetation clearance in geophysical grids.

2.5.10.1 Vegetation Clearance

2.5.10.1.1 SEAD will provide services to clear selected sampling areas (grids) of brush and underbrush. Brush clearance will be accomplished using a combination of mechanical (brush hog or hydroaxe) and hand clearance using weedeaters and chainsaws. Vegetation clearance will include pathways (ingress and egress routes) to the selected sampling areas. Vegetation will be cut to no closer than six (6) inches above ground level. Trees larger than three (3) inches in diameter will not be cut without approval from Parsons. Prior to beginning the brush clearing work at each grid, the areas within each grid shall be surface cleared of OE items by UXO technicians. The UXO technicians will conduct visual surveys for surface ordnance prior to brush clearing crew entering a suspected area. A magnetometer may be used to aid in searching the vegetation for surface OE/UXO prior to cutting or removing brush. Any OE/UXO encountered by the brush team will be marked with a red pin flag, reported to the UXOSO, and left in place for later disposal.

2.5.10.1.2 The SUXOS, on a daily basis, will request from the Parsons Site Manager the agenda for the day's work. Only the sites scheduled by the Parsons Site Manager will be cleared. If a change is desired to expedite a specific activity, approval must be given by the Parsons Site Manager prior to implementation. At all times, the location of the brush clearing team(s) will be made known to the Parsons Site Manager.

2.5.10.2 Personnel

2.5.10.2.1 USA will perform site preparation activities with a team consisting of a UXO Technician III and five UXO Technician IIs. This team will perform surface clearance of OE, limited brush clearing, and disposal of OE encountered.

2.5.10.3 Equipment

2.5.10.3.1 The site preparation team will be equipped with powered weed cutters and a variety of hand tools. In addition, when applicable, a brush hog may be used in clearing. The UXO Technician III will ensure that personnel engaged in brush cutting activities wear protective clothing and accessories appropriate for the equipment being operated (i.e. chainsaw chaps).

2.5.10.4 Procedures

2.5.10.4.1 Brush clearing will be accomplished by cutting vegetation on grids to approximately 6 inches from the ground surface. Large timber (with diameter greater than 3 inches) will not be cut. Trees will be trimmed only to the extent necessary to allow access for geophysical and investigation teams. Tree trimming will be performed in a manner that minimizes damage to the tree The UXO Technician III will record operational activities in a field logbook and complete USA's Brush Cutting Record for each operating grid. (This record may be either a paper copy or computer generated). The purpose of this record is to capture the manpower expended to perform the operation and provide information that will be used during subsequent operations.

2.5.10.4.2 OE encountered will be disposed on site by blowing in place (BIP). Disposal operations will be under control of the UXOSO and UXO Technician III.

2.6 OE/UXO Accountability and Records Management

2.6.1 The UXO Technician III will prepare and maintain a detailed accounting of activities performed at each grid. This record includes information pertaining to the following:

- Date and time operations began;
- Date and time operations were completed;
- Location, number, type and description of UXO or other items encountered;
- Estimated weight, in pounds, of the UXO related scrap metal removed from the grid;
- Type(s) and amounts of explosives used if disposal required.

2.6.2 For all site work USA personnel use bound logbooks with consecutively numbered pages. The field logbooks are used to record the daily activities of field teams, provide sketch maps and locations of UXOs and other pertinent items, and to note any observations that might affect the quality of data. The field log books and site records are utilized to record the following:

- Field Log Books: The SUXOS and UXO Technician III(s) maintain field logbooks. These personnel use these books to record site activities and field data. These log books are maintained in a neat and legible manner and provide an historic record of site activities;
- Daily Journal: The SUXOS maintains a separate Daily Journal for the site. This journal provides a summary of all operations conducted to include information on weather conditions, problem areas, work plan modifications, injuries, start/stop times, tail gate safety briefs, equipment discrepancies, UXO/OE located, training conducted, visitors and any additional items deemed appropriate.;
- Safety Log Book: The UXO Safety Officer maintains this log. The log is used to record all safety matters associated with the project such as: safety briefings/meetings (including items covered and attendees), safety training, safety audits, near-misses/accidents/incidents with cause and corrective action taken, weather conditions and any other matters relating to safety;
- Training Records: The SUXOS maintains training records for all site personnel. These records contain training certificates, licenses and other qualifying data for an individual's duty position;
- Visitor's Log Book: The SUXOS maintains this log. All personnel who are not directly involved in the project site activities are identified in this log by name, company, date, time in/out and a contact phone number. Safety briefings and training for visiting personnel are also recorded in this log;
- Correspondence Log: The SUXOS maintains a log of all official incoming and outgoing project correspondence.

2.7 Intrusive Investigations

2.7.1 USA will provide two UXO investigation teams for intrusive investigations of identified anomalies. Intrusive excavations will be limited to a radius of 1.5 feet from the reacquired anomaly position and a not-to-exceed depth of 4 feet (or to the water table whichever comes first). No digging of other potential sources of this zone of interest will be performed. Intrusive activities in designed hazardous waste sites will be conducted in compliance with the SSHP.

2.7.1 Relocate Subsurface Anomalies

2.7.1.1 The UXO team will reacquire the anomalies listed on a target list provided by Parsons. Reacquisition will be carried out no later than 14 days after the first anomaly is acquired. Reacquisition will be done using an EM-61, a G-858, or a Schonstedt magnetometer at the area where each instrument was originally used for the geophysical survey. A Trimble 4800 GPS accurate to within a few cm will be used for anomaly reacquisition for all targets designated on dig sheets. All discrepancies between original mapped locations and reacquired locations will be recorded and reported.

2.7.2 Excavation/Investigation of Anomalies

2.7.2.1 The team will excavate the anomalies using hand tools. During excavation operations the technician will periodically check the excavation with a magnetometer to verify the location/position of the anomaly. Once uncovered the technician will positively identify the item as UXO, OE, OE related scrap, or general refuse. The UXO will record the data on the target list and return the listing to Parsons. Should a UXO item be encountered, the UXO Technician III will perform a separate identification of the item. All UXO items encountered will be blown in place. Following removal of the anomaly or disposal of the UXO the excavation will be checked with the magnetometer and the hole backfilled.

2.7.2 1 Personnel

2.7.2.1.1 The investigation team(s) will consist of a UXO Technician III and four (4) UXO Technician IIs.

2.7.2.2 Equipment

2.7.2.2.1 The equipment requirements for this activity include:

- Schonstedt Model GA-72CV magnetometers that will be used to detect subsurface metallic anomalies.
- Miscellaneous common hand tools (e.g. shovels, hand trowels, screwdrivers, etc.).

All instruments and equipment that require maintenance and/or calibration will be checked prior to the start of each workday. Batteries will be replaced as needed and the instruments will be checked against a known source. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision of the equipment removed from service.

2.8 Disposal of UXO/OE and OE Related Material

2.8.1 All OE/UXO and OE/UXO-related material containing explosives or hazardous material will be disposed by detonation utilizing standard electric firing procedures as outlined in Technical Manual (TM) 60A-1-1-31 and USA Standard Operating Procedures (SOP). USA has the option to utilize non-electric firing procedures if the particular situation dictates. If these methods of disposal are determined to be impractical, USA will notify the on-site USAESCH Safety Specialist who will request local military Explosive Ordnance Disposal (EOD) support. The following paragraphs describe the procedures USA uses to detonate OE/UXO and UXO OE/UXO related items at SEAD.

2.8.2 OE/UXO will be disposed of daily in the grid where the item(s) are encountered. Items that are safe to move (unfuzed or unfired) may be consolidated within a grid to reduce the number of demolition shots and fragmentation contamination. On grids where an acceptable fragmentation distances cannot be achieved items safe to move may be moved to another grid (as long as the movement does not require transportation on public roads and with the concurrence of the USACE Site Safety Specialist). If movement to another area is not possible, other methods of mitigation, such as berms, tamping, or barricades, will be employed to reduce the fragmentation hazard area.

2.8.3 Disposal operations begin in the work site when all non-essential and non-UXO personnel are out of the fragmentation zone of the ordnance being detonated. UXO that is safe to move may be consolidated to reduce the number of shots. All roads/trails that provide access to the disposal site will have roadblocks established during demolition operations.

2.8.4 Organization for the SEAD site includes a SUXOS and a UXOSO. The SUXOS and a UXOSO will be on-site at all times during demolition operations. The operation is performed under the direction and supervision of the SUXOS, who is charged with the responsibility to ensure that procedures contained in this work plan and referenced documents are followed. The UXOSO monitors compliance with the safety measures contained in the work plan and associated documents and in the event of non-compliance is vested with the authority to stop or suspend operations.

2.8.5 Prior to the start of demolition activities the SUXOS and UXOSO verify that the area around the operating site is clear of all non-UXO and non-essential personnel and verify with Parsons that all required notifications have been made. Minimum separation distances, as shown in Table 4-4 are established and maintained around the operating site. Depending on the type of munitions being destroyed, the fragmentation distance may be increased or decreased based on data obtained from USAESCH, in accordance with HNC-ED-CS-S-98-1: Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives and with approval of the USAESCH Safety Specialist. Personnel remaining on-site is limited to those personnel needed to safely and efficiently prepare the item(s) of destruction.

2.8.1 Equipment

2.8.1.1 Standard electric and non-electric demolition equipment is used. Procedures follow the guidelines dictated by TM 60A-1-1-31 and USA's Demolition SOP.

2.8.2 Evacuation and Site Control

2.8.2.1 Prior to initiation of demolition operations all non-essential personnel are evacuated from the disposal site. Prior to priming the demolition charges all avenues of ingress are physically blocked by guard personnel. Radio communications are maintained between all involved parties at all times. Avenues of ingress are not opened without the express permission of the SUXOS. A constant state of vigilance is maintained by all personnel to detect any intrusion into the demolition area.

2.9 OE Scrap Removal

2.9.1 Within or adjacent to each operating grid, the UXO Technician III will establish a temporary scrap metal and non-hazardous OE collection points. During operations, scrap metal and OE items that are free of explosive contamination (i.e. fragments, parachutes, etc) will be placed into these collection points. The UXO Technician II placing the item in the temporary stockpile will perform an inspection to ensure the item is free of explosive hazards. Upon completion of operations, in that grid, the UXO Technician III will direct that the materials in these temporary collection points be loaded onto a vehicle for transfer to a central collection point. As the material is being loaded the UXO Technician III and UXO Technician IIs will perform a second inspection of the material to ensure it is free of explosives and other hazardous materials.

2.9.2 At the completion of operations, inert ordnance items and nonhazardous scrap will be disposed of through DRMO if available, or a local civilian scrap yard at no cost to the government. Parsons and USA will prepare a DD Form 1348-1A, in accordance with the Defense Utilization and Disposal Manual, DoD 4160.21-M, to be signed by the USA SUXOS. The certificate will state the following:

" *I certify that the property listed hereon has been inspected by me and, to the best of my knowledge and belief, contains no items of a dangerous nature.*" Turn-in documentation and certification will be included as an appendix in the EECA report.

2.10 Project Communications

2.10.1 All aspects of importance to the administration of the contract must be substantiated by permanent records, such as written correspondence, notes, and photographs. It is essential to summarize important non-written communications with notes covering conferences, telephone calls, and discussions, giving the date, location, parties involved, and important aspects discussed. Written correspondence is the most deliberate, as well as the most important, of the three general types of contractual communication (i.e., person to person, telephone calls, and written correspondence). All incoming correspondence from USACE that requires a reply must be responded to within 5 working days in one of the following ways:

- Reply in full;
- Interim reply (stating date by which full answer can be expected); or
- Acknowledgment of receipt.

2.10.1 Office Project Communications and Reporting

2.10.1.1 The Parsons PM is responsible for issuing the following documents throughout the project:

1. Meeting Minutes (due 10 calendar days after a meeting);
2. Record of Telephone Conversations (due with the monthly progress report);
3. Project Control and Reporting (submitted with this document); and
4. Monthly Progress Reports (due by the 10th day of the following month).

2.10.1.2 A monthly progress report will be issued pursuant to the terms of the contract. The monthly progress report will include a summary of the work performed during the reporting period as well as the work that is planned to be performed in the upcoming period. The report will summarize the results of meetings and telephone conversations that occurred during the reporting period. An earned value analysis of current and cumulative expenditures with respect to the baseline schedule and labor plan will be performed. Variance analysis will be included in the report as necessary.

2.10.2 Field Project Communications and Reporting

2.10.2.1 The following communications will be documented in a chronological communications log maintained by the Parsons Site Manager and the USA SUXOS:

- Each and every occasion that OE/UXO is encountered;
- When work is stopped for safety reasons;
- Health and safety violations; and
- Personnel changes and reason for changes.

2.11 Project Deliverables

2.11.1 Project deliverables will meet the schedule requirements of the project and will be prepared in the format indicated in the SOW.

2.11.1 Report Deliverables

2.11.1.1 Parsons will submit all deliverables to USAESCH and other reviewers shown in Paragraph 2.6.1.2 in accordance with the SOW. Deliverables will receive internal Parsons reviews prior to submittal to other organizations. The following deliverables are required under the SOW:

- Equipment Letter Report;
- Draft Work Plan;
- Final Work Plan;
- Draft EE/CA Report;
- Final EE/CA Report;
- Draft Action Memorandum;
- Final Action Memorandum;
- Meeting Minutes; and
- Monthly Progress Reports.

2.12 Project Schedule

2.12.1 The schedule was initiated with the Notice to Proceed dated July 30, 1999, and ends with the completion of the final EE/CA Action Memorandum. The period of performance ends September 30, 2000. The present overall schedule is presented in Appendix D.

2.12.2 The Parsons Site Manager, SUXOS, and OE SSO will be onsite during the Site Characterization sampling, estimated to be about 2.5 months. Multidiscipline teams will perform the site characterization.

2.12.3 It is assumed that a maximum of 105 acres will be geophysically investigated and 70% of the sample grids will require some brush clearance. The sites have been grouped on the schedule to optimize brush clearance and field investigation time. A total of 58 ten-hour days were assumed for the geophysical investigation effort. The estimated production rate for the project is 16 grids per manual geophysics team per week. This estimate is based on an average and will depend on the degree of clearing required and the number of anomalies excavated. The number and location of anomalies to be excavated will be established in the field as the EM-61 surveys are completed.

2.13 Public Relations

2.13.1 Mr. Steve Absolom, BRAC Environmental Coordinator, will be the overall coordinator for public affairs on this project. The following protocol will be followed during execution of this WP:

- All communications and contacts with the public will be under the direction of Mr. Absolom.
- All public information contacts made during the project will be documented and forwarded immediately to Mr. Absolom.
- Parsons will support, attend and participate in public meetings as directed by USAESCH. The support will include preparation and delivery of briefings, graphics, and presentations, and participation in site visits.

SECTION 3
EXPLOSIVE MANAGEMENT PLAN

3.0.1 This plan outlines the procedures USA Environmental, Inc. (USA Environmental) will use to perform ordnance and explosives (OE), identification and disposal operations at the Seneca Army Depot Activity (SEAD), Romulus, New York. The procedures are in accordance with the following:

- FAR 45.5
- ATFP 5400.7
- DOD 6055.9-STD
- AR 190-11
- DOT Regulations

3.1 Acquisition Desciption and Estimated Quantity of Explosives

3.1.1 USA has a Bureau of Alcohol, Tobacco and Firearms (BATF) permit to purchase and use explosives and will supply commercial demolition material for disposal operations at SEAD. This permit will be posted on site and will be available for local, state, or federal inspection. Accountability and use of the explosives will remain with USA unless custody is transferred to the Government or another contractor with a current BATF explosive license.

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

3.1.2 Acquisition Source

3.1.2.1 USA Environmental will purchase explosives from licensed commercial suppliers such as Halliburton and Austin Powder Company. The Senior UXO Supervisor (SUXOS) will be authorized to request and receive explosives from the commercial suppliers.

3.1.3 Listing of Proposed Explosives

3.1.3.1 The types of explosives that will be used are:

- 20 each ¾ lb. Cast booster (TNT & PETN);
- 40 each Quarry Charge (32 gram shape charge, RDX);
- 1000 feet, detonating cord (80 grain per foot, PETN);
- 50 each detonators (blasting caps electric, Lead Azide, Lead Styphnate, PETN).

3.2 Initial Receipt

3.2.1 Shipments of explosives will be by commercial carrier from the explosives suppliers. The explosive supplier is responsible for all permits and documentation required by Federal, State, and local regulations.

3.2.1 Receipt of Explosives

3.2.1.1 On receipt, the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Magazine Data Card (Figure 3-1). The original receipt documents and an inventory will be maintained on file in the site office by the SUXOS. The Magazine Data Card will remain in the magazine with the explosive items and be annotated and updated for each issue and receipt.

3.2.2 Reconciling Discrepancies

3.2.2.1 The SUXOS will be furnished a copy of all explosives requests by the USA home office and will inventory explosives received by lot number and quantity. The quantity received will be checked against the shipping manifest and any discrepancies will be annotated on the shipping document and immediately reported to USA Tampa. USA Tampa will then notify the supplier, and if necessary BATF, to reconcile any discrepancies.

3.3 Storage

3.3.1 USA will use Government approved and supplied explosives storage facilities at SEAD.

3.3.1 Establishment of Storage Facilities

3.3.1.1 SEAD currently has explosive magazines available in the SEAD Ammunition Storage Area (Igloo). USA will use the existing magazines for explosive storage. USA Environmental will comply with DOD 6055.9 STD, Ammunition and Explosive Safety Standards, for storage and compatibility criteria and procedures when using the Government facilities. If USA is required to establish additional explosive storage and no magazines are available in the SEAD ASP USA will:

- Use portable approved BATF Type 2 structures;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.9-STD;
- Install sufficient magazines to comply with explosive compatibility requirements, (i.e., bulk explosives, initiating explosives);
- Security, such as fencing and/or guards, to prevent unauthorized access and/or theft, is not required as the magazines will be sited within the fenced Igloo area.

3.3.2 Physical Security of Storage Facilities

3.3.2.1 Physical security of the SEAD Igloo area is provided by SEAD.

3.4 Transportation

3.4.1 Transportation of OE and explosives will comply with all federal, state, and local regulations. Permits are not required under CERCLA for on-site or on federal installations, for transportation of explosives or conventional OE.

3.4.1 Procedures for Transportation from Storage to Disposal Locations

3.4.1.1 For transportation of OE and explosives to disposal site USA will comply with the following:

- Initiating explosives, such as detonators, will remain separated from other explosives at all times. Detonators may be transported in the same vehicle as long as they are in a separate container; (IME-22 container or equivalent);
- Compatibility requirements will be observed;
- Only UXO Technicians III and above may be issued and transport explosive materials. The second individual in the vehicle can be a UXO Technician II or I and should be a member of the receiving party;
- Operators transporting explosives will have a valid drivers license;
- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions.;
- Personnel will not ride in the cargo compartment with explosives or OE;
- Vehicles carrying explosives will observe a speed of less than 10 M.P.H.

3.4.2 Explosive Transportation Vehicle Requirements

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

- Vehicles transporting explosives or OE will be inspected daily using the USA Environmental Explosive Vehicle Inspection form (Figure 3-2), and will be properly placarded;
- Vehicle engine will not be running when loading/unloading explosives and the vehicle will have the emergency brake set or the wheels chocked.
- Beds of vehicles will have either a wooden bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings;
- Vehicles transporting explosives will have a first aid kit, two 10 BC rated fire extinguishers, and communications capability; and
- A specified route will be followed as coordinated with SEAD.

3.5 Receipt Procedures

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

3.5.1 Records Management And Accountability

3.5.1.2 On receipt, the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Magazine Data Cards. The original receipt documents and an inventory will be maintained on file by the SUXOS. The Magazine Data Card will remain in the magazine with the explosive items and be annotated and updated for each issue and receipt. All original explosive records will be forwarded to USA Tampa for archive in accordance with BATF regulations and requirements. BATF requires USA to maintain explosive records for commercial purchases for a period of 15 years. Copies of all records will be maintained on site by the SUXOS and be available for inspection by authorized agencies.

Explosive items will be tracked by lot number until the item is expended or transferred to Government control and accountability.

3.5.2 Authorized Individuals

3.5.2.1 USA is required to provide commercial suppliers with documentation of individuals authorized to request and receive explosives. The individual authorized to receive and issue explosives is the SUXOS and in some cases, if the SUXOS is not available, a UXO Technician III. On site the SUXOS will designate in writing the UXO Technician III who is authorized to transport and use explosives and UXO Technician II who is authorized to use explosives.

3.5.3 Certification

3.5.3.1 The SUXOS and UXO Technician III team leader performing demolition will sign and date the Explosive Usage Form (see Figure 3-2) certifying that the explosives were used for their intended purpose.

3.5.4 Procedures for Reconciling Receipt Documents

3.5.4.1 The SUXOS will reconcile the delivery shipping documentation with the requested amounts ordered and received. Any shortages or overages will be reported to USA - Tampa who will contact the explosive supplier and reconcile any differences.

3.6 Inventory

3.6.1 The SUXOS will strictly control access to all explosives. The SUXOS will review all requests for explosives from the individual operating sites. Only sufficient explosives for the day's operations will be requested and issued.

3.6.1 Storage Facility Inventory Procedures

3.6.1.1 Access to explosive magazines will require a USA UXO escort for non-USA employees. This is required to maintain accountability and meet BATF inspection requirements. Issues of explosives are recorded on Explosive Usage Records and deducted from the Magazine Data Card(s) and annotated in the daily journal. This procedure will ensure that the issued explosives are accounted for while they are in the possession of individual users. The end user of explosives will certify on the Explosives Usage Record that the explosives were used for their intended purpose;

3.6.1.2 Entries made on the Explosive Usage Records and Magazine Data Cards will be verified through physical count by the Demolition Team UXO Technician III when drawing or turning-in the explosives and the SUXOS will verify the record.

3.6.2 Procedures for Reconciling Inventory Discrepancies

3.6.2.1 The SUXOS or a UXO Technician III and Parsons UXOQCS will be responsible for performing a weekly inventory of the explosives within the magazine. If there is a discrepancy between the inventory and the volume of explosives within the magazine, then they will review the Magazine Data Card and Explosives Usage Record to see if the inventory records are current. If a discrepancy still exists the procedures outlined in Paragraph 3.7 will be followed.

3.7 Reporting Loss or Theft of Explosive Materials

3.7.1 If it is confirmed that ordnance or explosives are missing, then the Parsons Project Manager, the USACE Site Safety Specialist, and USA Tampa will be notified. USA Tampa will notify BATF and immediately begin an investigation. Parsons will contact the USAESCH contract officer within 24 hours of discovery. Local authorities will be notified and a written report will be issued within 24 hours.

3.8 Procedures for Return to Storage of Explosives Not Expended

3.8.1 Explosives that were issued for use, but were not needed will be returned daily to the magazines, at the completion of disposal operations. The Demolition Team UXO Technician III will return the unused explosives to the storage magazine and revise the Magazine Data Card and Explosives Usage Record.

3.9 Disposal of Remaining Explosives

3.9.1 USA is required by BATF to account for all explosives purchased and used. At project completion all unused explosives will either be disposed of by detonation or custody and accountability transferred to an incoming contractor or the Government. USA and Parsons will perform an economic analysis for different alternatives for disposal of the remaining explosives and Parsons will submit it to the Contracting Office for approval.

3.10 Forms

3.10.1 USA will use internal forms for explosives receipt, issue, inventory, and vehicle inspections.

Magazine Data Card

Nomenclature:

Lot Number: Unit Of Issue:

Date	Name	Received	Issued	Balance	Checkers Initials

Figure 3-1

Explosives Usage Record

Contract Number:

Team Number: Date: Project Name:

Team Leader: Work Areas & Grid Numbers:

Explosives Issued — Signature Of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended — Signature Of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned — Signature Of SUXOS:

Item	Quantity	Lot Number	Checkers Initials

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

Figure 3-2

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

Figure 3-3

SECTION 4
EXPLOSIVES SITING PLAN

4.1 This plan outlines the procedures USA Environmental, Inc. (USA) will use to perform ordnance and explosives (OE), identification and disposal operations at SEAD and describes the safety criteria to be employed.

4.1 Explosives Storage Magazines

4.1.1 USA will use Government supplied explosives storage facilities at SEAD. If the storage magazines are not available or USA is required to install additional magazines, commercial Type 2 magazines will be leased.

4.1.1.Types(s) of Magazines

4.1.1.1 The SEAD Ammunition Supply Point (ASP) has standard earth covered and above ground magazines for storage of explosives. If commercial magazines are required, USA will use portable approved Bureau of Alcohol Tobacco and Firearms (BATF) Type 2, outdoor magazines. USA will:

- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.9-STD, Department of Defense Ammunition and Explosives Safety Standards;
- Install two or three magazines in order to comply with explosive compatibility requirements, (i.e., bulk explosives, initiating explosives, and OE waiting demilitarization).
- Magazines will be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. They will be supported to prevent direct contact with the ground. The ground around them will slope away for drainage or other adequate drainage will be provided.
- Hinges and hasps will be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked. Each door will be equipped with two padlocks fastened in separate hasps and staples. Padlocks will have at least five tumblers and a casehardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

4.1.2 Net Explosives Weight (NEW) and Hazard Division

4.1.2.1 The contents, Net Explosive Weight (NEW), and Hazard Division are presented below in Table 4-1. The distances shown are based on standard earth covered magazines.

Table 4-1
Explosives – Net Explosive Weight and Hazard Division

Mag. Type	Contents	Hazard	Amount	Net Exp.	Distance (in feet) From	
		Div.		Wt. (Lbs)	Inhabited Bldgs. *	Public Traffic Rt. *
High Explosive	Booster, 3/4 Lb.	1.1	20 ea.	15	500	300
	Detonating Cord, 80 grain	1.1	1000 ft.	8	500	300
	Perforator, 32 gram	1.1	40 ea.	7	500	300
			Total NEW	30	500	300
OE Storage	OE Items	1.1	NA	30	500	300
Initiating Explosives	Blasting Cap, Elect.	1.1	50	2	500	300
			Total NEW	92	500	300
* From DOD 6055.9-STD, Table C9.T1.						

4.1.3 Quantity Distance Criteria for Siting

4.1.3.1 The quantity distance criteria for siting of portable magazines is 670 feet for inhabited building distance and 750 feet from public traffic roads in accordance with paragraph C2.5.2.3.1.1 and table C9.T1, DOD 6055-9-STD.

4.1.4 Engineering Controls

4.1.4.1 In areas where an acceptable fragmentation distance cannot be achieved, items safe to move may be moved to another area as long as the movement does not require transportation on public roads and with the concurrance of the USAESCH Safety Specialist. If movement to another area is not possible, other methods of mitigation, such as berms, tamping, or sandbag barricades (in accordance with HNC-ED-CS-S-98-7), will be employed to reduce the fragmentation hazard. If these methods of disposal are determined to be impractical, USA will notify the on-site USACE Safety Specialist.

4.2 Safe Separation Distances

4.2.1 The safe separation distances for the public during intrusive operations will be the default distances in DoD 6055.9 STD. Chapter 5, paragraph C5.5.4 if the type of OE is unknown; the maximum fragmentation distance for the Most Probable Munition (MPM), as calculated by CEHNC's Engineering Directorate, Structural Branch; or when conditions and OE hazards permit, the minimum separation distance may be reduced to fit the situation, but in no case will the distance be less than $1/600ft^2$, or the Intraline Distance (I.D.) based on overpressure, whichever is greater. In the interest of safety, the largest munition that may be present at each site was used to determine the safe separation distance for the intrusive operations in those areas. The areas to be investigated and the MPM used to calculate the safe separation distance for each are shown in Table 4-3, as are the MPMs on which the geophysical surveys will be based. Table 4-4 shows the minimum separation distance calculated for each area. The information on the distance to be used has been furnished by the District Project Manager, along with the calculation sheet used in determining the fragmentation distance.

Table 4-2

MINIMUM SEPARATION DISTANCE

UXO Operation	Minimum Distance Between	
	UXO Teams	UXO Teams and Other Personnel
For Unintentional Explosive Detonations		
Surface Sweeps	200'	MSD for the MPM
Mag/Flag	200'	MSD for the MPM
Intrusive Investigation	200'	MSD for the MPM
For Planned Disposal Operations	MSD for the MPM	MSD for the MPM

Table 4-3

MOST PROBABLE MUNITION (MPM) BY AREA

AREA	AREA USED FOR	POTENTIAL MUNITION	MPM (SAFETY)	MPM (GEOPHYSICS)
SEAD-43	Former liquid propellant storage area	Liquid propellant drums	N/A	N/A
SEAD-44A	Former QA Function Test Area	Rifle-fired grenades, small arms	40mm rifle-fired grenade	40mm rifle-fired grenade
SEAD-45	Open Detonation Area	Small arms to 155mm HE	155mm M112	40mm rifle-fired grenade
SEAD-57	Former EOD range	Flares, small arms, 10 lb explosive limit	81mm mortar	40mm rifle-fired grenade
Demo Range	Demolition of projectiles	75mm projectile	75mm M48	40mm rifle-fired grenade
Burial Area near Indian Creek	Rumored burial	Unknown in ASR	75mm M48	40mm rifle-fired grenade

AREA	AREA USED FOR	POTENTIAL MUNITION	MPM (SAFETY)	MPM (GEOPHYSICS)
Grenade Area	Grenade training	40mm rifle-fired grenades, practice grenades, no HE	MKII grenade	40mm rifle-fired grenade
SEAD-46	Small arms range/small rocket range	3.5" rockets, small arms	3.5" rocket	3.5" rocket
EOD Area #3	Former EOD area	Unknown in ASR fuzes, flares, small arms expected	75mm M48	40mm rifle-fired grenade
EOD Area #2	Former EOD area	Explosives destroyed, 3-4 lb limit	75mm M48	40mm rifle-fired grenade
SEAD-16	Popping Plant	Small arms casings	20mm HE projectile	20mm HE projectile
SEAD-17	Popping Plant	Small arms casings	20mm HE projectile	20mm HE projectile

Table 4-4
Minimum Separation Distances for Seneca OE Sites based on CEHNC calculations for Most Probable Munitions (Safety)

AREA	MPM	MAXIMUM FRAGMENT RANGE
SEAD-45	155mm M112	1084 ft.
SEAD-57	81mm mortar	1233 ft.
Demo Range	75mm M48	1701 ft.
Burial Area near Indian Creek	75mm M48	1701 ft.
Grenade Area	MKII Grenade	650 ft.

AREA	MPM	MAXIMUM FRAGMENT RANGE
SEAD-46	3.5" Rocket	1420 ft.
EOD Area #3	75mm M48	1701 ft.
EOD Area #2	75mm M48	1701 ft.
SEAD-16	20mm HE	318 ft.
SEAD-16	20mm HE	318 ft.

These distances are plotted around each site in Figures 4-1 to 4-10. Note that the distances plotted around the SEAD-45 berm are twice the 1/600 and twice the maximum fragment range for the 155mm M112. As it is known where the berm in SEAD-45 was located, these should be the maximum distances that a 155mm would affect. SEADs-43 and -44A are not included in this table, as they will not be investigated during this project.

4.2.1 Demolition Areas

4.2.1.1 OE will be disposed of in the areas where the item(s) are encountered. A safe separation distance for all personnel will be established. If the OE is unknown the distances will be: 1,250 feet for non-fragmenting explosive material, 2,500 feet for bombs and projectiles with a diameter less than 5 inches (127mm), 4,000 feet for bombs and projectiles with a diameter 5 inches (127mm) or greater, and 2,500 feet for all other ammunition. If the OE is known the distance will be the maximum fragmentation distance for the MPM, as calculated by CEHNC's Engineering Directorate, Structural Branch.

4.3 Blow-in Place

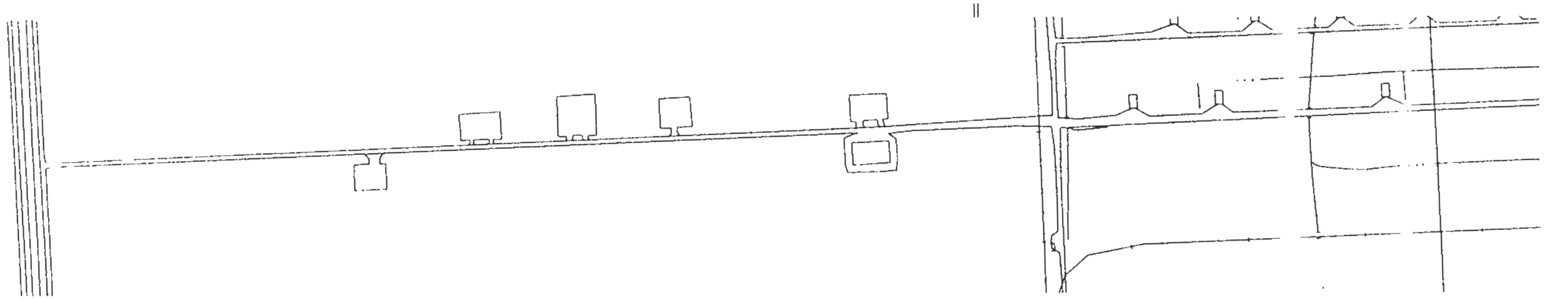
4.3.1 Prior to initiation of demolition operations all non-essential personnel are evacuated from the MSD Prior to priming the demolition charges all avenues of ingress will be physically blocked by guard personnel. Radio communications are maintained between parties at all times. Avenues of ingress are not to be opened without the express permission of the SUXOS. A constant state of vigilance will be maintained by all personnel to detect any intrusion into the fragmentation zone or over flights of aircraft. Upon completion of disposal operations, the Disposal Team's UXO Technician III and one UXO Technician will visually inspect each disposal shot. One of these personnel will perform a visual inspection of the disposal site(s). The second person will standby at a safe distance and be prepared to render assistance in the event of an emergency. Upon completion of this inspection and providing that there are no residual hazards, the SUXOS will authorize the resumption of site operations.

4.3.1 Collection Points

4.3.1.1 OE collection points will not be used, as items will be disposed of in the location where they are encountered. Suspect items that are safe to move and items requiring demilitarization may be stored in the OE explosive magazine and added to planned demolition shots.

4.3.2 Consolidated Shots

4.3.2.1 Items that are safe to move (unfuzed or unfired) may be consolidated to one location within that day's survey area to reduce the number of demolition shots and fragmentation contamination. UXO that is safe to move may be consolidated to reduce the number of shots. All movement of OE/UXO will be coordinated with and approved by the on-site USACE OE Safety Specialist. Consolidated shots will be in accordance with the CEHNC report "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites, August 98 (Terminology Update March 2000)" A copy of the report will be available on-site for reference.



1000 0 1000 2000 Feet

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SENECA ARMY DEPOT ACTIVITY

FIGURE 4-1
1800' RADIUS WITH MAXIMUM FRAGMENT AND 1/600 DISTANCES

Scale: 1" = 1000'	MARCH 2000

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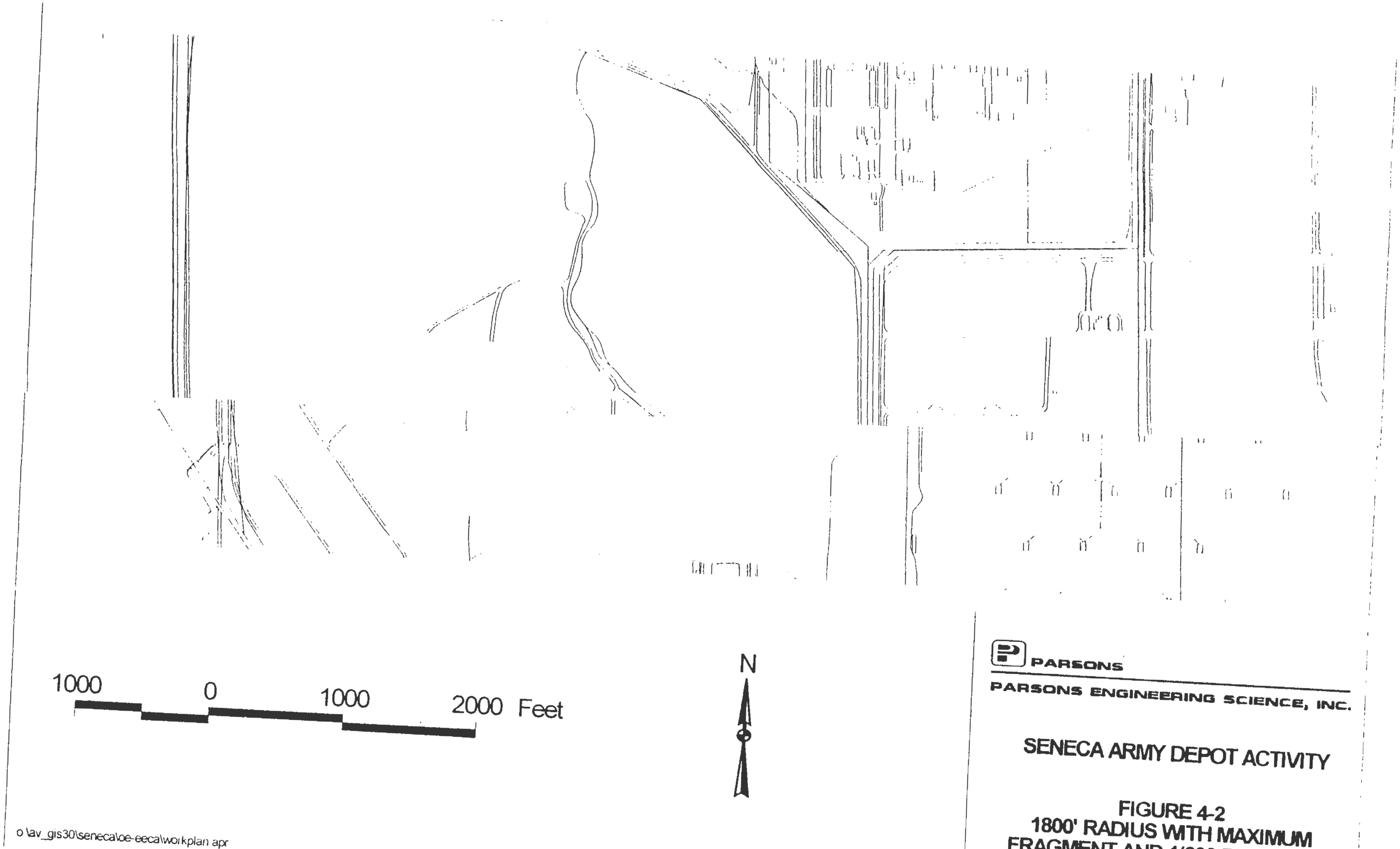

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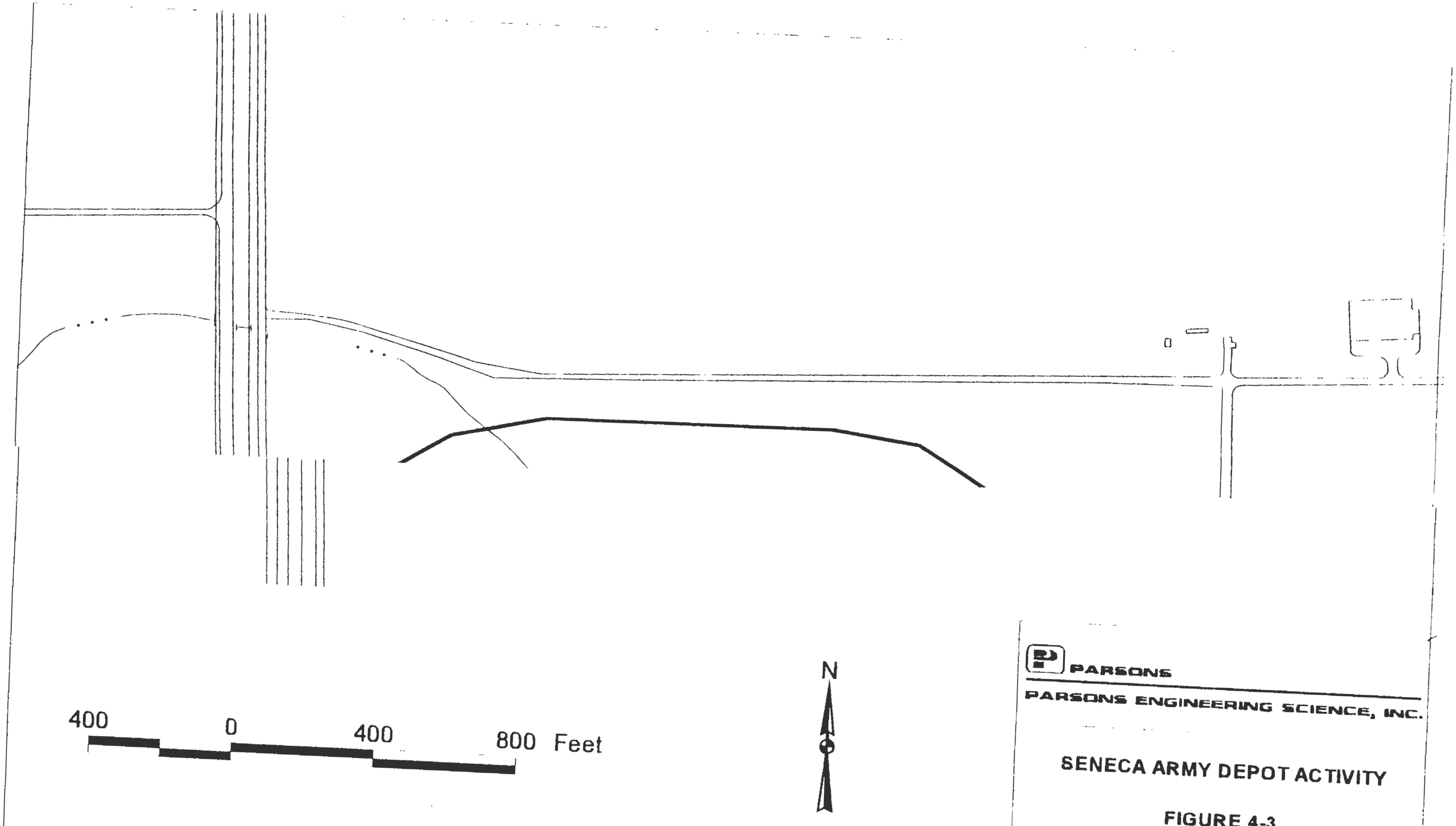
SENECA ARMY DEPOT ACTIVITY

FIGURE 4-2
1800' RADIUS WITH MAXIMUM FRAGMENT AND 1/600 DISTANCES

Scale: 1" = 1000'

MARCH 2000



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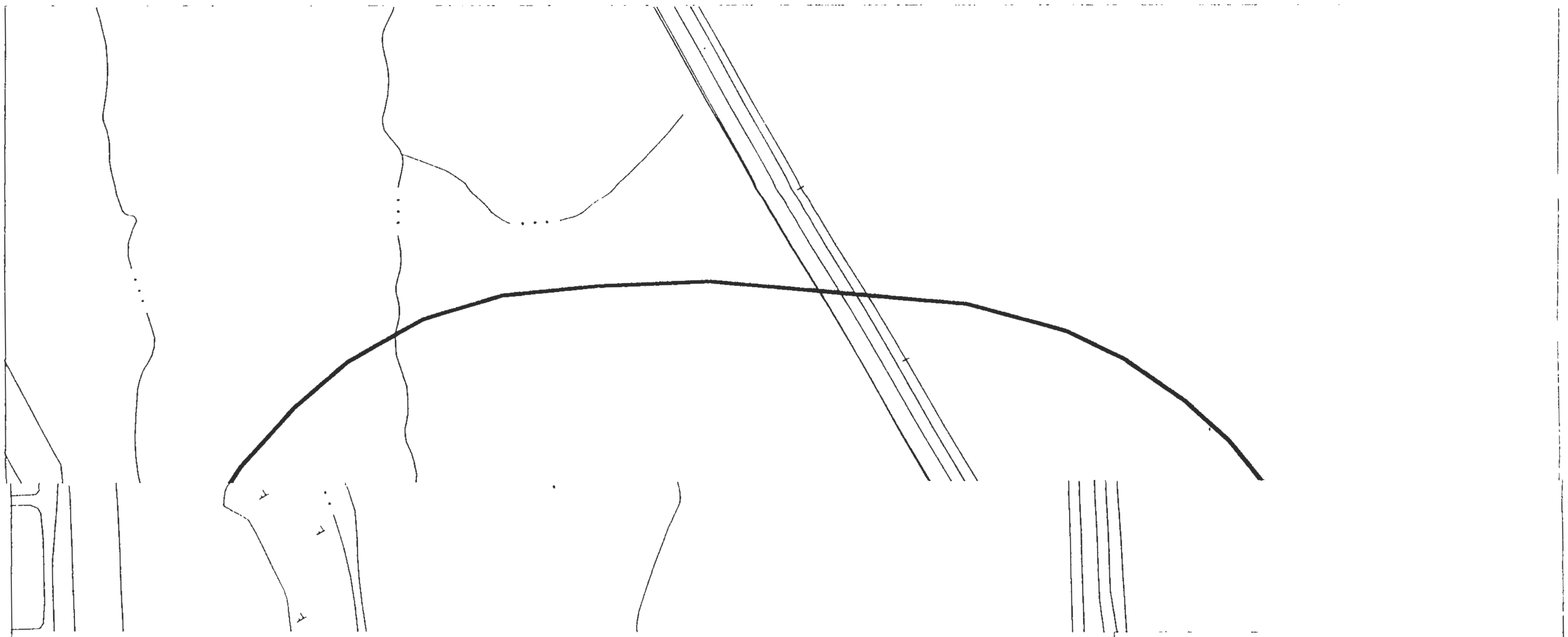
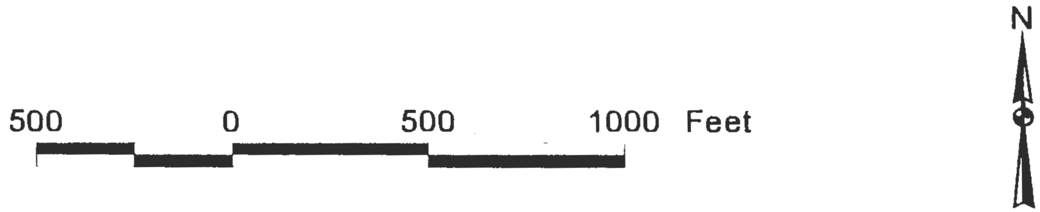
SENECA ARMY DEPOT ACTIVITY

FIGURE 4-3
GRENADE RANGE
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 400'

MARCH 2000





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SENECA ARMY DEPOT ACTIVITY

FIGURE 4-4
SEAD-46 INVESTIGATION AREA
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 500' | MARCH 2000

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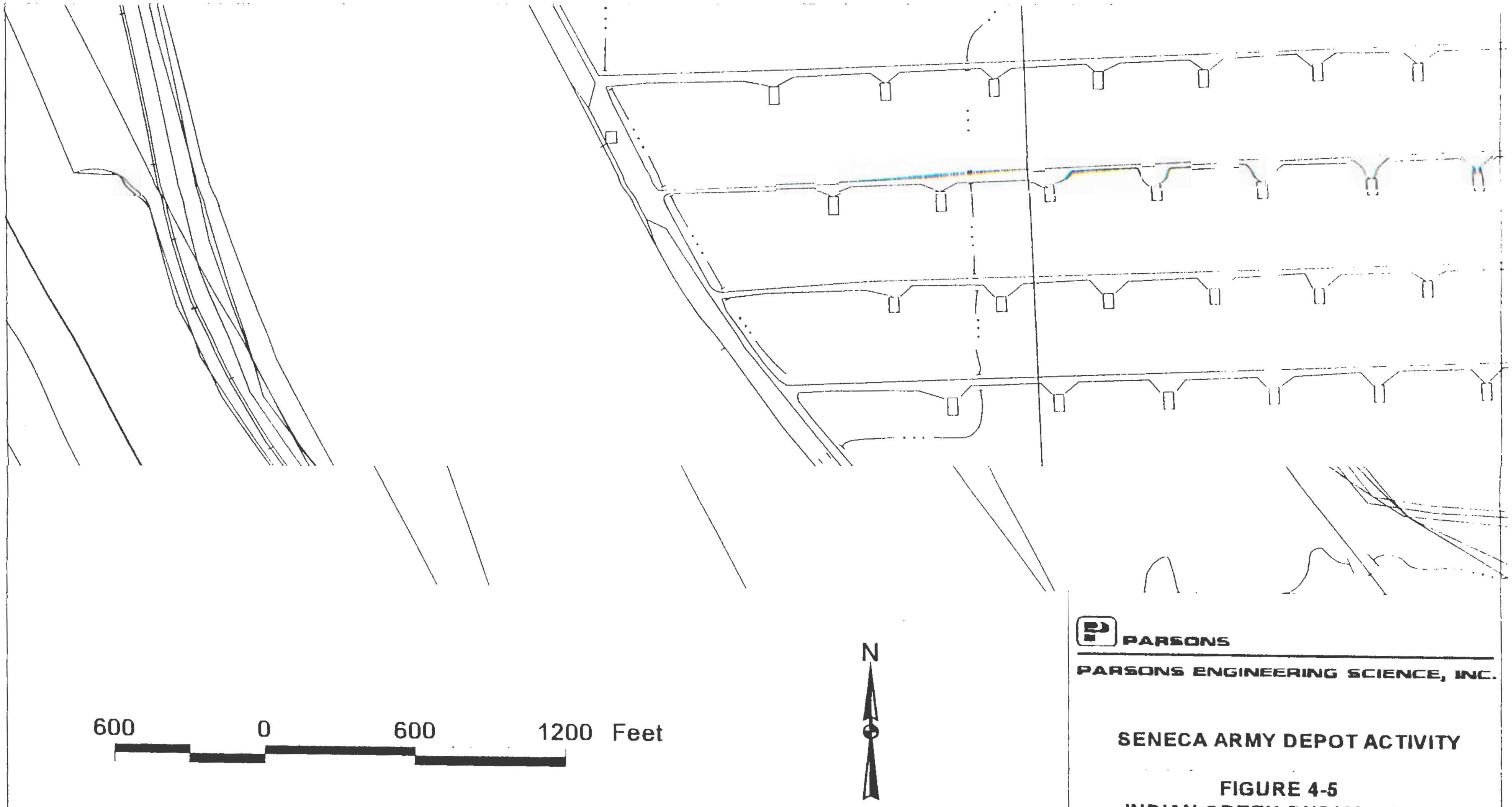

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SENECA ARMY DEPOT ACTIVITY

FIGURE 4-5
INDIAN CREEK BURIAL AREA
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 600' | MARCH 2000

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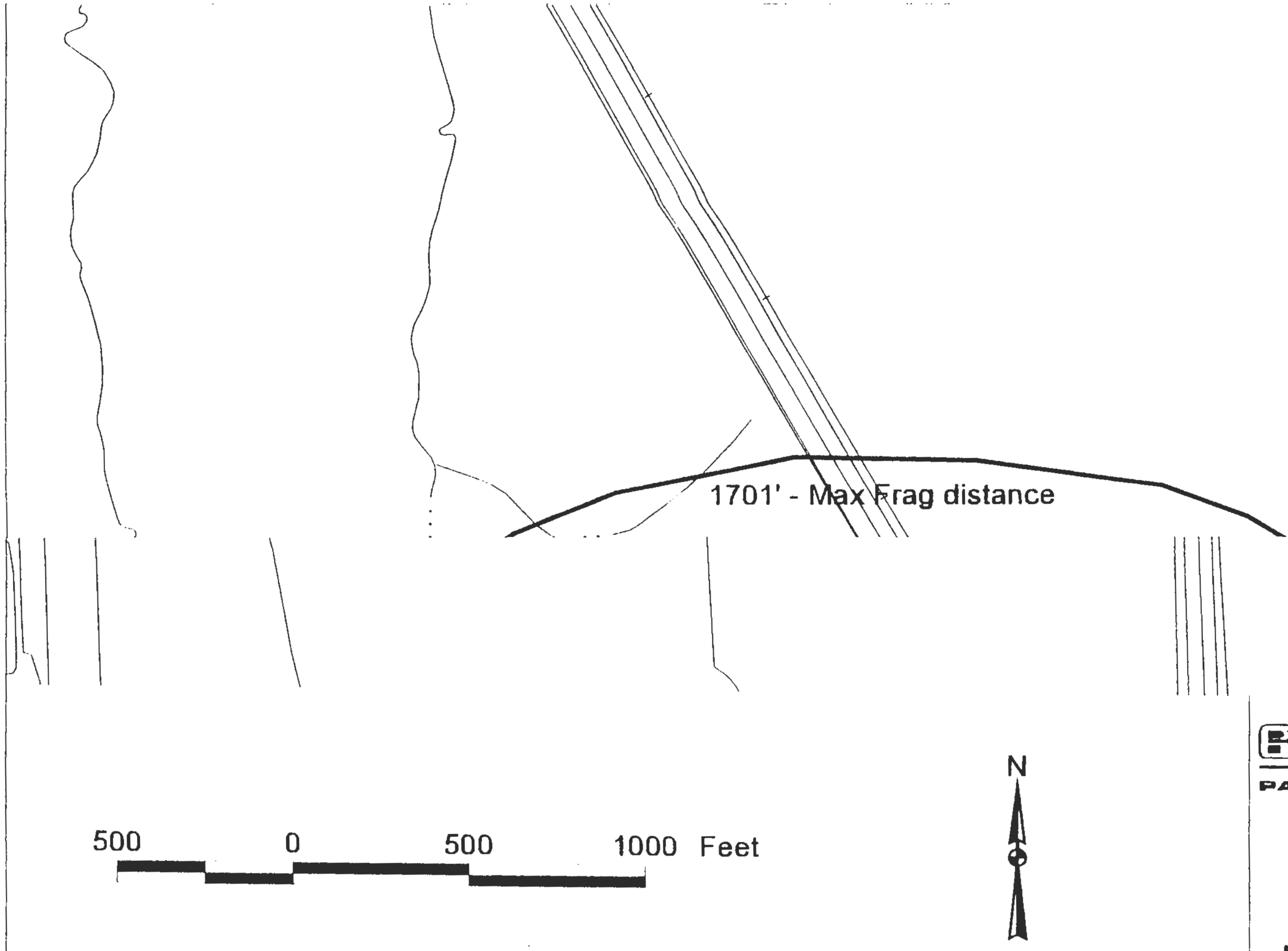

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SENECA ARMY DEPOT ACTIVITY

FIGURE 4-6
EOD AREA #3 INVESTIGATION AREA
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 500' | MARCH 2000

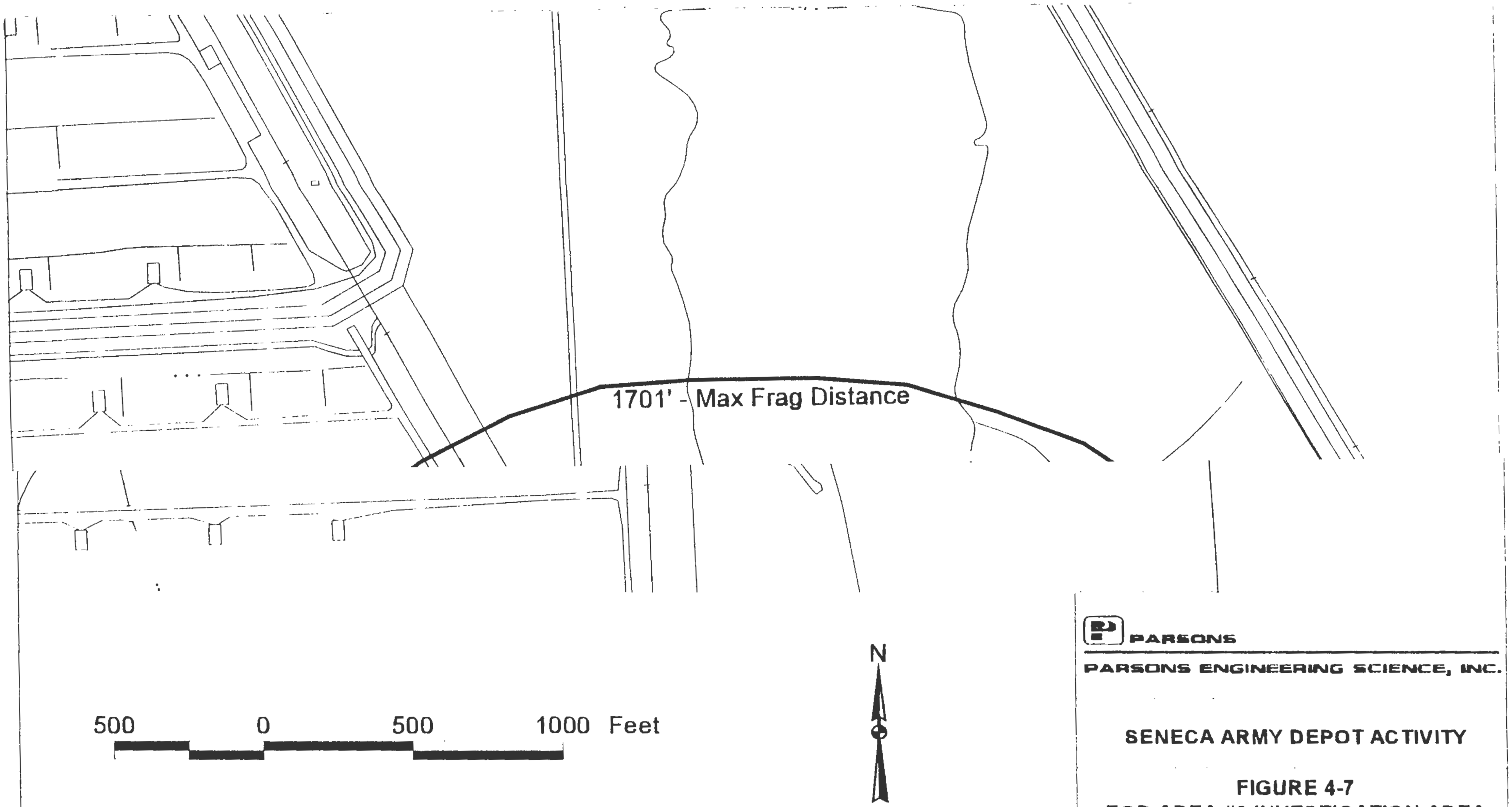

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FIGURE 4-7
EOD AREA #2 INVESTIGATION AREA
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 500' | MARCH 2000

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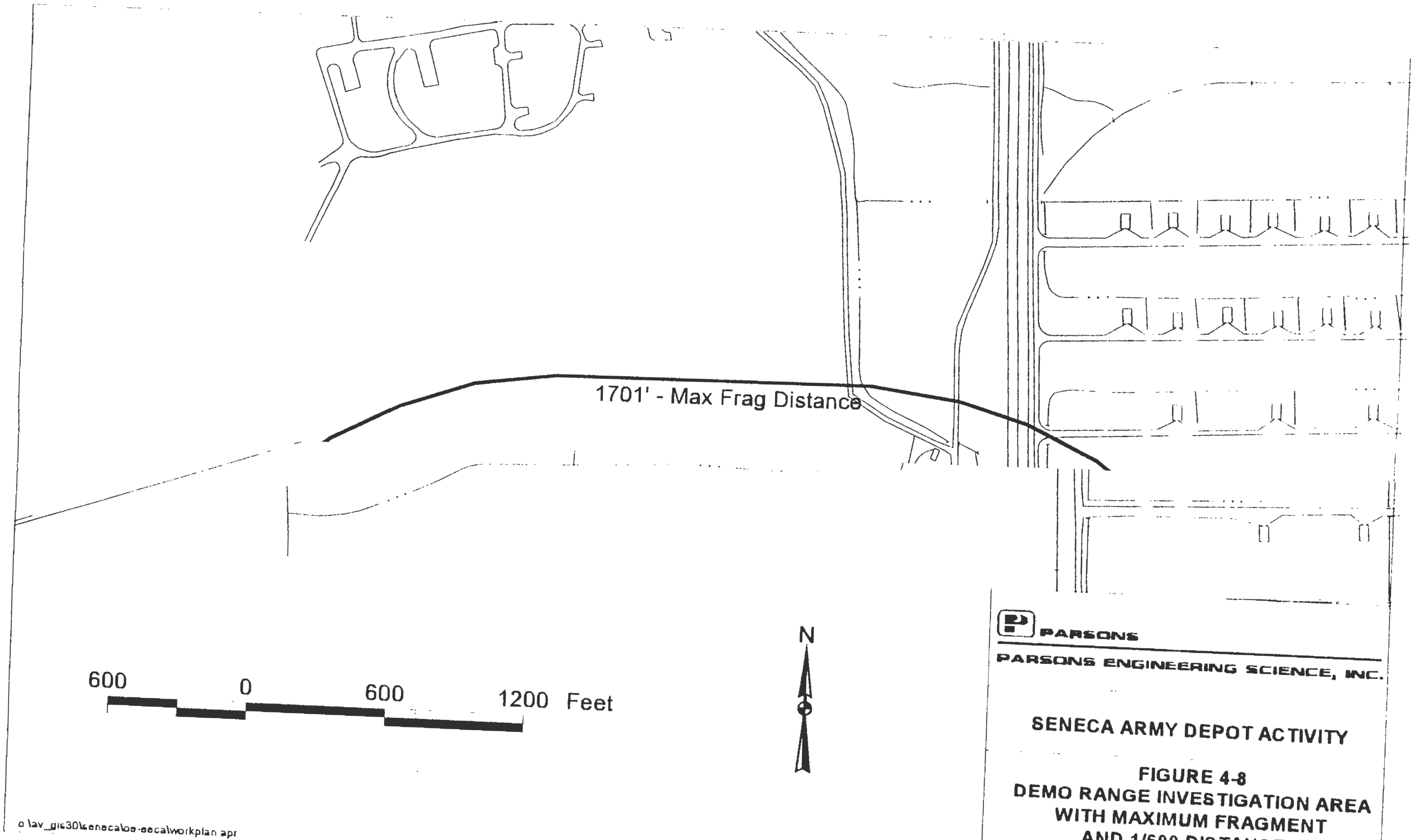

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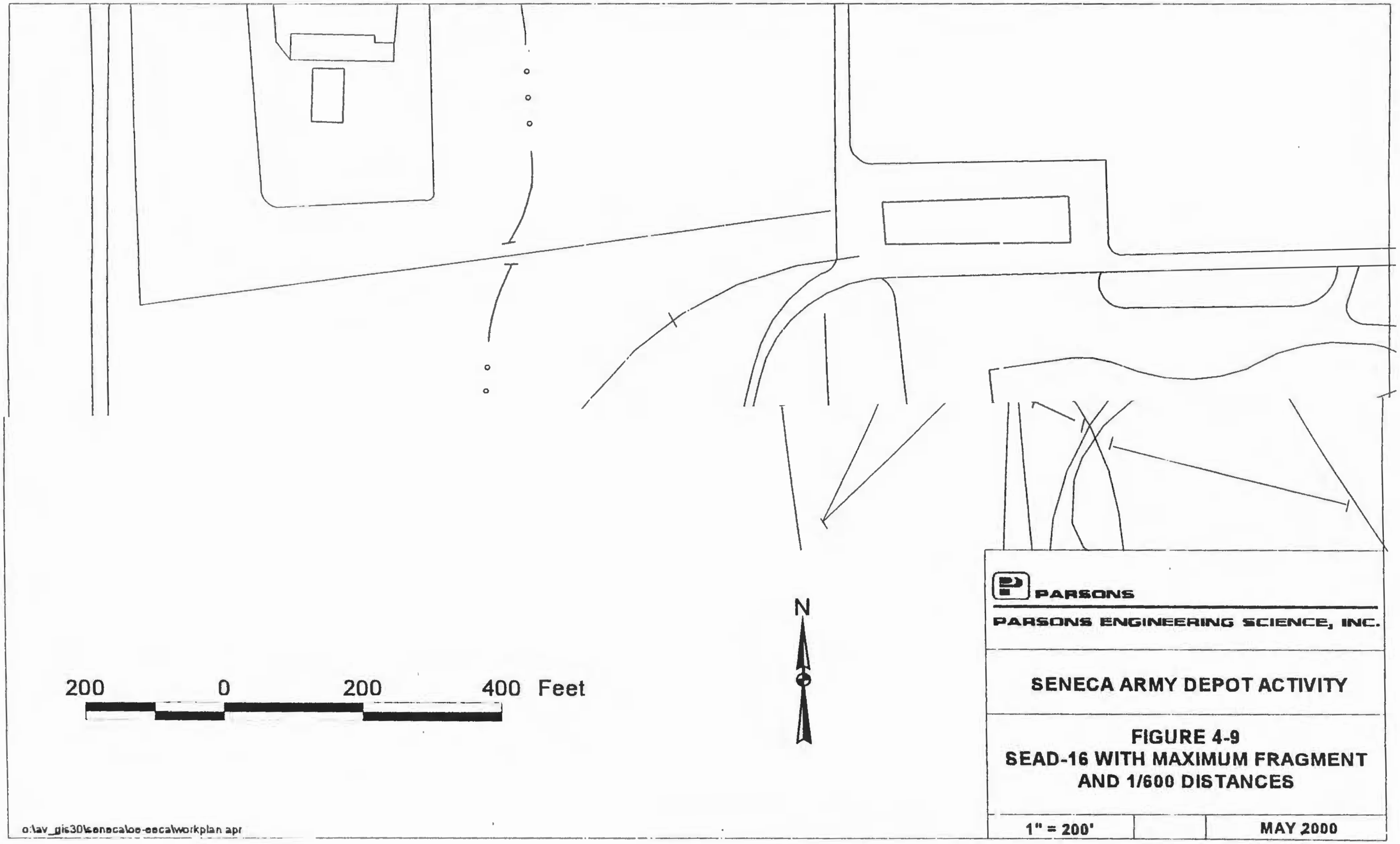
FIGURE 4-8
DEMO RANGE INVESTIGATION AREA
WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 600' | MARCH 2000



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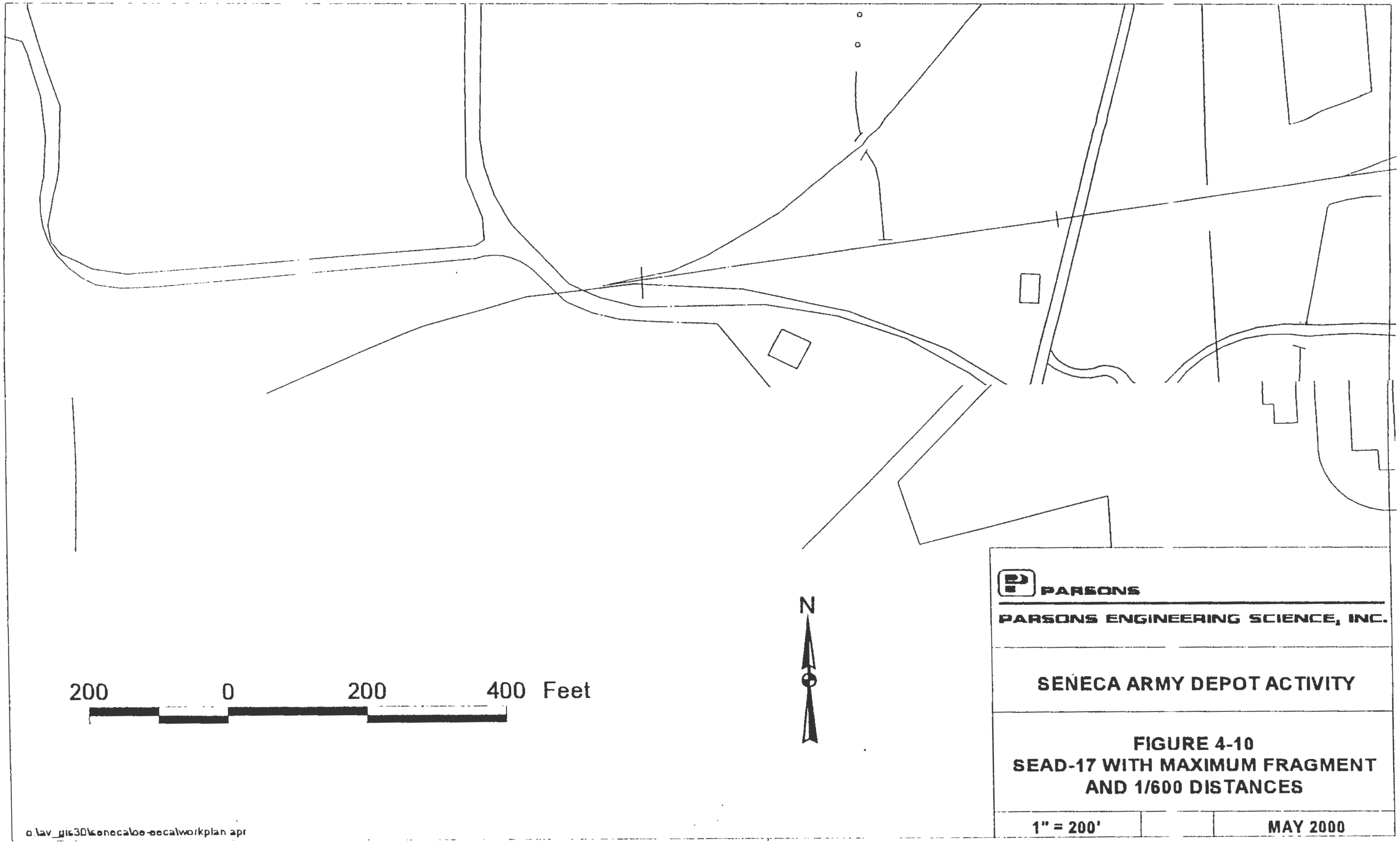
SENECA ARMY DEPOT ACTIVITY

FIGURE 4-9
SEAD-16 WITH MAXIMUM FRAGMENT AND 1/600 DISTANCES

1" = 200'		MAY 2000



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SENECA ARMY DEPOT ACTIVITY

FIGURE 4-10
SEAD-17 WITH MAXIMUM FRAGMENT
AND 1/600 DISTANCES

1" = 200'		MAY 2000

SECTION 5
GEOPHYSICAL INVESTIGATION PLAN

5.1 Program Objectives

5.1.1 The object of the geophysical investigation program is to survey the areas of interest described below using magnetic and electromagnetic induction methods. The results of these surveys will be used to identify specific anomalies for subsurface intrusive investigation.

5.2 Description of Seneca Army Depot and Areas to be Investigated

5.2.1 Past, current, and future use

5.2.1.1 The total area of SEAD is 10,587 acres, of which 8,382 are designated storage areas for ammunition, storage and warehouse, and open storage and warehouse. Land use at the depot is controlled by the facility mission. The entire facility has restricted access and is surrounded by chain-link fencing topped with barbed wire. The depot has a roadway network consisting of paved macadam, concrete, and gravel roads totaling approximately 141 miles.

5.2.1.2 During active military use, the land use was divided into three categories at the depot. The Main Post accounted for 9,832 acres and consists of an exclusion area containing partially buried, reinforced concrete igloos, general storage magazines, and warehouses. The cantonment areas of the facility consist of the North and South Posts. The North Post, at the north end of the Main Post, included troop housing, troop support, and community services. The South Post is located in the southeast portion of the facility near Route 96 and was a developed area containing warehouses, administration buildings, quarters, and community service.

5.2.1.3 Future use of the depot includes an industrial development in the eastern portion of the depot and a conservation/recreation area through most of the rest. All of the areas in the current study are to be used as a conservation/recreation area.

5.2.2 Terrain and Vegetation

5.2.2.1 SEAD consists mostly of former farmland that has been overgrown by dense underbrush between buildings and within the igloo area. Some marshy areas are found near the duck pond in the center of the depot. Woodlands predominate in most of the areas that are not immediately associated with a former facility or building complex.

The area is mostly flat with some moderate hills, especially at the Grenade Range and the Rocket Range. There is a slight change in topographic relief trending towards Seneca Lake to the west.

5.2.3 Geology and Soil Conditions

5.2.3.1 SEAD is located within one distinct unit of glacial till that covers the entire area between the western shore of Lake Cayuga and the eastern shore of Lake Seneca. The till is continuous across the entire depot and it ranges in thickness from less than 2 feet to as much as 15 feet with the average being only a few feet thick. This till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably rip-up clasts removed by the active glacier during the late Pleistocene era. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML).

5.2.3.2 Grain size analyses statistics on glacial till samples collected during the installation of monitoring wells at SEAD show a wide distribution of grain sizes. The glacial tills in this area have a high percentage of silt and clay with trace amounts of fine sand and some gravel. A zone of gray weathered shale of variable thickness is present below the till in almost all locations at SEAD. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

5.2.3.3 The underlying bedrock is a member of the Ludlowville Formation of the Devonian age Hamilton Group. The Hamilton Group, which is 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEAD is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales, mudstones and thin limestones with numerous zones of abundant invertebrate fossils. The groundwater table here is mostly at depth in the limestone formations.

5.2.3.4 Groundwater depths of 4 to 8 feet were found in some locations from seismic refraction work at SEADS 46 and 17. However, shallow groundwater is not expected to be a significant factor at any sites except at EOD area #3, in a marsh at the south end of the duck pond, and near Indian Creek, which appears to be close to the water table near the creek.

5.2.4 Scope of Work

5.2.4.1 The Scope of Work enumerates the following sites on which a geophysical investigation is to be conducted.

- Former EOD Range (SEAD-57)
- Open Detonation Grounds (SEAD-45)
- Demo Range
- Burial Area Near Indian Creek
- Grenade Range
- Small Arms Range/3.5" Rocket Range (SEAD-46)
- EOD Area #3
- EOD Area #2
- SEAD 53 (Igloo Area)

In addition, the following site was added on February 25, 2000, as discussed in the Archive Search Report.

- Popping Plants (SEADs 16 and 17)

5.2.4.2 Figure 1 shows the location of each site. In addition to performing geophysical investigations at these locations, data from previous investigations at the former QA Function Test Range and Associated Pits (SEAD – 44A) and the former Liquid Propellant Storage Area (SEAD-43) will be consolidated and included in the final report.

5.2.4.3 Grid locations for each of the areas were chosen according to a number of criteria. The number of grids was first chosen to match the total expected in the Scope of Work. For the smaller areas, areas EOD #3, the Burial Area at Indian Creek, and most of the grenade range, the grids were chosen to completely cover the area. For the rocket range (SEAD 46) the grids were chosen to both sample the area and allow for rapid geophysical surveying. For the Open Detonation area, grids were chosen to randomly sample the open area, and a total meandering path distance was chosen to sample the areas outside the open area and inside the 1800' blast radius. At SEAD 57, the grids were chosen in a similar manner to SEAD 45. At EOD area #3, the area along the side of the duck pond was marked to be covered using meandering path by land or water where possible; however, it may not be possible to get sufficient amount of meandering path to equal the survey acreage in the S.O.W. The grids in the demolition range were chosen to randomly sample the area; however, they may be moved due to difficulties in obtaining brush clearance in this area. We will not survey the berms at either SEAD-45 or SEAD-46, as the density of fragments in these areas and their relative inaccessibility make them unsuitable for geophysical investigation.

Each of the areas is described in detail below.

5.2.4.1 (Task 4) OE Characterization at the Former EOD Range (SEAD-57)

5.2.4.1.1 This area consists of approximately 58 acres northwest of the center of the depot. The entire area is visible in 1991 aerial photos. The primary focus of the geophysical investigation in this area is a berm 30' in diameter and 6' high near the northeast corner of the area. This berm does not appear in aerial photos until after 1978. An earlier visit in 1998 found the remains of many flares in and around this berm, and in shotholes on the opposite side of the access road from the berm. Other shotholes were located at the south side of the access road, and are visible on aerial photographs taken in 1955. The overall EOD area has a blast radius of 1800 feet.

5.2.4.1.2 Eighteen acres of this site will be geophysically investigated using the EM-61. A combination of geophysical grids, and meandering path will be used for this survey. 61 100' x 100' grids (14.0 acres) will be placed on the area to evenly sample the entire 58 acres in the SOW (Figure 5-2). The original proposal called for using traverses across the entire area. However, after a reexamination of the site, we have concluded that a sizable portion of it cannot be cleared for traverse surveying. Rather than create an unnecessarily complicated brush cutting and surveying plan, we have decided to remove the traverse portion of the survey and replace it with equivalent amounts of grids as originally specified in the SOW.

5.2.4.1.3 An equivalent of 18 grids (4.0 acres) of meandering path data will be collected outside of the 58 acres to be investigated using grids but within the blast radius of 1800 feet (Figure 5-2A). In this manner, specific grid areas will be investigated in detail and the 1800-foot blast radius area will be examined approximately, giving a useable estimate of the likely UXO density at all parts of this site.

5.2.4.1.4 The overall area is grassy and open and appears to be readily accessible to an operator dragging an EM-61. However, some small trees at the east, west and south, ends of the site may have to be removed, along with some minor brush at the west end. The grid density has been reduced on the south edge of the site to reflect the difficulties of brush clearance in this area.

5.2.4.2 (Task 5) OE Characterization at the Open Detonation Grounds – SEAD 45

5.2.4.2.1 The open detonation grounds are approximately 60 acres in area, located northwest of the center of the Seneca Army Depot. The area consists of open area and mounds of various types. Aerial photographs from 1954 show there may have been burn pads that were covered by 1978. A variety of ordnance was destroyed by detonation at this area, including explosives, rockets, and heavy artillery. Live ordnance is likely to be found up to the blast radius of 1800 feet from the center of the area; shrapnel and clutter may constitute a sizeable fraction of the anomalies detected at the area of concern.

5.2.4.2.2 Nineteen acres of this site will be geophysically investigated in 65 100' x 100' grids (15 acres) (Figure 5-3). The grids will be chosen to be centered around a berm and mound area. This area was the site of extensive ordnance detonation activities and has not been previously geophysically investigated. In addition, a total amount of meandering path data equivalent to 18 100' x 100' grids (4 acres) will be collected in an area within a radius of 1800 feet from the center of the site, an area corresponding to the max blast radius of possible OE (Figure 5-3A). In this manner, the entire site should be accurately characterized.

5.2.4.2.3 An examination of the data from the Prove-out Report (Appendix C) indicates that there is some possibility that large ordnance (155 mm), likely to be found at this site, can be successfully discriminated from clutter on either the EM-61 or the magnetometer data. The polarity of the magnetometer data will be useful in helping discriminate large UXO from scrap, especially when used in a crossing pattern with the EM-61. Both methods will therefore be used in parts of this area where large ordnance is to be expected. The magnetometer will be used in a crossing pattern with lines at 3 - 4 foot spacings. The bottom coil will be set at 1.5 feet above the ground to lower the signal from smaller near surface objects (fragments). The total number of grids to be investigated with the magnetometer will be determined by the effectiveness it shows in helping discriminate anomalies identified from the EM-61 data.

5.2.4.2.4 The site has very little tree or vegetation cover; a few small trees are found at the north end. Most of it should be accessible with an EM-61. If necessary, the magnetometer can also be used across most of the site. The exceptions are grids in the north east corner of SEAD-45, where it is anticipated that a White's hand-held, all-metals detector will be used to survey approximately 4 of the 100' by 100' grids. The surveys for these 4 grids will be "mag and flag" surveys, and pin flags will be placed during the survey. No post-processing of data is necessary, and there will be no digital records involved with these surveys other than the final locations of any objects that are discovered during the intrusive investigation.

5.2.4.3 (Task 6) OE Characterization at the Demolition Range

5.2.4.3.1 The demolition range is a 40 acre wooded lot adjacent to SEAD 57. This area was believed to have been used in the 1940's and 50's for projectile demolition. A 1963 aerial photograph shows most of it as being an open area, most of which has subsequently become fairly heavily wooded, as shown in a 1991 aerial photo. A 75mm projectile was found on the surface in an inspection of this range.

5.2.4.3.2 Eighteen acres of this site are to be selected for geophysical examination in 78 100' x 100' grids (Figure 4). It is anticipated that grids can be fully cleared in the southeast corner of the area and along an old road through the center of the site. However, the heavily wooded nature of the rest of the area will make using an EM-61 difficult, if not impossible, in most areas without extensive brush and tree clearance. It will also make GPS use very difficult as well. Small areas in regions where the trees are shorter will be cleared where possible. In addition, the grid size will be reduced to 50' x 50' or 50' x 100' to allow grids to be fit inside areas with larger trees. The number of grids has been reduced at the southwest and northeast corners of the site, in areas of extremely thick woods and undergrowth. Quantitech Inc. has approved the modified grid locations.

5.2.4.3.3 For very heavily wooded areas where grids cannot be set up or GPS received, the White's metal-detector will be used for a mag and flag survey to investigate the acreage specified in the scope of work. Since GPS will not function in the wooded areas here, these areas will have to be surveyed manually. After the intrusive investigation, the location of each piece of OE or OE scrap discovered will be determined using standard surveying equipment.

5.2.4.4 (Task 7) OE Characterization of Burial Area Near Indian Creek

5.2.4.3.4 This area consists of two acres at the junction of Indian Creek Road and the West Patrol Road in the southwest portion of the depot, visible as a small open area from aerial photographs. Supposedly, ammunition and non-ordnance items were buried here; a surface examination of the area showed no visible ordnance.

5.2.4.3.5 The entire area is to be investigated as nine 100' x 100' area grids (Figure 5-5). The EM-61 will be used exclusively in this region, as it has been consistently proven most effective at finding large caches of ordnance at depth. Approximately half of the area to be investigated is flat and clear of trees. The southern half of the site, however, will require extensive brush cutting before it can be surveyed.

5.2.4.5 (Task 8) OE Characterization of Former Grenade Range

5.2.4.5.1 According to the ASR, the former grenade range consists of approximately 30 acres (not 15, as stated in the Scope of Work) at which rifle-fired grenades were used.

The grenade range is visible from the air as an open area near the middle part of the western edge of the depot. Mannequins, wooden structures, and armored vehicles used as targets are all still present on the range.

5.2.4.5.2 Seventeen acres of this site will be evaluated geophysically. This area will be divided into two regions (Figure 5-6). The first, consisting of about 15 acres of the site onto which grenades were actually fired, is an area where considerable numbers of projectiles are expected to be found. It will be investigated as one large continuous grid. The second consists of the southern end and eastern side of the site, areas that are relatively removed from the target area. As it is farther from the targets, this section of the grenade range is not expected to have significant concentrations of ordnance. Therefore, two acres of it will be investigated via a meandering path survey.

5.2.4.5.3 According to depot personnel, only 40mm practice grenades were used at this site, and a site visit in 1998 showed a number of these projectiles scattered on the ground at the site. The 40mm grenade is an ordnance item particularly difficult to detect using either EM or magnetic methods. An examination of the Prove-out Report showed each method could discriminate grenades, although the signals recorded were sometimes weak for these items at depth. Consequently, a test will be performed at the grenade range to determine which of the methods will be more effective at this particular site. Three 100' x 100' grids will be surveyed with both the EM-61 and the G858 magnetometer. The data from both surveys will be processed, anomalies will be picked from each, and the grids will be investigated intrusively before the remainder of the grenade range is surveyed. Whichever instrument proves more effective in the test will be used to survey the rest of the site.

5.2.4.5.4 The entire area is relatively flat and treeless, although some brush is present throughout the range. Once the brush is cleared, the grenade range will be easily accessible for either of the instruments that may be used to survey.

5.2.4.6 (Task 9) OE Characterization of Small Arms/3.5" Rocket Range

5.2.4.6.1 This site covers approximately 40 acres situated to the northeast of the center of the depot. Depot personnel report that they have seen ordnance on the ground, although none was noticed during an examination of the site in 1990. The site appears from 1954 aerial photos to have been a long open area in which 3.5" rockets were fired. Subsequently, a number of small trees have grown up in the area.

5.2.4.6.2 Eighteen acres of this site will be investigated geophysically. The EM-61 will be utilized entirely at this site, as it was shown to be clearly better than the magnetometer for detecting ordnance of the size of the 3.5" rockets. Grids will be spaced 400 feet long and 100 feet wide to facilitate faster surveying, data collection, and data processing (Figure 5-7).

5.2.4.6.3 The area has a number of small, rolling hills; however, it appears to be readily clearable for survey with the EM-61. A fair number of medium sized trees located at the north end of the site will have to be cleared; if they are too dense or large to be completely removed, then the survey may be changed slightly to allow for the EM-61 to move around them in the grids. As the target berm in SEAD-46 is relatively steep and brush clearance would be extremely difficult, if not impossible, we have concluded that conducting geophysical surveys on the berm itself will not be possible. It will therefore not be investigated specifically as part of this scope of work.

5.2.4.7 (Task 10) OE Characterization of EOD Area #3

5.2.4.7.1 This area is located to the north of SEAD-46. It consists of a partially wooded area about 300 feet square on a side, and another larger area of more heavily wooded region. It is visible as an open area in a 1954 photograph; it has since been mostly overgrown, although the tree cover is low in much of it. Supposedly, this area was used as an EOD disposal area although a site investigation in 1991 showed no surface ordnance.

5.2.4.7.2 All five acres of this site are to be investigated in 20 100' x 100' grids (Figure 5-8). If sufficient brush clearance can be done, the EM-61 will be used in this area. The area will be investigated in smaller 100' x 50' or 50' x 50' areas to cut down the amount of tree removal needed if the trees are too large or too thick. This decision will be made at the time of the clearance operations. The Schoenstedt magnetometer or the White's metal detector will be used in heavily wooded areas of this site that cannot be cleared.

5.2.4.8 (Task 11) OE Characterization of EOD Area #2

5.2.4.8.1 EOD area #2 consists of a five acre mostly water-covered marsh approximately a quarter mile west of EOD area #3. The area appears on aerial photographs as the south end of an approximately one-mile long duck pond. According to depot personnel, explosive devices were used in this area, and non-explosive projectiles were possibly dumped in the water area. The actual disposal area appears on 1963 aerial photographs as a cleared area near the southwest corner of the duck pond which appears to have since been partially submerged. We have therefore moved the center of the survey to an area approximately 100 yards to the west of its original position in the S.O.W. in order to center it on the known location of the original detonation area.

5.2.4.8.2 The statement of work calls for five acres of this site to be surveyed in 20 100' x 100' grids. However, this is not physically possible at present, as much of the area of concern is underwater or covered by marsh. A discussion with Corps of Engineers personnel concerning this area indicates that the pond cannot be lowered for the purposes of this survey. Consequently, land survey of this area will be limited to the area directly south of and west of the pond where aerial photos indicated that ordnance disposal activities occurred (Figure 5-9). As much of this area as possible along the edge of the pond and in the wooded area to the west will be cleared and investigated via a meandering-path type of EM-61 survey. The Schoenstedt magnetometer or the White's metal detector, useful for non-ferrous objects which may be found at this site, will be used in heavily wooded areas of this site that cannot be cleared. Locations of objects will be surveyed in at areas where GPS reception cannot be obtained.

5.2.4.8.3 The northern portion of the site that is not covered by marsh (boat accessible) will be surveyed using a floating EM-61 pulled behind a wooden boat or an operator in waders. We believe this will be effective in locating any ordnance on or directly below the bottom of the pond, as the pond is believed not to be more than 2 or 3 feet deep at the south end. The EM-61 will be outfitted with a GPS to record it's location; we will, therefore, perform a floating meandering path survey on pond portions of the area that can be covered with a shallow boat. Note, however, that the marsh areas, comprising a substantial portion of the site appear to be inaccessible by either land or water. Any marsh areas which can be reached by either land or water will be surveyed, at the discretion of the field manager.

5.2.4.9 (Task 11b) OE characterization of the Popping Plants (SEADS 16 and 17)

5.2.4.9.1 This area is not included in the original scope of work; however, it was originally on the list of areas recommended for OE removal action in the ASR. It has been recently returned to the list of areas to be examined. It consists of popping plants for ammunition disassembly and approximately five acres surrounding them at SEADs 16 and 17 located slightly southeast of the center of the base. The main concern at this area is the possible presence of 20mm cannon rounds which may have been demilled here as at other similar popping plants. A visual inspection of the area showed spent small arms ammunition of various sizes lying on the surface over much of the area. In addition, debris of various types has been found at various locations around the plant.

5.2.4.9.2 Five acres of these sites will be investigated for the presence of surface and subsurface ordnance (Figure 5-10). As the magnetometer is not affected by the presence of brass and lead found in bullets, it should be useful for locating any ferrous objects such as 20mm rounds and will, therefore, be used in this area. Brush clearance at this area will be done in such a manner as to bring the brush down to a height of six inches above the ground. A complete visual survey of the area will be undertaken prior to the beginning of the geophysical investigation by qualified OE personnel to identify any ordnance which appears to be 20mm cannon or other OE items.

5.2.4.9.3 After the surface visual survey is finished, a magnetometer survey using the G-858 magnetometer with the bottom sensor at 1-foot height will be conducted across the entire area enclosed by the chain link fence around SEAD 16. Ten 100' x 100' grids placed at various locations around SEAD-17 will also be surveyed with the magnetometer. Survey lines will be spaced 2.5 feet apart for both of these surveys.

5.2.4.10 (Task 12) OE Characterization of the Igloo Area

5.2.4.10.1 The igloo area was originally proposed for additional sampling due to the suggestion that a Schoenstedt magnetometer has located some "hits" in the "D" row drainage ditch. Consequently, it has been decided that both of the "D" row ditches will be investigated to ascertain what the anomalies were (Figure 5-11). If it appears to be impractical to use the EM-61 at this location, the G-858 magnetometer will be used in a walking survey mode with positioning being provided by a portable GPS unit. Three lines of data will be collected along the entire length of the ditch, one in the middle and one on each side, and examined for anomalies.

5.2.5 Grid Preparation

5.2.5.1 A combination of survey grids and meandering path will be used. Survey grids will be placed in each sector at the former Seneca Army Depot. Establishment of sample grids will include selection of both random and strategic locations. For areas identified as suspect for the presence of potential OE, sample grids will be strategically placed to maximize the quality and usability of the data collected and to target locations of special interest. For these grids, available documented OE clearance data and interpretation of historical aerial photographs will be utilized with coordination from Quantitech Inc. For areas with limited documentation of past use, grid locations will be selected using a combination of random disbursement and professional judgement. For heavily wooded, hilly, or ponded areas where 100' x 100' sites cannot be cleared, 100' x 50' or 50' x 50' grids will be established. All grid locations will be surveyed, the coordinates recorded, and semi-permanent marker stakes will be advanced at each grid corner prior to investigation of a grid. Grids will be oriented north-south or east-west, where possible, to enable quick tracking of grid locations and access to each grid during subsequent investigations. Grids may be grouped, where possible, to reduce travel time between grids.

5.2.5.2 Figures 5-2 through 5-10 depict the proposed number of sample grids and their respective locations per area. The number of grids proposed at each sector was chosen based on the review of the total acreage, site accessibility, topographic features, land use cover, and statistical representativeness. Larger sectors are allotted more grids than the smaller sectors. Sites with high accessibility to the public and to the field crews are given more grids than sites that are difficult to access. Topography may influence the number of grids for a given sector because of slopes or wetlands. Areas where the proposed sample size was nearly equal to the entire site size were designated to be sampled as one entire survey grid.

5.2.5.3 For the meandering path type survey, the EM-61 in conjunction with a GPS receiver will be towed around the site in a manner designed to randomly sample the area to be investigated to a distance nearly equivalent to that allocated for survey grids of equivalent total line length. The path will be chosen to sample the area under investigation with minimal brush clearance. UXO clearance escort will be provided throughout the survey for safety reasons.

5.3 Anticipated UXO Type, Composition, and Quantity

5.3.1 Twelve areas within this work plan have been identified at the former SEAD facility as potentially containing OE items, of which two have been characterized already; ten more are described in the above plan. Each area is identified in **Table 5-1**, along with the former use of the area, the probable type of munitions that may be located in the area, and the approximate acreage.

5.3.2 A list of the potential OE items that may be found at the former SEAD property was prepared by USAESCH. It is summarized in Table 5-1. At those areas where potential munitions are unknown, the item that the geophysical investigations are designed to find will be the 40mm rifle-fired grenade, one of the smaller items believed to be present Depot-wide.

Table 5-1.
Potential UXO at Each Project Area

Project Area	Area Used For	Potential Type of Munition	Approximate Acreage
SEAD - 43	Former liquid propellant storage area	Liquid propellant drums	16 acres
SEAD - 44A	Former QA function test area	40mm rifle-fired grenades, small arms	4 acres
SEAD - 57	Former EOD range	Flares, small arms, 10 lb. explosive limit	58 acres
Demo Range	Demolition of projectiles	75mm projectile (40mm rifle-fired grenade to be used as MPM)	40 acres
Burial Area near Indian Creek	Rumored burial	Unknown as per ASR (40mm rifle-fired grenade to be used as MPM)	2 acres
Grenade Area	Grenade training	40 mm rifle-fired practice grenades/ no H.E.	15 acres
SEAD-53	Munitions Storage	Unknown as per ASR (40mm rifle-fired grenade to be used as MPM)	3000 acres

Project Area	Area Used For	Potential Type of Munition	Approximate Acreage
SEAD - 46	Small arms range/ small rocket range	3.5 " rockets and small arms including blanks and tracers	40 acres
EOD area # 3	Former EOD area	Unknown in ASR Fuzes, flares, small UXO expected	5 acres
EOD area # 2	Former EOD area	Explosive destroyed and non-explosive, 3-4 pound limit as per ASR Fuzes, flares, small UXO expected	5 acres
SEADS 16-17	Deactivation Furnaces	20mm HE projectile, Small Arms	8 acres

5.4 Site Specific Geophysical Conditions, Impediments, and Hazards

5.4.1 The background magnetic field has both diurnal and seasonal variations typical of magnetic data found at these latitudes. Site utilities are normal electric, water, gas and sewer lines found on most army depots. Depot utility maps are available for all or most areas of interest, and will be consulted prior to any anomaly investigation (note that most utilities will appear on contour maps of EM-61 data as linear anomalies, except clay or P.V.C. pipe.)

5.4.2 Most sites contain few or no man-made features which will affect the investigation. The grenade range, however, has a number of man-made target features which may impede the investigation. A number of the open areas are subjected to high speed winds of more than 30 M.P.H. coming across Seneca Lake. This could adversely affect the performance of the G-858 magnetometers, which sway in the wind. All sites can be readily accessed by roads; UXO clearance of routes will have to be provided, however, by trained UXO personnel.

5.5 Geophysical Survey Methods

5.5.1 The geophysical survey techniques to be used at the former Seneca Army Depot include a Geonics EM-61 TDMD and a Geometrics G-858 magnetometer. Appendix C summarizes the testing of these instruments at an initial test site within the former Seneca Army Depot. The initial testing was conducted as a Geophysical Prove-out Survey on January 11-13, 2000. The results of the Geophysical Prove-out Survey demonstrated that the EM-61 provided the best target resolution and was capable of detecting small simulated OE items with greater certainty than the G-858 magnetometer. However, the

G-858 may prove to be better for resolving larger anomalies at depth with a noticeable polarity, such as 105-155mm shells. Greater resolution of these items could be useful in discriminating between UXO and fragmentation material and for finding small anomalies near the surface, such as grenades. In addition, it can also be used in wooded or hilly areas where the EM-61 cannot. The Prove-out Report showed the potential for combining the two methods for improved identification and discrimination of anomalies. They are most effective in combination when used along cross lines; in this way, large anomalies oriented in a specific direction show up in the data of one or the other of the two methods.

5.5.2 Most grids will be geophysically surveyed using an EM-61 TDMD towed manually across sampling grids by an EM-61 operator. In the event that a G-858 is used during the former Seneca Army Depot EE/CA, it will be used in a single instrument configuration and carried by the G-858 operator. The G-858 will be used in areas where the EM-61 cannot be moved effectively, such as ditches or heavy forest areas, where it may improve the accuracy of the anomaly location based on EM-61 data (SEAD-45), or in the areas where the magnetometer may have slightly better detection and discrimination capabilities (grenade range). The G-858 will also be used in SEADs 16 and 17 where it should prove more effective at screening out the small arms casings spread across the site.

5.5.1 Geophysical Methods – EM 61

5.5.1.1 Grids will first be surveyed by the EM technique using Geonics EM-61 TDMD instruments. Parsons personnel will conduct these surveys. EM-61 devices generate electromagnetic pulses that trigger eddy currents in the subsurface. The eddy current decay produces a secondary magnetic field that is monitored by two receiving coils and recorded by an attached data logger. For the most part, the EM-61 instrument will be used in a wheeled mode. It is anticipated that the geophysical teams will each survey approximately 2 acres per day.

5.5.1.2 EM-61 Data will be collected along parallel survey lines spaced 3 feet apart in all grids with dimensions of 100 ft by 100 ft. Review of the Geophysical Prove-out Report data indicated that a survey line spacing of three feet is required to detect OE the size of an MKII grenade or smaller. Prove-out results also show that OE the size of a 155mm shell buried four feet below the ground surface will be detected up to four feet away from the center of the EM-61 sensors. If larger lane spacings than those stated above are believed to be warranted for a particular area, the justifications for such changes will be provided to the Parsons PM to CEHNC. Any such changes will be considered on a case by case basis, and will be approved by the Geophysical Coordinator, the Parsons PM, and CEHNC prior to implementation in the field.

5.5.1.3 Grids surveyed manually, using the EM-61 in the single unit configuration, will be subdivided into parallel survey lanes. During the EM-61 survey, the survey lines are traversed over a known distance with data being collected incrementally with distance. EM measurement events are triggered each time the instrument's tire rotates a specified distance. Data markers (fiducial marks) can also be inserted manually by the operator. Review of the Geophysical Prove-out Report data indicate that only a single fiducial mark will be needed at every 50 feet of each manually surveyed line to meet the lateral positioning accuracy goal of ±1 foot established for this project.

5.5.1.4 Data corrections for data collected manually will be performed using information recorded in the field log books (start and end of line stations, line spacing, fiducial mark intervals, etc.), information digitally recorded in each EM-61 data file, and the geodetic survey coordinates of the grid corners. This operation involves correcting the EM-61 data that was collected incrementally with distance to either compress or expand the recorded measurement locations for each line so that they cover the actual distance traveled. This operation is required to compensate for variations in the terrain along the survey line, which affects the rotation of the instrument's wheels. The survey data are then rotated and translated from the local coordinate system they were collected in (where the southwest corner of the grid surveyed was assigned a coordinate of 0E, 0N) to the New York State Plane coordinate system.

5.5.1.5 A "meandering path" geophysical survey will be conducted in areas where grids cannot be cleared by randomly traversing investigation areas using EM-61 units in conjunction with Trimble® 4800 GPS units. The EM-61 and 4800 instruments will be set up and checked following the procedures in the provided instruction manuals. The EM-61 unit will be manually towed by one of two individuals comprising the geophysical survey team. Each team will be assigned a UXO escort to provide visual OE clearance of the transect path and brush cutting as necessary. The lengths and locations of these transects may change depending on field conditions. The area covered by a transect will be calculated as the distance traveled multiplied by the width of the EM-61 footprint (one meter).

5.5.1.6 The Pathfinder™ software (provided by Trimble®) will be used to determine times of the day during which the correct number and position of satellites cannot be obtained. The daily work schedule of download and survey times will be appropriately adjusted to account for these times.

5.5.1.7 During the surveys, the EM-61 will collect EM data while the GPS records the location of the data collection points. EM-61 data will be time-stamped and combined with the GPS positioning data as described in Subsection 5.4.2. If GPS lock is lost during the geophysical survey, an audible signal notifies the geophysicist of the condition. If the signal is not reacquired within a few seconds the survey is temporarily halted until the signal is again locked. In addition, the geophysicist may opt to begin walking a straight line segment at constant pace upon indication of loss of GPS lock so equipment position can be reconstructed by a time average across the distance lost until

GPS lock is again obtained. As a worst case, very small data segments in the transect may be lost. This very small data loss is inconsequential as the transects are typically lengthened during the survey in anticipation of this minor loss. If the lost signal is not reacquired within a few minutes, the geophysicist may move a distance away from the last survey location and recommence survey at a new location, thus breaking the transect into smaller pieces.

5.5.2 Geophysical Survey Methods-Magnetics

5.5.2.1 In the case of grids placed in areas where the maneuverability of the EM-61 instruments is too limited to enable accurate data positioning or in areas where identification of a number of anomalies suggests using another method to improve anomaly picking, a Geometrics G-858 magnetometer (or equivalent) may be used for the surveys, except in areas where slap flares are expected. The G-858 instrument uses a cesium vapor magnetometer sensor incorporating a miniature atomic absorption unit from which a signal proportional to the intensity of the ambient magnetic field is derived (Pawlowski, et. al., 1995). The sensitivity of the instrument ranges from 0.05 nanoTesla (nT) at a data recording rate of 10 Hz to 0.01 nT at a data collection rate of 1 Hz.

5.5.2.2 Data collected with a G-858 will use the same procedures for grid preparation and data processing as those for the manually-towed, single unit EM-61 configuration described above. The G-858 is carried by the operator above the ground, while the EM-61 is rolled along it. In addition, it requires less than two feet of lateral space while the EM-61 requires three. This means that the G-858 can sometimes be used in areas where the EM-61 cannot, especially in wooded or hilly areas. The vertical separation of the coils will be set at 1.5 feet for all surveys. For the most part, it is expected that bottom sensor data will be used to make target picks. However, gradient or top sensor data may be used in regions where large ordnance is expected, as either may exhibit less noise than the bottom sensor in high clutter areas.

5.5.2.3 The magnetic technique will also be applied using Schoenstedt GA-52CX or White's, which also detect non-ferrous metals, magnetometers to pinpoint the exact locations of anomalies as part of the intrusive investigation for hilly or very heavily wooded areas. Size and orientation of buried targets and the soil characteristics of the work area limit the depth of detection of either of these magnetometers. Neither instrument is not capable of classifying the anomaly; each will only show the presence or absence of a magnetic field.

5.6 Location Surveying, Mapping and Navigation Methods

5.6.1 Positioning for the EM-61 data collected manually will be performed as described in Section 5.5.1.4. Any magnetics data collected over grids will be positioned in the same manner, although the G-858 collects data incrementally over time rather than distance.

5.6.2 Positioning for the EM-61 meandering path surveys will be provided by a Trimble 4800 (or equivalent). The GPS antenna will be mounted such that lateral and vertical sway is minimized when the tow vehicle is in motion. The data from the GPS will be corrected for selective availability either using differential correction information collected from a dedicated GPS base station. Differential GPS (DGPS) corrections are performed automatically by the GPS manufacturer's processing and display software. Parsons will use the positioning data output from the GPS to effect lag calculations to account for all GPS antenna to EM-61 sensor offsets. The positioning data will be merged with the EM-61 data either using standard routines supplied in the EM-61 data processing software or real-time in the field as the EM-61 data is collected. The method used will depend on whether a real-time DGPS system is used or whether the differential corrections are applied during post-processing.

5.7 Data Processing, Correction, and Analysis

5.7.1 All data collected in the field will be stored electronically on field laptop computers or on personal computers (PCs). Data from the EM-61 and 4800 surveys will be downloaded from the data loggers daily or twice daily to assure that work to be performed will not be interrupted by a lack of storage capacity in the data loggers. The data logger download cables and software are standard equipment and are provided by the instrument manufacturers. All raw field data will be backed-up each night and kept in a location separate from that of the day to day operations.

5.7.2 At the end of the day the data will be post-processed by combining the EM-61 and GPS data into a single database. This is done by matching time-stamped positioning data to time-stamped geophysical data. This step will be performed in the Dat-61™ software package. At this point, the geophysical data will be reviewed.

5.7.3 After processing the positioning data and reviewing the EM data, all data from the EM surveys will be exported from the Dat-61™ software package into a format compatible with software packages (i.e. Geosoft™, Arcview™, Surfer™, and Microsoft Excel™) used to process and create raster images. Once the data are imported into the processing software, leveling (adjusting to a common baseline), lag, contouring (if possible) and target analysis and selection will be performed. A raster image will be used to produce an anomaly map that identifies the locations of potential anomalies. Figure 5.5 in the Prove-out Report shows an example of the type of final map to be produced. Both electronic and hardcopy versions will be delivered to USAESCH.

5.8 Quantitative Interpretation and Dig Sheet Development

5.8.1 Geophysical data will be processed and interpreted using a multi-step process. Depending upon the types of instruments, positioning methods, and processing software used, some of these steps may be performed simultaneously. First, the data is located as described above so that each measurement is geo-referenced to the New York State Plane coordinate system. The data from each file for each grid is then analyzed on a line by line basis to remove any instrument drift, diurnal effect (for magnetometer data only), DC offset (for EM-61 data only), or data spikes (typically only in magnetic data, though sometimes observed in EM-61 data). This step typically involves calculating the mean of the measured data for each line and subtracting that value from each measurement on that line. The data will then be sent to the corps project manager in XYZ format every week for review, including a description of the processing done for each data set. The geophysical data are then contoured and/or profiled to allow for anomaly interpretation and dig sheet preparation.

5.8.2 Anomaly Dig Sheets will be developed based upon the interpretations of the Senior Project Geophysicist or based upon the interpretations of the Project Geophysicist under the supervision of the Senior Project Geophysicist. It is anticipated that anomaly dig sheets for a grid will be produced within 36 hours of the grid having been surveyed. Anomaly Dig Sheets will be produced for each grid investigated, showing the location of specific anomalies that are interpreted as having the potential of being OE contamination. Each anomaly for the former Seneca Army Depot EE/CA project will be assigned a unique anomaly ID and will reflect the sector ID, the grid ID, and the sequential anomaly ID for that grid. The sector ID will be prefixed with the letter 'S', the grid ID with the letter 'G', and the sequential anomaly number with a dash ('-').

5.8.3 All anomalies for a grid will be tabulated on an Anomaly Dig Sheet, and will include the distances from each anomaly to each of the four grid corners. The grid corners will be identified on the Anomaly Dig Sheets as they are in the field and as described in Subsection 5.3.1.2.5 above. The Anomaly Dig Sheets will then be given to the OE investigation/characterization team for investigation. An example of the Anomaly Dig Sheet is provided in Figure 5.1 (on page 4-12).

5.9 Anomaly Reacquisition

5.9.1 After the Anomaly Dig Sheets have been created, the anomaly locations will be overlain on aerial or infrared photos and reviewed and approved by USAESCH prior to reacquisition. Reacquisition will be performed by Parsons using a Trimble 4800 to reacquire the selected anomaly locations and an EM-61 or G858 magnetometer to verify the maximum signal amplitude. Whichever instrument was used in the collection of the original survey data will be used for reacquisition. Labeled pin flags or wooden stakes will be placed in the ground at or near the anomaly locations. The anomalies will then be excavated by the UXO subcontractor (USA).

5.10 Quality Control

5.10.1 Quality Control of EM-61 Field Procedures

5.10.1.1 The EM-61 units and magnetometers will be function tested at least twice daily to ensure that they are operating properly. The procedures for daily and weekly function tests are provided in Section 9.2.

5.10.1.2 The EM-61 units emit two types of tones during the survey process. One tone is continuous in nature, and its volume and frequency are directly proportional to the measured signal response. During the course of data collection, the EM-61 operator will monitor this signal tone for any inconsistent or unexpected volume or frequency changes (i.e. changes that do not appear to be due to sub-surface anomalies or cultural interference). If the EM-61 operator suspects instrument malfunction based upon changes or fluctuations in the EM-61 signal tone, the on-site project geophysicist will immediately be notified and a determination will be made concerning the operability of the instrument. If the cause of tonality changes can not be determined by the on-site geophysicist in the field, the unit will be returned to the daily function test area to verify its response in a known area. If the instrument is found to be malfunctioning, it will be removed from service and replaced or repaired.

5.10.1.3 The second tone emitted from the EM-61 indicates a measurement event. This tone is emitted as a "beep", and occurs only during data collection. The EM-61 operator will monitor for this tone during the course of the survey. Typically, when the EM-61 is operated in its standard configuration (i.e. manually towed along a survey line), the operator will verify that these tones are initiated at the start of each survey line and end when the center of the EM-61 sensors crosses over the end of a survey line. All instances where the EM-61 operator notices that extra data was collected before the start of a line or after the end of a line will be noted in the field logbook and removed from the final data set. The test results can be affected by environmental conditions, such as near surface groundwater or electrical storms. These conditions will be taken into consideration when function testing the EM-61 equipment as well as during data collection.

5.10.2 Quality Control of Magnetics Field Procedures

5.10.2.1 The G-858 magnetometer/gradiometer also emits a tone that is directly proportional the measured magnetic field intensity. However, this tone is intended only to provide an indication of the magnetic field relative to the chosen display range of the G-858 data logger. In this capacity, the tone emitted is used by the operator as an indicator that the G-858 is operating and collecting data, and to monitor for effects from electrical storms or solar magnetic storms. Large, high frequency changes in the emitted tone that can not be reproduced will indicate to the G-858 operator that an electrical or magnetic storm is occurring, and data collection will be stopped.

5.10.2.2 Magnetometer data may also be affected by electrical storms, solar flares, and magnetic storms. Data collection will cease during these events. Data collected when interference from cellular phones or radios is observed will be discarded and re-collected.

5.10.2.3 Diurnal or daily changes in the earth's magnetic field and instrument drift also occur and must be compensated for in magnetic data. This will be accomplished at the site by establishing a base station where measurements are taken at regular intervals throughout the survey. Typically, the starting station for a survey grid will be selected for base station measurements, and base station measurements will be recorded in the field logbook before and after each grid is surveyed. The magnetic data collected over the grid will later be adjusted based on the measurements recorded at the base station. Alternatively, a second G-858 instrument can be set up to collect data at a specific location at preset time intervals. Typically, a dedicated base station instrument is located in an area free from cultural interference and programmed to collect magnetic field measurements at 30 second or 60-second intervals. Data storage limitations and total survey time and survey logistics will determine the maximum base station recording rate.

5.10.3 Quality Control of Data Acquisition and Data Interpretation

5.10.3.1 During the processing of field data, the data processing personnel will review the individual data profiles for at least 15% of the lines surveyed for each grid. This review will focus on identifying abnormal spikes in the measured data or larger than usual fluctuations in the background noise levels. Data that is identified at this stage of review to have possible QA problems will be reviewed by the Senior Project Geophysicist, who will make a determination as to whether the data can be interpreted or whether the grid should be resurveyed. The Senior Project Geophysicist will also identify the source of the problem and make recommendations to minimize further such occurrences. If the source of QA problems is found to be a malfunctioning instrument, that instrument will be removed from service and repaired or replaced.

5.10.3.2 An additional quality check will be performed when the UXO contractor excavates the anomalies that were interpreted for each grid. This type of ground-truthing will provide a definitive QA analysis of the geophysical survey process and interpretation process. Geophysical anomalies will be identified as either true or false positives, and their actual locations will be known. The Senior Project Geophysicist will periodically review the information gathered from the OE characterization/investigation teams and compare that data to the Anomaly Dig Sheets. If QA problems are identified, the Senior Project Geophysicist will identify the source(s) of those problems and make recommendations to the Parson's PM and to CEHNC for implementing corrective actions.

5.11 Records Management

5.11.1 All data collected in the field will be stored electronically on field lap-top computers or on PCs and all raw field data will be backed-up onto floppy diskettes and kept in a location separate from that of the day to day operations. Data for each transect will be stored in ASCII data files whose names will reflect the Area ID, the transect ID, and the sequential data file ID for that transect. The file extension will be '.XYZ'.

5.11.2 The raw field data will also be transmitted via e-mail to the USAESCH Geotechnical Branch within a reasonable time after it has been acquired. Typically, the data will be transmitted to USAESCH within 36 hours of collection, however the maximum delivery time will be one week. The format of the raw field data from the EM-61 will be X, Y, Z, where X will be the New York State Plane easting coordinate, Y will be the New York State Plane northing coordinate, and Z will be the measured response from the EM-61. No comment or survey line identification will be provided in the data files transmitted to USAESCH. The files transmitted to USAESCH will be in an X, Y, Z space delimited format or other format requested by USAESCH. If more than one channel of data was recorded by the geophysical instrument(s), a separate file will be transmitted for each channel. The file names will reflect the Area ID, transect ID, and data channel for the data being transmitted. A "*readme.txt*" text file will be transmitted with the raw field data explaining all processing that was performed on the data, and detailing any peculiarities identified by the geophysical field personnel.

5.12 Final Reports and Maps

5.12.1 Final mapping will be created by CADD on PC and provided to the USAESCH in Microstation 5.0 two-dimensional digital design files on PC CD-ROM. All characteristics such as file naming and relationships, level structures, colors, line styles, weights, etc. in accordance with the surveying and mapping requirements of the Tri-Service Spatial Data Standards (TSSDS) of the current release will be compiled in the design files. Site maps plotted from these design files will be provided on reproducible standard metric A-l size drawings which are 841 millimeters (mm) by 594 mm (33.1 inches 23.4 inches) in size.

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

5.13 Geophysical Investigation Performance Goals

5.13.1 OE Detection (Performance Goal Modification)

5.13.1.1 Parsons has significant experience with EM tools for conducting geophysical surveys and with the assessment tools for the data (such as Geosoft™). Parsons will achieve industry standards for detection of ordnance using these tools, but believes the 99% detection standard listed in Data Item Description (DID) OT-005-05 may be too strict for certain targets that are in near horizontal orientations. Our experience has shown that small items that are not in near horizontal orientations are easily identified, even at depths greater than those defined by the detection function in the DID. However, the smaller items, typically smaller than 35 to 40mm, are periodically difficult to detect when they are buried in a near horizontal orientation. Based upon past experience, it is expected that items greater than 40mm in diameter will be detected within the metric defined in the UXO detection requirement of the DID. For items between 25mm and 40mm in diameter, it is anticipated that up to three misses (all in near horizontal orientations) per each 100 UXO recovered may occur. For items that are less than 25mm in diameter, it is anticipated that up to ten misses (all in near horizontal orientations) per each 100 UXO recovered may occur. These anticipated misses are based upon past experiences and reviews of controlled demonstration site results.

5.13.1.2 The accuracy goal for locating geophysical anomalies within the survey transects is that after reacquisition, 95% of all anomalies lie horizontally within a 10cm radius and 98% lie within a 20cm radius.

5.13.2 False Positives

5.13.2.1 Similar to the OE detection performance goal, the false positive rate will also be a function of target size and orientation. Parsons' experience has shown that items larger than 40mm in diameter have false positive rates well below the 15% defined in DID OT-005-05, and typically less than 5%. For items smaller than 40mm in diameter, and buried in orientations that are not near horizontal, the false positive rate is expected to be less than that defined in the DID. Items that are smaller than 40mm in diameter and buried in orientations that are near horizontal do not induce large responses, and are sometimes "hidden" in background noise recorded by the geophysical instruments. Identifying such items in the geophysical data would likely result in an increase in the number of false positives among those anomalies that are identified from low amplitude responses. For such low amplitude anomalies, the false positive rate may exceed 15%.

5.14 Resumes of Key Geophysical Personnel

5.14.1 Resumes of key geophysical personnel are enclosed in the following pages.

MICHAEL N. DUCHESNEAU, P.E.
Project Manager

Experience Summary

Mr. Duchesneau is a project manager with 16 years of progressively increasing responsible experience in managing complex hazardous waste remedial investigations and remedial designs for industrial and government clients. He has managed site projects involving hydrogeologic characterization, risk assessment, feasibility analysis, remedial design and remedial action, along with extensive negotiations with regulatory agencies throughout the Northeast. He routinely manages multi-disciplinary teams of geologists, hydrogeologists, engineers and toxicologists.

He has been responsible for numerous remedial programs involving remediation of hazardous waste sites. He has evaluated and designed soil and groundwater remedial systems, both pilot and full scale for the USEPA and industrial clients. This experience has included: the design of air stripping and carbon adsorption systems for groundwater remediation, vapor extraction and bioventing system for soil remediation. In support of these remedial programs, he has developed and implemented several innovative field analytical programs, involving soil gas analysis and field screening, in an effort to minimize analytical costs and maximize data collection efficiency. He has also authored several risk assessments for Superfund sites and has extensive experience in negotiating Remedial Action Objectives (RAO)s, Project Remedial Action Plans (PRAP)s, and Records of Decisions (ROD)s.

Years of Experience:

20

Years with Parsons:

8

Education

B.S., 1984, Civil Engineering, Worcester Polytechnic Institute

B.A., 1977, Chemistry, Assumption College

Registrations

Registered Professional Engineer in Massachusetts, Connecticut, and New York

Primary Experience

Parsons Engineering Science. **Project Manager/Environmental Engineer**. Responsible for remedial projects under CERCLA, RCRA and state requirements.

Project Manager (1998) responsible for remedial investigation and design projects for the Port Authority of New York/New Jersey. Provided peer review for the evaluation of remedial options for the JFK Airport Bulk and Satellite Fuel Tank Farms. Provided preliminary design of two interceptor trenches using an impermeable wall and high vacuum pumping system at the Bulk Fuel Tank Farm. Design included trench design and a treatment plant for oil separation and water treatment. Also for the Satellite Fuel Farm, provided preliminary design of a LNAPL/groundwater recovery system using air-operated total fluid pumping.

Lead Design Engineer (1997-Present) Responsible for Feasibility Studies and Basic Design of a free oil recovery system for 16 LNAPL plumes for Exxon at its Bayonne, New Jersey refinery. Responsible for the design of pilot testing, feasibility analysis, and basic design of the program. Oil recovery pilot testing and treatability studies included: skimmer tests, dual phase pumping tests, and vacuum enhanced tests. Each recovery alternative was evaluated for improved oil recovery. Pilot testing measurements of sustained oil recovery were used to assemble various LNAPL recovery strategies.

Lead Design Engineer (1996-1997) responsible for groundwater remedial design involving full scale pilot in-situ reactive barrier walls using zero valence iron for the Corps of Engineers at the Seneca Army Depot, Romulus, NY. Design included extensive groundwater modeling. Prepared engineering drawings for construction. Developed detailed cost estimate including subcontractor cost.

Mr. Duchesneau designed a pilot-scale interceptor trench to capture contaminated groundwater at the Ash Landfill. Optimum flow rates will be determined during step-drawdown pumping tests. As part of this task, Mr. Duchesneau was responsible for performing pilot-scale treatment efficiency and pre-treatment requirement studies of the UV/Ozone/Peroxide technology for reducing the concentrations of chlorinated organics in samples of groundwater.

Project Manager (1997). Responsible for project involving expert panel review of Recirculation Well Technology (RWT) at the Massachusetts Military Reservation (MMR) at Cape Cod, Massachusetts. This project was funded by the Air Force Center for Environmental Excellence (AFCEE). In addition to managing the project, Mr. Duchesneau was a panel member and provided technical review of pilot scale data collected over the six month study. He prepared the final report and presented the final recommendations to the MMR technical staff and the regulator in support of their evaluation. This project was completed on a "fast track" basis, as this technology evaluation was required prior to selection of the final plume response alternative. RWT evaluations were essential to meeting regulatory schedule of preventing further migration of a large groundwater plume.

Project Manager (1989-Present) for investigation and remediation of four former gas manufacturing facilities located in Connecticut for the Southern Connecticut Gas Co. These projects involved investigation and remediation of coal tar contaminated soils/sludges, sediments and groundwater. Interim remedial activities included lining a storm water pipeline and removal and disposal of product/groundwater. Following completion of the investigations, risk assessments and preliminary remedial analyses were performed in compliance with all regulatory requirements. The final remedial design included: removal of Dense Non-Aqueous Phase Liquids (DNAPL) using extraction wells, excavation using cassions, carbon adsorption treatment of the extracted groundwater and on-site soil incineration. He is currently supporting the client by providing expert witness testimony in support of litigation proceedings against the client.

Project Manager (1990-Present) for the multimillion dollar CERCLA and RCRA-driven RI/FS/RD at the Seneca Army Depot Activity (SEDA), New York, under two successive contracts with the Army Corps of Engineers. He is the responsible engineer in charge of negotiation of scopes of work, schedules, and budgets for all task orders; supervision of task managers; review of all deliverables and; presentation of project reports to state and federal regulators and to the public. Mr. Duchesneau has been very successful in negotiating with NYSDEC and USEPA Region II to expedite the site investigation, remediation and closure process and to secure approval for workplans and reports under CERCLA/RCRA requirements. This work has been performed through two consecutive contracts involving 22 different task orders, and totaling over $14 million. Mr. Duchesneau has managed a team of over 30 technical staff people on a variety of environmental assignments at SEDA outlined below.

Supervised the design and oversight of a $6 million soil remediation project using Low Temperature Thermal Desorption (LTTD) to eliminate a two acre area that was contaminated with chlorinated solvents. This project involved the design, installation, operation and evaluation of a LTTD unit with off-gas control. Parsons ES estimated costs at approximately $6 million which was within 5% of the final vendor bid. This cost estimate was used by the Army as the Government's cost estimate during negotiations with the vendor.

Responsible engineer for the preparation of an Engineering Evaluation/Cost Analysis (EE/CA) and bid specification that describes the design and construction plans and specifications for a groundwater interceptor trench at the Ash Landfill. The 1,000 foot long trench is designed to capture contaminated groundwater in the till/weathered shale overburden aquifer and convey it to a central treatment area.

During the soil remediation/removal action at the Ash Landfill, Mr. Duchesneau provided support services which included: an on-site, pre-bid meeting with all prospective remediation vendors; routine site inspections; consultation with the selected remedial vendor; preparation of information regarding site conditions; discharge permit support services and; and cost estimation/negotiation support.

Project Manager (1991). Responsible for the preparation of RCRA closure and post-closure plans for several former hazardous waste storage tanks and lagoons containing metal hydroxide sludge for Wyman-Gordan plant in Massachusetts.

1988-1990 IEP, Inc. **Senior Environmental Engineer**. Responsible for the design and implementation of remedial programs for clean-up of sites which have been impacted with petroleum hydrocarbons. Remedial designs included groundwater treatment systems such as air stripping, carbon adsorption, and vacuum extraction. Projects included:

Project Manager (1988-1990). Responsible for management of investigation and remedial feasibility analysis for two former MGP sites for the Berkshire Gas Company. Projects included soil borings, monitoring well installation, and regulatory negotiations.

Project Manager (1988-1989). Responsible for the management of several tank removal and installation projects for several major oil companies, including Shell Oil and Gulf Oil. Typical projects involved tank pit dewatering, soil excavation and disposal. Responsible for the design and construction of several groundwater and soil remediation projects. Process designs included air stripping, carbon adsorption technologies, soil vapor extraction and bioventing.

Field Manager (1986-1989). Responsible for the performance of site risk assessments, consistent with the requirements of the Commonwealth of Massachusetts and for the performance and operation of dozens of soil gas surveys, involving sampling and field chromatographic analysis of shallow soil vapors to identify and delineate subsurface contaminant plumes.

1984-1988 Camp Dresser & McKee, Inc. **Environmental Engineer**.

Project Engineer (1984-1988). Responsible for several CERCLA Remedial Investigations/Feasibility Studies (RI/FS) for EPA and private firms, including these Region I NPL sites: McKin, Davis Liquid, ReSolve and Iron Horse Park. Responsibilities included: design and implementation of various drilling operations, soil and groundwater sampling, performance and analysis of groundwater pumping and slug tests, soil gas surveys and treatability study evaluation of air stripping and carbon adsorption.

Project Engineer (1987-1988). Responsible for the evaluation, for the EPA, of the effectiveness of the Terra Vac vacuum extraction treatment system for soil decontamination. The project involved the preparation of a Quality Assurance/Quality Control (QA/QC) plan, which was approved by the EPA. Fieldwork involved measurement of gas flows and concentration of gasoline in the extracted gas.

Project Engineer (1986). Responsible for the design of a geotextile/geomembrane landfill cap at a 70-acre hazardous waste landfill. Project involved slope stability calculations, estimation of gas emission rates and leachate production. Project involved close coordination with EPA and the USACOE.

Other Experience

1977-1982 Luvak, Inc. Senior Analytical Chemist. Responsible for analyses of numerous metals, alloys, ores, and wastewater; designed and implemented various procedures for improved chemical analyses of exotic materials.

Professional Affiliations

American Chemical Society
National Water Well Association
American Society of Civil Engineers
Boston Society of Civil Engineers

New England Water Pollution Control Association

Papers and Presentations

Duchesneau, M., 1999. *Case Study at the Ash Landfill, Seneca Army Depot Activity, New York*. Presented at the International Environmental Technology EXPO '99, Atlanta, Georgia.

Duchesneau, M., 1989. *Vacuum Extraction of Volatile Organics from Vadose Zone Soils*. Proceeding, Third Annual Conference and Exhibition on Underground Storage Tank Management and Hydrocarbon Contamination Cleanup. Resource Education Institute, Sturbridge, Massachusetts.

Duchesneau, M. and Mulica, W.S., 1988. *Use of Soil Gas to Rapidly Define Ground Water and Soil Contamination*. Proceeding, Second Annual Eastern Conference and Exhibition on Real Estate Site Assessments and Environmental Audits. Resource Education Institute, Sturbridge, Massachusetts.

Duchesneau, M. and Baddour, F., 1988. *Soil Gas Sampling Technology: Applications and Limitations*. Proceedings, National Solid Wastes Management Association, Boston, Massachusetts.

Glynn, W. and Duchesneau, M., 1988. *Assessment of Vacuum Extraction Technology Application*. Prepared for USEPA Risk Production Laboratory Office of Research and Development, Contract Number 68-0303409.

Duchesneau, M. and Partridge, L.J., 1985. *Procedure for Evaluating the Allowable Metal Contaminant Levels in Landfilled Sewage Sludge*. Proceedings, Environmental Engineering Conference, American Society of Civil Engineers, Boston, Massachusetts.

ANDREW B. SCHWARTZ
Geophysicist/Database Administrator

Experience Summary

Mr. Schwartz has over 11 years of experience in planning and overseeing geophysical investigations for ordnance, engineering and construction projects, mineral exploration, and environmental studies. Mr. Schwartz is responsible for the quality assurance and quality control of geophysical data collection and he is responsible for interpreting and reporting the findings of geophysical investigations. He develops project specific data reduction and data interpretation applications that are used in DOS, Windows and Oracle environments. Mr. Schwartz is also responsible for designing and maintaining relational databases for use in Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remedial investigations of hazardous waste and radioactive mixed waste sites. He is also a database administrator.

Years of Experience

11

Years with Parsons

6

Education

B.S., Physics, 1988, Dalhousie University, Halifax, Nova Scotia

Experience Record

1993-Present, Parsons Engineering Science, Inc.

Geophysicist: Parsons Engineering Science, Inc. Involved in expanded site inspections, remedial investigation/feasibility studies, and engineering evaluation/cost analysis investigations of military, industrial, and mixed waste facilities in the eastern United States. Field team leader responsible for planning, supervising, and training personnel for electromagnetic surveys, ground penetrating radar surveys and magnetometer surveys at unexploded ordnance sites. Developed standard operating procedures for conducting geophysical investigations, for verifying and maintaining survey quality control, and for reducing and manipulating geophysical data. Directs invasive explorations of hazardous and radioactive mixed waste disposal sites.

Field Team Leader: Parsons Engineering Science, Inc. Responsible for planning EM-61 geophysical field work and supervising and training field personnel at various unexploded ordnance (UXO) site investigations. Developed standard operating procedures for EM-61 UXO investigations, survey quality control, and EM-61 data reduction and interpretation.

Task Manager: Parsons Engineering Science, Inc. Responsible for writing and implementing a multi-million dollar Remedial Investigation and Radiological Final Status Survey workplan at the Seneca Army Depot Activity in Romulus, New York. Negotiated the level of effort that will be required to meet US Army, New York State and USEPA requirements for site release. Trained field personnel to use differential global positioning system instruments, geophysical survey instruments, and radiological screening instruments. Designed the data collection and data handling strategies that are used to record and document all on-site activities needed to satisfy project requirements.

Database Administrator/Computer Programmer: Designs and builds relational database models within Oracle that are used to store, organize and present data collected during environmental site investigations. Aids database users by troubleshooting their database queries and providing database design solutions to specialized, information specific problems. Designs applications and database objects to facilitate linking Oracle databases to various off-the-shelf Windows based software packages. Designs and writes Visual Basic applications to validate, present, and interpret environmental sample data and to use that data in risk assessments of hazardous waste and radioactive mixed waste sites. Analyses data that is to be stored in Oracle and designs database models to accept that data and verify its integrity. Directs information up-loads.

Skilled in many software systems, including Oracle, Visual Basic, AutoCad, ArcView, Geosoft, RADAN, MagMap 96, and SIPT 2.

1988-1993 Geophysics GPR International, Montreal, Canada. **Field Operations Manager:** Served as field operations manager for various engineering feasibility studies and mineral exploration projects conducted in Canada, the United States, and East Africa. Responsible for planning, executing, and preparing final reports on various waterborne projects, which included side-scan sonar surveys, sub-bottom profiling surveys, bathymetric surveys, marine positioning, and shallow benthic coring. Served as senior geophysicist on a technology demonstration project to identify and characterize structural deterioration of submerged dam structures in the La Grande Hydroelectric complex. Served as senior geophysicist for environmental assessments of contaminated sediments in rivers, harbors, and canals.

Project Geophysicist: Responsible for the field testing and operational use of a prototype micro-computer controlled marine induced polarization system developed by the Hardy BBT Corporation and the Canadian government. Worked on waterborne projects where side scan sonar, seismic reflection, seismic refraction, magnetic, and hydrographic survey methods were used to evaluate river flow characteristics and physical properties of sub-marine sediments and bedrock. Performed marine magnetic surveys to search for UXO over the Nicolet Artillery Testing Range. Served as resident geophysicist for a harbor enlargement project.

Computer Programmer: Developed interfacing hardware and software to link various geophysical and positioning instruments together and record data from each simultaneously (both in hard copy and electronically). Designed applications to analyze geophysical and positioning data. Wrote computer routines to automate the reduction and processing of raw field data.

Special Training

40-hour health and safety training for work at hazardous waste sites in compliance with OSHA regulations 29 CFR 1910.120(e)(3), 1990.

Course and Certification, "Theory of Operation and Interpretive Techniques of Side Scan Sonar," Klein Associates, Inc., 1991.

Course and Certification, "Theory and Practice of Applying Subsurface Interface Radar Technology in Engineering and Geophysical Investigations, SIR-System 3," Geophysical Survey Systems, Inc., 1993.

8-hour Supervisory Training for work at hazardous waste sites in compliance with OSHA regulations 29 CFR 1910.120(e)(8), 1995.

Course and Certification, "Oracle 7 Database Administration", Oracle Education Center, 1997.

JOHN BAPTISTE
GEOLOGIST

Experience Summary

Mr. Baptiste is responsible for conducting environmental investigations for industrial and federal clients.

Mr. Baptiste is experienced in the use of the following instrumentation: Sensors and Software and GSSI ground penetrating radars; Geonics EM-31 terrain conductivity meter and EM-61 time domain metal-detector; Geometrics G-856 and G858 magnetometers; Trimble GPS equipment, and various utility-locating instruments.

Years of Experience

1

Education

B.A., 1997, Geology, Colby College

Training

OSHA Health and Safety Training (29 CFR 1910.120)

OSHA Site Supervisor Training (29 CFR 1910.120 (e) (4))

Hazardous Materials Transportation Training (49 CFR 172.700)

First Aid and CPR Training

Radiological Fundamentals Training Course

Computer Skills

Geosoft; Surfer; Arcview GIS; Dat31; Dat61; Groundwater Vistas; Magmap; Magloc; Pathfinder; Spiview; Kaleidagraph; gINT; Century's Log and Display

Experience Record

1999 - Date Parsons, Canton, MA. Geologist. Responsible for conducting site investigations for industrial and federal clients.

His project experience includes:

- Geophysicist – Massachusetts Military Reservation Unexploded Ordnance Investigation, Camp Gordon Johnston Ordnance and Explosives – Engineering Evaluation/Cost Analysis, Camp Ellis Ordnance and Explosives – Engineering Evaluation/Cost Analysis. These projects all included the collection of geophysical data using various instruments, as well as the collection of GPS data in order to correctly locate the anomalies found in the geophysical data.

- Geophysicist – Seneca Army Depot Activity Former Weapons Storage Area, Ordnance and Explosives – Engineering Evaluation/Cost Analysis. This project, which has just recently begun, has included the construction of a geophysical prove-out grid in order to test the effectiveness of instruments that may be used in the actual ordnance investigation. It also involved the collection of geophysical data over the prove-out grid and the later interpretation of this data.

- Geologist – Seneca Army Depot Activity Former Weapons Storage Area Remedial Investigation Program. Responsible for collecting groundwater samples and performing slug tests at wells across the site.

- Geologist – Sikorsky Aircraft Corrective Action Program, AC-6 Down Gradient Groundwater Investigation. Responsible for collecting groundwater samples in a marsh and in the main manufacturing building using a rig mounted Geoprobe.

1997-1998 NAEVA Geophysics, Valley Cottage, NY. **Geologist.** Conducted numerous site characterizations using magnetic, ground penetrating radar, electromagnetic, Geoprobe, and electromagnetic utility-locating methods. Responsible for interacting with clients, scheduling projects, generating proposals and reports, and conducting field work.

Publications

Pirmez, C.; Flood, R.; Baptiste, J.; Yin, H. and Manley, P. Clay content, porosity and velocity of Amazon Fan sediments determined from ODP Leg 155 cores and wireline logs. *Geophysical Research Letters*, Vol. 24, No. 3, Feb. 1997, pp. 317-320.

Baptiste, J. The effects of road salt on rivers and ground water in Waterville, Maine. *The Maine Geologist*, Vol. 23, No. 2, July 1997.

Ben McAllister
Geologist

Experience Summary

Ben McAllister has one year of experience in conducting hazardous waste site investigations on federal and industrial sites.

Years of Experience

1

Years with Parsons

1

Education

B.A. in Environmental Geology (Concentration: Coastal Biology, 1998, Northeastern University, Boston, MA

B.A. in Art (Concentration: Photography), 1998, Northeastern University, Boston, MA

Semester Curtin University West, 1997

Austrialia Geophysics for Exploration and GPS

Special Training

40-hr. Hazardous Materials Operator

HAZWOPER (1999)

PADI Scuba Certification (since 1988)

Site Supervisor Training (Parsons)

Radiation Worker Training (Parsons)

CPR

Primary Experience

1999-Date Parsons Engineering Science, Canton, MA, **Geologist.** Assigned to hazardous waste site investigation projects. Projects include:

Geologist for Seneca Army Depot Activity, Romulus, New York. Responsible for conducting field sampling activities in support of the OB Grounds (GPS) Survey, groundwater study in support of the Ash Treatability Study, hexchrome and groundwater study for SEAD-4, Ash remedial design for SEAD-12, and geophysical pump-out.

Geologist for Southern Connecticut Gas project video survey and archival research. Conducted ground penetrating radar (GPR) to locate buried piping.

Geologist for Sikorsky Aircraft, Stratford, CT. Conducted groundwater profiling and soil boring recovery log/

Geologist for the New Jersey Department of Transportation. Responsible for supporting the underground storage tank removal project and assist in preparing Fernwood Report.

Other Experience

Spring 1996 T.G.W.B., Inc.. Assigned to EG&G's Sea Star 5 Side Scan Sonar Profiling. Marine dredging dump site in Provincetown, MA combining profiling data with differential GPS to create subsurface mapping.

Summer 1994 University of California, Riverside, Institute of Geophysics and Planetary Physics (IGPP). Research Assistant. Implemented super high pressure, high temperature stress and stain deformation tests on Olivine and Peroxine.

Professional Affiliations

Geological Society of America

Association of Geologists and Petroleum Professionals

KERRY SMITH
Field Technician

Experience Summary

Kerry Smith is an Environmental Field Technician with experience in RCRA and CERCLA remediation projects and air emissions monitoring projects. His experience includes a wide variety of sampling and monitoring procedures at both hazardous waste sites, and industrial plant locations. Responsibilities also include acting as PI&T, Canton office Health and Safety Coordinator, primary Field Health and Safety Officer, and Field Equipment Manager.

Years Experience

8

Special Training

Radiological Fundamentals Training Course

D.O.T Hazardous Goods Training (49 CFR 172.700)

Health and Safety Certification (40 hours) OSHA 1910.120

Supervisory Instruction (8 hours) OSHA 1910.120(e)

EPCRA Section 313 Pollution Prevention Reporting Requirements

Certificate of Achievement - Quality Improvement Fundamentals

Experience Record

1992-Date Parsons Engineering Science, Canton, MA. **Field Technician**. Assigned to environmental engineering projects which include:

Field Technician responsible for performing environmental investigations for a large utility company in Bridgeport, CT. The project included extensive utility clearance, soil gas and water analysis in the field using a portable gas chromatograph, well installations, and soil and groundwater sampling collection.

Field Technician responsible for performing technical services for the Army Corps of Engineers at a closed nuclear weapons storage facility. Work included geophysical surveys, test pit excavations, surface and subsurface soil and water sample collection. This work required extensive use of radiological scanning instruments.

Field Technician providing support for a geophysical unexploded ordnance (UXO) survey program at a large military base on Cape Cod.

Field Technician responsible for collecting wastewater samples at a large jet engine manufacturing facility north of Boston, MA.

Field Technician responsible for conducting test well installations and performing pump testing and sample collecting at a large tank farm facility in Bayonne, New Jersey.

Field Technician performing a site survey identifying ozone depleting substances at a U.S. Navy Air Station in New Jersey. This work included the inventory of all related equipment, storage facilities, and maintenance records.

Field Technician for emission testing program at a western Massachusetts industrial facility. The project included monitoring and sample collecting of VOC's and particulates at stack locations and interior work areas.

Field Technician performing an indoor air monitoring program for a recreational complex north of Boston. A portable gas chromatograph was programmed to take hourly samples and to self calibrate over a two-week period. The purpose was to identify the source of a VOC previously detected during a long-term exposure testing program.

Field Technician for an oxygen diffuser project on the Androscoggin River in southeastern Maine. Work consisted of a post-construction efficiency survey measuring oxygen and flow rates in the vicinity of the diffuser located on the river bed.

Field Technician for a SARA Title III Fugitive Emissions Survey performed for a large manufacturing facility in western New York.

Field Technician for a Fugitive Emissions Survey conducted for a chemical manufacturing facility in southeastern Massachusetts. Assignments included an extensive flange and valve survey, and VOC leak detection utilizing a Flame Ionizing Detector.

Field/Lab Technician for on-going air quality monitoring programs for several industrial clients. Responsible for weighing weekly air monitoring particulate filters.

As **Field Technician** assisted in several meteorological monitoring programs in Massachusetts and Maine including the routine maintenance of tall meteorological towers.

Field Technician providing assistance in the installation and implementation of an air monitoring station at a RCRA Superfund Site in northeastern Massachusetts.

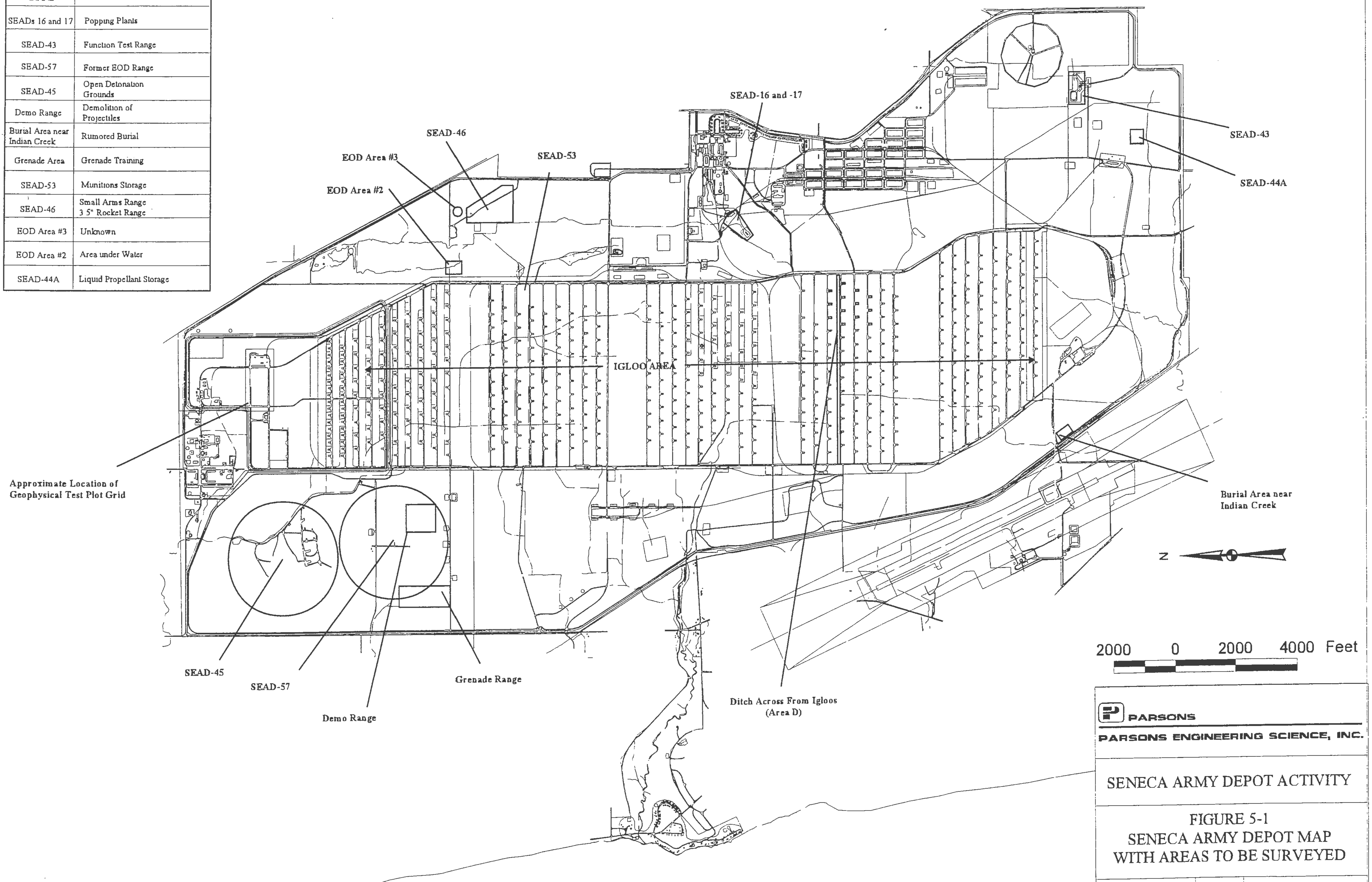
Field Technician performing technical services for a Army Corps of Engineers RI/FS Superfund Site project in New York. Tasks included groundwater, soil and biological sampling, soil gas surveying and groundwater headspace analysis utilizing a portable photoionization gas chromatograph, and supervising well installation including core sample logging.

Field Technician for extensive RCRA Assessment program at two manufacturing facilities in southern Connecticut. Tasks included providing technical support for a geophysical survey utilizing both ground penetrating radar and seismic detonation, soil borings and groundwater well installation, sampling of groundwater, soils, and wetlands including the navigation of a major river, and the identification, video and photo documentation of an extensive hazardous waste drum removal program requiring long-term continuous work in Level B protection.

Field Technician assisting in a wetland delineation mapping project at a U.S. Air Force Space Command complex in New Hampshire. Surveying was accomplished with the use of GPS survey instruments.

Field Technician conducting a dissolved oxygen survey along a 20-mile stretch of a major river for an industrial plant southwest of Boston, MA.

SITE	DESCRIPTION
SEADs 16 and 17	Popping Plants
SEAD-43	Function Test Range
SEAD-57	Former EOD Range
SEAD-45	Open Detonation Grounds
Demo Range	Demolition of Projectiles
Burial Area near Indian Creek	Rumored Burial
Grenade Area	Grenade Training
SEAD-53	Munitions Storage
SEAD-46	Small Arms Range 3 5" Rocket Range
EOD Area #3	Unknown
EOD Area #2	Area under Water
SEAD-44A	Liquid Propellant Storage

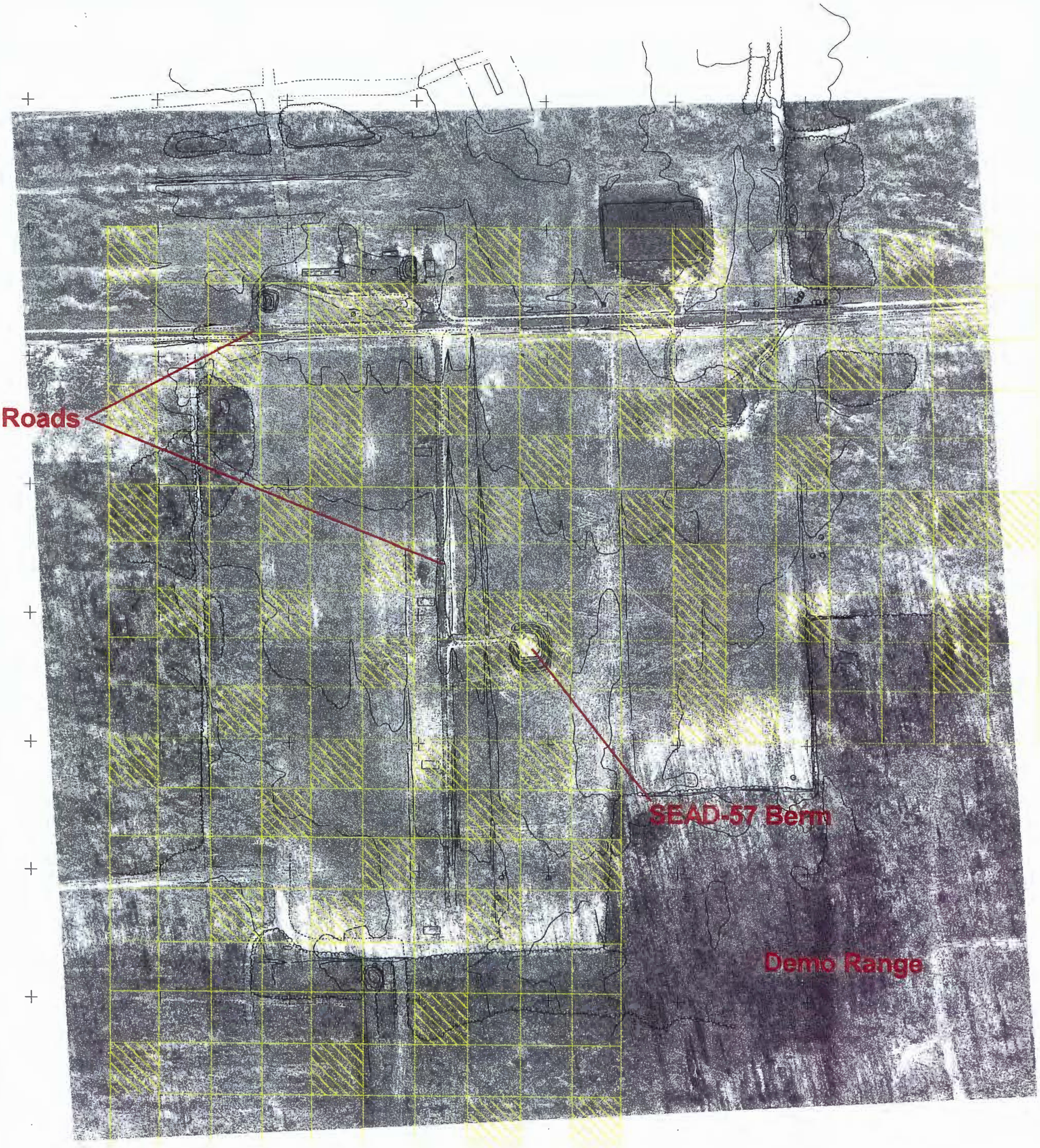


PARSONS
PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 5-1
SENECA ARMY DEPOT MAP
WITH AREAS TO BE SURVEYED

APR 2000



Areas to be 100 Percent Covered Geophysically

200 0 200 400 Feet

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 5-2
EOD AREA #1/ SEAD-57

Scale: 1" = 200'

MARCH 2000

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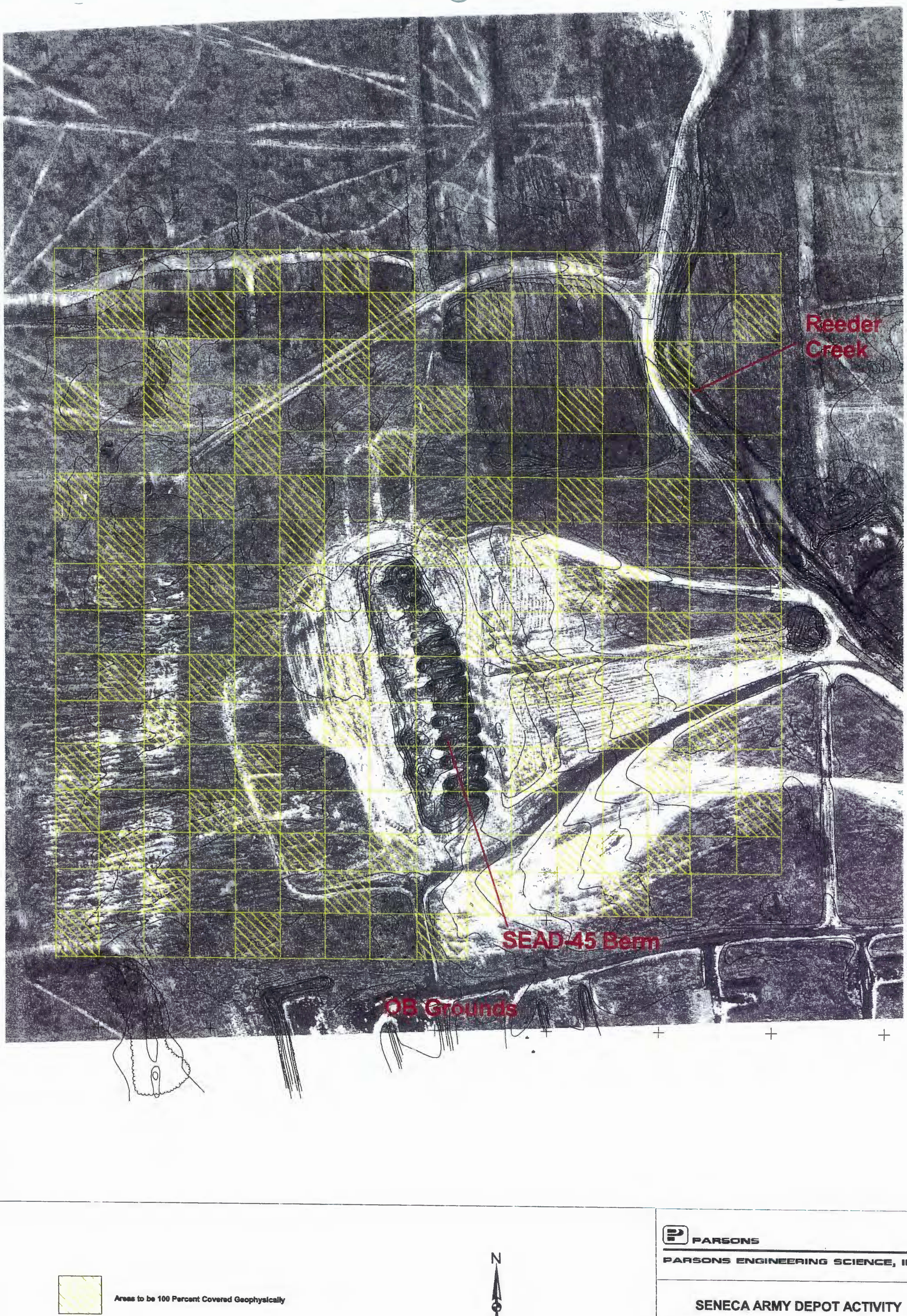

PARSONS

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SENECA ARMY DEPOT ACTIVITY

FIGURE 5-3
SEAD-45
OPEN DETONATION AREA

Scale: 1" = 200' | MARCH 2000

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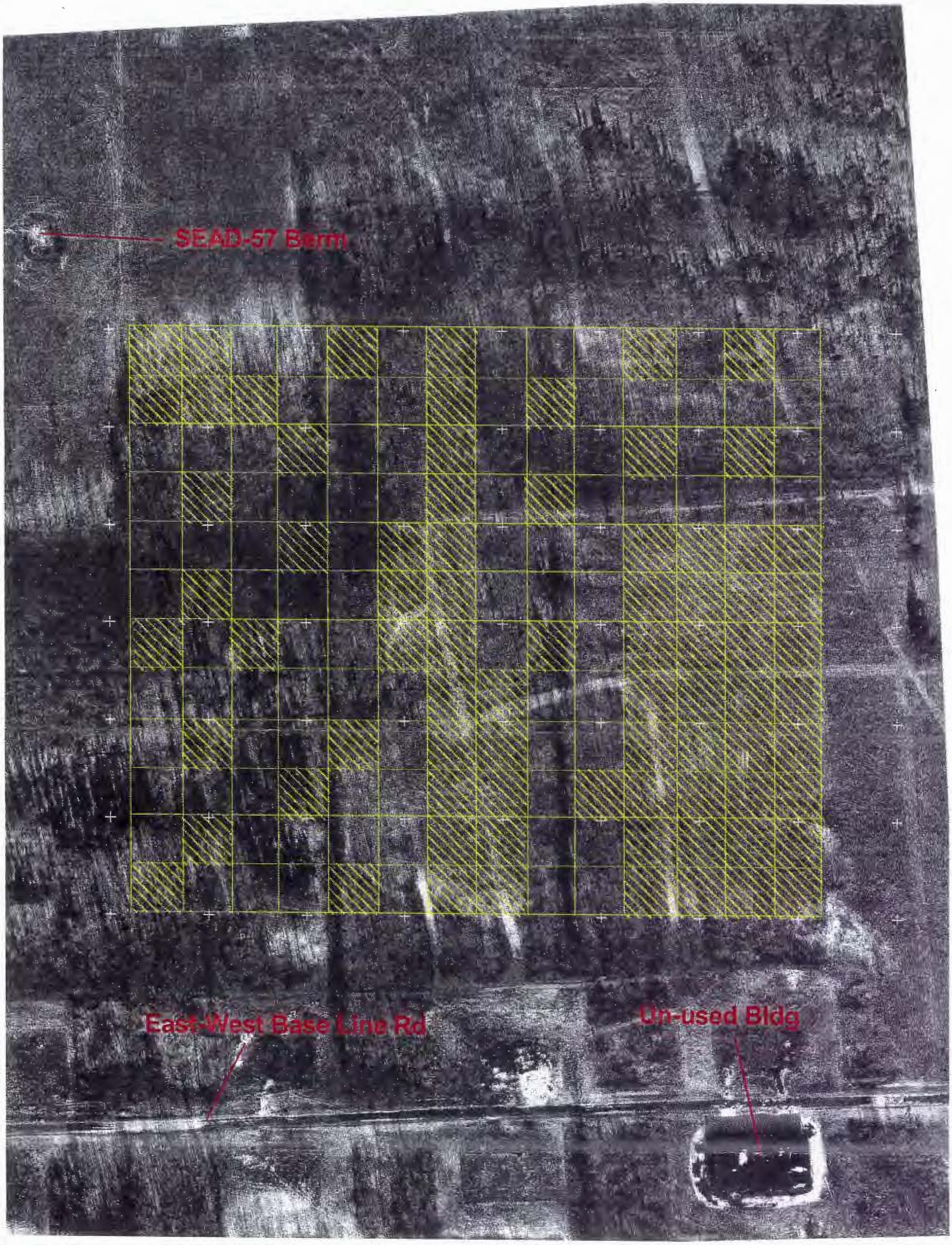

Areas to be 100 Percent Covered Geophysically

200 0 200 400 Feet

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 5-4
DEMO RANGE

1" = 200'

MARCH 2000

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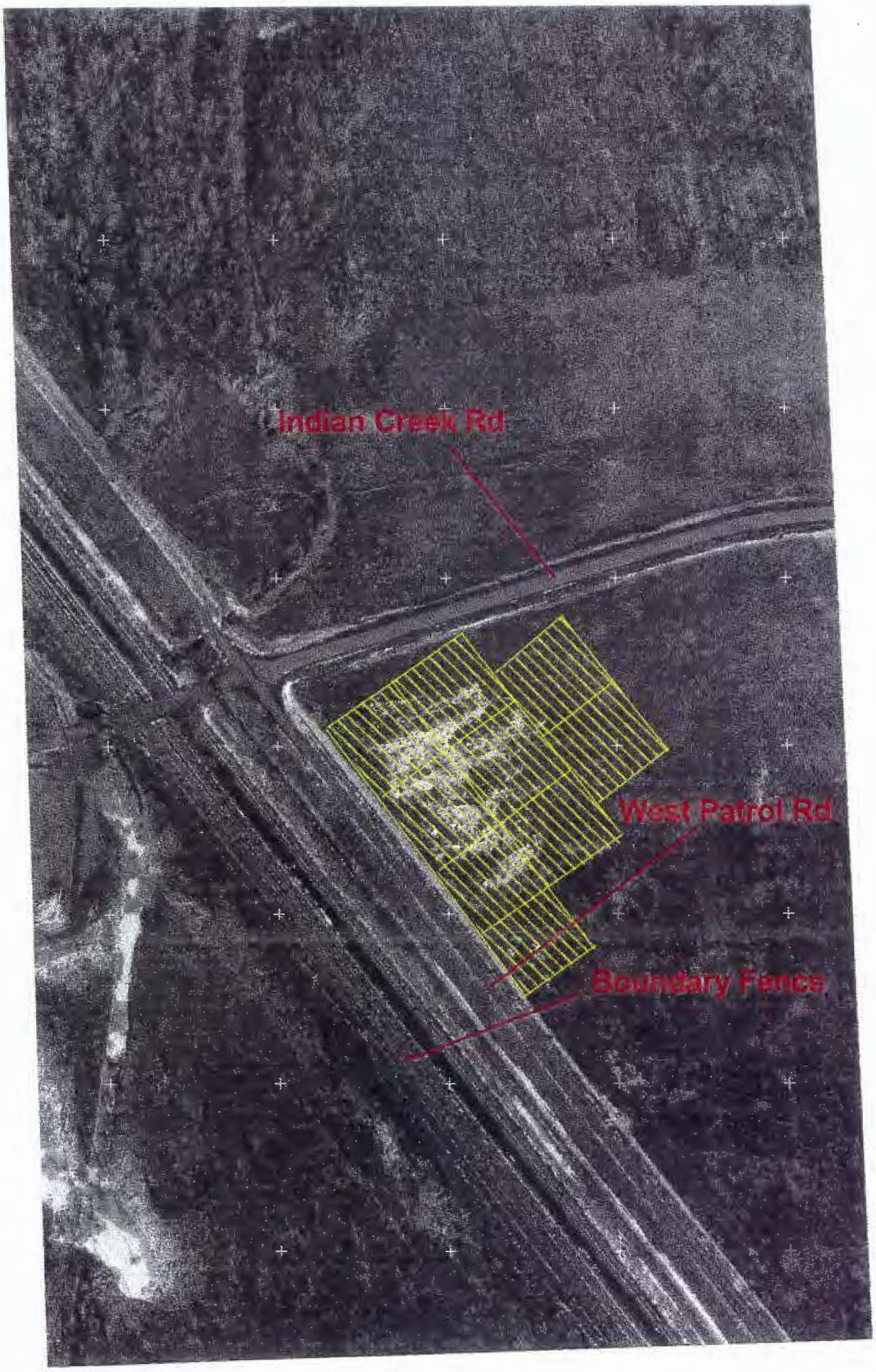

Areas to be 100 Percent Covered Geophysically

200 0 200 400 Feet

N

PARSONS

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SENECA ARMY DEPOT ACTIVITY

FIGURE 5-5
INDIAN CREEK BURIAL AREA

1" = 150' | MARCH 2000

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Areas to be Surveyed Using Meandering Path

Areas to be 100 Percent Covered Geophysically

N

200 0 200 400 Feet

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 5-6
GRENADE RANGE

1" = 200'		MARCH 2000

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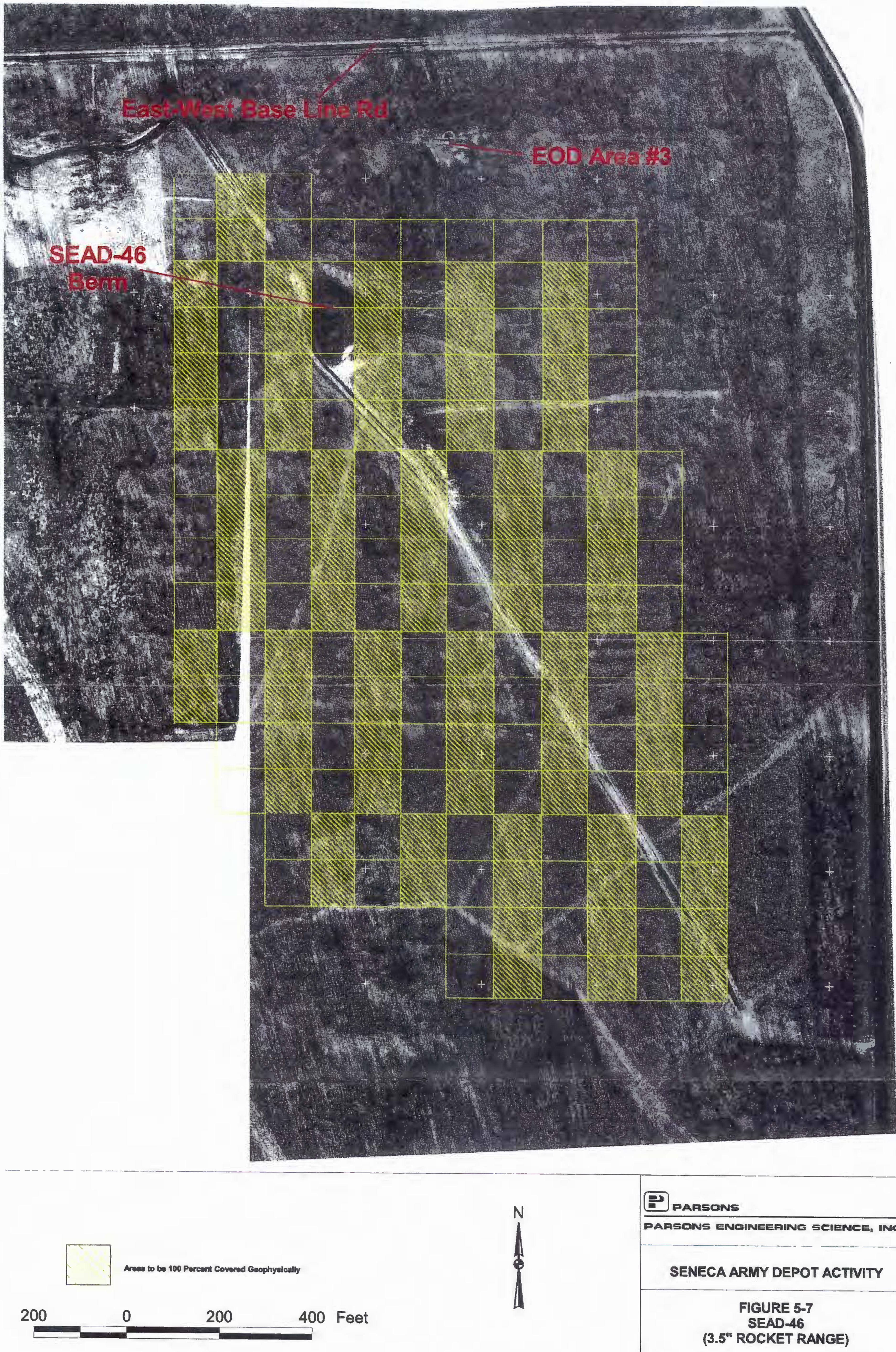

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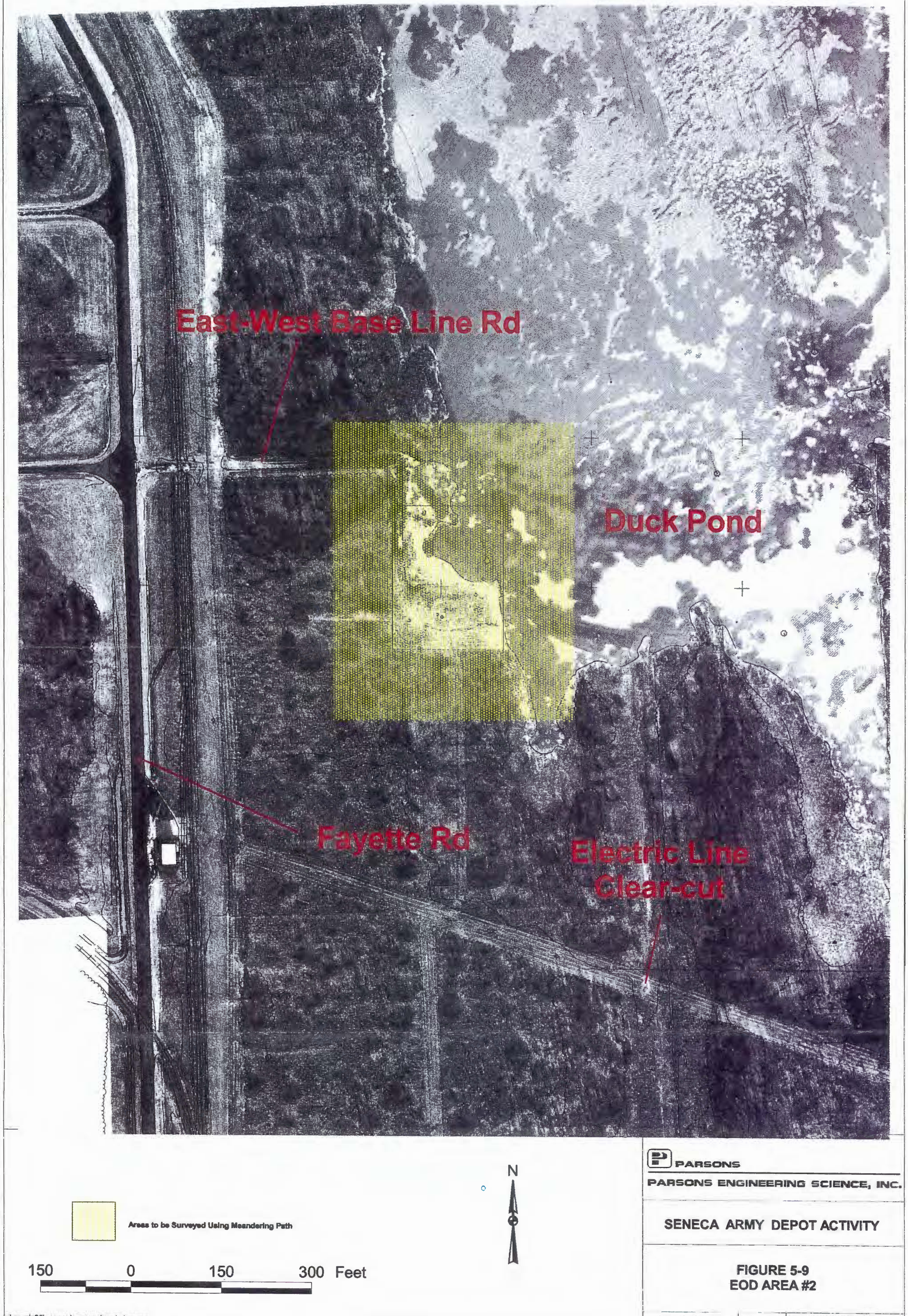
SENECA ARMY DEPOT ACTIVITY

FIGURE 5-7
SEAD-46
(3.5" ROCKET RANGE)

1" = 200' | MARCH 2000

o:\av_gis30\seneca\oe-eeca\workplan.apr

East-West Base Line Rd
SEAD-46 Berm
Areas to be 100 Percent Covered Geophysically
200
0
200
400 Feet
N
o:\av_gis30\seneca\oe-eeca\workplan.apr
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
SENECA ARMY DEPOT ACTIVITY
FIGURE 5-8
EOD AREA # 3
1" = 200'
MARCH 2000



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

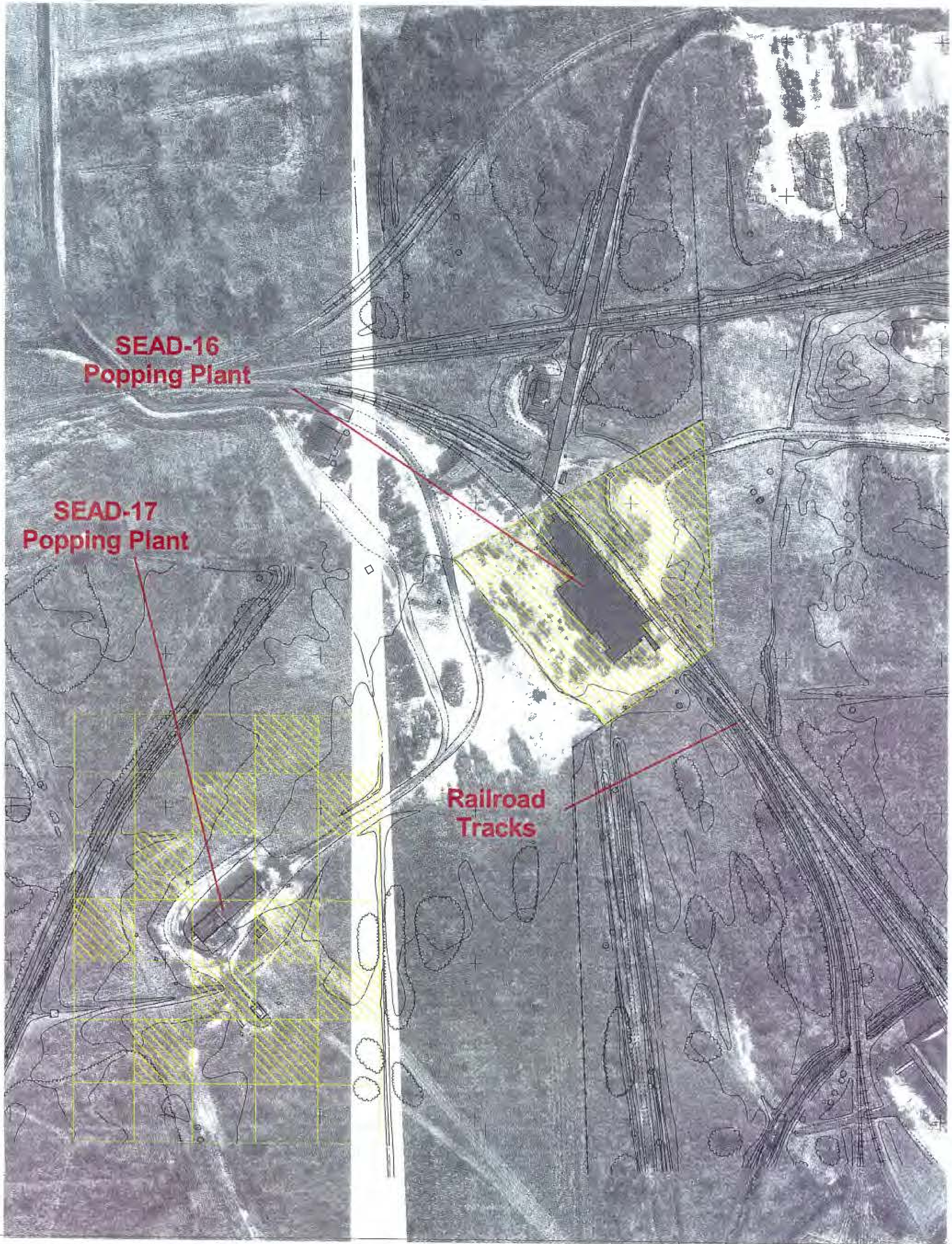
SENECA ARMY DEPOT ACTIVITY

FIGURE 5-9
EOD AREA #2

1" = 150'

MARCH 2000

p:\av_gis30\seneca\oe-eeca\workplan.apr



Areas to be 100 Percent Covered Geophysically

150 0 150 300 Feet

N

PARSONS

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SENECA ARMY DEPOT ACTIVITY

FIGURE 5-10
POPPING PLANTS (SEAD 16/17)

1' = 150'	MARCH 2000

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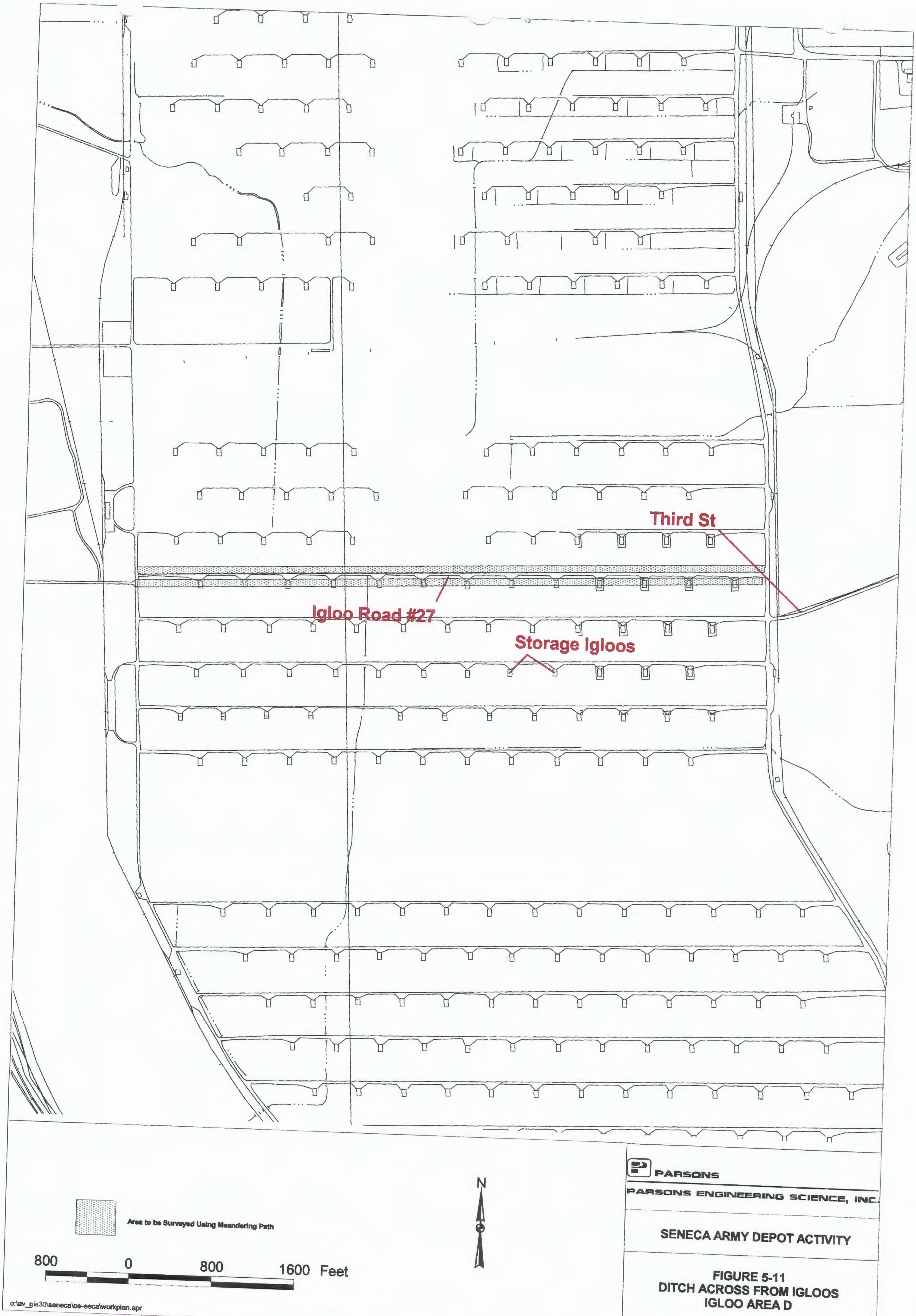

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PARSONS

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SENECA ARMY DEPOT ACTIVITY

FIGURE 5-11
DITCH ACROSS FROM IGLOOS
IGLOO AREA D

Scale: 1" = 800'

MARCH 2000

SECTION 6

HEALTH AND SAFETY PROGRAM

6.1 Purpose

6.1.1 The nature of field work has made health and safety a principal concern both during project planning and in the field. Office and field personnel must develop a health and safety consciousness, avoiding unnecessary or "calculated" risks. At the same time, unnecessary precautions that create additional safety hazards and/or inhibit work performance need to be avoided.

6.1.2 The purpose of a SSHP is to establish personnel protection standards and mandatory safety practices and procedures for all work conducted for this project. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are conducted at the site.

6.1.3 The sections of the Parsons SSHP (Appendix B), provide general guidance for the decision points in health and safety planning. Sections cover field personnel responsibilities and work procedures, physical and chemical risks, emergency procedures, and levels of personal protection. Site-specific information such as a project description and site history, a contingency plan, a list of emergency contacts, and necessary health and safety equipment are also discussed. USA (and any of their subcontractors) will adhere to Parsons SSHP.

6.2 Applicability

6.2.1 Parsons has the overall safety authority onsite. The Parsons plan provisions are mandatory for all on-site activities undertaken at Seneca Army Depot site by **all personnel**. All site activities comply with the provisions of the Parsons *Corporate H&S Policies and Procedures Manual* and applicable standards in 29 CFR 1910 and 1926. As site activities change, this plan may need to be modified. Such modifications will be submitted as SSHP addenda and will be numbered sequentially. All SSHP addenda will be reviewed and approved in compliance with Parsons standard procedures.

6.2.3 All Parsons and USA personnel working on site must read the SSHP and submit a signed Plan Acceptance Form prior to starting work at the site. The Parsons Plan Acceptance Form is shown as Attachment B-2 in Appendix B.

6.3 General Site UXO and Safety Procedures

6.3.1 General site safety procedures will be followed throughout this project, in addition to USACE safety concepts and considerations for UXOs as described in Appendix B and Section 7.

6.3.2 UXO operations will not be conducted during the hours from sunset to sunrise or during electrical storms or other severe weather conditions.

6.3.3 A minimum of two UXO technicians will be present during all UXO operations, so that one may always act as a safety observer.

6.3.4 All UXO encountered will be reported to the SUXOS and appropriate measures will be chosen to safeguard the area.

6.3.6 During all OE/UXO confirmation operations, only the minimum number of personnel (two) required to safely perform the task will be allowed onsite. All others will evacuate to a predesignated assembly point.

6.3.6 If CWM is encountered, all site personnel will immediately withdraw upwind of the work area and CEHNC will be notified.

CHAPTER 7

LOCATION SURVEYS AND MAPPING PLAN

7.1 Introduction

7.1.1 This section outlines the location survey activities to be conducted during the field activities. These activities include the establishment of the GIS (Geographical Information System) database including the input of aerial photography, topographic maps, existing site maps, and other appropriate data. This data will be combined within the database and will be used to develop the Work Plan and EE/CA Report(s), support the field effort. Also included are brief explanations of the unexploded ordnance safety provisions during all fieldwork and all survey activities.

7.2 Digital Aerial Photographs/Topographic Maps

7.2.1 All aerial photography will be acquired from a previous flyover by Sanborne Lockwood Mapping. The resultant aerial photographs will be delivered as either digital orthophoto format on CD ROM, or as a hard copy photograph from which Parsons will create a digital output. Photographs and maps will include high altitude aerial photographs converted to Raster image topographic maps, which will provide the base map for the GIS system. All delivered maps will be in 50 feet to one inch, 100 feet to one inch or 200 feet to one inch scale. Also provided will be digital photographs showing the kick out radius for the ordnance at each site, as computed by Dr. Michelle Crull of the USAESCH Huntsville.

7.2.2 Horizontal ground control will be established using the existing network of monuments available throughout the SEAD property. All data will be set up in an ORACLE database and conform to the TSSDS format required by DID OT-005-07. Digital aerial photography and planimetric maps will be submitted to USAESCH with the final report. GIS database submittals will be delivered to USAESCH on CD ROM with the final report upon completion of the project.

7.3 Survey Grids

7.3.1 The geophysical investigation for this project will incorporate two distinct methods of survey and mapping of anomaly locations. The first method will involve the establishment of a survey grid of 100'X 100' or 100' X 50' on a planimetric map prior to entering the field. The grid will first be established on a map and submitted to CEHNC for approval. Once approved the associated grid will then be surveyed in to its proper location once the field investigation begins. The proposed grid locations are shown in section 5.2

7.3.2 Land survey activities include field survey and mapping of each grid using grid coordinates provided by Parsons. The corners of each grid shall be referenced to the New

York State Plane Grid System based on the North American Datum of 1983 (NAD83).All grid locations will be surveyed, the coordinates recorded, and semi-permanent marker stakes will be advanced at each grid corner prior to investigation of a grid. The proposed grid locations are described in section 5.2. The corners of the individual grids will be established to a post-processed accuracy of ± one foot. Grids will be oriented north-south or east-west, where possible, to enable quick tracking of grid locations and access to each grid during subsequent investigations.

7.3.3 Approved survey techniques will be used to place the southwest corner of each survey grid to within approximately 25 meters of their proposed locations in this Work Plan. The remaining corners of the survey grids will then be located as described in Section 5.3. If the location of a grid falls in an area that would not be accessible to the geophysical survey crew (i.e. a ravine), or is in an area with significant cultural interference (such as irrigation piping), that grid will be relocated up to 50 meters from the originally selected location.

7.3.4 Grid corners may be laid out using a combination of surveyors' equipment, differential GPS equipment, and trigonometry. At a minimum, the southwest corner of each grid will be established using GPS or surveying methods. The horizontal accuracy of the geophysical surveys and the ability of the OE characterization/investigation team to reacquire anomalies will be greatly dependent upon the placement of the grid corners. The angle between the survey grid boundaries must be as close to 90 degrees as possible, and will periodically be verified for "squareness" by the survey crews. A grid found to be out of square by more than 1 foot (measured diagonally from grid corner to grid corner) will be resurveyed. EM-61 data collected from a grid that is found to be out of square will either be corrected (if possible) or the grid will be adjusted and resurveyed with the EM-61.

7.4 Meandering Path

7.4.1 The "meandering path" technique for survey coordinates has been used successfully by Parsons for similar EE/CA projects. The exact location of survey transects will not need to be pre-established which in turn will not require stakes to be driven at the individual transect location. Instead the geophysical equipment used in the survey will simultaneously collect GPS survey data and geophysical data. Existing permanent survey monuments listed on the "Description Cards" will be used as necessary to establish horizontal control. Anomaly reacquisition for intrusive investigation will be conducted using a similar GPS system to relocate the anomaly location. Therefore, no new concrete monuments will be established during the "meandering path" field effort. Horizontal control shall be periodically referenced to the North American Datum of 1983 (NAD83) and the State Plane Coordinate Grid System. All control points to be used for will be plotted at the appropriate coordinate point on a topographic map per the SOW. Establishment of new survey control points will not be required for the meandering path portion of this project. Tests of the accuracy of the G.P.S. system are given in the proveout report.

7.5 Unexploded Ordnance Safety Provision

7.5.1 In all areas suspected of having possible UXO contamination, the UXO-qualified person will inspect the areas where personnel may transit. A magnetometer check (Schonstedt) of all points where location stakes or posts are to be driven into the soil, or where permanent control points are to be established, will be accomplished prior to placement of stakes. If the magnetometer indicates the presence of a subsurface anomaly (via audio/visual signal), no monuments, stakes, or posts will be driven into the ground at that specific location.

7.6 GIS – Purpose and Scope

7.6.1 This section outlines the structure and procedures of the GIS for the Seneca Army Depot EE/CA Project. GIS technology provides a common repository for data needed for analysis and output. The GIS database, developed through the mutual efforts of many project participants, represents various disciplines. Maintaining strict controls over data input, data management, data access, and data output is paramount in order to ensure integrity of the project database.

7.7 Responsibilities

7.7.1 The responsibility for management and control of the Depot GIS will reside with the Parsons designated GIS Manager. The GIS Manager will direct GIS operations occurring locally and remotely.

7.7.2 The GIS database will be maintained on a computer system that provides for control over data access. A System Administrator will be appointed and made responsible for direct day-to-day control over the system. The System Administrator will be responsible for data integrity and database management and security. The System Administrator will follow the direction of the GIS Manager for granting access to and privileges on the database to specified individuals.

7.7.3 Primary GIS Staff will accomplish the day-to-day operations of the GIS. Primary GIS Staff have direct write access to the GIS database. They are responsible for performing GIS functions and analysis on the database. Primary GIS Staff have full access to the database for editing purposes and are individually responsible to maintain the integrity of the GIS database. No work shall be performed on the GIS database without authorization of the GIS Manager.

7.7.4 Secondary GIS Staff have direct read access, but do not have authorization to update, add new data to, or otherwise alter the database. Secondary GIS Staff facilitate GIS user activity and are responsible to assist in data acquisition. The Secondary GIS Staff has write access to a home work space which can be utilized to store output, awaiting evaluation by the GIS Manager, from manipulation and analysis activities. ArcView 3.0 will be the principal tool used by the Secondary GIS Staff to perform work. Secondary GIS Staff must coordinate with a Primary GIS Staff member in order to ensure orderly function of the GIS, timely inclusion of new data sets into the GIS database, and appropriate data output from the GIS.

7.7.5 Personnel requesting output from the GIS are defined as Users. Users have indirect access to the GIS database by coordinating with a GIS Staff member. Users assist with data acquisition and analysis particularly for data pertaining to their assigned project activities. Users coordinate with the GIS Manager, Primary GIS Staff, and Secondary GIS Staff when questions concerning use, need for additional analysis support or need for output are demonstrated.

7.8 Procedures

7.8.1 All of the GIS work for the Depot EE/CA Project will be conducted by Parsons. Parsons is the principal consultant and maintains the GIS database in Atlanta. The following is an outline of the relationship between the Project office and consultants and the procedures governing work accomplished relating to GIS activities.

7.8.1 GIS System

7.8.1.2 Parsons will incorporate the archival data into the GIS created from the USAESCH OE-GIS Standard. The project will be conducted using contractor workstations. All base data will be received in ArcInfo format and later be converted for use in the Intergraph modular GIS environment (MGE, version 6.0.3) format. All GIS information submitted to USAESCH by Parsons will be in a format that is recognized by MGE, version 7.3.2. This format includes Microstation (with file designation .dgn), and TIFF and GIF image files. ArcInfo or ArcView coverage files and shape files will be included in any GIS data submitted to USAESCH by Parsons if Microstation is not available. All tabular or attribute data will be maintained using the Oracle relational database (version 7.3.2).

7.8.2 Data Management

7.8.2.1 GIS data management requires a daily effort from all GIS personnel. The GIS Manager, GIS Coordinators, System Administrators, and Primary GIS Staff must support data management activities coincident with accomplishing their work. Management of field data will be the joint responsibility of the Site Manager and the Senior Project Geophysicist, and is described in Section 5.3.1.5.

7.8.2.1 Data Reconciliation

7.8.2.1.1 The GIS database will be maintained on the Parsons GIS system in Atlanta. As data are added, updated, changed, altered, or manipulated in any way, reconciliation of the database is critical. The procedural details of this reconciliation are outlined in Subsection 7.4. A direct communications link is the most effective manner to regularly accomplish the data reconciliation. A new or manipulated data set shall be sent over the wide area network (WAN) or the internet to the Atlanta office on the same day that the data is created. Upon receiving the data, it shall be immediately updated in order to ensure continuity between the databases.

7.8.2.1.2 All such transmissions of data shall be accompanied by a "read-me" file or written documentation regarding the contents of the database. The file should include the names of data sets, the path location of where they should be inserted in the database, who made the updates, what the updates are, and why the updates were made. Documentation on the contents of the databases will save many labor hours for those who might otherwise have to ascertain for themselves the contents.

7.8.2.2 Data Maintenance

7.8.2.2.1 As discussed above, the Depot GIS database is maintained in Atlanta. The database is managed by the GIS Manager. This database is used to store final or published versions of project GIS data. It is the official project repository of GIS data, including unprocessed feature and attribute data sources that may be used outside the GIS. The Atlanta based database is the main location for processing data sources into draft and final GIS products as well as production work.

7.8.2.2.2 A data entry application will be developed for the insertion of digital and analog data into the GIS. This application will provide a common user interface for all operators required to enter and reconcile new data into the GIS database. This will provide the project with a consistent and well-managed database. For data that is already in electronic format, an import function will be available within the application.

7.8.2.2.3 This application will be developed in Visual Basic and all data will be stored in the Oracle database. The front end of the application will be provided to workers in the field who will enter the collected data on a daily basis and transmit it back to Atlanta via the Internet.

7.8.2.3 Database Structure

7.8.2.3.1 The GIS Manager is the decision point for determining how data will be stored in the GIS. The GIS Manager is responsible for designing or approving the database relationships and physical storage format of data to be included in the GIS. These data include feature, attribute, graphic, and non-graphic sources. Until this determination is made, no processing of newly acquired data may occur. GIS Coordinators, System Administrators, and Primary GIS Staff may process data already in draft form, or pre-process data sets so that they may conform to already-approved database designs or physical formats.

7.8.2.3.2 **Data Source Evaluation.** The GIS Manager is responsible for evaluating the appropriateness of data to be included in the GIS. All acquired data, regardless of media format, is to be sent to the GIS Manager for review and evaluation prior to processing. When acquisition of new data sets requires purchase from a vendor, Users, GIS Staff and others involved in the acquisition shall make every effort to obtain Metadata or sample data sets prior to acquisition. This sample set or Metadata will be evaluated by the GIS Manager to determine its suitability to meet the project needs.

7.8.2.3.3 **Inventory.** Data is to be logged in as it is received for processing by filling out a Metadata sheet. Metadata sheets are to be controlled by the GIS Manager, GIS

Coordinators, and System Administrators at the various GIS work sites. In addition to the aforementioned, Primary GIS Staff, Secondary GIS Staff, and Users are responsible for making entries in the Metadata, based upon work activity at each work site. Metadata sheets are to be forwarded to the GIS Manager for review, record keeping purposes and insertion into the database.

7.8.2.3.4 **Physical Data Storage.** The GIS Manager is responsible for assigning storage locations of data received for inclusion in the GIS. Data are to be stored in pre-approved directory paths on the Atlanta GIS file server.

7.8.2.3.5 **System Administration.** The Depot GIS database is to be backed up locally by the System Administrators. Digital tapes and CD-ROMs containing newly acquired or processed data are maintained as part of the archive database. They will be maintained along with a historical set of archive tapes in the Atlanta office. Additionally the Parsons Atlanta office maintains an on-line archive of historical and source data sets. Source documents of manually submitted data sets shall be maintained in the Atlanta office.

7.8.2.3.6 **Data Transfer Standards.** The GIS Manager, GIS Coordinators, and System Administrators are responsible for establishing data transfer standards. As described in the statement of work, the Depot GIS database requires adherence to transfer standards, OEWGIS standards, and the Tri-services CADD standard. Data prepared at other Parsons work sites will conform to these data transfer standards. The GIS Manager will approve all naming conventions for data produced with GIS software products. Oversight of naming conventions is required in order to ensure that project file path/location pointers can be used when accessing data on the GIS system.

7.8.2.3.7 The preferred media for data transfer is the WAN. Floppy disks in DOS format are acceptable media for smaller files.

7.8.2.4 Metadata

7.8.2.4.1 Metadata will be created that will describe each GIS data source maintained in the GIS database. The Metadata will contain information about the data source, its location, where it originated, how it is structured, key attributes, and other miscellaneous items of interest to the Project team. Those responsible for providing this Metadata include the GIS Manager and the GIS Coordinators. Electronic copies of template pages are to be maintained at each GIS work site. The GIS Coordinators are responsible for providing to the GIS Manager required information as shown on the Metadata template. The manner and method for providing this information is the responsibility of the GIS Manager.

The GIS Metadata is to be updated in accordance with Procedure 7.8.2.3 above.

7.9 Database Reconciliation

7.9.1 A single common GIS database will be maintained in the Atlanta office. All other offices required to work on the GIS will obtain access to this database via the WAN.

Oracle data will always be stored in the Oracle database located in Atlanta. All GIS workstations within the Parsons Corporation have access to the Oracle server located within Atlanta. This will alleviate the transfer of data from one office to another and provide a central repository for the Depot Oracle database.

7.9.2 Any new GIS data that is created by an employee not working within the Atlanta office will be required to provide complete Metadata for each coverage developed. All data provided by another office must adhere to the TRI-Service CADD/GIS standard and be approved by the GIS Manager. After the Metadata has been approved, it will be considered valid and added to the GIS database.

SECTION 8
WORK, DATA AND COST MANAGEMENT PLAN

8.1 Introduction

8.1.1 This Work, Data and Cost Management Plan describes how the project work will be managed and accomplished, and how costs will be controlled. In addition, a brief description of the individual project tasks is provided including the project management approach for each task.

8.2 Project Tasks

8.2.1 This effort will be executed through a series of 20 tasks, which are outlined in the remainder of this section. These tasks are based on those provided in the Scope of Work for development of the EE/CA (Appendix A).

8.2.1 Task 1 - Site Visit and Records Review

8.2.1.1 An initial Site Visit was conducted between July 24, 1999 and July 29, 1999 under USAESCH SOW for Delivery Order No. 0052. The purpose of the site visit was to survey the former Seneca Army Depot site for familiarity, visually inspect areas identified as confirmed or potentially contaminated with OE in the 1998 ASR, and photograph the AOIs for potential EE/CA. In addition, the intention was to qualitatively evaluate applicability of various geophysical approaches for implementation during the EE/CA.

8.2.1.2 Prior to the Site Visit, the ASR was reviewed in detail to provide the team with a clear understanding of past activities conducted at the site. Topographic maps and 1993 aerial photographs were also reviewed. Additional historical data on the site was gathered and summarized in a Technical Report of Findings (Parsons, 1999c).

8.2.1.3 Under USAESCH SOW for Delivery Order No. 0052 (this order), no additional Site Visit or Records Review was required. Therefore, Parsons will not perform any work under this task.

8.2.2 Task 2- Geophysical Test Plot

8.2.2.1 The site-specific geophysical test plot was constructed from a prove-out performed at the former Seneca Army Depot (SEDA) to identify the geophysical technique that will be most effective for the Engineering Evaluation/Cost Analysis (EE/CA) investigation to be performed at the site. The test plot was constructed to provide a comparison of the geophysical techniques recommended by Parsons Inc. and agreed to by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) for testing. On-site activities were conducted between January 6 and 12, 2000.

8.2.2.2 The results from the plot were used to determine the method to be used for the geophysical surveys conducted during the EE/CA project. The test plot was conducted as a straight grid line survey, designed to determine the optimal line spacing and sensor height for Electromagnetic and Magnetic data collection. A complete report of the prove-out is contained in Appendix C.

8.2.3 Task 3 - EE/CA Work Plan

8.2.3.1 This task requires Parsons to evaluate the findings presented in the 1998 ASR (USACE, 1995) and subsequent site information collected after the Site Visit (Parsons, 1999a,b,c) to prepare and submit a WP to conduct the EE/CA at the former Depot. The WP, this document, concisely describes the policies, organizations, objectives, functional activities, and quality control activities required to achieve the data quality objectives for the project.

8.2.3.2 The WP contains a site-specific GIP (Section 5) and SSHP (Appendix B). The GIP describes proposed equipment, methods, personnel, and procedures for accomplishing EE/CA investigations at the site. The geophysical instrumentation used will be capable of detecting an inert M-9 Rifle Grenade (or equivalent) to a minimum of depth of 2 feet and a 155mm (or equivalent) to a minimum depth of 4 feet. The SSHP complies with the requirements of 29CFR1910.120(b)/29CFR1926.65(b)(4). This WP also includes the following subplans:

- Technical Management Plan (Section 2);
- Explosives Management Plan (Section 3);
- Explosives Siting Plan (Section 4);
- Geophysical Investigation Plan (Section 5);
- Site Specific Safety and Health Plan (Section 6).
- Locations Surveys and Mapping Plan (Section 7);
- Work, Data, and Cost Management Plan (Section 8);
- Project Quality Control Plan (Section 9);
- Environmental Protection Plan (Section 10);
- Geophysical Prove-out report (Appendix C)
- Institutional Analysis Plan (Appendix D)
- Impact Analysis Plan (Appendix E)

8.2.3.3 This WP will be submitted to USAESCH and CENAN for review. Comments will be incorporated into the final WP to be submitted to the Contracting Officer prior to the start of work. Note that no Property Management Plan, Sampling and Analysis Plan, or Investigated Derived Waste Plan are included in this work plan; no government property is to be utilized in the project, the scope of work does not call for subsurface soil or water sampling at any of the locations to be investigated, and no chemical warfare material (CWM) is expected to be found at the areas to be surveyed.

8.2.3.4 The site clearance, GIP, and OE sampling for each of the sites is to be implemented according to the subtasks described in the Scope of Work. Subtasks 3.1 and 3.2 are described in detail in sections 5 and 10 of this work plan. Subtask 3.3 is described in sections 3, 4, and 11. Subtask 3.4 is described in section 5. Subtask 3.4 is described in section 7.

8.2.4 Tasks 4-13 OE Characterization of Sites at Seneca Army Depot

8.2.4.1 An OE characterization consisting of surface preparation, geophysical investigation, intrusive investigation, and location surveying and mapping, will be performed at each of the following sites, specified by task.

(Task 4) Former EOD Range - an area of approximately 58 acres, of which 19 acres are to be investigated geophysically.
(Task 5) Open Detonation Grounds – an area of approximately 60 acres, of which 19 acres are to be investigated geophysically.
(Task 6) Demolition Range – an area of approximately 40 acres, of which 18 acres are to be investigated geophysically.
(Task 7) Burial Area near Indian Creek – an area of approximately 2 acres, all of which is be investigated geophysically.
(Task 8) Former Grenade Range – an area of approximately 15 acres, of which 12 are to be investigated geophysically.
(Task 9) Small Arms Range/3.5" Rocket Range – an area of approximately 40 acres of which 18 acres are to be investigated geophysically.
(Task 10) EOD Area #3 – an area of approximately 5 acres, all of which will be investigated geophysically.
(Task 11) EOD Area #2 – an area of approximately 5 acres, all of which will be investigated geophysically.
(Task 11b) SEADs 16 and 17 – two areas totaling approximately 10 acres, of which 5 acres will be investigated geophysically.
(Task 12) SEAD 53, the Igloo area, totalling approximately 6400 acres, 62 of which are scheduled to be investigated geophysically; note however, that at present only one of these (a ditch at Igloo row D) are to be included in the current work plan.

8.2.5 Tasks (13-14) Consolidation of Previous Characterization Sampling Results at SEAD-43 and SEAD-44A

8.2.5.1 Previous contractors' OE characterizations of two sites at Seneca Army Depot will be incorporated in the final report. All data and results relevant to these sites will be examined, presented, and summarized by Parson's Engineering in the final report. These tasks are as follows;

- (Task 13) The Liquid Propellant Storage Area (SEAD-43)
- (Task 14) Former QA Function Test Range (SEAD-44A).

Results of these studies indicate that OE removal is required at SEAD – 44A. This will not be done as part of this Scope of Work.

8.2.6 Task 15 - Institutional Analysis

8.2.6.1 An institutional analysis will be performed by Parsons to determine the appropriate authorities governing transactions at the Seneca Army Depot. The analysis preparation will be coordinated by Mr. Steve Absolom of Seneca Army Depot, who will also include appropriate agencies, including the BCT, RAB, and LRA. The report will determine which agencies have jurisdiction over the Seneca Army Depot, who represents them, and what authority, capability and resources they have. In addition, the analysis will examine the basis of each institution, including origin, basis of authority, sunset provision, if any, financial capability, constraints, technical abilities, relationships, stability, funding sources, and relations to other governmental bodies. The report will offer conclusions and alternatives on institutional control including effectiveness and cost of implementation of each alternative.

8.2.7 Task 16 - Safety Risk Evaluation

8.2.7.1 Quantitech. Inc., will perform a Safety Risk Evaluation (SRE) as part of the EE/CA process to evaluate the risk that each sector represents to public safety and the human environment. The risk evaluated shall be related to site safety pertaining to OE and shall not consider chronic health effects that could result from chemical constituents of OE. The SRE methodology to be used is USACE's Risk Analysis Risk Management Tool computer program. The SRE will use the data collected during the EE/CA field effort to mathematically determine the expected number of exposures and the associated risk to the population from exposure to UXO at the site. Available former Depot documentation and site OE sampling data and associated maps will be reviewed to assess final sector selection based on terrain factors, ordnance density, and other risk analysis factors as needed.

8.2.7.2 The results of the Risk Analysis computer program will include:

- A description of each sector evaluated;
- A list of all risk analysis defined activities that are anticipated to occur in each sector;
- The probability of an individual being exposed to ordnance on any given trip into a sector for each remedial alternative considered;
- The probability of an individual being exposed over a year of activity at a sector for each remedial alternative given;
- The life cycle number of exposures anticipated in each sector for each alternative; and
- The details of the calculations utilized to develop risk values.

8.2.8 Task 17 - Prepare EE/CA Report

8.2.8.1 Under this task, an EE/CA Report will be prepared to document the field work and subsequent evaluations and recommendations. The EE/CA Report will be prepared in accordance with the SOW and "Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA". The report will include:

- Executive Summary that details project objectives and historical attributes, site characterization effort, results and conclusions and recommended remedial action and estimated cost.

- Site Characterization, including site description, background, and previous removal actions. The EE/CA investigation effort will be described in detail including sample transect establishment, geophysical investigation, and intrusive investigation. The SRE utilizing the risk analysis model for evaluation of the risk to public safety and the human environment will be provided.

- Identification of Removal Action Objectives for the sectors based on the results of the risk analysis model and the SRE.

- Identification and Analysis of Removal Action Alternatives for each sector, including a "no DoD action indicated" and a general institutional controls alternative, to reduce the risk to public safety and the human environment.

- Comparative Analysis of Response Action Alternatives for each sector. Alternative development and evaluation for each sector will be based on effectiveness, implementabilty and cost.

- Recommended Removal Action Alternative selection. A preferred remedial alternative will be selected for each sector based on a detailed evaluation of effectiveness, implementabilty, and cost.

- An estimated OE density for each risk sector will be evaluated that takes into consideration the hazard factor for the type of OE found at the former Depot. A review of the OE density estimates is planned as part of the risk analysis parameters/data collection and assessment. All data acquired will be used to develop risk estimates for the former Depot investigation areas and associated removal alternatives. Alternatives to be considered will include but not be limited to some or a combination of the following:

- No DoD Action Indicated;
- Direct intervention institutional controls (access control, land use restrictions, regulatory control, and other passive measures);
- Behavior modification institutional controls (notification of real estate defect, notices, training clinics, pamphlets, etc.);
- Surface removal;
- Subsurface removal action to a depth of interest;
- Combination of the above.
- The estimate of cost associated with the implementation of the recommended response action(s) will include the direct and indirect cost for implementation of the response action(s). An important factor in the cost estimation effort is the time frame for completion of the response action. The basis for the cost estimate will include:

- Construction cost data bases;
- Cost from recent projects;
- Cost from contractors and suppliers; and
- Allowances for contingencies and professional services (surveying, geotechnical evaluations, geophysical surveys, engineering, legal and administrative costs, etc.)

8.2.9 Task 18 – Prepare Action Memorandum

8.2.9.1 An action memorandum shall be prepared according applicable CEHNC guidance documents.

8.2.10 Task 19 - Community Relations Support

8.2.10.1 Community relations support will be provided by Parsons in the form of attendance to public meetings conducted by USAESCH concerning the former Depot. Public meetings will be attended by the project PM and one other Parsons representative thoroughly familiar with the project. Several alternatives that address a single strategy will be developed if there are significant differences in plan performance with respect to selection criteria and it is pertinent to the decision process.

8.2.11 Task 20 – Meetings and Project Management

8.2.11.1 Meetings between DoD, regulatory and civilian agencies will be conducted as needed to coordinate site activities and discuss/assess results. Internal project meetings will also be held by the Parsons project team to coordinate project activities.

8.2.11.2 A variety of activities are required, during the life of the task order to manage the task order in accordance with the SOW. All project management associated with this task order, with the exception of direct technical oversight of work described in the preceding tasks, will be accounted for in this task. This task will be conducted continuously throughout the life of this project.

8.3 Organization and Responsibilities

8.3.1 Successful completion of this project requires the cooperation and coordination of a wide variety of government entities as well as civilian contractors. Table 2.1 identifies the project team members for the former Seneca Army Depot EE/CA. Table 8.1 provides a summary of responsibilities for each of the entities involved in this project.

8.4 Communications

8.4.1 Communications for this project will generally flow along the lines established by the organization depicted previously in Figure 2.1. All communications between Parsons and the USAESCH and/or CENAN will primarily be directed through the respective Project Managers or the Contracting Officer at USAESCH. Communication directly between Parsons and other government entities associated with this project will only occur when directed by USAESCH.

8.4.2 All primary correspondence will be sequentially numbered. Monthly reports of progress will be prepared and provided to the USAESCH Project Manager, with copies of the cover letter provided to AE Contracts.

8.4.3 Parsons will utilize a dedicated Web page for the Seneca Army Depot project. This Web page will be updated periodically with new information about the project and will be used to post copies of monthly reports, documents, and other correspondence as desired by USAESCH. Some of the access will be password protected as determined necessary by USAESCH. Access to the Web page will be gained through the Internet at HYPERLINK http://www.projecthost.com

8.5 Records Management

8.5.1 Hard copies of primary records for the Seneca Army Depot EE/CA will be retained in the project files located in the Document Control Center in the Parsons Atlanta, Georgia office located at 5390 Triangle Parkway, Norcross, GA 30092. Such records will include the Delivery Order and any modifications, correspondence including meeting minutes and monthly reports, draft submittals, responses to comments and final submittals, and correspondence received from USAESCH or other agencies. Electronic versions of working products will be retained within the Parsons Atlanta network server. Access to all servers are password controlled. Historic records and documents, including ASRs, previous study reports, and related items will be retained in working files located in the Parsons PM's office. Master GIS information will be retained on the Atlanta GIS Server during the course of the project. Access is limited by password to only those individuals manipulating the data. Copies of these data will be provided on CDROM as required by the SOW.

Table 8.1 Project Responsibilities

Organization
Responsibility

- U.S. Army Corps of Engineers, Huntsville Center (USAESCH)
  Serves as the USACE Project Manager for conduct of the EE/CA. Reviews and approves plans and reports prepared for the EE/CA. Coordinates government support to the AE Contractor. The USAESCH will also provide on-site safety specialists (if required) during the site investigations.

- Parsons Inc.

Prepares plans and implements field investigation activities for the EE/CA. Prepares the EE/CA Report and the Action Memorandum. Provides support at public meetings and provides administrative support and reporting as required by USAESCH. Parsons will provide for implementation of the geophysical surveys, sampling and other field tasks as specified in this plan.

- USA Environmental
  OE subcontractor to Parsons. Provides manpower and equipment to conduct intrusive investigations into suspect areas. Provides on-site UXO support as needed, including the handling and destruction/disposition of any OE items found.

8.5.2 During field efforts, records will be maintained in the project field office with copies delivered weekly to the project files in Atlanta. Following completion of the fieldwork, all files will be delivered to the project files in Atlanta. Such records will include geophysical logs, geophysical data, daily summary sheets, and related field and daily logs.

8.6 Format and Content of Engineering Reports

8.6.1 Engineering reports presenting all data, analyses, and recommendations will be prepared and submitted in accordance with the SOW. The contents and format of the engineering reports will be arranged in accordance with all pertinent guidance documents. All plans and reports will be submitted to the distribution list provided Subsection 2.6.1.

8.7 Monthly Progress Report

8.7.1 Parsons will prepare and submit a monthly progress report describing the work performed since the previous report, work currently underway and work anticipated. The report will state whether current work is on schedule. If the work is not on schedule, Parsons will state what actions are anticipated in order to get back on-schedule. The report will be sent by regular mail by the l0th day of the following month.

8.7.2 Included in the monthly report will be summaries and projections of costs. These summaries will provide a record of expenditures as well as projection of cost for each task. Data will be presented both in a tabular and graphical format. Data on the following will be provided:

- Budgeted Cost of Work Scheduled (BCWS) - original budget for work scheduled to date.
- Budgeted Cost of Work Produced (BCWP) - original budget for physical work accomplished.
- Actual Cost of Work Produced (ACWP) - actual cost of physical work accomplished.
- Schedule Variance (SV) - Difference between funds anticipated to be spent and those spent for the time period completed.
- Cost Variance (CV) - difference between what was budgeted versus actual for work

produced.

- Budgeted at Completion (BAC) - original budget for total task.
- Estimated to Complete (ETC) - total funds needed to complete remaining work based on current progress.
- Estimated at Completion (EAC) - total funds expected to be spent at completion based on current progress.
- Variance at Completion (VAC) - difference between what was proposed to be spent and what was actually spent at completion.
- These data points will be used as a tool in management of project schedule and costs.

8.8 Schedule

8.8.1 The anticipated schedule for this project is provided as Appendix D.

SECTION 9
PROJECT QUALITY ASSURANCE AND QUALITY CONTROL PLAN

9.1 General Requirements

9.1.1 This QC Plan will dictate the methods and procedures that will be used during the project, addressing equipment testing and calibration, QC inspection and audits, and data reduction and reporting. The QC Plan has been written to encourage positive communication throughout the Parsons project team. It is also intended to foster clear communication between Parsons and the USAESCH.

9.2 Instrument and Equipment Testing

9.2.1 Testing Procedures and Frequency. Instruments and equipment used to gather and generate environmental data will be tested with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

9.2.2 Hand-Held Metal-Detector QC. At least twice daily, all of the hand-held metal-detectors (White's, Schonstedt) will be function checked at a test grid to be established at the beginning of the project. The checks will be performed by measuring the instrument response over locations of items in this test grid and comparing that response to the standard response of each instrument. For this EE/CA, USA will establish the test grid near the site trailer. The seed items in the test grid will be inert or simulated items representing an M-9 grenade buried at 2 feet and a 155 mm shell buried at 4 feet. In addition, a slap flare, a 40 mm grenade, and a fuze (or reasonable simulants) will be seeded at depths to be chosen as representative of those expected at the areas of concern. The ability of the metal-detector to detect the items is the only pass/fail criteria in this QC check. If the instrument cannot detect all of the items, it will be removed from service.

9.2.3 EM-61 and G858 Daily QC. Prior to beginning grid surveys, a baseline spike reading will be determined for both the EM-61 and the G858. Each instrument will be used to collect 10 survey lines over a metal spike placed in the ground. The range between the minimum and maximum readings for each line will be averaged to determine the baseline reading for each instrument. During each subsequent day of use, the EM-61 and G858 magnetometer will be tested before and after the survey of each grid block. A metal spike will be placed in the ground adjacent to each of the grids, and one survey line will be collected over this spike before and after the survey of the corresponding grid. The instrument response over the spike will be recorded on a survey sheet, and the highest readings for each line will be compared to the baseline spike value for the corresponding instrument to ensure that the instrument response is consistent. Peak readings within 20% of the baseline reading will be regarded as consistent for the purposes of QC.

9.2.4 A static test of the EM-61 and the G858 will be performed each morning in order to detect any drift occurring in the instrument's response over a short time period. Cables will be shaken to test for shorts, and loose cables will be taped to the appropriate sensor frame. Each instrument will be set to collect data continuously for three minutes (4 readings a second for the EM-61 and 10 readings a second for the 858) over one location. Afterwards, a small metallic test object will be placed on the same location in a standard orientation, centered beneath the instrument sensors, and the static test will be repeated. For this project, a metal spike (or an inert M69 if possible) will be used as the test object. If the response of the instrument varies on either test by more than ±3mV of the initial response for the EM-61 or ±3nT on the gradient scale for the G858, the instrument will be repaired or removed from service. Data will be graphed and examined for compliance with the required QC guideline and documented in a daily field logbook.

9.2.5 In the case of the G858, a file will also be collected each day in order to correct any heading errors associated with the collection of magnetic data. This file will consist of a continuous measurement of one point. The operator will hold the magnetometer sensors over this location and turn in a 360° circle around the location. As the operator turns through each point of the compass (N, S, E, and W) a mark will be made in the data. Any variation in the magnetic field strength identified in this file will be attributed to the direction that the operator was facing at the time and will be processed out of the final data set.

9.2.6 Finally, one line of each grid block collected, typically the first line, will be repeated after collection of the grid. For each grid, the QC line will be collected first, a new file will be established to collect the remainder of the grid, and a third file will be used to re-collect the QC line upon completion of the grid. The QC lines will then be graphed and compared to ensure that they overlay each other.

9.2.7 EM-61 and G858 Weekly QC. Once a week, a more detailed QC check will be performed on each of the instruments. For this QC, a 100-foot long line will be established near the site trailer. For each instrument, six survey profiles will be collected along this line. The six profiles will be collected as follows:

1. Profile 1 will be run approximately N or E with no added anomalies along the line,
2. Profile 2 will run the opposite direction with no added anomalies along the line,
3. Profile 3 will run N or E with a spike added at the 50' mark along the line
4. Profile 4 will run the opposite direction with the added spike on the line
5. Profile 5 will run N or E at a very fast pace with the added spike on the line

6. Profile 6 will run the opposite direction at a very slow pace with the added spike on the line

9.2.8 Background repeatability will be established by a comparison of the first two profiles, anomaly repeatability will be established by a comparison of profiles 3 and 4, and proof of acquisition speed insensitivity will be established by a comparison of profiles 5 and 6. For QC, the first two lines should match each other to within ±3mV for the EM-61 or ±3nT on the gradient scale for the magnetometer, and the peaks on the anomaly-included profiles should be within 20% of each other.

9.2.9 GPS QC. For the purposes of grid location and anomaly reacquisition, the GPS equipment will be tested at known survey monuments. A GPS point will be collected at an established survey monument at the beginning and end of each day. Stations measured to within 0.5 feet of the known location of the survey point will be deemed accurate for the purposes of this project. For meandering path QC, two spikes will be placed in the ground in the vicinity of an existing survey monument. When geophysical data is to be collected in the meandering path mode, the GPS will be used in conjunction with the EM-61, and a line of data will be collected over these two points and the survey monument to ensure that meandering path data can be used to correctly locate anomalies. These three points will remain constant throughout the project. A "lag bar" or similar piece of metal will used in all meandering path surveys to post-process and locate the data correctly. All of the QC data collected during the project will be submitted with the survey data collected on the corresponding day. In the case of meandering path QC data, both raw and corrected ASCII files will be submitted. Any processing or filtering of the data will be detailed in a readme.txt file sent with the data.

9.2.10 Testing, repair, or replacement records will be filed and maintained by the Geophysical Survey Team Leader and Intrusive Investigation Field Supervisor and may be subject to audit by the QA Manager. Testing records of the field instrumentation will be filed with the Parsons PM in Canton after the field work is completed.

9.2.11 Field Instruments. All geophysical survey instruments will be function checked twice daily as described above. The operational and test procedures will conform to manufacturer's standard instructions. This field test will ensure that the equipment is functioning within the allowable tolerances established by this project.

9.3 Geographic Information System Quality Assurance Procedures

9.3.1 The accuracy of the geographic analysis is only as good as the underlying data being analyzed. Certain guidelines are necessary to ensure data quality after it has been entered into the system. The quality assurance guidelines presented in this section pertain only to GIS data that has been loaded into the system.

9.3.2 Potential data problems include source data errors, data entry errors that can be corrected, data editing errors that can be corrected, data corruption errors that can be prevented, and user errors that can be anticipated.

9.3.3 Quality control measures will be implemented to ensure that the data is within acceptable spatial accuracy parameters. The spatial accuracy of the intrusive investigative data (OE contamination locations) will be determined by cadastral surveys of the site conducted in accordance with the 11083 NAD83 referenced to the New York Central State Plane Grid System.

9.3.4 Geometric Accuracy. After all coordinate information for grids and OE contamination locations are verified, the geometric accuracy of the geographic features will be checked. This process will eliminate free end points, unclosed polygons, and dangles. After this is complete, corners and endpoints will be examined for coordinate accuracy. Certain geographic features may be incorrectly located. When this is detected, the source data will be examined and the correct location and place points will be determined in the GIS data set to represent identifiable elements of the feature such as corners or intersections. To prevent errors from occurring during the editing process, as previously stated, original files will be backed up prior to making edits.

9.3.5 Geographic Accuracy. One of the strengths of GIS is the accuracy with which geographic phenomena can be mapped. However, this strength can become a weakness if the overall spatial accuracy of the data is not clearly indicated. Whereas Microstation can measure to within a fraction of an inch, if the accuracy of the data is limited to ±5 feet (as an example) then Microstation's supposed accuracy can be deceptive. Therefore, a statement of the accuracy of the spatial data should always be included with documentation of the graphic files, assuming that it is known. Standard situations to be examined in all GIS coverages include evaluating the graphical accuracy of the geographic features. The GIS coverages should be evaluated to determine if the geographic features are graphically correct. If they are not in accordance with the data dictionary, they should be corrected. After such corrections, it is generally a good idea to rebuild topology for the coverage(s) affected by the operation. All such corrections will be noted in a GIS Operations Log by the contractor. The accuracy of the grid corners will be ±12 inches.

9.3.6 Data Loss and File Corruption. There are several programs that manipulate the various files used by the GIS and relational database. Due to hard disk limitations, Random Access Memory (RAM) limitations, or human error these programs occasionally crash, and the files being manipulated by these programs are corrupted among other problems. To prevent data loss, these files should be backed up.

9.3.7 Schema Quality Control. The database values are the other part of the data structure that require quality control. The database is generally treated as a single file with unique properties. Quality control procedures will be developed by the GIS operator to ensure that the data contained therein is accurate and usable. Before editing any database tables, the tables will be unloaded for backing up the schema. Another safeguard is to use a reference file of how data entry is performed.

9.3.8 The GIS operator will develop and use a checklist of standard quality control steps. For example, another approach to fixing errors is to run a program that edits the ASCII data export file.

9.4 Data Reduction, Validation, Quality Control, and Reporting

9.4.1 Data Reduction

9.4.1.1 Any raw data from field measurements (including geophysical and intrusive data collection activities) will be appropriately recorded and notated in the field notebooks. If the data are to be used in the project reports, they will be reduced and summarized, and the reduction method will be documented in the report. Data reduction and analysis methodologies will be dependent upon those geophysical methods selected. Data reduction requirements will meet accepted standards. Unprocessed geophysical data will be provided to CEHNC, typically within 3 working days. However, as stated in Appendix H, the time limit for delivery of data will be one week.

9.4.2 Data Validation and QC

9.4.2.1 Validation of geophysical data will be performed by actually excavating geophysical anomalies. Post-excavation data review will be performed by reexamining a limited quantity of surveyed areas (10% of all grids investigated) and confirming the excavated location was 1) within three feet of the identified anomaly location and 2) not a "false positive". Data review will be performed on both the geophysical surveys and the intrusive investigations.

9.4.3 Quality Control of Geophysical Data

9.4.3.1 Prior to beginning work, USA's survey teams will sweep a controlled area (test grid) of known magnetic anomalies. The results of the field test procedure will be recorded in the logbook. The test grid will be constructed in the following manner. A 100 percent electronic sweep of the test grid will be conducted to determine existing anomalies. The strip will be seeded with inert ordnance items (or similar objects) indigenous to the former Seneca Army Depot at various depths. The geophysical instrumentation used shall be capable of detecting an inert M-9 rifle grenade (or similar object) to a depth of 2 feet and a 155mm projectile (or similar object) to a depth of 4 feet. In addition, a slap flare, a 40 mm grenade, and a fuze (or reasonable simulants) will be seeded at depths to be chosen as representative of those expected at the areas of concern. Readings will be taken at locations atop the seeds and positive or negative acquisition will be recorded in a logbook. The location of all existing and seeded anomalies will be recorded on the test grid map.

9.4.3.2 Before and after the survey of each grid block, the geophysical survey teams will re-check their instruments using a spike. An instrument reading differing more than 20% from an established baseline reading may suggest equipment failure or procedural error. Weekly QC of geophysical instruments will also be performed as described in section

9.2.4. QC of the EM-61 or G-858 geophysical survey will be accomplished by performing a magnetometer survey of a percentage of the grids investigated. The purpose of this QC effort is to evaluate the effectiveness of the geophysical survey instruments at the former Seneca Army Depot and to ensure data integrity for subsequent safety risk assessment.

9.4.4 Data Reporting

9.4.4.1 For all anomaly analyses and review, at a minimum, the GIS data packages/maps will show traceability to the anomaly location and will contain the following information required for data validation:

- Case narrative describing any deviations from the normal anomaly evaluation procedures required and the anomalies affected;
- Anomaly location identifications;
- Geophysical data set identifications;
- Individual parameter results; and
- Summary of all GIS quality control procedures.

9.4.4.2 As a part of the data evaluation process, the GIS operator will confirm that its documentation is complete, paginated, and legible; qualitative identifications are accurate; calculations are accurate; and the results are expressed in the appropriate units. A copy of the OE/UXO data as displayed on the GIS anomaly maps will be checked for completeness and compliance. In addition, the data will be validated and any results not in compliance with established QA/QC criteria will be identified. The effect of any noncompliance on the usability of the data will also be discussed.

9.4.4.3 Parsons will take the data packages generated by the GIS and check them for completeness. The evaluation process will include:

- The anomaly's location with respect to confirmed OE/UXO;
- The detection instrument readings (e.g., the electronic signature);
- Subsurface conditions and proximity to sources of interference that affect the sensitivity and reliability of the detection instrument; and
- Field observations and comments by the geophysical and intrusive investigation personnel.

9.5 Internal Quality Control Procedures

9.5.1 Internal Quality Control

9.5.1.1 The overall effectiveness of the quality control program for this project depends on the site survey, geophysical survey, intrusive investigation, and the GIS activities being conducted in accordance with a program that ensures the precision and accuracy of analyses by detecting errors and preventing recurrences or measuring the degree of error inherent in the activities and procedures. The field test grid used during this project is discussed in Subsection 9.2.2 and 9.4.3. The routine GIS QC procedures to be employed during the project are discussed in the LSMP (Section 7).

9.5.2 GIS Quality Control Checks

9.5.2.1 Quality control will be conducted for all GIS hard copy and electronic deliverables. At a minimum the following measures will be conducted:

- Standard coordinate systems will be used and verified throughout the project.
- Suitable scales will be used and data will be verified with standard map references.
- Electronic templates will be used to minimize errors and ensure consistency in data, naming, and methodology.
- Geometric features will be reviewed for proper topology and geographic position. Corrections will be logged.
- All deliverables will be reviewed according to a standard checklist and peer reviewed to ensure accuracy and conformance to the Tri-Services CADD/GIS Standard.
- Electronic data will be backed up periodically.
- Up-to-date Metadata will be created and compared with the corresponding deliverables.
- Programs will be properly formatted and documented. Modular programming will be employed to ensure consistency and ease of reuse.
- Databases will include automatic data input checking routines. Fifteen percent of the data will be manually verified.

9.6 Preventive Maintenance

9.6.1 Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendation and written procedures developed by the operators.

9.6.1 Maintenance Procedures

9.6.1.1 The manufacturer's written maintenance schedule shall be followed to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. At a minimum, equipment used daily will be cleaned at the end of each work day and kept in good operating condition. Service to the equipment instruments, tools, etc. shall be performed by qualified personnel. In the absence of any manufacturers recommended maintenance criteria, a maintenance procedure will be developed by the operator based upon experience and previous use of the equipment.

9.6.2 Maintenance Records

9.6.2.1 Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the geophysical equipment operators and/or UXO technicians when this equipment is used at the site. The QA Manager can audit these records to verify complete adherence to these procedures.

9.6.3 Equipment Spare Parts

9.6.3.1 An extra battery pack for each type of geophysical instrument shall be on-site at all times. Due to cost considerations, a back-up geophysical instrument will not be kept on site. However, arrangements shall be made with a equipment vendor so that replacement equipment or any spare parts needed can be delivered to the site by overnight delivery or equivalent means.

9.7 Corrective Action

9.7.1 The following procedures have been established to assure that conditions adverse to quality such as malfunctions, deficiencies, deviations, and errors are promptly investigated, documented, evaluated, and corrected.

9.7.2 Adverse Conditions and Corrective Actions. When a significant condition adverse to quality is noted in the field or at other subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned will be documented and reported to the Site Team Leader, PM, QA Manager, and involved subcontractor management. Implementation of corrective actions will be verified by documented follow-up action. All project personnel have the daily responsibility to promptly identify problem areas, solicit approved corrective actions, and report any condition adverse to quality.

9.7.3 Corrective actions will be initiated at a minimum:

- When predetermined acceptance standards are not attained;
- When procedures or data compiled are determined to be faulty;
- When equipment or instrumentation is found faulty;
- When quality assurance requirements are violated;
- As a result of system and performance audits; and/or
- As a result of management assessment.

9.8 Quality Assurance Reports

9.8.1 During the project, the QA Manager will prepare at least one quality assurance report to discuss:

- The periodic assessment of measurement data accuracy, precision, and completeness; and
- Significant quality assurance problems and corrective actions taken.

9.8.2 In addition, the Parsons PM will receive periodic updates concerning quality assurance in the field or with the GIS. A final report prepared upon completion of the project may include a separate data assessment report summarizing data quality information.

9.9 Overall QC Management

9.9.1 The overall responsibility for implementing QC activities for this project is the Parsons QA Manager. Responsibility for field OE/UXO operations QC rests with the USAQC Manager.

9.9.2 The Parsons PM will have overall responsibility for assigning QC responsibilities and ensuring that QC programs are implemented in accordance with the CEHNC SOW.

9.10 Field Investigation Documentation

9.10.1 Daily Field Activity Records

9.10.1.1 Field activity logbooks will be maintained daily, if applicable, and all entries will be recorded in ink. All personnel will use bound and numbered field logbooks with consecutively numbered pages. The following logs will be maintained.

9.10.1.1 Daily Activity Log

- Date and recorder of field information;
- Start and end time of work activities including breaks, lunch, and down times;
- Visitors;
- Weather conditions;
- Relevant events;
- Important phone calls;
- Changes from approved or planned work instructions; and
- Signature of the Parsons Site Manager and UXOQCS..

9.10.1.2 Safety Log

- Date and recorder of log,
- Tailgate safety briefing (time conducted and by whom),
- Weather conditions,
- Significant site events relating to safety,
- Accidents,
- Stop work due to safety,
- Safety audits, and
- Signature of the Parsons Site Manager and UXOQCS indicating concurrence.

9.10.1.3 Training Log

- Date and recorder of log;
- Nature of training (personnel will complete the Parsons and the UXO documentation of training form);
- Visitor training; and
- Signature of both the Parsons Site Manager and the USA SUXOS indicating concurrence.

9.10.1.4 QC Activity Log

- Date and recorder of log;
- Equipment testing;
- Equipment monitoring results;
- QC audits;
- Nonconformance reports; and
- Signature of both the Parsons Site Manager and the USA SUXOS indicating concurrence.

9.10.1.5 Ordnance Accountability Log

- Date and recorder of log;
- Assigned identification number;
- Type, condition, and location;
- Disposition; and
- Signature of both the Parsons Site Manager and the USA SUXOS indicating concurrence.

9.10.2 Photographic Records

9.10.2.1 Photographic records, in addition to the site videotape, will be maintained by site personnel. Significant activities will be documented by 35-mm color prints and/or by videotape. Photographic records will be used to supplement information recorded in the daily activity logs, including photographs of equipment prior to use, typical ordnance items, and the condition of sites prior, during, and after any activity. Photographs will be maintained in a photograph logbook with appropriate labels identifying the negative and a complete description of the photograph subject.

9.10.3 Working Maps

9.10.3.1 Working maps or sketches of the sampling sites will be used to document ordnance locations during excavation and removal activities. As UXO is located and identified, the assigned technician will record (on the working map) the location and corresponding log entry number in the Ordnance Accountability Log. If a large number of OE/UXO items are found, such as a burial site, the area will be marked on the working map along with the total number of OE/UXO items found at that site. The status of each individual grid will be maintained on Individual Grid Status Sheets. These sheets shall indicate the overall status of activities planned/completed for the grid as well as the location of each surface UXO.

9.10.4 Records Of Inert Ordnance Items

9.10.4 Records Of Inert Ordnance Items

9.10.4.1 Inert ordnance items and nonhazardous scrap will be disposed of through DRMO if available, or a local civilian scrap yard at no cost to the government.

9.10.4.2 Parsons and USA will prepare a DD Form 1348-1, in accordance with the Defense Utilization and Disposal Manual, DoD 4160.21-M, to be signed by the USA SUXOS. The certificate will state the following:

"I certify that the property listed hereon has been inspected by me, and, to the best of my knowledge and belief, contains no items of a dangerous nature."

_________________________________ Date ________________

Senior UXO Supervisor

9.10.4.2 Turn-in documentation and certification will be included as an appendix in the EECA report.

9.10.5 Field Office/Communications

9.10.5.1 Field QC procedures will include establishing field office entry requirements and communication protocols. A field office will be established within the property boundaries of the former Seneca Army Depot. All official visitors will report to the project field office to sign in. No official visitors will be allowed to visit any portion of the site without an escort. All official visitors will be announced to the site via a two-way radio if the visitors are touring the actual site work areas. All internal communications will be by use of Motorola MTX portable and base station equipment, or equivalent. All official external communications shall be via cellular telephone or land line from the field office.

9.11 USA Field Investigation QC Procedures

9.11.1 QC Objectives

9.11.1.1 This subsection presents the project field QC requirements as specified in the SOW (Appendix A). The QC procedures described in this subsection will be used for all field work performed during the EE/CA at the project site. These procedures were designed to manage, control, and document performance of work efforts. This subsection of the QC Plan will achieve the following objectives:

1. Identify QC procedures and responsibilities for UXO/OE investigation.
2. Ensure CEHNC and Parsons notifications as required by the SOW.
3. Document the quality of work efforts via audits and independent staff reviews of deliverables.
4. Ensure the development of an appropriate ordnance accountability ledger and appropriate OE chain of custody and disposal.
5. Ensure data integrity through implementation of data management QC procedures.
6. Ensure data precision through implementation of field equipment maintenance and use procedures.
7. Outline an inspection system.

9.11.2 Quality Management

9.11.2. 1 The Quality Management oversight for the project will be provided by the USA-OES UXO/OE Quality Manager. The Quality Manager is part of the project team, but is authorized to elevate any quality problems to the Director, that cannot be resolved by the project team. He ensures that all site training is conducted prior to the start of the field activities, that the QC Specialist is qualified and trained and that quality controls are built into the project WP to support the EE/CA action.

9.11.2.2 According to the USA/OES QA program, effective day-to-day field QC authority is delegated to the USA/OES site QC Specialist. The site QC Specialist will interact daily with the project team to ensure that all QC procedures presented in the WP, and this QC Plan, are followed in the project performance. When on-site, the QC Specialist will generate daily field activity reports to the Quality Manager with a copy furnished to the USA Project Manager. These reports will describe QC activities and will be the basis of project reports to the Parsons PM.

9.11.2.3 Final Reports--Peer review of all deliverable reports and data supporting this project will be performed by technically qualified individuals from each major discipline represented in the deliverable. The Quality Manager will audit the project files to ensure that final reports and deliverables have gone through the peer review.

9.11.3 Corrective Action

9.11.3.1 When a condition adverse to quality is noted at the main office, project site office, or field, the cause of the condition will be determined and immediate corrective actions will be implemented. Quality improvement measures will also be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action will be documented and reported to the USA Project Manager, SUXOS, and Quality Manager. All project personnel have the responsibility, as part of their work duties, to promptly identify, solicit approved corrections, and report conditions adverse to quality.

9.11.4 USA Project Manager Responsibilities

9.11.4.1 The USA/OES PM has the inherent responsibility of ensuring that all tasks are implemented in accordance with the Work Plan.

9.11.5 QC Specialist Responsibilities

9.11.5.1 When on-site, the QCS has the responsibility for day-to-day implementation of QC for all aspects of the on-site operations. The QCS will report directly to the Quality Manager, but it is imperative that he interacts with the PM, SUXOS, and all team members. This interaction is essential so emphasis is directed toward proactive, preventive actions, rather reactive, corrective actions. Quality Conformance Inspections (QCI) will be conducted and recorded on USA-OES Division Form No. 6, Quality Conformance Inspection (QCI) Record and these will be the basis of the report to the PM. The QCS has Stop-Work-Authority to prevent nonconformances from occurring.

9.11.6 Field Data Management QC

9.11.6.1 The SUXOS is the onsite field data manager and will be responsible to the USA PM for tabulating all data collected or produced by removal action teams, and placing the data under the custody and control of the project data management system.

9.11.7 Equipment Checkout and Receiving Inspections

9.11.7.1 Equipment pre-operation procedures will be observed by the QC specialist, or in his absence, the UXO Supervisor, and recorded in the daily log. If equipment field checks indicate that any piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged and removed from service. The SUXOS will be notified and a request for replacement equipment will be expedited. Replacement equipment will meet the same specifications for accuracy and sensitivity as the equipment removed from service.

9.11.7.2 Specific procedures for QC checks of magnetometers include the following before, during and after maintenance checks:

1. Before operation checks shall include the location of inert ferrous objects as specified in the OE/UXO Operations Plan; specifically, they will include inert or simulated items representing an M-9 grenade buried at 2 feet and a 155 mm shell buried at 4 feet.
2. During operation, checks shall include frequent battery checks.
3. After operation checks shall include removal of the batteries and cleaning of equipment.

9.11.7.3 Specific procedures for before, during and after checks of radios and cellular phones include the following:

1. Before operation communication checks shall be conducted to insure the equipment is operating correctly.
2. During operation, communication checks at established intervals, shall be conducted to assure the equipment is operating properly.
3. After operation maintenance shall include cleaning of equipment and turning off before inserting into the battery charger

9.11.7.4 When Contractor Acquired Property (CAP) or Government Furnished Property (GFP) is received, it will be examined to detect damage in transit, for completeness and to insure that the equipment is adequate to perform its intended task. Receiving inspections will also include a function test if applicable. CAP and GFP are considered government property. Inventories of CAP and GFP will be performed by the designated individual. The QCS will conduct audits to verify that the appropriate procedures are being followed.

9.11.8 Field Effort Documentation

9.11.8.1 Each live OE identified by the investigation will be qualitatively interpreted by the specialist and UXO Supervisor and documented in the ordnance accountability log. QC checks of the clearance procedures will be accomplished as indicated in Section 9.11.10 below.

9.11.8.2 Photographic records, in addition to a site video tape, will be maintained by site personnel. Significant activities will be documented by 35-mm color prints. Photographic records will be used to supplement information recorded in the daily activity logs, to include photographs of equipment prior to use, and the condition of sites prior to any activity. Photographs will be taken during all aspects of the project. The photographs should clearly show the task being accomplished and provide for a visual account of the operations. Operations are not to be staged, but these photographs should be taken during normal conduct of the operations. These photographs will be provided to Parsons for inclusion in the EE/CA Report.

9.11.8.3 A working map of the clearance areas will be used to document ordnance locations during removal action. As OE is located and identified, the UXO Supervisor will record (on the working map) the location and corresponding log entry number in the Ordnance Accountability Log (USA/OES Form 26) If a large number of live OE items are found in one grid the area will be marked on the working map along with the total number of live OE items found. The working maps will serve as a QC check for finished maps prepared for the site after field activities are completed.

9.11.8.4 Appropriate documentation will be maintained regarding the location and disposal of OE. Locations of live OE and OE-related scrap will be documented on a site map and entered in the Ordnance Accountability Log.

9.11.8.5 Field activity logbooks will be maintained in ink for each of the following activities performed, if applicable. All personnel will use bound and numbered field logbooks with consecutively numbered pages. These activity logbooks may be copied and become part of the EE/CA Report, thus, it is imperative that the personnel recording information in this logbooks, print/write clearly, concisely, spell correctly, and in a manner that can be read.

9.11.9 Field Office/Communications

9.11.9.1 Field QC procedures will include establishing field office entry requirements and communication protocols. A field office will be established at the Parsons office site during the field effort. All official USA/OES visitors will report to the SSHO and/or the SUXOS to sign in, receive a safety briefing/training and obtain an escort within the project site. All visitors will be announced to the site via a 2-way radio. All internal communications will be by use of Motorola MTX portable radios, or equivalent (radios will not be operated within 10 feet of electric blasting caps or firing circuits). All official external communications shall be via cellular telephone or land line from the field office

9.11.10 Quality Conformance Inspections (QCI)

9.11.10.1 QCI will be conducted as outlined in the QCI Schedule, Table 9.1. The QCS has the latitude to modify this schedule based on the quality of the work being performed and his presence on site.

Table 9.1 (To be performed by the QC Specialist, when he is on-site.)

Tasks	Daily	Weekly	Bi-Weekly	As-Needed	100%
Personnel Qualifications					X
Accident-Incident Reporting					X
Search Effectiveness					X
Turn-in of Recovered OE-Related Scrap	X				
Preventive (Operator) Maintenance	X				
Safety Inspections		X			
Personal Protective Equipment		X			
Medical Support		X			
Communication Effectiveness		X			
Explosives Storage and Accountability		X			
UXO Transportation		X			
Surveying & Mapping		X			
UXO Final Disposal		X			
UXO/OE Accountability		X			
Fire Protection- Prevention		X			
Project Administration		X			
Safety & Health Program			X		
Management of USA/OES Property			X		
Management of Government/Parsons-Furnished Property			X		
Currentness of WP/SSHP			X		
Visitor Briefings				X	
Site-Specific Training				X	

Hazard Assessment				X	

9.11.11 Nonconformance/Corrective Action Reports

9.11.11.1 Any nonconformance to WP or contractual requirements will be documented utilizing USA-OES Division Form No. 6. Nonconformance includes, but is not limited to, the following items:

1. Delivery of items or services that do not meet the contractual requirements by USA/OES and any of its subcontractors.
2. Errors made in following work instructions or improper work instructions.
3. Unforeseeable or unplanned circumstances that result in items or services that do not meet quality, contractual, and/or technical requirements.
4. Technical modifications to the project by individuals without responsibility and authority.
5. Errors in craftsmanship and trade skills.

9.11.12 Risk Management Plan

9.11.12.1 The QCS will audit to ensure that a Hazard Analysis is performed for each task. The Hazard Analysis will be incorporated into the Risk Management Sub plan located in the SSHP.

SECTION 10

ENVIRONMENTAL PROTECTION PLAN

10.1 Introduction

10.1.1 This Environmental Protection Plan (EPP) has been prepared for the BRAC OE investigation at the former Seneca Army Depot, Seneca County, New York. The purpose of the EPP is to ensure compliance with the National Environmental Policy Act (NEPA) and AR 200-2 by avoiding or minimizing potential adverse environmental impacts. This EPP includes a summary of the types of OE assessment activities that could adversely impact sensitive biological resources within the former Seneca Army Depot and a detailed approach for evaluating and mitigating potential adverse impacts of OE investigation activities on water resources, biological resources, and cultural resources.

10.1.2 This EPP identifies sensitive resources within the AOIs and the means by which impacts on these resources will be avoided, minimized, or reduced (mitigated).

10.1.3 Figure 10.1 summarizes the approach for minimizing environmental impacts at the site. This approach has been developed by Parsons specifically for the Seneca Army Depot project, based on the application of a combination of the meandering path and grid geophysical survey methods.

10.2 Field Activities and Potential Environmental Impact

10.2.1 The site characterization activities will include geophysical surveys along transects using the "meandering path" survey method on larger parcels, and in areas next to wetlands. The grid method of surveying will be used on smaller parcels. Grids will be cleared of all brush using a heavy brush cutting machine. This will include trees up to approximately 3 inches in diameter. In addition, intrusive excavations, sampling, disposal and data collection activities will be conducted in areas where OE/UXO is identified. This approach will involve: (1) surveying for OE/UXO along transects with footprints of approximately 3-feet by 3,300 feet; and (2) disturbance of soils associated with the intrusive sampling and disposal.

10.2.2 Exact locations of transects and grids will be located in the field by the geophysical team based on the preliminary locations depicted on Figure 5.1 though 5.10 and ROEs (Appendix G). The preliminary transect and grid locations were selected based on avoidance of areas with sensitive resources (locations of wetlands and known cultural resources) presented on Figure 10.2.

10.2.3 The ASR does not address the potential issue of effects on cultural resources on the Depot. A letter has been sent to the NY SHPO to determine whether any sites are present. On receipt of the response from the state, these areas, if present, will be mapped using GIS. Preliminary transect and grid locations will be further refined in the field to minimize impacts to any undocumented sensitive resources, if present.

10.2.4 Based on the information presented in the Archives Search Report (ASR), no state- or federally-listed species of plants and animals occur on the site. The USFWS reported that there are no known federally-listed species on the site or in the immediate vicinity. The New York Department of Environmental Conservation (NYDEC) reported that Seneca Lake, which borders the western edge of Seneca Depot, is home to 35% of the state's wintering mallards (*Anas platyhyncos*). This species is not a protected species, but is an important wildlife resource in the area. Even though the USFWS and NYDEC have indicated that no listed species are present, protected plants and animals may still occur within the Depot boundaries. Therefore, the Army will conduct surveys of the site during the OE/UXO investigations to assure that adverse effects on these species do not occur. In addition, letters have been sent to the New York State Heritage Program, USFWS and NYDEC to notify these organizations of the OE/UXO investigations. Any information obtained from these agencies will be incorporated into the field investigations as indicated in this EPP.

10.2.5 The "meandering path" geophysical survey method involves limited light clearing of brush with machetes. As the transect is followed by the geophysical team, the only biological impact is treading on vegetation and cutting of plants with the machete, as needed. Trees will not be cut down and sensitive areas such as wetlands will be avoided. Clearing of the grids will result in removal of all brush and small trees within each cleared area.

10.2.6 If an anomaly along a transect or within a grid is selected for intrusive investigation, excavations will be conducted to confirm the presence or absence of OE/UXO materials. During this intrusive phase, impacts on protected species and/or archaeological resources could occur. For biological resources, the selected intrusive sampling sites will be evaluated by a qualified biologist in order to minimize the potential for adverse impacts on protected species. Selected areas will be examined in the field, based on the professional judgment of the biologist. For example, if intrusive excavation of a selected anomaly has the potential for impacting state- or federally-listed species, either the anomaly will be deleted from the investigation or the grids may have to be moved (in the case of plants – animals cannot typically be moved, except in some instances). In most cases, the former alternative will be selected. If intrusive investigation proceeds and the presence of UXO is confirmed, on-site demolition (BIP) may be required for safety reasons. During this demolition phase, reasonable efforts to minimize impacts on protected species will be implemented but at no time will a confirmed UXO item be left on-site.

10.2.7 Archaeological investigations were not reported in the ASR. Consequently, a letter has been sent to the NY SHPO to obtain information on any cultural resource sites that might be present on the Depot. These locations, if present, will be mapped using GIS at the appropriate time. If cultural resources are identified, these areas will be avoided in the field. A qualified archeologist will accompany the field team to assure that adverse impacts on these resources do not occur. If potential cultural artifacts are encountered during intrusive investigation, excavation will cease and USAESCH will be notified.

10.3 Approach For Environmental Resource Identification

10.3.1 This section summarizes the approach for identification of environmental resources that could be impacted by the project activities. Environmental resources include wetlands, protected species, aquatic habitats, other known sensitive habitats (natural areas, preserves) identified by the state and/or federal agencies, or historical and archaeological resources that might be impacted by the project. Means of mitigating potentially adverse impacts on these resources are also included in this EPP. The steps of the approach include: (1) literature review/GIS mapping of sensitive resources; (2) establishment of transects and grids to avoid sensitive resources; and (3) intrusive-phase assessments.

10.3.1 Literature Review/GIS Mapping of Sensitive Resources

10.3.1.1 Parsons reviewed all available information regarding the following resources within the project site, as required by the SOW:

- Endangered and threatened species;
- Wetlands;
- Cultural resources;
- Water resources;
- Trees and shrubs that would be removed;
- Existing waste disposal areas; and
- Compliance with Applicable Rules and Regulations (ARARs);

10.3.1.2 Information sources included:

- Correspondence with the USFWS and NYDEC;
- The U.S. Fish and Wildlife Service *listings of threatened and endangered species* (USFWS 1998);
- U.S. Fish and Wildlife Service *National Wetland Inventory Maps*;
- New York State GIS program (soils, hydrology, wetlands);
- United States Geological Survey (USGS) 7.5 minute topographic maps;

- Available aerial photographs;
- New York State Historic Preservation Office (SHPO) resources; and
- Other sources, including previous OE/UXO investigation reports.

10.3.1.3 Wetlands will be identified using U.S. Fish and Wildlife National Wetland Inventory (NWI) maps, New York State GIS wetland maps, and aerial photographs. Additional wetlands will be identified in the field based on observations of field indicators (i.e., vegetation, signs of wetland hydrology). Formal delineation of wetlands using the U.S. Army Corps of Engineers "Routine On-site Method" (USACE 1987) will not be conducted.

10.3.1.4 In order to comply with the ARARs for this project, data requests were sent to the U.S. Fish and Wildlife Service, New York Natural Heritage Program, the NYDEC, and the New York State Historic Preservation Officer (SHPO). The most recent information on protected species and natural areas in the former Seneca Army Depot study area will be obtained from these sources and summarized in text and tabular format. Additional information will be obtained from the available literature.

10.3.2 Establishment of Transects to Avoid Sensitive Resources

10.3.2.1 The potential for impacting protected species or other sensitive resources during brush clearing along the transects and in the grids will be minimal. Brush clearing will be limited to hand clearing of herbaceous vegetation with machetes. Small trees will be cut in the grids but not in the transects. Therefore, a biological survey of every transect to be geophysically surveyed will not be conducted.

10.3.2.2 Geophysical surveys and/or intrusive excavations and sampling activities will not be performed in wetlands, streams, ponds, or any aquatic habitats. Disposal of UXO has been reported in a duck pond/wetland, but this area will not be disturbed.

10.3.2.3 Archaeological surveys of transects and grids prior to conducting the geophysical surveys will not be conducted because these areas will only be impacted by foot traffic and hand clearing with machetes. Archaeological resources will be avoided based on the locations of known sites from the correspondence with the SHPO and planning the transects to avoid impacting these resources, if applicable. These resources, if present, will be mapped and avoided as needed.

10.3.3 Intrusive-Phase Assessments

10.3.3.1 Areas in which intrusive activities are proposed could impact protected species, if they are present. A biologist will therefore evaluate all areas selected for intrusive investigation to assure that impacts on protected species do not occur. Any proposed investigations of wetlands identified during the investigation will be coordinated with the Corps of Engineers permitting division as needed.

10.3.3.2 Results of intrusive site investigations will be recorded in field notebooks, and photographs will be taken as necessary to document observations of species or suitable habitats. If protected species and/or wetlands are identified, Parsons will evaluate the surrounding area to recommend relocation of investigation activities, if possible. All proposed mitigation measures will be coordinated with appropriate state and/or federal agencies (see Subsection 10.4).

10.3.3.3 Archaeological investigations will not be conducted for the intrusive phase of the investigations for purposes of safety. Archaeological investigations during this phase would require excavation of materials and disturbance of soils, which cannot be conducted within areas where known OE/UXO exists for purposes other than removal and disposal of these materials.

10.4 Impact Mitigation Measures

10.4.1 Various measures will be used to mitigate these impacts. This section defines these measures according the requirements specified in the SOW.

10.4.1 First Level Mitigation – Placement of Transects and Grids

10.4.1.1 The first level of mitigation will be to avoid placement of transects and grids in sensitive areas. This goal will be achieved by mapping sensitive aquatic, biological and archaeological resources using a GIS, and placing preliminary transects and grids in non-sensitive areas. Transects and grids will be placed in upland areas that do not impact these resources. In general, the small size of the transects and grids relative to the whole study area will also help assure that impacts will affect a very small overall study area.

10.4.2 Second Level Mitigation Measures – Activities Within Transects

10.4.2.1 The following measures will be taken within transects designated for geophysical survey:

- The amount of brush cutting in each transect will be kept to the minimum amount necessary to conduct the geophysical surveys. Approximately 2/3 of each grid will be cleared of brush. Areas that receive brush clearing treatment will be allowed to revegatate naturally after field survey activities are completed. Ordnance excavation activities will not disturb local drainage patterns.
- Trees will not be cut as part of the "meandering path" survey method being employed. Small trees and brush will be cleared from the grids.
- A biological survey of each transect and grid will not be conducted. The grids, however, will be inspected to make sure wetlands are not impacted. A survey of selected intrusive investigation sites may be conducted in order to mitigate potentially adverse impacts on protected species. Prior to intrusive investigations, a qualified biologist may conduct a visual inspection of a specific

area if known sensitive resources are nearby. If wetlands, protected species habitat and/or species are identified at a site, coordination with the appropriate state or federal agency will then be made at that point. For federal species, this will require formal consultation since federal law requires this for situations involving a "taking" of a federally-listed species. No species are known to occur on the Depot property, however, which means there is a low probability of the occurrence of federally-protected plants and animals. For state-listed species, a decision will be made in the field that will minimize impacts on that species. For example, some plants can be moved. Specific recommendations will be made at time of the surveys. However, it is very unlikely that this situation will arise since the intrusive plots to be investigated are a small fraction of the total land area being investigated, and sensitive habitats will have been avoided early on in the transect selection process.

- Field archaeological assessments will not be conducted for any phase of the project. The "meandering path" and grid clearing operations will not impact any resources even if they were present. However, the GIS will be used in the field to avoid these resources in the location of the transects, as applicable. Since the ASR does not indicated that an archeological assessment has been conducted, a letter has been sent to the NY SHPO to determine whether resources are present. If resources are identified, they will be avoided. No excavations, however, will be proposed since this is a UXO site.
- If significant mitigation of any other type is required, it will be accomplished by USAESCH and CESAJ.
- Damage to trees, shrubs, and the native wildlife habitat will be minimized to the greatest extent possible. Areas that have been impacted by the project will be restored, to the greatest extent practicable, to the previously existing condition at the completion of the project.
- All soil removal will be placed in the vicinity and once actions are complete, the soil will be returned to the area from which it came. If needed, fabric silt fencing will be installed to adequately control erosion problems. If necessary, diversion dikes and ditches will be installed to control sediment migration. The area of soil exposed at any given time during soil disturbance will be kept to a minimum. Spoil piles will be covered with plastic/tarp to minimize any soil run-off. Reseeding will be initiated as soon as possible to minimize erosion potential.
- During ordnance removal activities, soil may be displaced by intrusive excavation of small areas (typically 2-ft by 2-ft or less). All excavations will be restored by backfilling with the displaced soil. Each site will be regraded to its former condition so that local drainage is not modified. Backfilling and regrading will be accomplished manually with shovels and rakes.
- Any solid waste material (drinking water bottles, food containers, or other material) generated during the geophysical surveys and/or intrusive phases will

be stored in plastic bags and disposed of at the motel where the team is staying.

- No burning activities will take place during this project.
- Excavations in the intrusive phase will typically be less than 2 ft by 2 ft areas and brush clearing will not produce bare areas of soil. Therefore, dust control will not be required for this project.
- Chain saws or brush cutters will not be required for brush clearing. Therefore, there will no oil and gas stored or used on-site
- All materials used for the geophysical and intrusive surveys will be stored either in a locked vehicle or the motel rooms where the team is staying during the field investigations.
- Transects and grids will be located in areas that will require the minimum walking distance for access. Only a minimum amount of clearing for access is anticipated. This will minimize potential impacts on natural vegetation in the study area.

10.5 Documentation

10.5.1 As required by the SOW, the EPP will include environmental documentation required under the NEPA. The specific type of NEPA documentation will be determined by the USAESCH. Parsons will coordinate with Mr. Tom Enroth to obtain appropriate documentation of protected and cultural resources. Field changes in response to Section 10.2.4 will be documented as part of the monthly report.

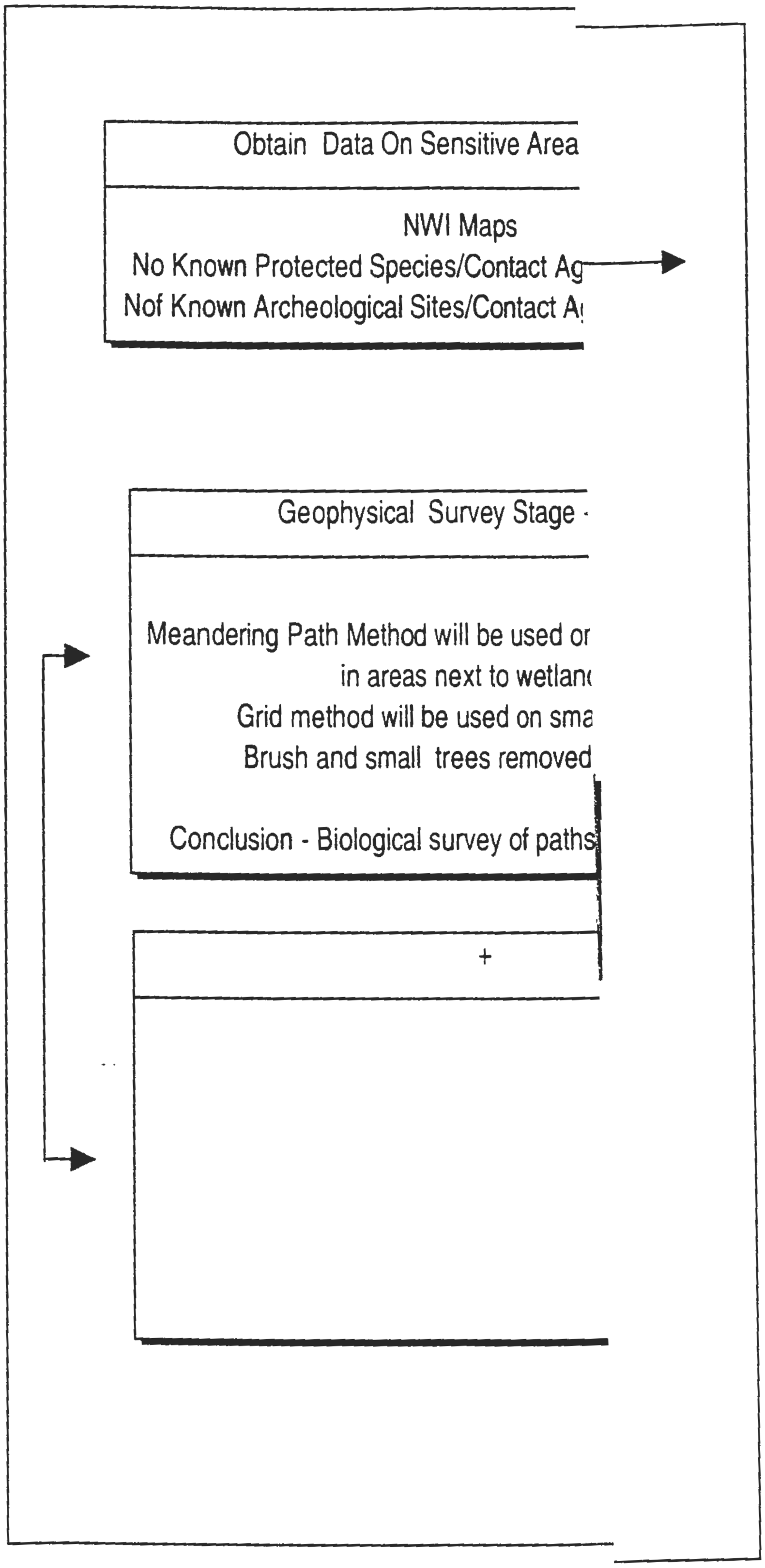
Obtain Data On Sensitive Area
NWI Maps
No Known Protected Species/Contact Ag
Nof Known Archeological Sites/Contact A
Geophysical Survey Stage -
Meandering Path Method will be used or
in areas next to wetlan
Grid method will be used on sma
Brush and small trees removed
Conclusion - Biological survey of paths
+

Figure 10.1

SECTION 11

REFERENCES

Jet Propulsion Laboratory. 1990. *Sensor Technology Assessment for Ordnance and Explosive Waste Detection and Location,* Prepared for U.S. Army Engineering and Support Center, March 1995.

Parsons, Inc. 2000. *Report on Geophysical Equipment Test Prove-Out.,* Prepared for U.S. Army Corps of Engineers Huntsville Center, April 2000.

Parsons Engineering Science, Inc. 1999. *Report on UXO Detection Geophysical Surveys at the Grand Oaks Neighborhood Massachusetts Military Reservation.* Prepared for USA Environmental Inc., August 1999.

Parsons Engineering Science, Inc. 1998. *Work Plan Engineering Evaluation/Cost Analysis, Former Blaine Naval Ammunition Depot, Hastings, Nebraska.* Prepared for U.S. Army Corps of Engineers Huntsville Center, September 1999.

Parsons Engineering Science, Inc. 1999. *Completion Report for Six Areas of Concern SEADs (43,56,69), 44A, 44B, 52, 62, and 120B.* Prepared for U.S. Army Engineer Division, Hunstville, Alabama, February 1999.

PRC Environmental Management, Inc. 1996. *Unexploded Ordnance (UXO): An Overview,* Prepared for Federal Advisory Commitee for the Development of Innovative Technologies, October 1996.

PRC Environmental Management, Inc. 1997. *Controlled Site Advanced Technology Demonstration Program, Phase III.* Prepared for U.S. Army Environmental Center. April 1997.

Quantitech Inc. 1995. *Ordnance and Explosives Site Statistical Sampling Based Methodology.* Prepared for U.S. Army Engineering and Support Center, September 1995.

U.S. Army Corps of Engineers (USACE), New York District. 1998. *Ordnance and Explosive Archive Search Report Findings for the Former Seneca Army Depot,* August 1998.

APPENDIX A

SCOPE OF WORK
FOR
ORDNANCE AND EXPLOSIVE (OE)
ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
AT
SENECA ARMY DEPOT ACTIVITY

1.0 BACKGROUND AND OBJECTIVE

1.1 The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program (DERP) and the Base Realignment and Closure (BRAC) program. Ordnance and Explosives (OE) may exist on property that is currently owned by the Department of Defense and due to be transferred. This action will be performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121: Executive Order 12580; the National Contingency Plan (NCP). In accordance with the above, no federal, state or local permits are required, nor will be obtained, for actions (including on-site destruction of unexploded ordnance (UXO)) that may be required. However, substantive permit requirements shall be fulfilled.

1.2 OE is a safety hazard and may constitute danger to site personnel and the local population if improperly managed. All activities involving work in areas potentially containing unexploded ordnance hazards shall be conducted in full compliance with CEHNC, USACE, DA and DoD requirements regarding personnel, equipment and procedures. 29 CFR 1910.120 shall apply to all actions taken at this site.

1.3 The objective of this delivery order is for the A-E to prepare an Engineering Evaluation/Cost Analysis (EE/CA) report that allows and documents meaningful stakeholder participation; that characterizes ordnance and explosives (OE) nature, location and concentration; that provides a description of the OE related problems affecting human use of the site; that identifies and analyzes reasonable risk management alternatives; and that provides a convenient record of the process for use in final decision making and judicial review, if necessary.

1.4 Personnel assigned to the project shall meet the qualification requireements listed in DID ot025d.

2.0 INTRODUCTION

2.1 <u>Location.</u> SEDA is a US Army facility located in Seneca County, New York. SEDA occupies approximately 10.600 acres. 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.

2.2 Regulatory Status. SEDA was included on the Federal Facilities National Priorities List on 13 July 1989. Consequently, all work to be performed under this contract shall be performed according to the Federal Facilities Agreement in effect for Seneca Army Depot.

2.3 Previous Investigations. Previous investigations have been performed at SEDA. An "Archive Search Report" (Reference 6.21) was conducted by the U.S. Army Corps of Engineers, St. Louis District, in 1998. The purpose of the ASR was to identify areas of the depot that might be contaminated with Ordnance and Explosives (OE).

2.4 Areas of Focus. The sites of focus in this effort are:

Former Liquid Propellant Storage Area (SEAD-43)
Former QA Function Test Range and Associated Pits (SEAD-44A)
Former EOD Range (SEAD-57)-approx. 58 acres;
Open Detonation Grounds (SEAD-45)-approx. 60 acres.
Demo Range (No SEAD designation)- Site is Item 3 on page 7-2 of the ASR-approx. 40 acres;
Burial Area Near Indian Creek (No SEAD Designation)-Site is Item 5 on page 7-3 of the ASR-approx. 2 acres;
Grenade Range (No SEAD Designation)-Site is Item 7 on page 7-3 of the ASR-approx. 15 acres;
Igloo Area (SEAD-53)-approx. 6500 acres;
Small Arms Range/3.5" Rocket Range (SEAD-46)-approx. 40 acres;
EOD Area #3 (No SEAD Designation)-Site is Item 11 on page 7-4 of the ASR-approx. 5 acres;
EOD Area #2 (No SEAD Designation)-Site is Item 12 on page 7-4 of the ASR-approx. 5 acres;

3.0 SPECIFIC REQUIREMENTS

3.1 (Task 1) - Site Visit & Records Review. The A-E shall make a site visit, review pertinent records and interview personnel knowledgeable of site conditions. The purpose of this task is to permit the A-E's staff with direct project responsibility to gain necessary information about site conditions. It is not intended that this task be a "records locating task " where new information is located or developed. An abbreviated Site Safety and Health Plan (ASSHP) must be prepared by the A-E and submitted to the Contracting Officer for review and approval prior to the visit. Site visitors to areas potentially contaminated with OE must be escorted by a qualified UXO specialist, provided by the A-E. The Contracting Officer will provide a generic ASSHP for the A-E to site-adapt. The A-E shall ensure that the site visit is fully coordinated and that all members of the site visit team maintain compliance with the ASSHP.

3.2 (Task 2) - Geophysical Test Plot. The A-E shall, on a geophysical test plot at the site designed and established by the A-E and the Government, test various geophysical methods, equipment and personnel for use at the individual sites in order to establish the methods, equipment and procedures best suited to each site. A separate test plot for each site is not required. One effort, to include seed OE items expected at all sites, shall suffice. The A-E shall use the information gathered in this phase of work to evaluate the relative efficiencies of potentially appropriate geophysical investigation procedures. Afterwards, the A-E shall propose and justify specific geophysical methods, equipment and personnel appropriate and necessary to accomplish the required geophysical investigations. The proposed geophysical methods must be clearly based upon site-specific conditions, instrument capabilities, and project goals.

3.3 (Task 3) - EE/CA Work Plan. The A-E shall prepare an EE/CA Work Plan in accordance with TAB EECA001 (attached).

3.4 Site Investigation and Sampling. The A-E shall characterize the site by implementing the work described in the Project Work Plans and including, but not necessarily limited to, the following activities. Each of the four subtasks represented in paragraphs 3.4.1 through 3.4.4 shall be completed for each of the sites involved:

3.4.1 (SubTask #.1) - Surface Preparation, OE Identification and Removal. The A-E shall provide all necessary qualified personnel and equipment to perform surface preparation, as well as surface OE identification, removal and disposal on the site in anticipation of site activities scheduled to occur under this contract. The A-E shall perform the minimum amount of work necessary to clear the areas of vegetation, surface OE and OE scrap where these impede the progress, effectiveness or safety of the geophysical investigation team. All OE-related activities shall be performed in accordance with applicable sections of the approved work plan.

3.4.2 (SubTask #.2) - Geophysical Investigation and Evaluation. The A-E shall implement geophysical investigations as described in the approved Work Plan and DID ot005-05.

3.4.2.1 Investigation. The total cumulative area to be geophysically investigated and evaluated under this SOW consists of the acreages discussed later in this SOW for each site. The actual number and location of grids may increase or decrease based upon conditions encountered in the field, if so directed by the Contracting Officer.

3.4.2.2 Evaluation. After the site is geophysically mapped, the A-E shall utilize a qualified geophysicist to check and evaluate the geophysical data collected. The geophysicist shall make a professional determination regarding the identification of anomalies at the site. Based on this determination, the A-E shall provide a "dig-sheet" showing predicted location and character of all suspected anomalies to the CEHNC Project Manager. In addition, the A-E shall continually compare predicted results with actual results so that the A-E's geophysical evaluation methodology is constantly refined over the life of the project.

3.4.2.3 Anomaly Selection. Note that not all geophysical anomalies meeting the criteria to be considered a potential UXO will be dug. Representative anomalies will be excavated in order to characterize geophysical anomalies and to provide information necessary to estimate location, concentration and nature of UXO present at the site.

3.4.2.4 Data Format and Storage. The A-E shall utilize an appropriate data format and storage system for geophysical mapping data that is consistent with CEHNC computer/CADD systems in accordance with TAB 009 and as described in the approved Work Plan.

3.4.3 (SubTask #.3) Intrusive Investigations (OE Sampling). The A-E shall, utilizing qualified personnel IAW DID OT-025, implement site OE sampling as specified in the approved work plan. This task shall be accomplished as follows:

3.4.3.1 OE Access, Evaluation and Management. The A-E shall provide all necessary qualified personnel and equipment to perform surface and subsurface OE access, evaluation and management.

3.4.3.2 Accessing Anomalies. The A-E shall access anomalies identified by the geophysical investigations and as directed by the Contracting Officer. The A-E shall, using qualified UXO personnel, determine whether the OE can be moved or if it must be destroyed in-place. This is a safety-driven decision that will be based solely on DoD munitions safety standards and requirements.

3.4.3.3 OE Destruction. The A-E shall be responsible for the destruction of all UXO encountered during site investigations and characterizations utilizing qualified personnel and in accordance with all aspects of the project Work Plan. The A-E shall establish in the Work Plan a method of disposal for all OE.

3.4.3.4 Backfilling Excavations. All access/excavation/detonation holes shall be backfilled by the A-E. The A-E shall restore such areas to their prior condition.

3.4.3.5 OE Accountability. The A-E shall maintain a detailed accounting of all OE items/components encountered. This accounting shall include the amounts of OE, the identification and condition, depth located, disposition and location. The accounting system shall also account for all demolition materials utilized to detonate OE on-site. This accounting shall be a part of an appendix to the EE/CA report.

3.4.3.6 DD Form 1348-1. The A-E shall complete a DD Form 1348-1 as turn-in documentation for inert OE/Ordnance-Related Scrap (ORS) located and removed during the performance of this task order. Instructions for completing this form are contained in the Defense Utilization and Disposal Manual, DoD 4160.21-M. The Senior UXO Supervisor shall sign a certificate as follows:

"I certify that the property listed hereon has been inspected by me and, to the best of my knowledge and belief, contains no items of a dangerous nature."

DRMO turn-in documentation receipts shall be submitted as an appendix to the EE/CA Report.

3.4.3.7 UXO Quality Control (QC) Specialist. The individual performing the UXO QC shall not be involved in the performance of other OE field tasks. UXO QC shall be a separate function and is not envisioned as a full-time position. As outlined in DID OT-25, the UXO QC Specialist shall meet the minimum prerequisites of an UXO Supervisor and have the documented training, knowledge and experience necessary to implement the A-E's QC plan. Any exceptions must be approved by the Contracting Officer.

3.4.3.8 Quality Assurance Sampling Areas. In order to evaluate the effectiveness of the geophysical investigation and evaluation methods utilized by the A-E, the Contracting Officer may direct the A-E, government personnel, or an independent contractor provided by the government, to independently map, locate and access all detected subsurface anomalies at locations as directed.

3.4.4 (SubTask #.4) - Location Surveys and Mapping. The A-E shall perform topographic and location surveys as described in the approved Work Plan and in accordance with DID ot005-07.

3.5 (Task 4) OE Characterization at the Former EOD Range (SEAD-57) -The A-E shall characterize the Former EOD Range (SEAD-57). This site consists of approximately 58 acres, of which ***19*** acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of ***83*** 100' by 100' grids.

3.6 (Task 5) OE Characterization at the Open Detonation Grounds (SEAD-45). The A-E shall characterize the Open Detonation Grounds (SEAD-45). This site consists of approximately 60 acres, of which ***19*** acres will be geophysically investigated and evaluated. The actual investigation/ evaluation area will consist of ***83*** 100' by 100' grids.

3.7 (Task 6) OE Characterization at the Demo Range (No SEAD designation- Site is Item 3 on page 7-2 of the ASR) - The A-E shall characterize the Former Demo Range. This site consists of approximately 40 acres, of which *18* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *78* 100' by 100' grids.

3.8 (Task 7) OE Characterization at the Former Burial Area Near Indian Creek (No SEAD Designation - Site is Item 5 on page 7-3 of the ASR) - The A-E shall characterize the Former Burial Area Near Indian Creek. This site consists of approximately 2 acres, of which 2 acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of 9 100' by 100' grids.

3.9 (Task 8) OE Characterization at the Former Grenade Range (No SEAD Designation)- Site is Item 7 on page 7-3 of the ASR) -The A-E shall characterize the Former Grenade Range . This site consists of approximately 15 acres, of which *12* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *53* 100' by 100' grids.

3.10 (Task 9) OE Characterization at the Small Arms Range/3.5" Rocket Range (SEAD-46)- The A-E shall characterize the Former Small Arms Range/3.5" Rocket Range (SEAD-46). This site consists of approximately 40 acres, of which *18* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *78* 100' by 100' grids.

3.11 (Task 10) OE Characterization at the Former EOD Area #3 (No SEAD Designation - Site is Item 11 on page 7-4 of the ASR) - The A-E shall characterize the Former EOD Area #3. This site consists of approximately 5 acres, of which *5* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *22* 100' by 100' grids.

3.12 (Task 11) OE Characterization at the Former EOD Area #2 (No SEAD Designation - Site is Item 12 on page 7-4 of the ASR) -The A-E shall characterize the Former EOD Area #2. This site consists of approximately 5 acres, of which *5* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *22* 100' by 100' grids.

3.13 (Task 12) OE Characterization at the Igloo Area (SEAD-53) - The A-E shall characterize the Igloo Area (SEAD-53). This site consists of approximately 6500 acres, of which *62* acres will be geophysically investigated and evaluated. The actual investigation/evaluation area will consist of *270* 100' by 100' grids. It should be noted that seventeen of the igloos are still being used.

3.14 (Task 13) Consolidation of Previous Characterization Sampling Results for the Former Liquid Propellant Storage Area (SEAD-43). The A-E shall take all data furnished by the Government and consolidate it into an EE/CA format recommending the appropriate and defensible remedial alternative. In addition to recent OE sampling done, the A-E shall base conclusions on data obtained previously at the site during ESI/RI/FS investigations performed by Parsons (Boston).

3.15 (Task 14) Consolidation of Previous Characterization Sampling Results for the Former QA Function Test Range and Associated Pits (SEAD-44A). Previous data has demonstrated that an OE removal is required at this site. The A-E shall take all data furnished by the Government, present it and formally summarize the conclusions reached in the EE/CA report document.

3.16 (Task 15) Institutional Analysis. The A-E shall perform an institutional analysis in accordance with TAB EECA006 (attached).

3.17 (Task 16) Risk Evaluation. The A-E shall utilize a CEHNC computer program, *OECert*, to determine the baseline public risk and the predicted risk reduction for each removal alternative evaluated in the EE/CA. The A-E shall write a risk report in accordance with the OECert Standing Operating Procedure that supports the EE/CA report and that determines the baseline public risk and the resultant public risk for each alternative under consideration. The A-E shall ensure that qualified personnel collect the required data, operate the computer model and write the risk report in accordance with *CEHNC 1115-3-86, "Ordnance and Explosives Cost-Estimating Risk Tool (OECert) Standing Operating Procedure (SOP)"*.

3.17.1 Site UXO Statistical Report. As part of the risk evaluation report the A-E shall write a statistical report that shows how the UXO densities were determined. The A-E shall use the UXO Calculator methodology for determining a range of sector densities unless a prior statistical method has been approved by the Government.

3.18 (Task 17) Prepare EE/CA Report. The A-E shall prepare and submit an EE/CA report fully documenting the field work and subsequent evaluations and recommendations made by the A-E, as described in DID EE/CA TAB 005. The text portions of the report shall be fully supported with accompanying maps, charts, and tables as necessary to fully describe and document all work performed and all conclusions and recommendations presented.

3.19 (Task 18) Prepare Action Memorandum. The A-E shall, based upon close consultation with the Contracting Officer, prepare an Action Memorandum in accordance with applicable CEHNC guidance documents.

3.20 (Task 19) Community Relations Support. The A-E shall attend and participate in public meetings as directed by the Contract Officer. The support shall include preparation and delivery of briefings, graphics and presentations, and participation in site visits. The A-E shall assume two public meetings lasting two days each (including travel). The A-E shall assume that two persons will be in attendence at each.

3.21 (Task 20) Meetings and Project Management. The A-E shall perform project management functions as necessary to maintain project control and to meet required reporting requirements. The A-E shall assume six contract meetings lasting two days each (including travel). Three of those meetings will be held at Seneca ADA and three will be held at HNC. The A-E shall assume that two persons will be in attendence at each.

3.22 (Task 21, Option 1) - Prepare Explosives Safety Submission (ESS). If the Action Memorandum decision is for no further action (NOFA) or Institutional Controls, the A-E shall, if directed by the Contracting Officer, prepare an ESS for coordination an approval by the Department of Defense Explosive Safety Board. The A-E shall use the format specified in Reference 6.9.

4.0 SUBMITTALS AND CORRESPONDENCE

4.1 Format and Content of Engineering Reports. Engineering Reports presenting all data, analyses, and recommendations shall be prepared and submitted by the A-E. All drawings shall be of engineering quality in drafted form with sufficient detail to show interrelations of major features. The contents and format of the engineering reports shall be arranged in accordance with all pertinent guidance documents. When drawings are required, data may be combined to reduce the number of drawings. Reports shall consist of 8-1/2 inch by 11 inch pages with drawings other than the construction drawing folded, if necessary, to this size. A decimal paragraphing system shall be used, with each section and paragraph of the reports having a unique decimal designation. The report covers for each submittal shall consist of durable 3-ring binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A report title page shall identify the site, the A-E, the Corps of Engineers District, Huntsville Center, and the date. The A-E identification shall not dominate the title page. All data, including raw analytical and electronic data, generated under this delivery order are the property of the DoD and the government has unlimited rights regarding its use.

4.2 Computer Files. All final text files generated by the A-E under this contract shall be furnished to the Contract Officer in Microsoft Word 6.0/95 or higher, IBM PC-compatible format. All final CADD/GIS data, design drawings and survey data generated by the A-E under this delivery order shall be submitted in the proper format and media that will permit their loading, storage, and use without modification or additional software on the Huntsville Center CADD/GIS workstations.

4.3 HTML Deliverables. In addition to the paper and digital copies of submittals identified above, the final version of the EE/CA and the Action Memorandum shall be submitted, uncompressed, on one floppy disk or CD ROM in hypertext markup language (HTML) along with a linked table of contents, linked tables, linked photographs, linked graphs and linked figures included and suitable for viewing on the Internet.

4.4 Review Comments. Various reviewers will have the opportunity to review submittals made by the A-E under this contract. The A-E shall review all comments received through the CEHNC Project Manager and evaluate their appropriateness based upon their merit and the requirements of the SOW. The A-E shall issue to the Project Manager a formal, annotated response to each in accordance with the schedule in paragraph 4.13

4.5 Draft Reports. Each page of draft reports shall be stamped "DRAFT". Submittals shall include incorporation and notation of all previous review comments accepted by the A-E.

4.6 Identification of Responsible Personnel. Each report shall identify the specific members and title of the A-E's staff and subcontractors that had significant, specific input into the reports' preparation or review. All final submittals shall be sealed by the registered Professional Engineer-In-Charge.

4.7 Minutes of Meetings. Following the presentation, the A-E shall prepare and submit minutes of all meetings attended to the Contract Officer or his representative within 10 calendar days .

4.8 Correspondence. The A-E shall keep a record of each phone conversation and written correspondence affecting decisions relating to the performance of this IDO. A summary of the phone conversations and written correspondence shall be submitted with the monthly progress report to the Contract Officer.

4.9 Project Control and Reporting. The A-E shall prepare and submit a Work, Data and Cost Management plan IAW DID ot-005-08. The plan shall be includedas part of chapter 3 of the Work Plan.

4.10 Monthly Progress Report. The A-E shall prepare and submit a monthly Cost/Schedule Status Report (CSSR) IAW DID OT-035 describing the work performed since the previous report, work currently underway and work anticipated. This report shall show the earned value curves for the amount of funds obligated, planned and actually spent to date on the project. This will allow the continuous tracking of the actual cost versus the proposed cost at the beginning of the project. The report shall state whether current work is on schedule. If the work is not on schedule, the A-E shall state what actions are anticipated in order to get back on-schedule. The report shall be submitted not later than the 10th day of the following month. Additionally, a monthly status report shall be submitted IAW DID O080

4.11 Public Affairs. The A-E shall not publicly disclose any data generated or reviewed under this task order.

The A-E shall refer all requests for information concerning site conditions to the local Corps District's Public Affairs Office, with a copy furnished to the CEHNC Project Manager. Reports and data generated under this task order are the property of the DoD and distribution to any other source by the A-E, unless authorized by the Contracting Officer, is prohibited.

4.12 Addresses. The following addresses shall be used in mailing submittals:

ADDRESSEE	QUANTITY
Commander US Army Corps of Engineers, Huntsville Center ATTN: CEHNC-OE-DC (Mr. Fred Wissel) PO Box 1600 Huntsville, Alabama 35807-4301	4
Commander Seneca Army Depot Activity ATTN: Engineering and Environmental Office (Mr. Absolom) 5786 State Route 96, Romulus, New York, 14541-5001	10
Rick Sprague/Mark Bellis	1
IOC - Randy Nida	1
AEC John Buck	1

4.13 Schedule and Submittals. The A-E shall submit all deliverable data to the Contract Officer and other reviewers shown in Paragraph 4.12 in accordance with the following schedule. All submittals shall be delivered to all addressees no later than the close of business on the day indicated in this paragraph. In addition, submittals to regulatory reviewers shall be shipped by registered mail or other method where a signed receipt in obtained indicating the date received and the individual accepting the submittal.

DOCUMENT	DATE DUE
General Requirements	
Assumed Notice To Proceed	29 Sep 99
ASSHP	1 Oct 99
Draft Geophysical Test Plot Plan	8 Oct 99
A-E Receive Comments from Govt.	15 Oct 99
Final Geophysical Test Plot Plan	22 Oct 99
Draft EE/CA Work Plan	22 Oct 99
A-E Receive Comments from Govt.	5 Nov 99
Final EE/CA Work Plan	19 Nov 99
A-E Receive Approval to Begin Field Work	24 Nov 99

OE Characterization

Draft EE/CA Report	21 Jul 00
A-E Receive Comments from Govt.	11 Aug 00
Final EE/CA Report	29 Sep 00
Draft Action Memorandum	TBD
A-E Receive Comments from Govt.	TBD
Public Meeting	TBD
Final Action Memorandum & Responsiveness Summary	TBD

Additional General Requirements

Monthly Report	NLT 10th of following month
Minutes of Meetings	NLT 10 days after each Meeting

The overall completion date of this delivery order is 31 May 2001.

5.0 SAFETY AND HEALTH PROGRAM

The SSHP required by 29CFR1910.120(b)/29CFR1926.65(b)(4), shall be prepared in accord with DID OT-005-06, and submitted with the Work Plan for approval. On-site activities shall not commence until the plan has been reviewed and accepted.

6.0 REFERENCES.

6.1 National Contingency Plan, 40 CFR 300.

6.2 Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

6.3 Army Corps of Engineers Safety and Health Requirements Manual,

6.4 EM-385-1-1. October 1992.

6.5 Army Corps of Engineers. ER-385-1-92. Appendix B. Safety and Occupational Health Document Requirements for Hazardous Toxic and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OE) Activities. 18 March 1994.

6.6 Occupational Safety and Health Administration (OSHA) General Industry Standards. 29 CFR 1910 and Construction Industry Standards. 29 CFR 1926. especially 196.120/29CFR1926.65-"Hazardous Waste Site Operations and Emergency Response."

6.7 NIOSH/OSHA/USCG/EPA. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities". October 1985. (DHHS(NIOSH) Publication No. 85-115).

6.8 CEHNC 1115-3-86. "Ordnance and Explosives Cost-Estimating Risk Tool (OECert) Standing Operating Procedure (SOP)". November 1996.

6.9 TAB EECA001 EECA Work Plan (Attached)

6.10 TAB EECA006 Institutional Controls (Attached)

6.11 TAB EE/CA TAB-005 EECA Report Description (Attached)

6.12 DID ot005-02 Technical Management Plan

6.13 DID ot005-03 Explosives Management Plan

6.14 DID ot005-04 Explosives Siting Plan

6.15 DID ot005-05 Geophysical Investigation Plan

6.16 DID ot005-06 Site Safety and Health Plan

6.17 DID ot005-07 Location Surveys and Mapping Plan

6.18 DID ot005-08 Work, Data, and Cost Management Plan

6.19 DID ot005-10 Sampling and Analysis Plan

6.20 DID ot005-11 Quality Control Plan

6.21 DID ot005-12 Environmental Protection Plan

6.22 DID ot005-13 Investigation Derived Waste Plan

6.23 DID ot005-15 Accident reports

6.24 DID ot005-025 Personnel and Work Standards

6.25 DID ot005-040 Disposal Feasibility Letter Report

6.26 DID ot005-045 Report

6.27 DID ot005-055 Telephone Conversations

6.28 DID ot005-060 Conventional Safety Submissions

6.29 DID ot005-085 Weekly Status Report

6.30 "*Base Realignment and Closure, Archives Search Report, Seneca Army Depot, Romulus, Seneca County, New York*", St.Louis District, US Army Corps of Engineers, 1998.

6.31 "SWMU Classification Report, Seneca Army Depot Activity", ERC Environmental/Parsons ES, **September** 1994.

6.32 Federal Facility Agreement

Note: Copies of all DID's can be obtained at http://www.hnd.usace.army.mil/oew/policy/dids/didindx.html"

APPENDIX B
PARSONS SITE SAFETY & HEALTH PLAN

ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
SENECA ARMY DEPOT

SITE SAFETY AND HEALTH PLAN (SSHP)
TO SUPPORT
ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
SENECA ARMY DEPOT

Prepared for

U.S. ARMY CORPS OF ENGINEERS
HUNTSVILLE CENTER
Huntsville, Alabama

Contract No. DACA 87-95-D0018
Task Order No. 0052

Prepared by

PARSONS ENGINEERING SCIENCE, INC.

30 Dan Road
Canton, MA 02021

FINAL

(Revised 6/12/00)

SITE SAFETY AND HEALTH PLAN (SSHP)
TO SUPPORT
ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
SENECA ARMY DEPOT

Reviewed and Approved By:

Michael Duchesneau, P.E. **Project Manager:**	Michael Duchesneau	3/15/00
	(Signature)	**(date)**
Brian Powell, CSP/CIH **Project Health and Safety Officer:**	Brian J. Powell, CIH CSP	3/14/2000
	(Signature)	**(date)**

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INTRODUCTION

B1.1 PURPOSE

B1.1.1 The nature of fieldwork has made a Site-Specific Safety and Health Plan (SSHP) a principal concern both during project planning and in the field. Planning and field personnel must develop a health and safety consciousness, avoiding unnecessary risks.

B1.1.2 The purpose of this SSHP is to establish personnel protection standards and mandatory safety practices and procedures for all work conducted for the following project: Engineering Evaluation/Cost Analysis (EE/CA) at the Seneca Army Depot Activity (SEDA), Romulus, New York. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at fieldwork sites.

B1.1.3 This SSHP provides general guidance for making decisions during field activities. Sections cover field personnel responsibilities and work procedures, physical and chemical risks, emergency procedures, and levels of personal protection. Site-specific information such as a project description and site history, a contingency plan, a list of emergency contacts, and necessary health and safety equipment are also discussed. Attachments B-1 and B-2 contain an Accident Report Form and a Plan Acceptance Form, respectively. Attachment B-3 contains an Occupational Safety and Health Administration (OSHA) Job Health and Safety Protection Poster. Attachment 4 entitled "Safety Concepts and Considerations For Unexploded Ordinance (UXO) Operations" serves as the safety Standard of Procedure regarding UXO identification, handling, transportation and disposal. Attachment B-5 is the Air Monitoring Calibration Log, and Attachment B-6 is the Field Monitoring Log Form. Attachment B-7 addresses Contractor Requirements at Seneca Army Depot.

B1.2 APPLICABILITY

B1.2.1 The plan provisions are mandatory for all on-site activities undertaken at SEAD by Parsons Engineering Science, Inc. (Parsons) and USA Environmental (USA) UXO Subcontractor personnel. All site activities comply with the provisions of the Corporate Health and Safety (H&S) Policies and Procedures Manual and applicable standards in 29 CFR Parts 1910 and 1926. As site activities change, this plan may need to be modified. Such modifications are submitted as SSHP addenda and are numbered sequentially. All SSHP addenda are reviewed and approved by the Project H&S Manager.

B1.2.2 All Parsons and USA project personnel must read this plan and submit a signed Plan Acceptance Form prior to the start of the work at this site. The Plan Acceptance Form is shown as Attachment B-2.

B1.2.4 Hazard Communication. All project work will be conducted in accordance with Parsons's standard policies for hazard communication. Material safety data sheets for any hazardous chemicals on site will be located at Parsons's field trailer. Site orientation and training will be provided to all new employees brought on site and this will include an overview of all known hazards associated with the site.

B1.3 SITE DESCRIPTION AND HISTORY

B1.3.1 Site Description

The Seneca Army Depot, a 10,587 acre facility in Seneca County, Romulus, New York, has been owned by the United States Government and operated by the Department of the Army since 1941 (Figure 1). Since its inception in 1941, SEAD's primary mission has been the receipt, storage, maintenance, and supply of military items. This function includes disposal of military ammunition and explosives by burning and detonation.

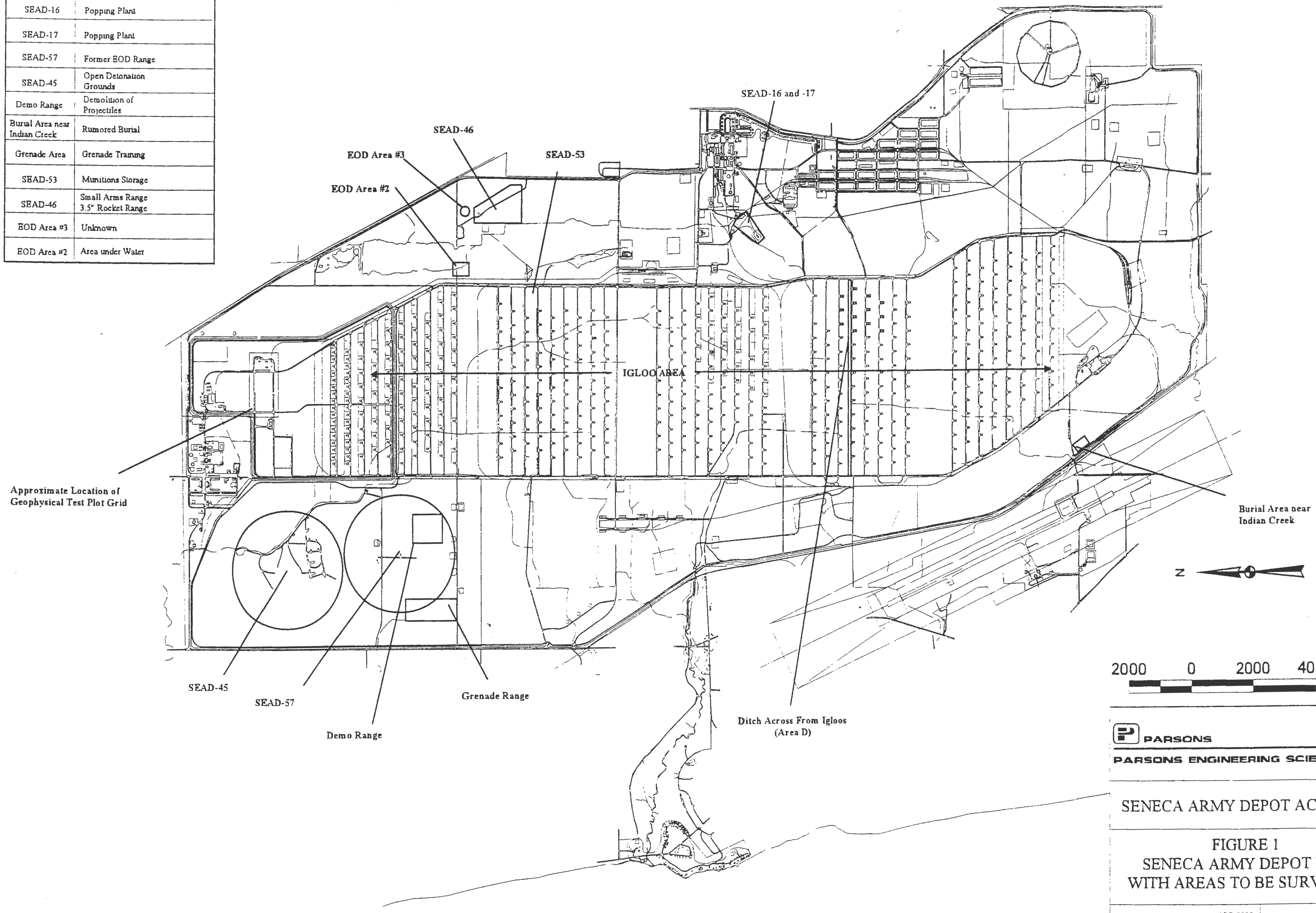
Refer to Figure B5.1 for locations of Emergency Exits from the Depot.

During active military use, the land use was divided into three categories at the depot. The Main Post accounted for 9,832 acres and consists of an exclusion area containing partially buried, reinforced concrete igloos, general storage magazines, and warehouses. The cantonment areas of the facility consist of the North and South Posts. The North Post, at the north end of the Main Post, included troop housing, troop support, and community services. The South Post is located in the southeast portion of the facility near Route 96 and was a developed area containing warehouses, administration buildings, quarters, and community service.

SEAD-16: The Abandoned Deactivation Furnace, Building S-311, is located in the east-central portion of SEAD. Directly to the northwest of Building S-311 and separated by two sets of SEAD railroad tracks which pass through the site, is a smaller abandoned building. The site is permanently closed. The entire site is enclosed by a chain-link fence with a second gate. Access to the area is restricted. The site is composed of grasslands to the north, east, and west and by a general storage area for empty boxes and wooden debris and an unpaved roadway to the south.

The Abandoned Deactivation Furnace is an elongated building and contains stacks on the eastern end and western end and is surrounded by loading docks on the southwestern and

SITE	DESCRIPTION
SEAD-16	Popping Plant
SEAD-17	Popping Plant
SEAD-57	Former EOD Range
SEAD-45	Open Detonation Grounds
Demo Range	Demolition of Projectiles
Burial Area near Indian Creek	Rumored Burial
Grenade Area	Grenade Training
SEAD-53	Munitions Storage
SEAD-46	Small Arms Range 3.5" Rocket Range
EOD Area #3	Unknown
EOD Area #2	Area under Water



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

FIGURE 1
SENECA ARMY DEPOT MAP
WITH AREAS TO BE SURVEYED

APR 2000

northwestern sides. The building condition is poor with localized flooding in the basement. A sloping concrete ramp leads to the base of the building.

Two underground storage tanks (USTs) formerly existed at Building S-311. One of the USTs (Tank 311-A) had a capacity of 1,000 gallons, was installed in 1953, was located to the northwest of the building, and provided Number 2 fuel oil to the boiler used to heat the building. The second UST (Tank 311-B) had a 2,000 gallon capacity, was installed in 1953, was located to the southwest of the building, and provided Number 2 fuel oil to the deactivation furnace. Both of the tanks were removed in September of 1992.

The site is generally flat and slopes gently to the west. The northeastern portion of the site is vegetated with low grass and the southwestern portion is paved with asphalt. There is little topographic relief on the site with no water bodies evident. Surface water run-off is directed off-site to the southeast and southwest by small drainage swales. A water main traverses the southwestern portion of the site with a service line leading to the northwestern side of the large building. An abandoned sewer line enters the site from the northeast, approximately 50 feet south of the access gate, and connects to the central portion of Building S-311.

Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the grass-covered eastern portion of the site, surface water likely accumulates in local topographic low areas. Near the survey monuments SEAD16 and SEAD16A, surface water is directed off-site to the southeast and northwest, respectively, via small drainage swales. In the paved western portion of the site, the asphalt provides an impenetrable surface which results in an increased amount of surface water runoff on the site. Based on topographic expression, surface water flow on the asphalt is to the west.

SEAD-16 is classified as High Priority SWMU under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

SEAD-17: The Existing Deactivation Furnace is located in the east-central portion of SEAD approximately 800 feet to the southwest of SEAD-16. Access to this site is restricted due to its location in the ammunition storage area. It is characterized by an elongated deactivation furnace building that is surrounded by a crushed shale road. Beyond the crushed shale road is grassland. Two small sheds are located in the eastern portion of the site. There is vehicular access to the site within SEAD from a road to the north. Both vehicular and pedestrian access to the site is restricted.

The actual deactivation furnace is a steel rotary kiln incinerator and is enclosed by an eight foot high uncovered reinforced concrete wall. The concrete wall is designed to contain the effects of a detonation. The deactivation furnace building contains an emission stack and air pollution control devices including an afterburner, 2 gas coolers, a cyclone and a baghouse on the southwestern side. The building appears to be in good condition and structurally sound.

Number 2 fuel oil was used to fire the burners in both the kiln and the afterburner, and propane is used as a pilot fuel for the afterburner burner. The liquid propane storage tank and the Number 2 fuel oil tank are located approximately 100 feet to the southeast of the deactivation furnace building. The propane and fuel oil piping from the storage and pumping area to the incinerator area is installed in a concrete ditch for leak containment. The propane storage tank is a 1000 gallon horizontal drum mounted on a concrete pad. The appropriate valves, fittings, regulators and piping are installed for propane pressure reduction and transportation to the afterburner burner pilot train.

The fuel oil storage tank is a 4000 gallon drum mounted on a 24 by 14-foot concrete pad. The fuel oil storage tank pad has a 30-inch-high wall on all sides for secondary containment. A pump, with the required valves and piping, is used to transport the fuel oil to the incinerator area.

The site is generally flat and slopes gently to the southwest. A small drainage ditch is located approximately 100 feet east of the furnace and transports surface water to the west past the southern end of the building. This ditch intersects with a well-defined ditch which flows south and ultimately flows into Kendaia Creek. In the extreme northern portion of the site, a small swale drains to the north.

Surface water flow from precipitation events is controlled by local topography. There are no sustained surface water bodies on-site. Most of the surface water flows off of the crushed shale roadway surrounding the deactivation furnace onto lower ground which surrounds it. A drainage swale traverses the eastern and southern portions of the site and transports surface water to the west. This swale intersects with a well-defined south-draining swale that is defined by a elongate stand of low brush and trees. In the extreme northern portion of the site, a small swale drains to the north and west. The regional surface water flow is believed to be controlled by the overall westward sloping ground surface.

SEAD-17 is classified as High Priority SWMU under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

SEAD-45: The Open Detonation (OD) Grounds are approximately 60 acres in area, located north west of the center of the Seneca Army Base. Aerial photographs from 1954 show there may have been burn pads which were covered by 1978. A variety of ordnance was destroyed by detonation at this area, including explosives, rockets, and heavy artillery. A large number of items have been dug up including a number of complete unfired large artillery shells. Live ordnance is likely to be found up to the blast radius of 1800' feet from the center of the area.

The OD Grounds is characterized by an unvegetated, elongate detonation mound that is surrounded by an unvegetated area to the east and lightly vegetated grassland to the west, north and south. The mound is approximately 500 feet long and 14 feet high and contains many smaller excavated areas on its east side. These excavated areas are used to bury the explosives that are destroyed during detonation events. A small soil-covered bunker, from which the detonation events are controlled, is present in the eastern portion of the site near Reeder Creek. Topography on-site slopes to the east.

Approximately 700 feet east of the detonation mound is Reeder Creek, which defines the eastern boundary of the site. At the southern boundary of the site is a crushed shale road which separate the OD Grounds from the OB Grounds. Grassland and low brush are located to the west and north of the site.

Vehicular access to the site is provided via a paved roadway that leads from North South Baseline Road, however, access to the OD Grounds is restricted by a locking gate. In the southeastern portion of the site the paved roadway divides into several dirt roads which provide direct access to the detonation mound. The OD Grounds are not fenced, but access to the site is restricted since it is located within the Ammunition Storage Area.

From the detonation mound, surface water flow is in all directions. In general, the drainage ditches at the site flow from the west to the east, and the culverts and the roads channel the surface water into Reeder Creek.

In 1988 the OD Grounds was designated a Solid Waste Management Unit (SWMU), SEAD-45, and was added to SEAD's application for a Part B, RCRA permit. Under the RCRA Hazardous and Solid Waste Amendments of 1984 (HSWA), Part B Permits issued after November 8, 1984, require identification and corrective action at any SWMU located on the installation that is releasing hazardous constituents or hazardous wastes to the environment.

SEAD-45 is classified as a High Priority Area of Concern (AOC) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

SEAD-46: SEAD-46 is the Small Arms Range and it is located in the northeastern portion of SEAD. It is characterized by an open area covered with low brush approximately 2 acres in size. It was clear cut at one time, probably at the start of its use, as shown by the larger trees surrounding the area. A vegetated berm approximately 150 feet long and 20 feet high is located in the northwestern portion of the site. Access to the site is provided by a dirt road which forms the southwestern boundary of the site. A vehicle pull-off area is located immediately to the south of the berm and is unvegetated. Currently, the site is not active, but it is occasionally used for training troops. Blank ammunition is used during training practices.

SEAD personnel claim that they have seen rockets on the ground, although none were noticed during an examination of the site in 1990. The site appears from 1954 aerial photos to have been a long open area along which 3.5" rockets were fired. Subsequently, a number of small trees have grown up in the area. The area has a number of small rolling hills.

The open area to the southeast of the berm suggests that the tracers and rockets were fired from the southern end of the site towards the north, either at the berm or at targets in front of the berm.

Access to the area is not restricted. The area is composed of wooded areas to the north, south and east, and brush and wetlands to the west. SEAD-13 East is located approximately 700 feet northwest of SEAD-46. A large body of surface water (referred to as the Duck Pond) is also located approximately 700 feet to the northwest.

No standing water bodies exist at SEAD-46. Other than the berm, there is little topographic relief on the site. The site is generally flat and slopes gently to the west. Surface water run-off is directed to the west toward the feeder creek for the Duck Pond by a small drainage depression located on the western side of the dirt road. Water draining into the Duck Pond ultimately leaves SEAD by way of Kendig Creek approximately one mile to the north of SEAD-46. The direction of groundwater flow at SEAD-13 East was determined to be to the north-northwest (draft ESI Report, ES, August 1994), and it is assumed to be the same at SEAD-46.

Through 1960, SEAD-46 was used for testing fire tracers, 3.5-inch rockets and possibly other ammunition. An unknown number of rockets were fired into the large earthen barricade at one end of the range.

In January 1980, this facility was identified by the U.S. Army Toxic and Hazardous Materials Agency as a location of known or suspected waste materials. In 1987, the facility was deleted from the SWMU submission list by the U.S. Army Environmental Hygiene Agency. The reason for deleting the unit was due to the fact that wastes were not handled at the unit. The facility was again added to the SWMU list in August, 1988 by the New York Department of Environmental Conservation (NYSDEC). The Small Arms Range was included in the final list of SWMUs at SEAD in the Federal Facilities Agreement under CERCLA Section 120 (Docket Number: II-CERCLA-FFA-00202) signed by the EPA, Army and NYSDEC.

In accordance with the decision process outlined in the Interagency Agreement (IAG) between the U.S. Army Corps of Engineers (USACE) the U.S. Environmental Protection Agency (EPA) Region II, and NYSDEC, SEAD-46 is classified as a Low Priority Area of Concern (AOC) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

SEAD-57: SEAD-57 is the Explosive Ordnance Disposal (EOD) Area. This area consists of approximately 58 acres north west of the center of the base. The entire area is visible in 1991 aerial photos. A berm 30' in diameter and 6' high is located near the northeast corner of the area, which does not appear in aerial photos until after 1978. An earlier visit in 1998 found the remains of many flares in and around this berm, and shotholes on the opposite side of the access road from the berm. Other shotholes were located at the south side of the access road, visible on aerial photographs taken in 1954. The overall area is grassy and open with a few small trees at the south end of the site.

The disposal area was used by Army EOD personnel for the disposal of conventional ammunition or explosives weighing less than 5 pounds. The site was active from 1941 to 1993. Because of the nature of EOD work, open detonations at the site were performed irregularly.

According to a current SEAD employee, however, a training mission was performed approximately every month.

The open detonation at the site was performed inside the rectangular bermed enclosure. Before the berm was built, the open detonation at the site may have been performed in four pits approximately 15 feet by 30 feet in size located immediately to the west of the unpaved road.

The berm is surrounded on all sides by open grassland for several hundred feet. A shallow depression approximately 150 feet by 75 feet in size is located approximately 150 west of the berm. A paved east-west road is located 600 feet to the north of the berm, and Building T2105, a dilapidated wood frame structure, is located 700 feet to the north of the berm. A munitions storage igloo used for munitions scheduled to be disposed of at the explosive ordnance disposal area is located approximately 700 feet to the northwest of the berm.

Topography near the berm and to the west of the berm slopes to the southwest. A local topographic high is located one hundred feet to the east of the berm and to the east of that, the ground surface slopes to the east-southeast.

Surface water flow from precipitation events is controlled by local topography on the site. Surface water on the site would likely be collected in one of three north-south trending swales which originate near the paved road in the northern portion of the site and drain to the south. One swale is located east of the berm and the other two are between the berm and the unpaved access road. Immediately north of the road is a local topographic high where the ground elevation is greater than 634 feet. Topography on-site slopes to the south and southwest, however, in the eastern portion of the site it slopes gently to the east, indicating that there may be a local surface water flow divide in this area. The eastern-most drainage swale which drains predominantly to the south on-site eventually bends to the east.

SEAD-57 is classified as a Moderately High Priority Area of Concern (AOC) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Grenade Range: The former grenade range consists of about 30 acres at which rifle-fired grenades were used. The grenade range is visible from the air as an open area near the middle part of the western edge of the base. According to the base personnel, only 40 mm practice grenades were used at this site. A site visit in 1998 showed a number of these projectiles scattered on the ground at the site. The site also has mannequins, wood structures, and armored vehicles set up as targets, and foxholes at the firing lines. The area has some small trees and hills scattered across the site.

EOD Area #2: EOD area #2 consists of a five acre water-covered marsh about a quarter mile west of EOD area #3. The area appears on aerial photographs as the south end of a mile or so long duck pond. According to base personnel, explosive devices were used in this area, and non-explosive projectiles were dumped in the water area. The area is currently underwater.

EOD Area #3: This area is located north of SEAD-46. It consists of about a 300' x 300' partially wooded area. Although the site is visible as an open area in a 1954 photograph, it has since been mostly overgrown. The tree cover is surprisingly low in much of it indicating possible subsurface contamination. Supposedly, this area was used as an EOD disposal area although a site investigation in 1991 showed no surface ordnance.

Burial Area Near Indian Creek: This area consists of 2 acres at the junction of two roads in the southwest central portion of the base, visible as a small open area from aerial photographs. Supposedly, ammunition and non-ordnance items were buried here; a surface examination of the area showed no visible ordnance. The area is flat and has little vegetation.

Demolition Area Near SEAD-57: The Demo range is a 40 acre wooded lot adjacent to SEAD 57. This area was used in the 1940's and 1950's for projectile demolition. A 1963 aerial photograph shows it as being an open area which has subsequently grown up to be fairly heavily wooded, as shown in a 1991 aerial photo. A 75 mm projectile was found on an inspection of this range.

B1.3.2 Site History

When the Army arrived in Seneca, New York in 1941, the nearly 10,000 acres in Central New York State were abundant farmland. In June 1941, the War Department approved the munitions project, and in July 1941, construction for the Seneca Ordnance Depot (Depot) began. Construction workers completed nearly 500 storage igloos and six aboveground magazines by the end of the year (Johnson 1984). With the construction of the administrative area, ammunition facilities, warehouses, utility structures and a few housing quarters completed in 1943, the Depot began its primary mission of receipt, storage, maintenance and supply of ammunition. As a filler Depot, it also issued and reconditioned ammunition for the First and Second Service Commands and for the Boston Port of Embarkation. This included all classes of ammunition and explosives except chemical ammunition other than smoke. In 1946, the Army assigned the Depot to the First Army, which included the Mid-Atlantic States of New York, New Jersey and Delaware (Seneca Ordnance Depot 1946).

SEAD-16: The original Popping Plant, Building S311, was built during 1942 and 1943. The Abandoned Deactivation Furnace is located in this building and was active between 1945 through the mid 1060s. Small arms and munitions were destroyed by incineration.

SEAD-17: An additional Popping Plant, Building 367, was built near the original one in 1961. The existing Deactivation Furnace was active in Building 367 from 1962 through 1989. The furnace at the Popping Plant processed fired brass or steel cartridge cases at a temperature of 1,400°F. Cartridge cases having a live primer were popped and rendered inert (History 1943).

SEAD-45: Since 1941, the OD Grounds have been used to demolish waste munitions. The main feature of the OD facility is a detonation mound which covers approximately 1.0 acre. The mound is composed of soil from the surrounding area which was moved via bulldozer to create the mound. Aerial photos from 1968 show that the mound was previously located at least 200 feet west of its present location. Waste munitions are placed in a bulldozed hole in the hill with additional demolition material, covered with a minimum of 8 feet of soil, and detonated remotely using blasting caps and primer cord. A Resource Conservation and Recovery Act (RCRA) Subpart X permit application is pending New York State Department of Environmental Conservation (NYSDEC) approval, and the operation of the OD facility is currently under interim status.

SEAD-46: Through 1960 the site was used for testing fire tracers, 3.5-inch rockets and possibly other ammunition. An unknown number of rockets were fired into a large earthen barricade at one end of the range.

SEAD-57: The disposal area was used by Army EOD personnel for the disposal of conventional ammunition or explosives weighing less than 5 pounds. The site was active from 1941 to 1993. Because of the nature of EOD work, open detonations at the site were performed irregularly. According to a current SEAD employee, however, a training mission was performed approximately every month.

B1.4 SCOPE OF WORK

B1.4.1 Parsons Engineering Science, Inc. (Parsons) received Contract No. DACA87-95-D-0018, Delivery Order No. 52, from the Corps of Engineers, Huntsville Center (CEHNC), to conduct an Engineering Evaluation/Cost Analysis (EE/CA) at the former Seneca Army Depot, Seneca, New York. The EE/CA will implement ordnance and explosives (OE) risk management actions in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and in substantial compliance with the National Contingency Plan (NCP). In accordance with the NCP on-site actions will not require Federal, State, or local permits. The EE/CA will adhere to the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS) and relevant U.S. Army regulations and guidance for OE programs.

The purpose of the EE/CA is to characterize OE risk, analyze risk management alternatives, and recommend feasible OE risk reduction alternatives for Areas of Interest (AOIs) identified within the approximately 10,587 acres comprising the former Seneca Army Depot. The objective of the EE/CA is to allow and document meaningful stakeholder participation; to characterize OE nature, location, and concentration; to provide a description of the OE related problems affecting human use of the site; to identify and analyze reasonable risk management alternatives; and to provide a convenient record of the process for use in the final decision making and judicial review, if necessary.

The project scope involves the geophysical and intrusive assessment of ten sites. Task for this project include surface OE clearance and then vegetation clearing of sampling grids, geophysical surveys, excavation and identification of subsurface targets identified by geophysical surveys, and disposal of UXO and UXO related scrap.

Brush clearance will be accomplished using a combination of mechanical (brush hog or hydroaxe) and hand clearance using weedeaters and chainsaws. Vegetation clearance will include pathways (ingress and egress routes) to the selected sampling areas. Vegetation will be cut to no closer than six (6) inches above ground level. Trees larger than three (3) inches in diameter will not be cut.

Prior to beginning the brush clearing work at each grid, the areas within each grid shall be surface cleared of OE items by UXO technicians. The UXO technicians will conduct visual surveys for surface ordnance prior to brush clearing crew entering a suspected area. A magnetometer may be used to aid in searching the vegetation for surface OE/UXO prior to cutting or removing brush. Any OE/UXO encountered by the brush team will be marked with a red pin flag, reported to the UXOSO, and left in place for later disposal.

The number of grids for each site and the grid size was chosen to provide sufficient coverage to show the likely existence of UXO's or to prove that no UXO's are likely to exist at each sites. Grids of 100' x 100' size will be laid out on each site for all areas that can be cleared effectively. For areas that cannot be cleared effectively smaller grids or a meandering path survey will be performed. Meandering path data will be collected at SEAD-57 & 45, at EOD#2, and in the ditches in the Igloo Area.

After the grids are laid out, geophysical surveys will conducted to determine the presence of surface and subsurface ordnance. EM-61, magnetometer, or a hand held metal detector will be used for the surveys.

Intrusive investigations of identified anomalies will be conducted following the geophysical surveys. Intrusive excavations will be limited to a radius of 1.5 feet and a not-to-exceed depth of 4 feet (or to the water table whichever comes first). Excavations will be performed with hand tools. No digging of other potential sources of this zone of interest will be performed.

The disposal of OE will be performed by detonation in place, or by consolidated shots.

B1.5 PROJECT TEAM AND ORGANIZATION

B1.5.1 FIELD PERSONNEL AND RESPONSIBLITIES

The names of principal personnel are delineated below.

Contractor: **Parsons Engineering Science**

Project Manager (PM): Michael Duchesneau,P.E.-Canton, MA

Field Task Manager: John Baptiste – Canton, MA

Project Safety Officer (PSO): Brian Powell,CSP,CIH - Syracuse, NY

UXO Safety Officer (UXOSO): Howard Stepp – Pasedena, CA

UXO Quality Control Specialist (UXOQCS): Howard Stepp – Pasedena, CA

UXO Subcontractor: **USA Environmental, Inc.**

Senior UXO Supervisor (SUXOS): Sam Newberry

The Safety and Health (S&H) requirements and personnel listed in this plan may change as work progresses at the site, however, no changes will be made without approval of Parsons, USA, and the ACOE. The safety organization structure and responsibilities for field personnel operating at SEDA are described in the following paragraphs.

PARSONS PROJECT SAFETY OFFICER (PSO): BRIAN POWELL

The PSO is responsible for the development, implementation, and oversight of the SSHP. Reports to the Project Manager.

Responsibilities

- Approve, sign and date the SSHP;
- Consult with the UXOSO and Task Manager to implement and enforce the SSHP;
- Maintain documentation of accidents and safety violations forwarded by the UXOSO;
- Notifies the Project Manager of all accidents, safety violations, or other important safety related issues;
- Conduct safety audits;
- Consult with the UXOSO to ensure proper monitoring and PPE.
- Make amendments to the SSHP as required.

PARSONS SITE MANAGER (SM) : JOHN BAPTISTE

The Site Manager is responsible for field team operations and safety.

Responsibilities

- Manages field operations and reports to the PM/PSO ;
- Oversee subcontractors field operations and insures SSHP complience;
- Enforces site control;
- Documents field activities.

PARSONS UXO SAFETY OFFICER (UXOSO): HOWARD STEPP

The UXOSO has primary responsibility for job safety. He reports Site Manager, and has direct access to the Parsons Project Safety Officer for safety and health issues. The UXOSO will monitor all safety related activities at all sites to be examined for surface and subsurface UXO's by all on-site personnel. The UXOSO meets the USACE requirements as a graduate of the U.S. Naval School of Explosive Ordnance Disposal; 40-hour and 8-hour Hazardous Waste Site Worker; Supervisor courses in accordance with 29 CFR 1910.120; and has at least 15 years of EOD experience, 10 of which have been in supervisory EOD positions. Three years of documented OE contractor experience may be substituted for 3 years of active duty EOD experience. The UXOSO will have the following safety and health related responsibilities:

Responsibilities

- Has STOP WORK authority for safety and health reasons;
- Complete Personnel Data Sheets on all site personnel;
- Implement and enforce the SSHP, and report safety violations to the PSO;

- Establishing work zones and controlling access to these zones;
- Confirm all contractor and subcontractor personnel's suitability for work, based upon OSHA and site specific medical and training requirements;
- Conduct daily General Safety Briefings;
- Implement and document the Site Specific Hazard Information Training Program (as specified by 29 CFR 1910.120);
- Ensure proper condition, maintenance, storage, and use of PPE;
- Conduct air quality monitoring during operations as required.
- Consulting with the UXO Supervisors prior to downgrading or upgrading of alternating monitoring or PPE requirements;
- Assisting in the continued development of the SSHP and other safety and health procedures;
- On-site enforcement of the Parsons Alcohol/Drug Abuse Policy;
- Investigate accidents and "near misses" and files reports with the PM and PSO.
- Conduct visitor orientation;
- Enforce the "buddy" system;
- Conduct and document daily safety inspections, and weekly OE team safety audits;
- Maintain and calibrate safety monitoring equipment, and document calibration data in the monitoring or safety log;
- Restrict site personnel from site activities if they exhibit symptoms of alcohol or drug use or illness, and continually monitor site personnel for signs of chemical exposure or physical stress;
- Maintain the site safety and monitoring logs;
- Act as the On-Scene-Incident-Commander (OSIC) in the event of an emergency, notify and coordinate off-site emergency and medical response agencies;
- Post the descriptions and maps associated with hospital and emergency evacuation routes;
- Ensure field implementation of the Parsons I&T Health & Safety Policies;
- Conduct on-site safety orientation and operational review. The orientation and review will be accomplished during the first working day at SEDA.

PARSONS UXO QUALITY CONTROL SPECIALIST (UXOQCS): HOWARD STEPP

Responsibilities

The UXOQCS has the responsibility of ensuring personnel are in compliance with the SSHP. The Parsons UXOQCS reports directly to the Site Manager or the UXOSO on safety issues. The UXOQCS meets the USACE requirements of being a graduate of the U.S. Naval Explosive Ordnance Disposal School, 40-hour and 8-hour Hazardous Waste Site Worker, and Site Supervisor courses in accordance with 29 CFR 1910.120; the UXOS has at least 10 years EOD/UXO experience, 3 years of which must be active duty military EOD experience. The UXOQCS can act concurrently as the UXOSO when total number of workers is 15 or less.

USA SENIOR UXO SUPERVISOR (SUXOS):

The SUXOS is charged with developing and implementing the Work Plan and Accident Prevention Plan for this project. Internally, the SUXOS reports directly to the UXO PM. The SUXOS meets the USACE requirements as a graduate of the U.S. Naval School of Explosive Ordnance Disposal; 40-hour and 8-hour Hazardous Waste Site Worker; Supervisor courses in accordance with 29 CFR 1910.120; and has at least 15 years of EOD experience, 10 of which have been in supervisory EOD positions. Three years of documented OE contractor experience may be substituted for 3 years of active duty EOD experience. The SUXOS will have the following safety and health related responsibilities:

Responsibilities

- Reports directly to the USA Vice President and the UXOSO;
- Managing the funding, manpower and equipment necessary to safely conduct site operations;
- Reviewing and becoming familiar with the site Work Plan (WP) and SSHP;
- Furnishes copies of the WP and SSHP to site and subcontract personnel for their review;
- Reviewing the scope of work (SOW) and ensuring that the required safety and health elements are addressed in the SSHP and/or WP;
- Coordinating the assignment of subcontractor personnel and ensuring that the personnel and equipment provided by the subcontractor meet the requirements of the WP and SSHP;
- Ensuring implementation of project quality and safety and health procedures through close coordination with the UXOSO, UXOQCS, and UXOS. Early detection and identification of potential problem areas, including safety and health matters, and instituting corrective measures;
- Directly interfacing with the Project/Field Manager and advising him of safety and health matters related to conduct of the site operations.
- Enforcement of the USA Substance Abuse Policy.

USA UXO SUPERVISOR (UXOS)

The UXOS takes daily direction from and reports directly to the SUXOS. The UXOS directs the action of an OE team in accordance with the approved WP and the daily verbal direction of the SUXOS. The UXOS maintains continuous communication with the SUXOS during the performance of OE operations and has the authority to temporarily stop the performance of work to resolve and correct any unsafe condition. The UXOS is a graduate of the U.S. Naval Explosive Ordnance Disposal School, 40-hour and 8-hour Hazardous Waste Site Worker, and Site Supervisor courses in accordance with 29 CFR 1910.120; the UXOS has at least 10 years EOD/UXO experience, 3 years of which must be active duty military EOD experience. The UXOS will have the following safety and health related responsibilities:

- Task/team compliance with all aspects of the SSHP;

- Documents daily tailgate safety meetings and all OE team safety related activities, including air monitoring. Documentation is reviewed and filed by the UXOSO.
- Coordinate with the UXOSO proper PPE requirements;
- Consult with the UXOSO before the upgrade or downgrade of levels of protection or the requirement of air monitoring;
- Coordination with the UXOSO to ensure that all site safety considerations are enforced;
- Enforcement of the USA Substance Abuse Policy.

USA UXO SPECIALIST

All USA UXO specialists are required to comply with the provisions of this SSHP, the WP and all applicable Federal State and local regulations. They will report all safety violations, unsafe conditions, and injuries/illnesses immediately to the UXOSO.

RESPONSIBILITIES OF ALL SITE PERSONNEL

Ensuring the safe and healthful conduct of site operations is the responsibility of everyone assigned to the site, therefore, all personnel involved in site activities will be responsible for the following:

- Complying with the SSHP and all other required safety and health guidelines;
- Taking all necessary precautions to prevent injury to themselves and to their fellow employees;
- Continual alertness to any potentially harmful situation and the need to immediately inform the UXOSO of any such conditions;
- Performing only those tasks that they believe they can do safely and have been trained to do;
- Notifying the UXOSO of any special medical conditions (i.e., allergies, contact lenses, diabetes) which could affect their ability to safely perform site operations;
- Notifying the UXOSO of any prescription and/or over-the-counter medication which they are taking that might cause drowsiness, anxiety or other unfavorable side affects;
- Preventing spillage and splashing of materials to the greatest extent possible;
- Practicing good housekeeping by keeping the work area neat, clean and orderly;
- Immediately reporting all injuries, no matter how minor to the UXOSO;
- Maintaining site equipment in good working order, and reporting defective equipment to the UXOSO;
- Reporting to work clean shaven, if required to use respiratory protection;
- Properly inspecting and using the PPE required by the SSHP or the UXOSO.

APPENDIX B2
RISK ANALYSIS/CONTROL

B2.1 NATURE AND EXTENT OF CHEMICAL HAZARDS

Five sites included in the Scope of Work have been classified as Areas of Concern under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). These Solid Waste Management Units (SWMU's) are SEAD's 16,17,45,46, and 57.

The primary chemicals that present a risk of exceeding exposure limits in soil are heavy metals, along with a lesser potential of exposure to petroleum products and explosive compounds. Table B2.1 summurizes maximum concentrations detected at the SEAD's 16, 17, 45, and 57. The maximum explosive compound concentration detected in soil, (7.47 ppm), is far below levels of potential detonation. Table B2.2 shows exposure limits to chemicals of concern at the work sites. This information will be used to determine the proper PPE and monitoring requirements for the tasks and locations covered by the SSHP.

Non-designated SWMU areas included in the scope work have no history that would indicate a potential of chemical contamination of the soil, (i.e. buried drums or spills). However any intrusive investigation of geophysical anomalies must consider that possibility. Refer to Section B3 on monitoring requirements.

Studies of this project area have not identified any chemical or biological warfare hazards on this site. Should suspected chemical warfare munitions (CWM) or biological warfare munitions (BWM) be encountered, personnel will immediately evacuate the work area to an upwind location and notify the UXOSO and USAESCH for guidance.

B2.1.1 SEAD-16: SEAD-16 has been described in five reports. The first report is a SWMU Classification Report (Parsons, 1994) that describes and evaluates the Solid Waste Management Units (SWMUs) at SEAD. This report was an initial step to provide a cursory evaluation of all of the SWMUs at SEAD. The second report is the Work Plan for CERCLA Expanded Site Inspection (ESI) of Ten Solid Waste Management Units (SWMUs) (Parsons Main Inc., 1993.) This report detailed the site work and sampling to be performed for the ESI. The third report is an Expanded Site Inspection Report (Parsons, 1995.) This report presents the results of a more detailed investigation of SEAD-16 and SEAD-17. The fourth report is the Final Closure Report for the Underground Storage Tank Removal (Science Applications International Corporation, May 1994.) This report describes the removal of two USTs at SEAD-16 and presents the confirmatory sampling records and chemical analyses associated with the closure. The fifth report, the Remedial Investigation Report (Parsons, March 1999), presents the results of the remedial investigation program and estimates the potential risk to human health and the environment.

The nature and extent of the chemicals of concern at SEAD-16 were evaluated through a comprehensive field investigation program. Primary media investigated at SEAD-16 included building materials, indoor air quality, surface soil, subsurface soil, surface water and sediment, and groundwater.

Table B2.1
Maximum Concentrations of Primary Chemicals of Concerns at Work Sites

Site	Location	Chemical of Concern	Maximum Concentration		Matrix
SEAD-16	SS16-26	Lead	140000	mg/kg	Surface Soil
	SB16-5	Lead	35400	mg/kg	Subsurface Soil
SEAD-17	SS17-37	Lead	6270.0	mg/kg	Surface Soil
	SB17-3	Lead	21.2	mg/kg	Subsurface Soil
SEAD-45	SS45-9	Lead	77.7	mg/kg	Surface Soils
	TP45-3	Lead	87.8	mg/kg	Subsurface Soils
	SS45-9	Total Explosives	7470	ug/kg	Surface Soils
	TP45-4	Total Explosives	5750	ug/kg	Subsurface Soils
SEAD-57	SS57-9	Lead	42.4	mg/kg	Surface Soil
	TP57-2	Lead	1860	mg/kg	Subsurface Soil

TABLE B2.2
PERMISSIBLE EXPOSURE LIMITS FOR SELECTED COMPOUNDS AT SEDA

		Permissible Exposure Limits(1) (mg/m3)	Short-Term Exposure Limits (mg/m3)(2)	Ceiling Limits (mg/m3)(3)	Other Exposure Limits (mg/m3)(4)	Carcinogenic Rating(5)
Metals	Arsenic	0.010	--	--	0.002(6)	A
	Barium	0.5	--	--	--	--
	Cadmium dust	0.005	--	0.6	--	A
	Chromium (VI)	--	--	0.1	0.001(7)	A
	Copper, Dust and Mist	1.0	--	--	--	D
	Lead	0.03	--	--	0.05(9)	B2
	Mercury	0.01	0.03	0.1	.05	D
	Nickel	1.0	--	--	0.015(7)	A
	Selenium	0.2	--	--	--	(8)
	Zinc Total Dust	15	10.0	15.0	5.0	--
Volatiles		(PPM)	(PPM)			
	Benzene	1.0	5	--	0.1(7)	A
	Toluene	200	150	300	100(7)	D
	Xylene	100	150	--	--	D
	Petroleum Products					
	trans 1,2-Dichloroethene	200			200 (7)	D
	cis-1,2-Dichloroethene	200			--	--
	Trichloroethene	100		200	25(7)	D
	Vinyl chloride	1		5	5 (7)	A
Semi-volatiles	PCB's	0.5 (skin)	--	--	0.001(7)	B2
	DDT	1.0 (skin)	--	--	0.5(7)	B2
	Nicotine	0.5	--	--	--	--
Explosives						
	HMX	--	--	--	1.5(9)	--
	RDX	--	--	--	1.5(9)	C
	2,4,6-TNT	1.5 (skin)	--	--	0.5(7)	(8)
	2,6-DNT	1.5 (skin)	--	--	1.5(7)(skin)	B2
	2,4-DNT	1.5 (skin)	--	--	--	B2
	Tetryl	1.5 (skin)	--	--	0.5 (skin)(10)	--
Ionizing Radiation	Beta/Gamma	--	--	--	2 mRem/hr	(6)
	Alpha	--	--	--	2 mRem/hr	(6)

Notes:
(1) OSHA 8-hour time-weighted average Permissible Exposure Limits (PEL). For metals, PEL shown is lowest of compounds likely to be encountered on-site.
(2) OSHA Short-Term Exposure Limit. 15 minute time-weighted average concentration
(3) OSHA Ceiling Limit. Concentration not to be exceeded during any part of the work day.
(4) Occupational Exposure Limits from other sources.
(5) EPA weight of evidence ratings for each compounds.
- A Confirmed human carcinogen
- B1 Probable confirmed human carcinogen. Limited human evidence.
- B2 Probable confirmed human carcinogen. Sufficient animal evidence.
- C Possible Human Carcinogen, Limited Animal Evidence
- D Not classifiable
- -- No data or carcinogenic rating not determined.

(6) NIOSH REL Ceiling
(7) NIOSH REL TWA
(8) Substance identified as suspected or confirmed human carcinogen by agency other than USEPA.
(9) ACGIH TLVs, 1999-2000 edition.

For soil, the concentrations established by the NYSDEC Technical Administrative Guidance Memorandum (TAGM) values, HWR-94-4046, Revised January 24, 1996. TAGM values were used for screening of site contaminants because these concentrations are levels at which the NYSDEC considered reasonable alternatives to pre-disposal conditions. For groundwater, the NYSDEC Class GA groundwater standards were used for comparison. For surface water, the Class C surface water standards were considered. For sediment, the NYSDEC Sediment Criteria described in the NYSDEC, Division of Fish, Wildlife and Marine Resources, *Technical Gudance for Screening Contaminated Sediments, January, 1999.* For metals in sediment, the Lowest Effect Level (LEL) was used for comparison.

A brief summary of the analytical results is presented below. A detailed description of the analytical results is presented in the SEAD-16 and SEAD-17 Remedial Investigation Report (Parsons, March 1999).

Tables B2.1.1 and B2.1.2 summarize concentrations of the chemicals of concern at SEAD 16. Figure B2.1 show the sampling location's highest concentration values.

Metals and SVOCs, predominantly PAH compounds, were found to be pervasive in the surface and subsurface soils, particularly adjacent to the Abandoned Deactivation Furnace. Twenty-one metals were detected in the surface soils at concentrations above their respective TAGM values. Lead, copper, arsenic, and zinc were detected in almost all of the surface soil samples at concentrations above their respective TAGM values. In the subsurface soil, 14 metals were detected in the subsurface soils at concentrations above their respective TAGM values. Copper and lead were found to be the most pervasive.

SVOCs were also detected at concentrations above their respective TAGM values. The highest concentration of PAH compounds in surface soils were detected in samples located adjacent to the northwestern corner of the Abandoned Deactivation Furnace Building. Nitroaromatic compounds were also present in the surface and subsurface soil near both buildings. Impacts from pesticides, PCBs, and herbicides in soil were less significant than the impacts from SVOCs and metals.

Based on the RI data, seven metals (aluminum, antimony, iron, lead, manganese, sodium, and thallium) were detected above their respective NYSDEC AWQS Class GA or Federal MCL groundwater standards. It should be noted that SEAD-16 monitoring wells were resampled on October 30, 1999 and analyzed for thallium. The results indicate that all groundwater samples had a thallium concentration at the detection limit of 1.5 ug/l, which is less than the EPA MCL (2 ug/l). SVOCs and nitroaromatics were not detected above the groundwater standards. No VOCs, pesticides, or PCBs were detected in groundwater at SEAD-16.

Based on the RI data, surface water impacts were primarily from metals. Six metals (lead, copper, zinc, cadmium, selenium, and iron) were detected at several locations at

Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SB16-1		SB16-3		SB16-3		SB16-4		SS16-1		SS16-10	
					SAMP ID:	16037		16032		16033		16030		SS16-1-1		SS16-10-1	
					QC CODE:	SA		SA		DU		SA		SA		SA	
					STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		ESI		ESI	
					TOP:	0		0		0		0		0		0	
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0,2	
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFAC E SOIL		SURFAC E SOIL	
				Above	Sample Date:	8/14/1996		8/14/1996		8/14/1996		8/14/1996		########		11/9/1993	
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene	UG/KG	85000		0		420	U	1800	U	3500	U	1100	U	2200	J	1800	U
2,6-Dinitrotoluene	UG/KG	8000	1000	3		420	U	1800	U	3500	U	1100	U	180	J	1800	U
Benzo(a)anthracene	UG/KG	220000	224	10		420	U	1800	U	3500	U	1800		420	J	1800	U
Benzo(a)pyrene	UG/KG	200000	61	13		420	U	1800	U	3500	U	4400		560	J	1800	U
Benzo(b)fluoranthene	UG/KG	200000	1100	5		420	U	1800	U	3500	U	3800		480	J	1800	U
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		32	J	900	J	340	J	6300		160	J	1800	U
Benzo(k)fluoranthene	UG/KG	170000	1100	4		420	U	1800	U	3500	U	2300		740	J	1800	U
Carbazole	UG/KG	89000		0		420	U	1800	U	3500	U	100	J	710	UR	1800	U
Chrysene	UG/KG	220000	400	9		420	U	96	J	3500	U	2100		500	J	1800	U
Di-n-butylphthalate	UG/KG	16000	8100	1		420	U	1800	U	3500	U	150	J	1300	J	120	J
Dibenz(a,h)anthracene	UG/KG	49000	14	9		26	J	260	J	220	J	1100	J	710	UR	1800	U
NITROAROMATICS																	
2,4-Dinitrotoluene	UG/KG					120	U	6800	J	280	J	2200		320		130	U
2,6-Dinitrotoluene	UG/KG		1000			120	U	250	U	120	U	130	J	130	U	130	U
2-amino-4,6-Dinitrotoluene	UG/KG					120	U	250	U	120	U	120	U	130	U	130	U
Tetryl	UG/KG					120	U	250	U	120	U	120	U	130	U	130	U
METALS																	
Antimony	MG/K	1930	3.59	16		0.42	UJ	0.39	UJ	0.38	UJ	1.6	J	[illegible]		6.6	U
Arsenic	MG/K	32.2	7.5	10		5	J	4	J	3.8	J	3	J	4.9		5.2	J
Barium	MG/K	9340	300	8		198	J	67.6	J	61.5	J	44.4	J	102		33.6	
Cadmium	MG/K	16.6	1	8		0.36		0.06	U	0.06	U	0.18		0.44	U	0.41	UR
Copper	MG/K	37900	25	42		19	J	35.6	J	[illegible]	J	[illegible]	J	[illegible]		29	J
Lead	MG/K	140000	21.86	41		[illegible]	J	65.9	J	51.7	J	[illegible]	J	[illegible]		16.1	
Mercury	MG/K	11.4	0.1	25		0.1	J	0.05	U	0.04	J	[illegible]	J	[illegible]		0.02	U
Nickel	MG/K	148	33.62	18		30	J	[illegible]	J	[illegible]	J	12.3	J	23		22.4	
Silver	MG/K	11.1	0.4	5		0.3		0.25	U	0.25	U	0.24		0.9	U	0.84	UJ
Thallium	MG/K	16.6	0.28	14		[illegible]		0.82	U	0.79	U	[illegible]		1.6	U	0.24	UJ
Zinc	MG/K	14600	82.5	35		[illegible]		84.4		79.8		[illegible]		[illegible]		65.8	J

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SS16-11		SS16-12		SS16-13		SS16-14		SS16-15		SS16-16		SS16-17
					SAMP ID:	SS16-11-1		SS16-12-1		SS16-13-1		SS16-14-1		SS16-15-1		SS16-16-1		16040
					QC CODE:	SA		SA		SA		SA		SA		SA		SA
					STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI		RI ROUND
					TOP:	0		0		0		0		0		0		0
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2		0.2
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL
				Above	Sample Date:	########		########		########		########		########		########		8/19/1996
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE
SEMIVOLATILE ORGANICS																		
2,4-Dinitrotoluene	UG/KG	85000		0		440	U	360	U	750	U	370		350	U	1800	UJ	390
2,6-Dinitrotoluene	UG/KG	8000	1000	3		440	U	360	U	750	U	56	J	350	U	1800	UJ	390
Benzo(a)anthracene	UG/KG	220000	224	10		110	J	31	J	45	J	26	J	350	U	1800	UJ	390
Benzo(a)pyrene	UG/KG	200000	61	13		99	J	27	J	40	J	24	J	350	U	1800	UJ	22
Benzo(b)fluoranthene	UG/KG	200000	1100	5		100	J	31	J	49	J	33	J	350	U	1800	UJ	21
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		62	J	360	U	750	U	19	J	350	U	1800	UJ	390
Benzo(k)fluoranthene	UG/KG	170000	1100	4		98	J	34	J	53	J	30	J	350	U	1800	UJ	22
Carbazole	UG/KG	89000		0		22	J	360	U	750	U	370	U	350	U	1800	UJ	390
Chrysene	UG/KG	220000	400	9		130	J	49	J	72	J	44	J	16	J	1800	UJ	22
Di-n-butylphthalate	UG/KG	16000	8100	1		250	J	19	J	750	U	76	J	350	U	1800	UJ	390
Dibenz(a,h)anthracene	UG/KG	49000	14	9		440	U	360	U	750	U	370	U	350	U	1800	UJ	390
NITROAROMATICS																		
2,4-Dinitrotoluene	UG/KG					130	U	130	U	130	U	1200		130	U	150		74000
2,6-Dinitrotoluene	UG/KG		1000			130	U	130	U	130	U	130	U	130	U	130	U	2500
2-amino-4,6-Dinitrotoluene	UG/KG					130	U	130	U	130	U	130	U	130	U	130	U	2500
Tetryl	UG/KG					130	U	130	U	130	U	130	U	130	U	130	U	2500
METALS																		
Antimony	MG/K	1930	3.59	16		13.9	U	6.6	U	8.2	U	[illegible]		6.2	U	9	U	2.9
Arsenic	MG/K	32.2	7.5	10		7.7		5.2		6.8		9.9		4.8		3.8		4.7
Barium	MG/K	9340	300	8		195		52		88.2		211		35.1		56.6		168
Cadmium	MG/K	16.6	1	8		0.87	U	0.41	U	0.51	U	0.61	J	0.39	U	0.56	U	0.45
Copper	MG/K	37900	25	42		199		54.8		204		163		[illegible]		69.2		74.4
Lead	MG/K	140000	21.86	41		616		195		460		720		210		643		304
Mercury	MG/K	11.4	0.1	25		0.73		0.24		1		0.07	J	0.05	J	0.04	J	1.2
Nickel	MG/K	148	33.62	18		35.2		39.5		50.8		29.4		30.5		28.5		22.7
Silver	MG/K	11.1	0.4	5		1.8	U	0.84	U	1	U	0.93	U	0.79	U	1.1	U	0.26
Thallium	MG/K	16.6	0.28	14		0.26	U	0.25	U	0.16	U	0.14	U	0.24	U	0.23	U	1.7
Zinc	MG/K	14600	82.5	35		1270		89		128		104		68.6		93.8		107

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:		SS16-18		SS16-19		SS16-2		SS16-20		SS16-21		SS16-21	
					SAMP ID:		16041		16042		SS16-2-1		16043		16058		16059	
					QC CODE:		SA		SA		SA		SA		SA		DU	
					STUDY ID:		RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1		RI ROUND1	
					TOP:		0		0		0		0		0		0	
					BOTTOM:		0.2		0.2		0.2		0.2		0.2		0.2	
				No.	MATRIX:		SURFACE SOIL		SURFACE SOIL		SURFAC E SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				Above	Sample Date:		8/19/1996		8/19/1996		########		8/19/1996		8/21/1996		8/21/1996	
PARAMETER	Unit	Max	TAGM	TAGM		Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																		
2,4-Dinitrotoluene	UG/KG	85000		0		U	420	U	340	U	760		58	J	15000		19000	
2,6-Dinitrotoluene	UG/KG	8000	1000	3		U	420	U	340	U	410	U	350	U	1200	J	1600	J
Benzo(a)anthracene	UG/KG	220000	224	10		U	420	U	340	U	260	J	26	J	2300	U	2900	U
Benzo(a)pyrene	UG/KG	200000	61	13		J	420	U	340	U	300	J	34	J	2300	U	2900	U
Benzo(b)fluoranthene	UG/KG	200000	1100	5		J	420	U	20	J	500		32	J	2300	U	2900	U
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		U	420	U	340	U	130	J	350	U	2300	U	2900	U
Benzo(k)fluoranthene	UG/KG	170000	1100	4		J	420	U	16	J	310	J	32	J	2300	U	2900	U
Carbazole	UG/KG	89000		0		U	420	U	340	U	48	J	350	U	2300	U	2900	U
Chrysene	UG/KG	220000	400	9		J	19	J	24	J	470		37	J	2300	U	2900	U
Di-n-butylphthalate	UG/KG	16000	8100	1		U	420	U	340	U	710		350	U	2300	U	2300	U
Dibenz(a,h)anthracene	UG/KG	49000	14	9		U	420	U	340	U	410	U	32	U	2300	U	2900	U
NITROAROMATICS																		
2,4-Dinitrotoluene	UG/KG						120	U	220		500		310		7300		7700	
2,6-Dinitrotoluene	UG/KG		1000			U	120	U	120	U	130	U	120		250	U	250	U
2-amino-4,6-Dinitrotoluene	UG/KG					U	120	U	120	U	130	U	120	U	250	U	250	U
Tetryl	UG/KG					U	120	U	120	U	130	U	120	U	250	U	250	U
METALS																		
Antimony	MG/K	1930	3.59	16		J	2.5	J	3.5	J	55.6		[illegible]	J	20.8	J	19.2	J
Arsenic	MG/K	32.2	7.5	10		J	4.1	J	4.5	J	16.6		5.2	J	6.5		7.2	
Barium	MG/K	9340	300	8		J	148	J	124	J	1200		175	J	442	J	676	J
Cadmium	MG/K	16.6	1	8			0.25		0.36		1.6	R	0.49		0.69		0.87	
Copper	MG/K	37900	25	42		J	60.1	J	99.4	J	911		207	J	379		536	
Lead	MG/K	140000	21.86	41		J	187	J	669	J	3780		[illegible]	J	2030		2640	
Mercury	MG/K	11.4	0.1	25		J	0.77	J	0.04	U	4		0.13	J	0.46		[illegible]	
Nickel	MG/K	148	33.62	18		J	20.3	J	38.8	J	21.7		[illegible]	J	45		49.8	
Silver	MG/K	11.1	0.4	5			0.32	U	0.31		1.5	U	0.28		0.21	U	0.25	U
Thallium	MG/K	16.6	0.28	14		J	1.1	J	0.74	J	0.19	U	[illegible]	J	[illegible]	J	[illegible]	J
Zinc	MG/K	14600	82.5	35			87.5		117		478		174		246		307	

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SS16-22		SS16-23		SS16-24		SS16-25		SS16-26		SS16-27	
					SAMP ID:	16049		16051		16060		16050		16046		16047	
					QC CODE:	SA		SA		SA		SA		SA		SA	
					STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
					TOP:	0		0		0		0		0		0	
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2	
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				Above	Sample Date:	8/20/1996		8/20/1996		8/21/1996		8/20/1996		8/20/1996		8/20/1996	
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene	UG/KG	85000		0		95	J	380	U	1800		39	J	870		85000	
2,6-Dinitrotoluene	UG/KG	8000	1000	3		360	U	380	U	160	J	340	U	350	U	8000	J
Benzo(a)anthracene	UG/KG	220000	224	10		190	J	380	U	340	U	26	J	500		1300	J
Benzo(a)pyrene	UG/KG	200000	61	13		250	J	380	U	340	U	30	J	520		1500	J
Benzo(b)fluoranthene	UG/KG	200000	1100	5		420		380	U	480		28	J	810		1800	J
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		210	U	380	U	340	U	24	J	440	U	14000	U
Benzo(k)fluoranthene	UG/KG	170000	1100	4		290	J	380	U	340	U	33	J	600		1500	J
Carbazole	UG/KG	89000		0		26	J	380	U	41	J	340	U	110	J	14000	U
Chrysene	UG/KG	220000	400	9		370		380	U	340	U	40	J	720		1600	J
Di-n-butylphthalate	UG/KG	16000	8100	1		32	J	380	U	340	U	340	U	430		16000	
Dibenz(a,h)anthracene	UG/KG	49000	14	9		67	U	380	U	38	J	340	U	100	U	680	U
NITROAROMATICS																	
2,4-Dinitrotoluene	UG/KG					160	J	120	U	450	J	200	J	490		7500	J
2,6-Dinitrotoluene	UG/KG		1000			120	U	120	U	120	U	120	U	120	U	320	J
2-amino-4,6-Dinitrotoluene	UG/KG					120	U	120	U	120	U	120	U	120	U	250	U
Tetryl	UG/KG					120	U	120	U	120	U	120	U	120	U	250	U
METALS																	
Antimony	MG/K	1930	3.59	16		20.3	J	10.4	J	7.1	J	3.1	J	1930	J	122	J
Arsenic	MG/K	32.2	7.5	10		6.2	J	7.9		6.1		4	J	[illegible]	J	[illegible]	J
Barium	MG/K	9340	300	8		169	J	263	J	148	J	121	J	9340	J	5190	J
Cadmium	MG/K	16.6	1	8		1.3		0.76		1.2		0.25		[illegible]		16.6	
Copper	MG/K	37900	25	42		337	J	291		324		86.6	J	37900	J	3200	J
Lead	MG/K	140000	21.86	41		2920	J	1360		1450		[illegible]	J	140000	J	12600	J
Mercury	MG/K	11.4	0.1	25		1.7	J	0.93		0.27		0.4	J	[illegible]	J	2.6	J
Nickel	MG/K	148	33.62	18		44.1	J	25		48		[illegible]	J	30.2	J	31.3	J
Silver	MG/K	11.1	0.4	5		0.33		0.27		0.28		0.32		[illegible]		1.9	
Thallium	MG/K	16.6	0.28	14		0.9	J	0.85	U	0.66	U	0.82	U	16.6	J	[illegible]	J
Zinc	MG/K	14600	82.5	35		299		411		327		[illegible]		14600		2120	

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SS16-28		SS16-29		SS16-3		SS16-30		SS16-31		SS16-32	
					SAMP ID:	16044		16045		SS16-3-1		16048		16062		16052	
					QC CODE:	SA		SA		SA		SA		SA		SA	
					STUDY ID:	RI ROUND1		RI ROUND1		ESI		RI ROUND1		RI ROUND1		RI ROUND1	
					TOP:	0		0		0		0		0		0	
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2	
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFAC E SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				Above	Sample Date:	8/19/1996		8/19/1996		########		8/20/1996		8/21/1996		8/20/1996	
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene	UG/KG	85000		0		500		1800		7100		9400		91000	UJ	340	U
2,6-Dinitrotoluene	UG/KG	8000	1000	3		51	J	150	J	310	J	680	J	91000	UJ	350	U
Benzo(a)anthracene	UG/KG	220000	224	10		42	J	340	U	110	J	1300	U	220000	J	760	
Benzo(a)pyrene	UG/KG	200000	61	13		61	J	17	J	120	J	1300	U	200000	J	1800	
Benzo(b)fluoranthene	UG/KG	200000	1100	5		84	J	17	J	170	J	1300	U	200000	J	2500	
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		350	U	340	U	1100	U	1300	U	100000	J	1100	
Benzo(k)fluoranthene	UG/KG	170000	1100	4		65	J	340	U	97	J	1300	U	170000	J	350	U
Carbazole	UG/KG	89000		0		350	U	340	U	1100	U	1300	U	89000	J	34	J
Chrysene	UG/KG	220000	400	9		70	J	17	J	200	J	170	J	220000	J	950	
Di-n-butylphthalate	UG/KG	16000	8100	1		350	U	150	J	1200		1500		91000	UJ	350	U
Dibenz(a,h)anthracene	UG/KG	49000	14	9		28	U	340	U	1100	U	1300	U	49000	J	520	
NITROAROMATICS																	
2,4-Dinitrotoluene	UG/KG					310		180	J	1100		510		120	U	120	U
2,6-Dinitrotoluene	UG/KG		1000			120	U	120	U	130	U	120	U	120	U	120	U
2-amino-4,6-Dinitrotoluene	UG/KG					120	U	120	U	430	J	120	U	120	U	120	U
Tetryl	UG/KG					120	U	120	U	220	J	120	U	120	U	120	U
METALS																	
Antimony	MG/K	1930	3.59	16		6.7	J	1	J	121	R	28.1	J	0.81	J	1.5	J
Arsenic	MG/K	32.2	7.5	10		5.2	J	2.9	J	23.6		11.2	J	6.6		5.1	
Barium	MG/K	9340	300	8		107	J	48.1	J	1540	R	1220	J	70.9	J	85.3	J
Cadmium	MG/K	16.6	1	8		0.3		0.11		2.5		[illegible]		0.49		0.5	
Copper	MG/K	37900	25	42		192	J	28.3	J	1730		617	J	39.5		104	
Lead	MG/K	140000	21.86	41		626	J	66.6	J	9140		2560	J	81.1		265	
Mercury	MG/K	11.4	0.1	25		0.11	J	0.03	U	11.4	J	[illegible]	J	0.07		0.12	
Nickel	MG/K	148	33.62	18		35.1	J	18.1	J	37.3		22.7	J	28.9		36.3	
Silver	MG/K	11.1	0.4	5		0.41		0.37		1.1	UJ	0.44		0.26	U	0.35	
Thallium	MG/K	16.6	0.28	14		0.86	U	0.75	U	0.24	U	0.71	U	1.1	J	[illegible]	J
Zinc	MG/K	14600	82.5	35		115		42.7		929		573		134		157	

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SS16-33		SS16-34		SS16-35		SS16-36		SS16-37		SS16-38	
					SAMP ID:	16067		16053		16066		16061		16054		16068	
					QC CODE:	SA		SA		SA		SA		SA		SA	
					STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
					TOP:	0		0		0		0		0		0	
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2	
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				Above	Sample Date:	8/22/1996		8/20/1996		8/22/1996		8/21/1996		8/20/1996		8/22/1996	
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene	UG/KG	85000		0		510	U	1800	U	6900		700	U	350	U	350	U
2,6-Dinitrotoluene	UG/KG	8000	1000	3		510	U	1800	U	400	J	700	U	350	U	350	U
Benzo(a)anthracene	UG/KG	220000	224	10		1900		1800	U	1000		700	U	350	U	17	J
Benzo(a)pyrene	UG/KG	200000	61	13		1900		1800	U	1000		700	U	350	U	19	J
Benzo(b)fluoranthene	UG/KG	200000	1100	5		3300	J	1800	U	850	U	700	U	350	U	350	U
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		1000		1800	U	570	J	700	U	350	U	54	J
Benzo(k)fluoranthene	UG/KG	170000	1100	4		510	U	1800	U	1700	J	700	U	350	U	350	U
Carbazole	UG/KG	89000		0		160	J	1800	U	410	J	700	U	350	U	350	U
Chrysene	UG/KG	220000	400	9		1700		1800	U	910		700	U	350	U	22	J
Di-n-butylphthalate	UG/KG	16000	8100	1		510	U	1800	U	2000		700	U	350	U	350	U
Dibenz(a,h)anthracene	UG/KG	49000	14	9		700		1800	U	390	J	700	U	350	U	350	U
NITROAROMATICS																	
2,4-Dinitrotoluene	UG/KG					120	U	4400		3000	J	120	U	120	U	120	U
2,6-Dinitrotoluene	UG/KG		1000			120	U	120	U	120	U	120	U	120	U	120	U
2-amino-4,6-Dinitrotoluene	UG/KG					120	U	120	U	120	U	120	U	120	U	120	U
Tetryl	UG/KG					120	U	120	U	120	U	120	U	120	U	120	U
METALS																	
Antimony	MG/K	1930	3.59	16		1.2	J	0.35	UJ	7.1	J	0.5	J	0.37	UJ	0.56	J
Arsenic	MG/K	32.2	7.5	10		6		5.8		5.3		6.7		5.5		3.8	
Barium	MG/K	9340	300	8		70.7	J	47.7	J	314	J	42.3	J	42	J	127	J
Cadmium	MG/K	16.6	1	8		0.06	U	0.31		[illegible]		0.29		0.14		0.06	U
Copper	MG/K	37900	25	42		44.6		41.5		407		[illegible]		30.9		34.4	
Lead	MG/K	140000	21.86	41		131		43.7		1290		34.7		23.6		60.3	
Mercury	MG/K	11.4	0.1	25		0.12		0.03	U	0.12		0.04	U	0.04	U	0.04	U
Nickel	MG/K	148	33.62	18		31.2		23.7		28.6		24.7		27.6		43.5	
Silver	MG/K	11.1	0.4	5		0.28	U	0.3		0.5		0.2	U	0.24	U	0.25	U
Thallium	MG/K	16.6	0.28	14		0.91	U	0.98		0.78	U	0.64	U	0.77	U	0.82	U
Zinc	MG/K	14600	82.5	35		109	J	109		466	J	[illegible]		80.6		117	J

Note: Shaded values exceed the NYSDEC TAGM.
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Table B2.2.1
SEAD-16 Summary of Analytes Detected in Surface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

					LOC_ID:	SS16-4		SS16-5		SS16-6		SS16-7		SS16-8		SS16-9	
					SAMP ID:	SS16-4-1		SS16-5-1		SS16-6-1		SS16-7-1		SS16-8-1		SS16-9-1	
					QC CODE:	SA		SA		SA		SA		SA		SA	
					STUDY ID:	ESI		ESI		ESI		ESI		ESI		ESI	
					TOP:	0		0		0		0		0		0	
					BOTTOM:	0.2		0.2		0.2		0.2		0.2		0.2	
				No.	MATRIX:	SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL		SURFACE SOIL	
				Above	Sample Date:	########		########		########		########		########		11/9/1993	
PARAMETER	Unit	Max	TAGM	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
SEMIVOLATILE ORGANICS																	
2,4-Dinitrotoluene	UG/KG	85000		0		7200	U	530	J	14000	U	1300	U	1800	U	2700	U
2,6-Dinitrotoluene	UG/KG	8000	1000	3		7200	U	750	U	14000	U	1300	U	1800	U	2700	U
Benzo(a)anthracene	UG/KG	220000	224	10		7200	U	240	J	14000	U	1300	U	1800	U	2700	U
Benzo(a)pyrene	UG/KG	200000	61	13		7200	U	270	J	14000	U	1300	U	1800	U	2700	U
Benzo(b)fluoranthene	UG/KG	200000	1100	5		7200	U	350	J	14000	U	1300	U	1800	U	2700	U
Benzo(g,h,i)perylene	UG/KG	100000	50000	1		7200	U	180	J	14000	U	1300	U	1800	U	2700	U
Benzo(k)fluoranthene	UG/KG	170000	1100	4		7200	U	330	J	14000	U	1300	U	1800	U	2700	U
Carbazole	UG/KG	89000		0		7200	U	78	J	14000	U	1300	U	1800	U	2700	U
Chrysene	UG/KG	220000	400	9		7200	U	340	J	14000	U	1300	U	1800	U	2700	U
Di-n-butylphthalate	UG/KG	16000	8100	1		7200	U	350	J	14000	U	1300	U	1400	J	510	J
Dibenz(a,h)anthracene	UG/KG	49000	14	9		7200	U	750	U	14000	U	1300	U	1800	U	2700	U
NITROAROMATICS																	
2,4-Dinitrotoluene	UG/KG					170		780	J	130	U	130	U	770		450	J
2,6-Dinitrotoluene	UG/KG		1000			130	U	130	U	130	U	130	U	130	U	130	U
2-amino-4,6-Dinitrotoluene	UG/KG					130	U	130	U	130	U	130	U	130	U	130	U
Tetryl	UG/KG					130	U	130	U	130	U	130	U	130	U	130	U
METALS																	
Antimony	MG/K	1930	3.59	16		26.3		27.3		7.9	U	8.8	U	8.2	U	7	U
Arsenic	MG/K	32.2	7.5	10		11.3		10.8		5.1		5		5.2		4.2	J
Barium	MG/K	9340	300	8		227		630		45.1		41.2		72.2		53.6	
Cadmium	MG/K	16.6	1	8		0.55	U	2.8		0.49	U	0.55	U	0.52	U	0.43	UR
Copper	MG/K	37900	25	42		399		635		26.2		28.9		88.9		31.4	J
Lead	MG/K	140000	21.86	41		2940		2860		8.5		812		1890		76.2	
Mercury	MG/K	11.4	0.1	25		0.21		0.99		0.03	U	0.04	U	0.08		0.05	J
Nickel	MG/K	148	33.62	18		41.6		148		22.7		21.7		28.7		29.3	
Silver	MG/K	11.1	0.4	5		1.1	U	1	U	1	U	1.1	U	1	U	0.88	UJ
Thallium	MG/K	16.6	0.28	14		0.22	U	0.24	U	0.14	U	0.14	U	0.23	U	0.21	UJ
Zinc	MG/K	14600	82.5	35		416		562		65.8		66.1		105		78.8	J

Note: Shaded values exceed the NYSDEC TAGM.
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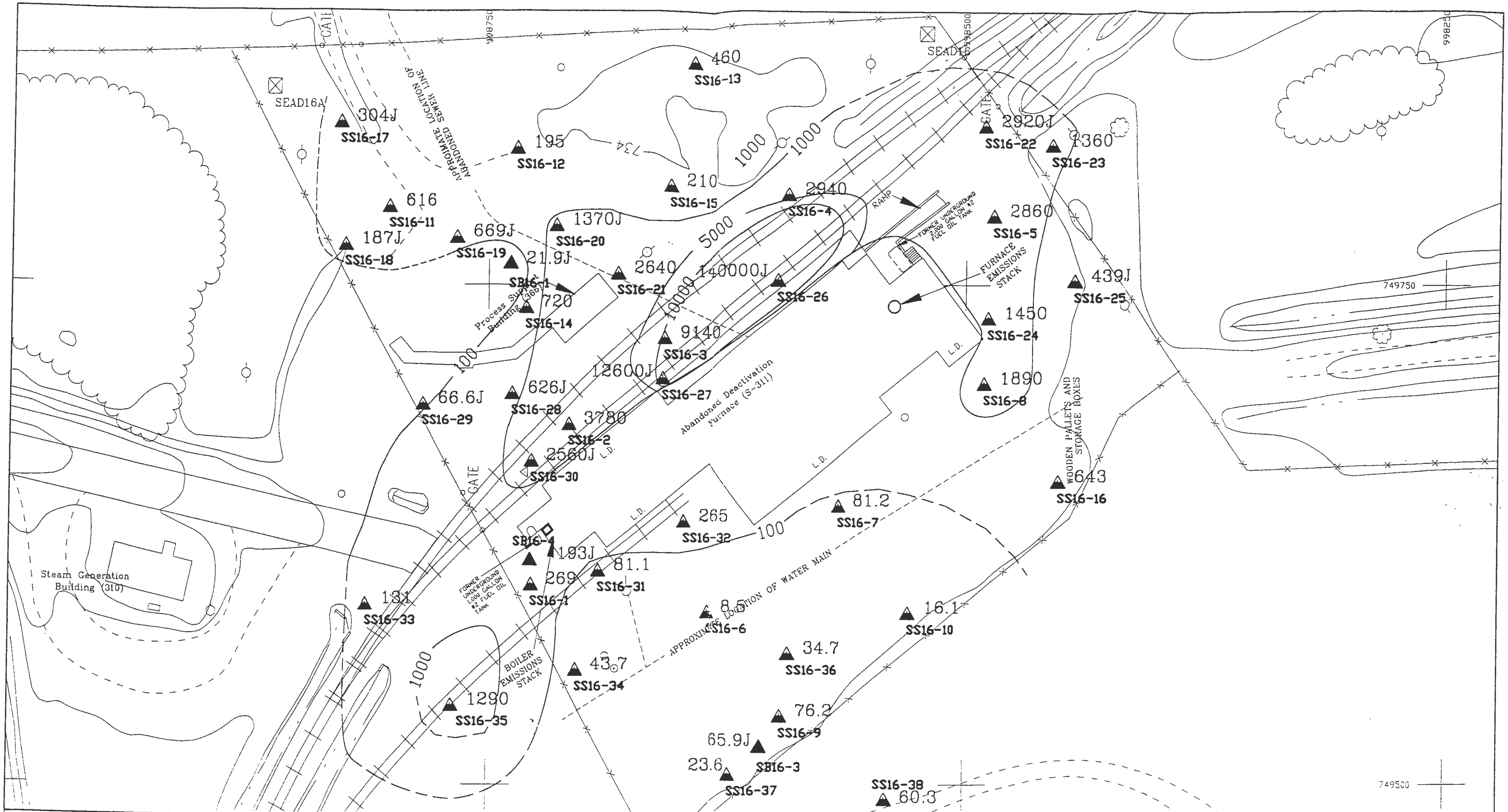
Table B.2.2.2
SEAD-16 Summary of Analytes Detected in Subsurface Soil

SEAD-16 Remedial Investigation
Seneca Army Depot Activity

			LOC_ID:	SB16-1		SB16-1		SB16-2		SB16-4		SB16-5		SB16-5	
			SAMP ID:	16038		16093		16036		16031		16034		16035	
			QC CODE:	SA		SA		SA		SA		SA		SA	
			STUDY ID:	RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1		RI ROUND1	
			TOP:	2		6		1		2		1		2	
			BOTTOM:	3		12		2		4		2		3.3	
			MATRIX:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
			Sample Dat	8/14/1996		8/22/1996		8/14/1996		8/14/1996		8/14/1996		8/14/1996	
PARAMETER	Unit	TAGM		VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Anthracene	UG/KG	50000		390	U	340	U	380	U	310	J	2000		40	J
Benzo(a)anthracene	UG/KG	224		390	U	340	U	55	J	420	J	6600		110	J
Benzo(a)pyrene	UG/KG	61		390	U	20	J	63	J	1400	J	6200		170	J
Benzo(b)fluoranthene	UG/KG	1100		390	U	18	J	72	J	670	J	6000		110	J
Chrysene	UG/KG	400		390	U	22	J	90	J	480	J	7000		120	J
METALS															
Copper	MG/K	25		23.6	J	[illegible]		206	J	16.4	J	[illegible]	J	[illegible]	J
Lead	MG/K	21.86		12.6	J	[illegible]		791	J	21.4	J	[illegible]	J	[illegible]	J
Mercury	MG/K	0.1		0.04	U	0.18		1.9	J	0.04	J	[illegible]	J	0.03	U
Nickel	MG/K	33.62		23.8	J	[illegible]		23.9	J	30.7	J	[illegible]	J	29.2	J
Thallium	MG/K	0.28		0.94	U	0.85	U	0.91		0.87	U	88.2	U	0.85	U

Note: Shaded values exceed the NYSDEC TAGM.



LEGEND

MINOR WATERWAY	☒ SURVEY MONUMENT
MAJOR WATERWAY	L.D. LOADING DOCK
FENCE	ROAD SIGN
UNPAVED ROAD	DECIDOUS TREE
BRUSH LINE	FIRE HYDRANT
LANDFILL EXTENTS	MANHOLE
RAILROAD	GUIDE POST
760 GROUND SURFACE ELEVATION CONTOUR	POLE
	UTILITY BOX
	CORDINATE GRID (250' GRID)
	OVERHEAD UTILITY POLE
	MAILBOX/RR SIGNAL

▲167J SS17-6 SURFACE SOIL SAMPLE WITH CHEMICAL CONCENTRATION (ppm)

100 CHEMICAL CONCENTRATION CONTOURS (DASHED WHERE INFERED)

25 0 25 50
1" = 50'

N

ACAD\SENECA\16-17RIFS\SD16LEAD.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT ENVIRONMETAL ENGINEERING | Eng. No. 729696-01001

FIGURE B2.1
SEAD-16 DISTRIBUTION OF LEAD IN SURFACE SOILS

SCALE 1" = 50' | DATE JANUARY 1997 | REV A concentrations exceeding the NYSDEC Ambient Water Quality Standard (AWQS), Class C surface water standards.

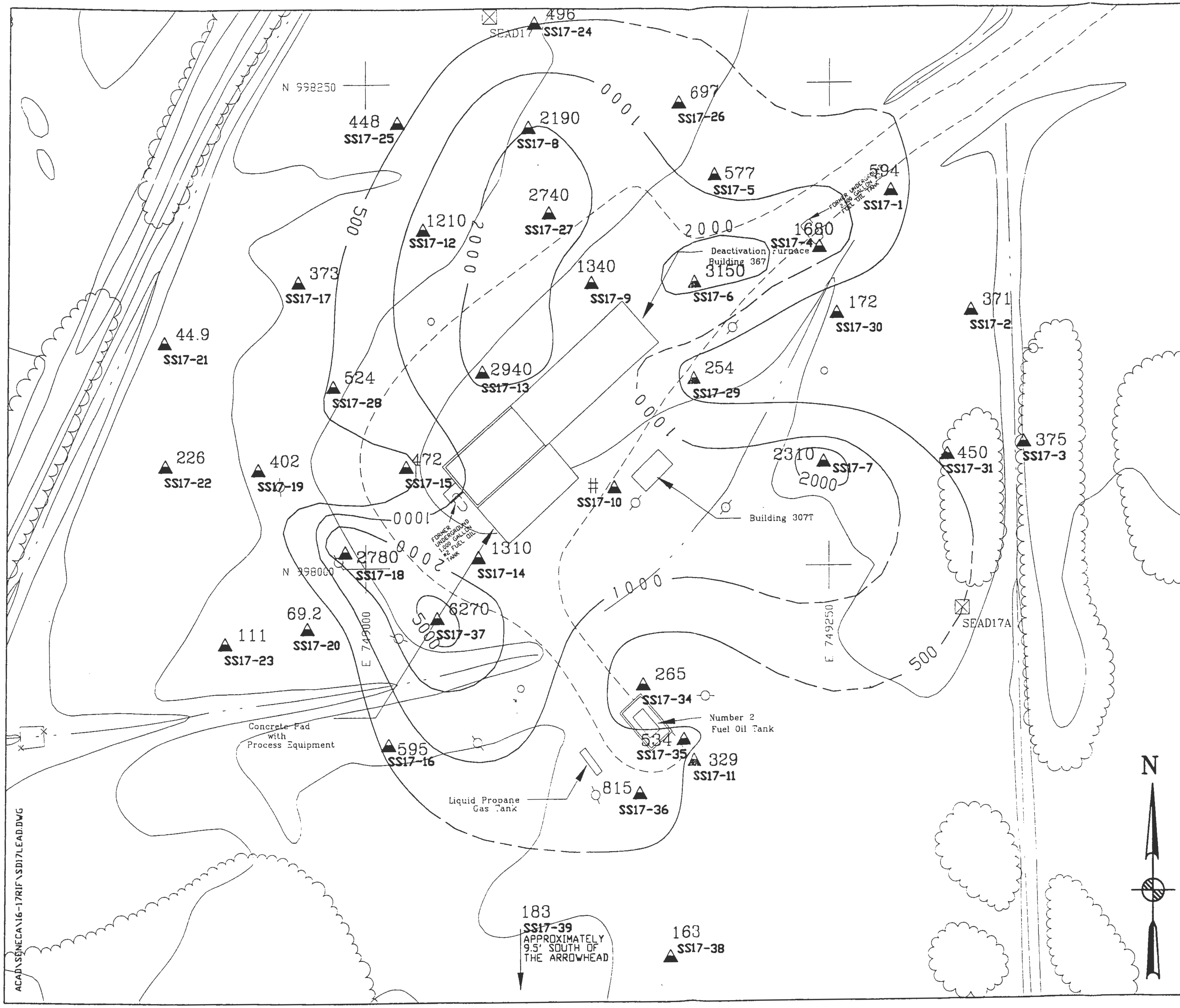
Sediment impacts were primarily from SVOCs, pesticides, and metals. Several samples contained pesticide compounds and SVOCs, which exceeded their respective NYS sediment criteria. The most significant exceedence was in sediment sample SW/SD16-1, which was collected from the northeastern corner of the Abandoned Deactivation Furnace. Several samples contained metals (antimony, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, and zinc) at concentrations above the NYS LEL. Samples SW/SD16-3 and SW/SD16-10 had the highest concentration of metals. Impacts from nitroaromatics were less significant.

B2.1.2 SEAD-17

SEAD-17 has been described in five reports. The first report is a SWMU Classification Report (Parsons, 1994) that describes and evaluates the Solid Waste Management Units at SEAD. This report was an initial step to provide a cursory evaluation of all of the SWMUs at SEAD. The second report is the Work Plan for CERCLA Expanded Site Inspection (ESI) of Ten Solid Waste Management Units (SWMUs) (Parsons Main Inc., 1993.) This report detailed the site work and sampling to be performed for the ESI. The third report is an Expanded Site Inspection Report (Parsons, 1995.) This report presents the results of a more detailed investigation of SEAD-16 and SEAD-17. The fourth report is the Final Closure Report for the Underground Storage Tank Removal (Science Applications International Corporation, May 1994.) This report describes the removal of two USTs at SEAD-16 and presents the confirmatory sampling records and chemical analyses associated with the closure. The fifth report, the Remedial Investigation Report (Parsons, March 1999), presents the results of the remedial investigation program and estimates the potential risk to human health and the environment.

The nature and extent of the chemicals of concern at SEAD-17 were evaluated through a comprehensive field investigation program. Primary media investigated at SEAD-17 included surface soil, subsurface soil, surface water and sediment, and groundwater. Samples collected during the ESI and the RI were screened against available standards, criteria and guidelines. This screening effort identified constituents and media that may have the potential to cause unacceptable risk.

For soil, the concentrations established by the NYSDEC Technical Administrative Guidance Memorandum (TAGM) values, HWR-94-4046, Revised January 24, 1996. TAGM values were used for screening of site contaminants because these concentrations are levels at which the NYSDEC considered reasonable alternatives to pre-disposal conditions. For groundwater, the NYSDEC Class GA groundwater standards were used for comparison. For surface water, the Class C surface water standards were considered. For sediment, the NYSDEC Sediment Criteria described in the NYSDEC, Division of Fish, Wildlife and



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
44.9 SS17-6 SURFACE SOIL SAMPLE WITH CHEMICAL CONCENTRATION (ppm)
500 CHEMICAL CONCENTRATION CONTOURS (DASHED WHERE INFERED)
REJECTED DATA

25 0 25 50
1' = 50 FEET

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
RI/FS
SEAD-17 ACTIVE DEACTIVATION FURNACE

DEPT ENVIRONMENTAL ENGINEERING	Dwg. No. 729685-01001

FIGURE B2.2
SEAD-17 DISTRIBUTION OF LEAD IN SURFACE SOILS

SCALE 1" = 50'	DATE JANUARY 1997	REV A

Marine Resources, *Technical Gudance for Screening Contaminated Sediments, January, 1999.* For metals in sediment, the Lowest Effect Level (LEL) was used for comparison.

A brief summary of the analytical results is presented below. A detailed description of the analytical results is presented in the SEAD-16 and SEAD-17 Remedial Investigation Figure B5.2 shows theReport (Parsons, March 1999).

Figure B2.2 show the soil sampling location's highest concentration values for lead at SEAD 17.

Metals were found to be pervasive in the surface and subsurface soils at SEAD-17. Based on the RI and ESI data, twenty-one metals were detected in the surface soils at concentrations above their respective TAGM values. Antimony, arsenic, copper, lead, mercury, and zinc were detected in almost all of the surface soil samples at concentrations above their respective TAGM values. The metals were generally evenly distributed around Building 367, although some of the highest concentrations were located immediately to the southwest of the building. A potential source for the high concentrations of metals in this area of the site may be the discharge pipe, which has an outfall near sample SS17-18 and drains the retort inside Building 367. In the subsurface soils, lead was detected at concentrations above the TAGM value in all samples analyzed. Two SVOC parameters were detected at four surface soil sampling locations and one pesticide parameter was detected at two surface soil sampling locations above their respective TAGM value.

Based on the RI data, the groundwater at SEAD-17 has not been significantly impacted by any of the chemical constituents. Low concentrations of SVOCs were detected below the NYSDEC AWQS Class GA and federal MCL groundwater standard. Six metals (aluminum, iron, lead, manganese, sodium, and thallium) did exceed the groundwater standard. It should be noted that SEAD-17 monitoring wells were resampled on October 30, 1999 and analyzed for thallium. The results indicate that all groundwater samples had a thallium concentration at the detection limit of 1.5 ug/l, which is less than the EPA MCL (2 ug/l). Additionally, no VOCs, pesticides, PCBs, or nitroaromatics were detected in the groundwater.

Surface water impacts were not widespread and many of the chemical constituents analyzed for were not detected in the samples. Most of the impacts from metals occurred in the surface water samples from the drainage ditch south of the Deactivation Furnace. No VOCs, pesticides, PCBs, or nitroaromatics were detected in the samples. Copper, iron, lead, and selenium were detected at concentrations above the NYSDEC AWQS Class C surface water standard.

Sediment impacts were from SVOCs, pesticides, and metals. Impacts from SVOCs were most significant at one location in the drainage ditch, in the northeastern corner of the site. Pesticides were found in the drainage ditches in the western and northeastern portions of the site. Metals were found in sample SW/SD17-3, located in the drainage ditch in the eastern portion of the site. Antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc were detected at concentrations above the NYS LEL. No PCBs or nitroaromatics were detected.

B2.1.3 SEAD-45

SEAD-45 has been described in six investigations. The purpose of the previous investigations described below, which were performed over a period of approximately 16 years was to determine if previous activities at SEAD had impacted soil, groundwater, sediment or surface water at SEAD-45.

The first study was conducted in 1979 in which groundwater and surface water from Reeder Creek were sampled and analyzed. The second study was a 1982 study conducted by the USAEHA. Eight soil samples were collected from the demolition mound. The third study was conducted between 1982 and 1987. Monitoring wells MW-1 through MW-5 were sampled on a quarterly or semi-annual basis. The fourth study was conducted in 1988 by Metcalf and Eddy. Monitoring wells MW-1 through MW-5 were sampled as part of an investigation involving the OB Grounds. The fifth study was conducted as part of the OB Grounds Remedial Investigation in which surface water and sediment samples were collected from drainages into Reeder Creek and from Reeder Creek itself. The sixth study was an Expanded Site Inspection (ESI) conducted by Parsons in 1993. This study involved completing 14 test pits in and near the demolition mound; installing four groundwater monitoring wells up and downgradient of the demolition mound; and the collection of surface soil, subsurface soil, surface water, groundwater, and sediment samples. A geophysical investigation was conducted across the OD Grounds, including the OD mound, to locate any subsurface features. The test pits excavated in the mound uncovered various components of high explosives and fuzes. The test pits excavated away from the detonation mound located the electrical conduits that served the previous locations of the detonation mound.

Soil Data

The first soil samples taken from the detonation mound in 1982 detected no metals at concentrations exceeding the Extraction Procedure Toxicity Limits. There were, however, three explosive compounds and the decay product of an explosive compound detected in these samples. Explosives were also found in each sample. RDX was found at concentrations of 1.4 to 1.7 ppb, Tetryl at 1.6 to 16.3 ppb, 2,4,6-TNT at 2.2 to 61 ppb, and 2,4-DNT at 1.1 to 19 ppb.

The five subsurface samples taken from the demolition mound during the ESI in 1993 contained high concentrations of explosive compounds and metals, notably cadmium, copper, mercury, and silver. The surface soil samples taken from nine locations at the site also contained high concentrations of explosive compounds, cadmium, copper, and mercury.

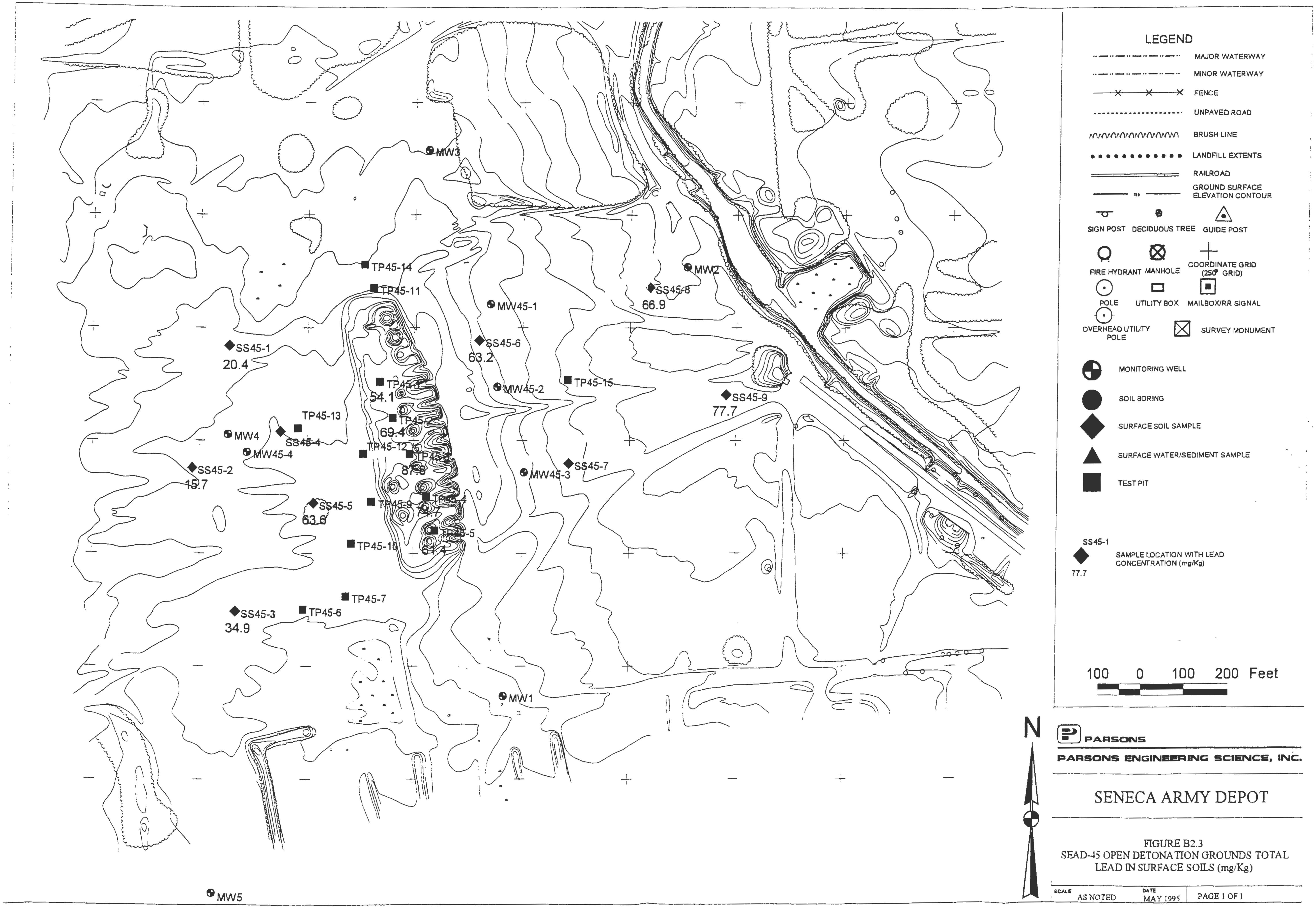
Table B2.2.3
SEAD 45 Summary of Analytes Detected in Soil
Seneca Army Depot

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-1 202506	SOIL SEAD-45 0-0.2 10/25/93 SS45-2 202507	SOIL SEAD-45 0-0.2 10/25/93 SS45-3 202508	SOIL SEAD-45 0-0.2 10/25/93 SS45-4 202509	SOIL SEAD-45 0-0.2 10/25/93 SS45-5 202512	SOIL SEAD-45 0-0.2 10/25/93 SS45-10 202517 SS45-5DUP	SOIL SEAD-45 0-0.2 10/25/93 SS45-6 202511
NITROAROMATICS										
HMX	ug/kg	470	NA	130 U	130 U	130 U	130 U	120 J	140 J	130 U
RDX	ug/kg	5800	NA	130 U	130 U	100 J	82 J	280 J	290 J	1800
1,3,5-Trinitrobenzene	ug/kg	190	NA	130 U	130 U	100 J	100 U	130 UJ	130 UJ	120 J
Tetryl	ug/kg	330	NA	130 U	130 U	130 U	90 J	130 UJ	130 J	330
2,4,6-Trinitrotoluene	ug/kg	1400	NA	130 U	130 U	96 J	130 U	84 J	80 J	190
4-amino-2,6-Dinitrotoluene	ug/kg	270	NA	130 U	130 U	130 U	130 U	130 UJ	130 UJ	130 U
2-amino-4,6-Dinitrotoluene	ug/kg	680	NA	130 U	130 U	99 J	130 U	280 J	270 J	590
2,4-Dinitrotoluene	ug/kg	190	NA	130 U	130 U	130 U	110 J	150 J	140 J	160
METALS										
Arsenic	mg/kg	8.2	7.5	5	5.5	5.1	5.1	6.2	6.4	5.5
Barium	mg/kg	365	300	122	194	115	143	161	151	160
Cadmium	mg/kg	13.1	1	2.8	2.4	1.1	3.9	9.5 J	9.5 J	8.8
Chromium	mg/kg	39.3	24	24.1	39.3	27.4	22.9	26.9	23.8	24.2
Copper	mg/kg	1240	25	79.4	192	55.8	155	538	405	491
Lead	mg/kg	87.8	30	20.4	15.7	12	34.9	63.6	54.9	63.2
Mercury	mg/kg	4.3	0.1	0.43	0.63	0.17	0.43	1.5 J	2.1 J	2.4
Nickel	mg/kg	51	37	29.4 R	41.3 R	40.5	35.2 R	40.5	36.4	34.2 R
Silver	mg/kg	26.2	0.5	1.3 UJ	1.5 UJ	2.1	1 UJ	3.5 J	2.7 J	4.3
Zinc	mg/kg	557	90	148 R	122 R	115 R	208 R	427	361	347 R
Cyanide	mg/kg	8.3	NA	0.56 U	0.57 U	0.58 U	0.54 U	0.72 U	0.67 U	0.52 U

Table B2.2.3
SEAD 45 Summary of Analytes Detected in Soil
Seneca Army Depot

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	TAGM	SOIL SEAD-45 0-0.2 10/25/93 SS45-9 202516	SOIL SEAD-45 3 11/08/93 TP45-1 203646-203648	SOIL SEAD-45 3 11/08/93 TP45-11 203656-203658 TP45-1DUP	SOIL SEAD-45 3 11/08/93 TP45-2 203650-203652	SOIL SEAD-45 3 11/08/93 TP45-3 203654	SOIL SEAD-45 3 11/09/93 TP45-4 204026-204028	SOIL SEAD-45 3 11/09/93 TP45-5 204030-204032
NITROAROMATICS										
HMX	ug/kg	470	NA	130 UJ	250 J	430 J	470 J	240 J	350	200
RDX	ug/kg	5800	NA	5800 J	2500 J	1600 J	2700 J	2500 J	4300	1300
1,3,5-Trinitrobenzene	ug/kg	190	NA	130 UJ	150 J	170 J	190 J	130 UJ	180	140
Tetryl	ug/kg	330	NA	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 U	180 J
2,4,6-Trinitrotoluene	ug/kg	1400	NA	1400 J	330 J	340 J	600 J	400 J	330	280
4-amino-2,6-Dinitrotoluene	ug/kg	270	NA	270 J	130 UJ	130 UJ	130 UJ	130 UJ	130 U	130 U
2-amino-4,6-Dinitrotoluene	ug/kg	680	NA	130 UJ	430 J	430 J	680 J	530 J	480	350
2,4-Dinitrotoluene	ug/kg	190	NA	130 UJ	130 UJ	140 J	190 J	120 J	110 J	90 J
METALS										
Arsenic	mg/kg	8.2	7.5	6.1	6.8	6.3	7.1	8.2	6 J	5.1 J
Barium	mg/kg	365	300	202	208	177	201	248	216	174
Cadmium	mg/kg	13.1	1	5.5 J	10.4 J	9.6 J	9.5 J	13.1 J	10.9 R	7.4 R
Chromium	mg/kg	39.3	24	27.4	31.3	25.7	30.1	35.5	32.1	27.6
Copper	mg/kg	1240	25	267	722	555	561	791	1240 J	449 J
Lead	mg/kg	87.8	30	77.7	54.1	73.3	69.4	87.8	74.7	61.9
Mercury	mg/kg	4.3	0.1	1.9 J	3.1 J	1.4 J	3.1 J	4 J	3.6	4.3
Nickel	mg/kg	51	37	42.5	41.8	39.1	40.5	51	48.3	39.2
Silver	mg/kg	26.2	0.5	1.3 J	3.2 J	4.7 J	5 J	6.6 J	26.2 J	3.9 J
Zinc	mg/kg	557	90	383	345	360	390	538	557 J	333 J
Cyanide	mg/kg	8.3	NA	0.7 U	0.7	0.54 U	0.55 U	0.55 U	0.62	0.51 U

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) U = Compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.



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SENECA ARMY DEPOT

FIGURE B2.3
SEAD-45 OPEN DETONATION GROUNDS TOTAL LEAD IN SURFACE SOILS (mg/Kg)

SCALE	DATE	
AS NOTED	MAY 1995	PAGE 1 OF 1

LEGEND

- MAJOR WATERWAY
- MINOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR
- SIGN POST
- DECIDUOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- COORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT
- MONITORING WELL
- SOIL BORING
- SURFACE SOIL SAMPLE
- SURFACE WATER/SEDIMENT SAMPLE
- TEST PIT

SS45-1 / 7470 — SAMPLE LOCATION WITH TOTAL EXPLOSIVES CONCENTRATION (mg/Kg)

100 0 100 200 Feet

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SENECA ARMY DEPOT

FIGURE B2.4
SEAD-45 OPEN DETONATION GROUNDS TOTAL EXPLOSIVES IN SURFACE SOILS (ug/Kg)

SCALE	DATE	
AS NOTED	MAY 1995	PAGE 1 OF 1

Fourteen of the 16 soil samples analyzed had cadmium concentrations above the criteria value of 1 ppm. The highest cadmium concentration was identified in sample TP45-3, where 13.1 ppm was reported. This test pit soil sample was collected from the center of the OD mound. This sample also had elevated concentrations of all the other metals of note, and had the highest detected concentrations of lead, nickel, and vanadium, and the second highest detected concentrations of copper and mercury. In all of the soil samples collected, copper and mercury exceeded TAGM criteria. The subsurface samples taken from the mound contained the highest concentrations for both of the metals. In general, the highest concentrations for all of the metals were found in the samples collected from the five test pits completed in the OD mound. The exception was chromium, where the highest concentration (39.3 ppm) was found in the surface soil sample SS45-2, collected west of the OD mound. Even though the highest metals concentrations were in the test pit soil samples, there were TAGM exceedances in the surface soil samples as well. The highest metals concentrations in the surface soil samples were in the samples SS45-5, collected just west of the OD mound, and SS45-6 and SS45-9, collected east of the OD mound.

The evaluation of the information collected to date indicates that metals and explosive compounds have been transported away from the demolition mound. Surface water transport may be a significant pathway by which soil is eroded from the demolition mound, and the unvegetated nature of the OD Grounds suggests that wind erosion may also be a pathway by which contaminants are transported from the mound to the surrounding surface soil. No air monitoring has been performed during a detonation event, so air has not been evaluated as a transport pathway. Aside from the samples taken from the test pits at the demolition mound, no subsurface soil sampling was conducted at the site. There is no information, therefore, about the vertical extent of the contamination.

Refer to Table B2.1.3 for a Summary of Analytes Detected in Soil at SEAD 45. Locations of lead concentrations are shown in Figure B2.3 and for copper in Figure B2.4.

Groundwater Data

When originally sampled in 1979, the monitoring wells MW-1 to MW-4 contained iron in excess of New York State Ground Water Standards (NYSGWS). Each of the monitoring wells, as well as samples taken from Reeder Creek, also contained explosive compounds.

Groundwater sampling conducted from 1982 through 1988 detected no explosive compounds in the monitoring wells, but NYSGWS were exceeded for metals in MW-1 (chromium, iron, lead), MW-2 (manganese, lead), MW-3 (lead), MW-4 (cadmium, chromium, lead), and MW-5 (chromium, manganese, lead, selenium). Verbal communication with USAEHA suggests that the collected groundwater samples were invalid due to high turbidity.

During the Quarterly Sampling Program for the OB Grounds, explosive compounds were detected on two different occasions in MW-4. Groundwater standards were exceeded for metals in MW-1 (iron, mercury), MW-2 (iron, mercury, antimony), MW-3 (iron), MW-4 (iron, magnesium, sodium), and MW-5 (iron). In most of the samples collected in January 1993, various metals, including iron, mercury, and zinc were found exceeding NYSGWS. These samples were extremely turbid, and the validity of the samples is questionable.

During the groundwater sampling program conducted for the ESI, explosive compounds were detected in MW-1 and MW-5. MW-1 contained 0.5 ppb HMX and MW-5 contained 0.067 ppb 1,3-dinitrobenzene. A variety of metals, particularly antimony, iron and manganese were found to exceed the NYSGWS in each of the eight monitoring wells sampled.

Cadmium, chromium, iron, lead, manganese, mercury, selenium, sodium, and zinc have all been detected in the OD monitoring wells at concentrations exceeding the NYSGWS, but no explosive compounds have been detected at concentrations exceeding the NYSGWS. Since explosive compounds are not naturally occurring compounds it must be concluded that they are the result of demolition activities carried out in the OD Grounds. Monitoring wells MW-1 and MW-5 lie between the detonation ground and the burning pads and could reflect the result of activities conducted at either area, but the remaining six monitoring wells discussed above are primarily influenced by the OD Grounds. This groundwater data suggests that metals and explosive compounds have leached from the demolition mound into the on-site groundwater.

Surface Water Data

Surface water sampling that was conducted during the OB RI detected both an explosive compound and metals in areas influenced by runoff from the OD mound. The surface water samples were taken from standing water in an area between the OB Grounds and the OD Grounds, from drainage swales leading from the OD mound into Reeder Creek, and from Reeder Creek itself. RDX was the only explosive compound found. It was detected in SW-120 (0.67 ppb), collected from Reeder Creek, and SW-160DL 9.4 ppb), collected from standing water between the OB Grounds and the OD Grounds. New York State has no water quality guideline for RDX in Class D surface water. Various metals were detected, but only SW-290, a sample from a drainage swale leading into Reeder Creek, contained metals (Cu, Fe) in concentrations above New York State guidelines.

Surface water samples taken during the ESI conducted at SEAD-45 detected both explosive compounds and metals as well. The surface water samples were collected from drainage ditches leading from the demolition mound to Reeder Creek and from standing water near the mound. The explosive compounds RDX and HMX were detected in SW45-2, collected from a drainage between the demolition mound and Reeder Creek; RDX was detected from SW45-1, located in the same drainage swale that SW-290 was collected. HMX was detected in SW45-3 collected from standing water between OB and OD where SW-160DL was collected. Two explosives, HMX and RDX were detected in three of the surface water samples. SW45-1 contained 0.24 ppb RDX, SW45-2 contained 0.45 ppb HMX and 2 ppb RDX, and SW45-3 contained 0.49 ppb HMX.

Metals including aluminum, cadmium, copper, iron, lead, mercury, and zinc were found in the surface water. Of those, aluminum, iron, and mercury exceeded New York State guidelines in each of the four samples collected, and copper exceeded New York State guidelines in three of the four samples.

Explosive compounds and metals have been detected in standing water near the demolition mound, in water draining from the demolition mound, and in the Reeder Creek, which is the main transport pathway of water from the site. Some of the standing water collected and the water taken from Reeder Creek is in the area influenced by both the OB and the OD Grounds, and contamination could be a result of activities at either area. The surface water data suggests that surface runoff via overland flow is a significant pathway for contaminants to be transported away from the demolition mound and off of the site.

Sediment Data

Sediment samples for the OB RI were collected from the same locations as the surface water samples were collected for the OB RI. Two explosive compounds were detected in SD-290, located in a drainage swale leading from the demolition mound into Reeder Creek. HMX was detected at a concentration of 130 ppb, and 2-amino-4,6-dinitrotoluene was detected at a concentration of approximately 85 ppb. No explosive compounds were detected in the surface water collected at that location, but metals exceeding New York State surface water guidelines were found there. Six explosive compounds were detected at SD-190, collected in a drainage ditch between the OB and OD Grounds. The explosive compounds detected were HMX (120 ppb), RDX (500 ppb), 2,4,6-trinitrotoluene (100 ppb), 4-amino-2,6-dinitrotoluene (160), 2-amino-4,6-dinitrotoluene (180 ppb), and 2,4-dinitrotoluene (98 ppb). This location was dry at the time of sampling, so there is no surface water data from this location.

Metals exceeding NYSDEC sediment criteria were found at each of the nine sediment locations sampled for the OB RI. These metals were arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc. Copper and iron exceeded NYSDEC criteria in eight of the nine samples, and lead, nickel, and zinc exceeded NYSDEC criteria in seven of the nine samples.

Sediment samples collected during the ESI conducted at SEAD-45 were also collected at the same location as the corresponding surface water sample. Explosive compounds were detected at only one of the sample locations, SD45-2. Five explosive compounds were detected there, RDX (210 ppb), Tetryl (140 ppb), 2,4,6-trinitrotoluene (120 ppb), 2-amino-4,6-dinitrotoluene (260 ppb), and 2,4-dinitrotoluene (83 ppb). The surface water sample at that location also contained explosive compounds.

Metals in excess of NYSDEC sediment criteria were detected at three of the four sampling locations. SD45-2, SD45-3, and SD45-4 each contained copper and mercury in excess of NYSDEC criteria SD45-2 also contained cadmium and iron, and SD45-4 also contained cadmium.The explosive compounds and metals detected in the sediment does not correlate directly with the explosive compounds found in the surface water samples, but the contaminants found in each of the two mediums do suggest that the contaminants are being transported by the surface water and are being deposited in the drainages leading from the demolition mound.

B2.1.4 SEAD-46

SEAD-46, the small arms range, is discussed in the SWMU Classification Report for Seneca Army Depot Activity (Parsons, 1994). This report does not provide any detailed information about the site, but it does provide clues to it current and past uses. The report states that the range was used for testing fire tracers. An unknown number of 3.5-inch rockets were fired into an earthen berm at one end of the range. It further states that the area is occasionally used for training troops, however, blank ammunition was used during training practices. The report also discusses other characteristic of the contaminants of concern at the site, the details of which are discussed in other sections of this report.

A Remedial Investigation was conducted in late 1999, but data is not yet avalible.

From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site, and the potential for impacts to surface water and sediment exists due to the direction of surface water run-off and the proximity of the Duck Pond.

The potential contaminants of concern at SEAD-46 are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been verified at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.5 SEAD 57

An Expanded Site Inspection (ESI) was conducted by Parsons Engineering Science, Inc. in 1993 and 1994 at the Explosive Ordnance Disposal Area. The results of the ESI are presented in the draft final Three Moderately High Priority SWMUs Expanded Site Inspection Report (Parsons, June 1995). Chemical analyses were performed on a total of nine surface soil samples, eleven subsurface soil samples and three groundwater samples as part of the ESI.

Refer to Figures B2.5 for locations and concentrations of lead in soils, and Figure B2.6 for locations and concentrations of copper.

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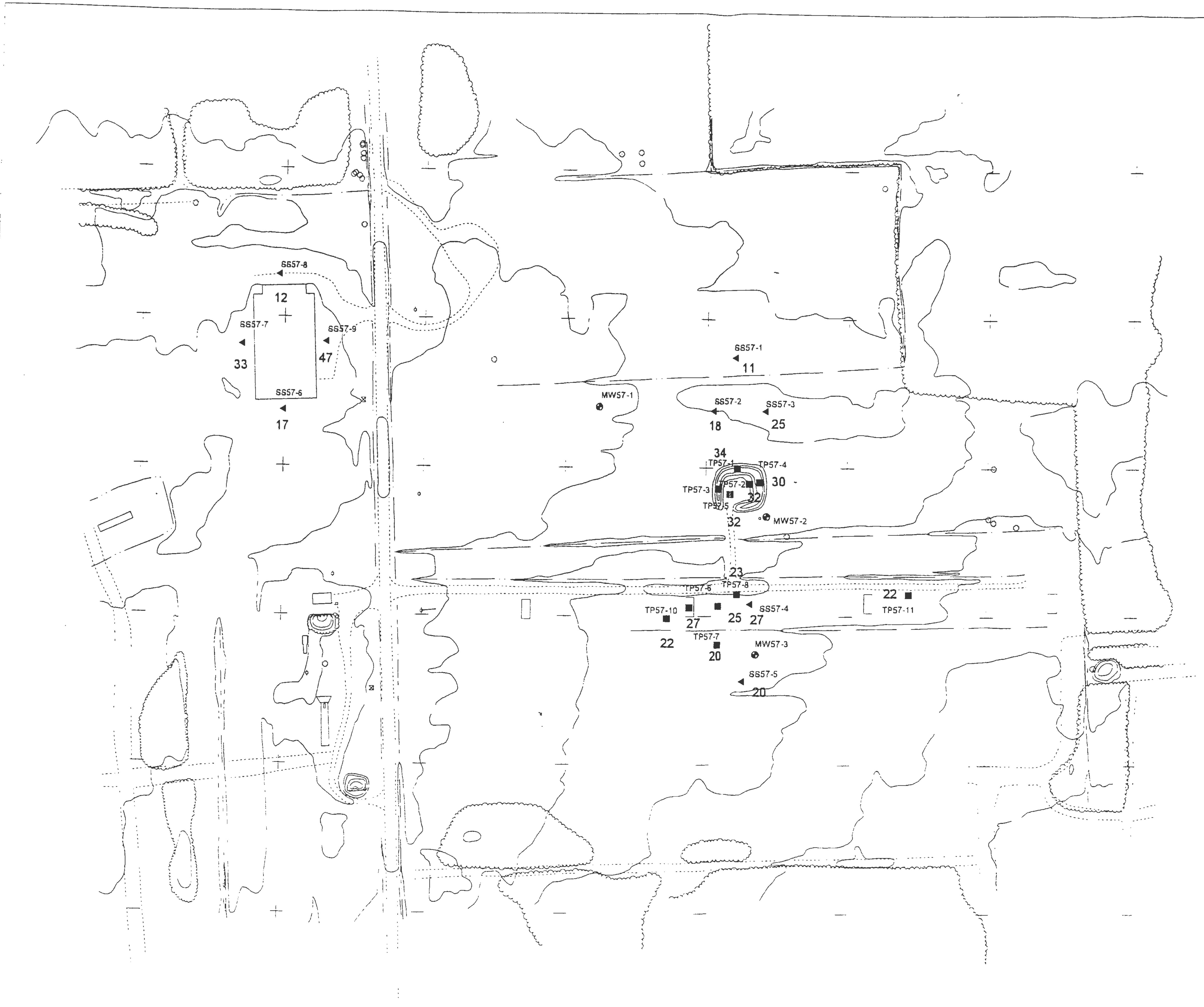
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING DWG NO. 736"03-01000

FIGURE B2.5
SEAD-57 EXPLOSIVE ORDINANCE
DISPOSAL AREA
LEAD IN SOILS (mg/Kg)

SCALE 1" = 200' DATE JUNE 1995



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENT
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT

TP57-1
60.9
SAMPLE LOCATION WITH ID AND CONCENTRATION (ppm)

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SENECA ARMY DEPOT ACTIVITY

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FIGURE B2.6
SEAD-57 EXPLOSIVE ORDINANCE DISPOSAL AREA
COPPER IN SOILS (mg/Kg)

SCALE 1" = 200'	DATE JUNE 1995

Eleven test pits were excavated at SEAD-57: three on the berm (TP57-1, 3, and 4), two within the detonation area (TP57-2 and 5), five in the depressed area (TP57-6 to 10), and one at a background location (TP57-11). Seven of the eleven test pits were located at anomalies detected during the geophysical surveys in these three areas.

Based on the results of the ESI, it appears that the site soil and groundwater have been impacted by the release of metals. In particular, the metals aluminum, chromium, copper, lead, nickel, potassium and zinc were identified at concentrations which were significantly above TAGM values and/or present above the TAGM value in a large number of soil samples. The test pit sample TP57-2, which was collected from within the bermed enclosure, contained copper, lead, and zinc concentrations which exceeded their respective TAGM values by at least an order of magnitude.

The results of the groundwater sampling program at SEAD-57 indicated that antimony was present in the groundwater collected from MW57-1 and MW57-3 at concentrations which exceeded both MCL and NY AWQS Class GA criteria. Additionally, magnesium and manganese were detected in the groundwater sample collected from MW57-2 at concentrations which exceeded their respective NW AWQS Class GA criteria.

Surface Soil

Constituents which were detected in the surface soil at SEAD-57 include VOCs, SVOCs, pesticides, one PCB compound, metals, and nitrate/nitrite nitrogen. Of all the compounds detected, only metals were found at concentrations which exceeded their respective TAGM values. No herbicides or nitroaromatic compounds were detected in the surface soil samples. The metals aluminum, chromium, copper, iron, lead, potassium, nickel and sodium were detected at concentrations that only slightly exceeded their respective TAGM values in one or more samples. The metal silver, however, was detected in the sample SS57-1 at a concentration of 1.7 mg/kg, which significantly exceeds the TAGM value of 0.5 mg/ kg.

Subsurface Soil

Subsurface soil at the site has been impacted primarily by metals. Other constituents that were detected include VOCs, SVOCs, pesticides, herbicides, and nitrate/nitrite-nitrogen. All of these constituents other than metals are not considered to be significant because they were detected at concentrations which are below their respective TAGM values.

Of the 22 metals reported in soil, 15 of these were found in one or more samples at concentrations above their respective TAGM values. While several of these exceedances were found in only one or two samples, or were only marginally above the TAGM value, several metals were identified at significant concentrations and/or in a large number of potassium which were detected in a large percentage of the samples at concentrations exceeding their respective TAGM values. Copper, lead and zinc were detected at concentrations which were an order of magnitude or greater above their respective TAGM values. The highest concentrations of these (copper at 2930 J mg/kg, lead at 1860 mg/kg and zinc at 1250 J mg/kg) were detected in test pit sample TP57-2.

Groundwater Data

The major constituents of concern detected in the groundwater at the site are inorganic elements. Other constituents that were detected include SVOCs and nitrates. These latter constituents were considered to be insignificant because they are present at low concentrations which were below their respective criteria values. Constituents that were not detected in the groundwater include VOCs, pesticides, PCBs, herbicides, and nitroaromatic compounds.

Antimony was found in two of the three groundwater samples at concentrations above the criteria value. The maximum concentration for antimony, 44.7 μg/L, was found in the groundwater sample collected from monitoring well MW57-1.

The metals magnesium and manganese were found in one of the groundwater samples at concentrations above the criteria value. The maximum concentration for magnesium, 36,900 μg/L, and the maximum concentration for manganese, 327 μg/L, were found in the groundwater sample for monitoring well MW57-2.

B2.1.6 Grenade Range

No analytical data exists for the Grenade Range. From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site, and the potential for impacts to surface water and sediment exists due to the direction of surface water run-off.

The potential contaminants of concern at the Grenade Range are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been detected at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.7 EOD Area #2

No analytical data exists for EOD Area #2. From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site, and the potential for impacts to surface water and sediment exists due to the direction of surface water run-off and the proximity of the Duck Pond.

The potential contaminants of concern at EOD Area #2 are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been detected at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.8 EOD Area #3

No analytical data exists for EOD Area #3. From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site, and the potential for impacts to surface water and sediment exists due to the direction of surface water run-off and the proximity of the Duck Pond.

The potential contaminants of concern at EOD Area #3 are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been detected at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.9 Burial Area Near Indian Creek

No analytical data exists for the Burial Area Near Indian Creek. From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site, and the potential for impacts to surface water and sediment exists due to the direction of surface water run-off and the proximity of Indian Creek.

The potential contaminants of concern at the Burial Area Near Indian Creek are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been detected at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.10 Demolition Area Near SEAD-57

No analytical data exists for the Deomolition Area Near SEAD-57. From the information available concerning activities at the site and the nature of the materials used at the site, a threat to human health and the environment may exist. The potential for impacts to surface soil exists due to the way in which materials were handled a the site.

The potential contaminants of concern at the Demolition Area Near SEAD-57 are explosive compounds, metals, and SVOCs, and the environmental fate of these potential contaminants of concern is discussed below. Although explosive compounds have not been detected at the site, explosive compounds are still considered potential contaminants of concern because material containing explosive compounds was handled.

B2.1.11 Toxicity of Chemicals of Concern

The following is a summary of the toxic effects of these compounds. Exposure limits are given in Table B2.2.

Arsenic - Arsenic becomes a skin irritant with prolonged exposure: moist areas of the skin; respiratory mucosa; angles of eyes, ears, nose, and mouth; and the wrists being common sites of irritation. Acute exposure symptoms include abdominal pain, vomiting, and watery diarrhea followed by shock due to fluid loss. Acute inhalation exposure can cause chest pain, coughing, giddiness, and general weakness which precede gastrointestinal symptoms. Symptoms of chronic inhalation exposure proceed in three phases. Initial symptoms are weakness, loss of appetite, occasional nausea and vomiting, and some diarrhea. The second phase consists primarily of irritant effects of the eyes, nose, and respiratory passages, with perforation of the nasal septum common, and allergic reactions of the skin. The third phase consists of peripheral neural effects, usually numbness. Arsenic has been causally associated with skin cancer and implicated in increases in the incidence of lung cancer.

Barium - Barium and its compounds are highly toxic. Acute symptoms are excessive salivation; vomiting; colic; diarrhea; convulsive tremors; slow, hard pulse; and elevated blood pressure. Bleeding in the stomach, intestines, and kidneys may occur. Chronic exposure results in enlargement of the liver and spleen, and increases in white blood cell counts. Barium has been found to produce lung cancer in rats.

Cadmium - Cadmium compounds induce vomiting at low oral doses and systemic oral poisoning is rare. Acute exposure can occur by inhalation, producing irritation in the respiratory tract followed hours later by coughing, chest pain, sweating and chills and, later, general weakness, severe respiratory irritation, and fluid build up in the lungs. These symptoms can lead to emphysema or death. Chronic exposure can lead to emphysema, kidney damage, and possible heart and blood pressure effects. Animal studies have shown cadmium to produce cancer, birth defects, testicular atrophy, and liver and nerve damage. Some studies in man have shown an association of cadmium exposure with cancers of the prostate and kidney.

Chromium - Chromium compounds can act as allergens, resulting in local irritation of the skin and respiratory tract. Systemic effects are generally a result of the irritating properties of chromium compounds on the eyes, nose, and respiratory tracts. Chromium compounds has been shown to be carcinogenic in rats and has been associated with increases in lung cancer in humans. The irritant and carcinogenic effects differ widely for various compounds of chromium.

Copper - Copper is a soft, heavy metal which occurs naturally as a variety of salts, as well as in the pure metallic form. Copper is an essential trace element in humans and animals. Copper salts are irritating to the skin and cause itching, erythema, and dermatitis. They may cause conjunctivitis, ulceration and clouding of the cornea. Metallic copper can cause keratinization of the hands and soles of the feet. Inhalation of copper fumes can cause congestion of the nasal mucous membranes and perforation of the septum. Ingestion causes irritation of the gastrointestinal tract, producing nausea, vomiting, gastritis, and diarrhea. If vomiting fails to occur, gradual absorption from the bowel may cause systemic poisoning. The systemic effects of copper include capillary damage, kidney and liver damage, and excitation followed by depression. Jaundice and hemolytic anemia can also occur following acute poisoning.

Mercury - Mercury is a local irritant of skin and mucous membranes any may be a skin sensitizer in some people. Acute poisoning symptoms are generally irritant: acute inhalation exposure results in inflammation of the lung and bronchioles. Chronic exposure symptoms are non-specific: weight loss, appetite loss, memory loss, insomnia, indigestion, weakness, metallic taste in mouth, tremors in eyelids, fingers, lips, or tongue, and loosening of teeth. Symptoms may vary among individuals. Long-term or high dose exposures can produce irritability, delirium, anxiety, or manic depressive psychosis.

Nickel - Dermal exposure to nickel and nickel compounds results in contact dermatitis and chronic eczema. Nickel and its compounds are also irritants to the conjunctiva of the eye and mucous membranes of the upper respiratory tract. Chronic exposure to elemental nickel and its salts may result in lung and nasal passage cancer. Effects are also seen on the heart, muscles, brain, and kidney.

Selenium - Selenium and various selenium compounds can effect the body if inhaled, if they come into contact with the eyes or skin, or if swallowed. Selenium compounds if inhaled in large quantities can cause severe breathing difficulties. Skin contact can cause burns or rashes. Long-term exposure can cause paleness, stomach disorders, coated tongue, and nervousness. Fluid in the abdominal cavity, damage to the liver and spleen have been reported in animals.

Explosives

HMX - The chemical name of HMX is octahydro-1,3,5,7 -tetranitro -1,3,5,7 -tetrayocine. Considered a poison by ingestion or intravenous injection, HMX remains an explosive of concern to many industries who handle this compound. At high temperatures, HMX decomposes violently and emits toxic fumes such as oxides of nitrogen ($NO_{x)}$.

RDX - The chemical name of RDX is hexahydro-1,3,5 -trimethyl -1,3,5 -triazine. The solubility of RDX in water at 18° was found to be 44.7 ppm and hydrolysis is slow. RDX is a corrosive irritant to the skin, eyes and mucous membranes. Experimental reproductive abnormalities and epileptiform convulsions from exposure have been reported. It is one of the most powerful high explosives in use today. RDX has more shattering power than TNT and is often mixed with TNT as a bursting charge for aerial bombs, mines and torpedoes. When heated to decomposition it emits toxic fumes such as oxides of nitrogen ($NO_{x)}$.

2,4,6-TNT - The chemical name of 2,4,6-TNT is 2,4,6-trinitrotoluene. It is not been known to undergo hydrolysis in the environment. Symptoms of exposure to TNT are sneezing, coughing, sore throat, and muscle pain. TNT effects the blood, liver kidneys, skin, central nervous system, and cardiovascular system. Human systemic effects when ingested include: hallucinations, cyanosis, and gastrointestinal changes. Experimental reproductive abnormalities and mutagenic data have been reported. This chemical has been classified as a skin irritant and has been implicated in aplastic anemia. TNT can cause headaches, weakness, anemia, liver injury and may be absorbed through the skin. TNT is flammable or explosive when exposed to heat or flame. Moderate explosion hazard; will detonate under strong shock. It is a comparatively insensitive explosive, however, sudden heating of any quantity will cause detonation.

2,6-DNT - The chemical name of 2,6-DNT is 2,6-dinitrotoluene. It is not expected to hydrolyze under normal environmental conditions. NIOSH recommends to reduce exposure to DNT to the lowest levels possible. Experimental testing of 2,6-DNT has shown it to be more active as a liver carcinogen than 2,4-DNT isomer. The major target organs are the blood, liver, and central nervous system. Symptoms of exposure include anoxia, cyanos, anemia, and jaundice.

2,4-DNT - The chemical name of 2,4-DNT is 2,4-dinitrotoluene. It is not expected to hydrolyze under normal environmental conditions. 2,4-DNT is poisonous if swallowed or injected subcutaneously. It has been shown to be carcinogenic, teratogenic, and mutagenic in experimental tests. 2,4-DNT can cause anemia, methemoglobinemia, cyanosis, and liver damage. The chemical will combust when exposed to heat or flame; can react with oxidizing materials. There have been cases of explosion during manufacture and storage and mixture with nitric acid is a high explosive. Other mixtures such as alkalies can cause a significant increase in pressure. When heated to decomposition it emits toxic fumes such as oxides of nitrogen ($NO_{x)}$.

B2.1.12 CHEMICAL HAZARD CONTROL

Before intrusive activities are conducted at a forementioned SEAD location the UXOSO will review the site-specific information and discuss with the UXOQCS and SUXOS methods of insuring a safe working environment. Engineering controls will be used to minimze potential exposure:

- Position personnel and equipment upwind of excavation (use wind flag);
- Minimize size of excavation if possible;
- Use disposible PPE (Section B3.1);

- Monitor breathing zones (Section B3.2);

B2.2 UXO HAZARDS/CONTROL

Parsons and USA have analyzed the scope of work tasking to determine the work risk hazards associated with each task. The tasks consist of direct tasks and the implied tasks, or sub tasks, to accomplish the work.

PERFORM OE SURVEY

- plant life; exposure to wildlife, rodents, insects, ticks, and snakes which present the possibility of bites and associated diseases;
- Potential trip hazard associated with Exposure to hazards associated with surface OE. These items if moved or handled improperly could detonate, either killing or seriously injuring personnel;
- Biological hazards: exposure to poison oak, poison ivy, or other types of irritating or toxicground cover, irregular terrain, and vegetation;
- Heat Stress.

PERFORM OE IDENTIFICATION DURING EXCAVATION

- Exposure to hazards associated with buried OE. These items if moved or handled improperly could detonate, either killing or seriously injuring personnel at the work site;
- Biological hazards: exposure to poison oak/ivy or other types of irritating or toxic plant life; exposure to wildlife, rodents, insects, ticks, and snakes which present the possibility of bites and associated diseases;
- Potential trip hazard associated with ground cover, irregular terrain, and vegetation;
- Lifting hazards, such as back strain, associated with handling UXO scrap ;
- Heat Stress.

The following Task Hazard Analyzes Sheets identify the following hazards/risks for the SEDA site:

Hazard Analysis

PROJECT NAME: Seneca Army Depot Activity **CUSTOMER: CEHNC** **ACTIVITY:** UXO Avoidance/Identification		**ANALYZED BY/DATE:** George Spenser - 3/14/00
PRINCIPLE STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED CONTROLS**
Locate, identify, and mark visual surface and subsurface OE.	Potential OE; unplanned detonation. Wildlife, insects. Toxic Plants. Slips, trips, fall. Heat stress. Cuts and scrapes. Sunburn/Windburn. Exposure to contaminated soil.	UXO safety precautions IAW the WP and SSHP. UXO qualified personnel will accompany all non-UXO qualified personnel. Only UXO personnel will handle UXOs; Mark UXO IAW the WP. Do not subject UXO to heat, shock or friction; Do not move armed/fuzed UXO. Avoid toxic plants; Watch for snakes, do not handle wildlife, Wear Level D PPE. Use insect repellent/barrier cream as necessary; Be alert, watch for trip hazards. Dress for the weather; use Buddy system monitoring; Use Sunscreen as necessary. No Smoking except in designated areas. Wear proper PPE to avoid direct contact of contaminated soils.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; first aid kit; fire extinguisher, radio, hand tools, flagging material, PPE as needed. magnetometers.	Daily PMCS and calibration checks. Radio check; inspect first aid kit and extinguishers.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures. UXO identification and safety precautions training for non-UXO trained personnel.

Hazard Analysis

PROJECT NAME: Seneca Army Depot Activity
CUSTOMER: CEHNC
ACTIVITY: UXO Excavation **ANALYZED BY/DATE:** George Spenser - 3/14/00

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavating and identifying contacts. Hand digging. Down hole monitoring.	Potential UXO, unplanned detonation. Slips, trips, and falls. Scrapes and cuts. Heat/Cold Stress. Sunburn/Windburn. Unauthorized personnel within the EZ. Exposure to contaminated soil/dust.	Only UXO technicians will excavate or handle UXO. Personnel in the immediate vicinity of UXO operations will be kept to the minimum necessary for safe operations but no less than two UXO technicians. Only hand excavation permitted within 1 foot of UXO. Check soil borings every two feet for anomalies. If anomaly is detected during down hole monitoring, relocate bore hole. Do not subject UXO to heat, shock or friction. Establish exclusion Zone (EZ); post Warning signs; Stop all UXO operations when non-UXO trained personnel are in the EZ. Wear Level D PPE. Be aware of footing and terrain; avoid obstacles when possible. Dress for the weather. Use Buddy system monitoring. Use sunscreen, insect repellent/barrier cream as necessary. Wear proper PPE(see B3.1). Minimize production of dust, monitor for dust and VOC's as needed (see B3.2).
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; extinguishers; first aid kit; magnetometers; communication equipment. Shovels, picks, trowels. PPE and air monitoring instruments as needed.	Daily PMCS first aid kit contents, extinguishers. Hand tool inspection. Radio or telephone check; calibrate Magnetometers.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures. UXO identification and safety precautions training for non-UXO trained personnel.

Hazard Analysis

PROJECT NAME: Seneca Army Depot
CUSTOMER: CEHNC
ACTIVITY: Disposal Operations **ANALYZED BY/DATE:** George Spenser - 3/14/00

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Transportation of explosives/UXO. Preparing and placing charges. Blow (detonation) In Place (BIP). Venting inert filled UXOs.	Vehicle accident, Fire, unplanned detonation. Slips, Trips, and Falls. Heat/Cold Stress. Noise, fragmentation, debris.	Load/unload vehicle in designated areas. Use authorized explosive route. Placard vehicle. No personnel in cargo compartment. No explosives in passenger compartment. Observe explosives transportation compatibility requirement. Do not fuel when loaded. No smoking. Shut vehicle off and block wheels when loading. Block/brace secure explosives/UXO. Use Demolition Procedures IAW Work Plan, EODB/TM/TO 60A-1-1-31, SOPs. Maintain Exclusion Zone, distance, tamping, personnel shelters, control of shot size. Be aware of obstacles - watch footing.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicles, fire extinguisher, demolition materials, explosives, blocking, bracing, cushioning material.	All equipment and explosives serviceable. Daily PMCS. Vehicle inspection IAW DD Form 626.	EOD trained personnel. Daily tailgate meetings, procedures IAW WP, SSHP, EODB/TM/TO 60A-1-1-31. Valid State driver license. Current OSHA qualification.

Hazard Analysis

PROJECT NAME: Seneca Army Depot **CUSTOMER: CEHNC** **ACTIVITY:** UXO Escort		**ANALYZED BY/DATE:** George Spenser - 3/14/00
PRINCIPLE STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED CONTROLS**
Escort Geophysical/Survey team. Locate, identify, and mark visual surface OE.	Potential OE; unplanned detonation. Wildlife, insects. Toxic Plants. Slips, trips, falls. Heat/cold stress. Cuts and scrapes. Sunburn/Windburn.	UXO safety precautions IAW the WP and SSHP. UXO qualified personnel will accompany all non-UXO qualified personnel. Only UXO personnel will handle UXOs; Mark UXO IAW the WP. Do not subject UXO to heat, shock or friction; Do not move armed/fuzed UXO. Avoid toxic plants; Watch for snakes, do not handle wildlife, Wear Level D PPE. Use insect repellent/barrier cream as necessary; Be alert, watch for trip hazards. Dress for the weather; use Buddy system monitoring; Use Sunscreen as necessary. No Smoking except in designated areas.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; first aid kit; fire extinguisher, radio, hand tools, flagging material.	Daily PMCS and calibration checks. Radio check, inspect first aid kit and extinguishers.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures. UXO identification and safety precautions training for non-UXO trained personnel.

Hazard Analysis

PROJECT NAME: Seneca Army Depot **CUSTOMER: CEHNC** ACTIVITY: Anomaly Investigation		**ANALYZED BY/DATE:** George Spenser - 3/14/00
PRINCIPLE STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED CONTROLS**
Excavating contacts. Hand digging.	Potential UXO, unplanned detonation. Slips, trips, and falls. Scrapes and cuts. Heat/Cold Stress. Sunburn/Windburn. Unauthorized personnel within the EZ. Exposure to contaminated soil/dust.	Only UXO technicians will excavate or handle UXO. Personnel in the immediate vicinity of UXO operations will be kept to the minimum necessary for safe operations but no less than two UXO technicians. Only hand excavation permitted within 1 foot of UXO. Do not subject UXO to heat, shock or friction. Establish exclusion Zone (EZ); post Warning signs; Stop all UXO operations when non-UXO trained personnel are in the EZ. Wear Level D PPE. Be aware of footing and terrain; avoid obstacles when possible. Dress for the weather. Use Buddy system monitoring. Use sunscreen, insect repellent/barrier cream as necessary. Wear proper PPE(see B3.1). Avoid/control making dust. Monitor breathing zone(see B3.2).
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; extinguishers; first aid kit; communication equipment. shovels, picks, trowels, PPE, monitoring instruments	Daily PMCS first aid kit contents, extinguishers. Hand tool inspection. Radio or telephone check; calibrate Magnetometer.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures. UXO identification and safety precautions training for non-UXO trained personnel.

Hazard Analysis

PROJECT NAME: Seneca Army Depot
CUSTOMER: **CEHNC**
ACTIVITY: Heavy Equipment Operation **ANALYZED BY/DATE:** George Spenser - 3/14/00

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Operating Heavy Equipment. Excavating using Earth Moving Machinery (EMM).	Vehicle accident. Potential UXO, unplanned detonation. Wildlife, insects, poison oak and hazardous plants. Slips, trips, and falls. Scrapes and cuts. Heat/Cold Stress. Sunburn/Windburn, exposure to contaminated soil and dust	Only UXO technicians will excavate or handle UXO. EMM will be operated by trained, experienced personnel. Look before backing; be aware of personnel in the area of EMM. Negotiate slopes straight up or down; do not travel across a slope. All controls in traveling position when moving EMM between sites; When excavating, if personnel are in range of bucket, put bucket on the ground and remove hands from the controls; Place blades and buckets on ground when not operating. Wear Level D PPE with hard hat, hearing protection, steel toe footwear, when working in the vicinity of operating EMM. Be aware of terrain; avoid obstacles when possible; take care when mounting/dismounting EMM. Dress for the weather. Use Buddy system monitoring. Use sunscreen, insect repellent/barrier cream as necessary.; Stop all UXO operations when non-UXO trained are in the EZ. Wear proper PPE in contaminated areas. Avoid dusty conditions, monitor for dust and VOC's(see B3.2).
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Earth Moving Machinery (EMM). Communication equipment, fire extinguisher, first aid kit, PPE, air monitoring instruments	Daily PMCS first aid kit contents, extinguishers. Daily PMCS of EMM. Radio check.	OSHA Qualified; UXO personnel are EOD trained. Experienced operators. Daily Tailgate meeting. Daily inspection, maintenance, calibration, of all equipment. Emergency procedures and safe working practices IAW the SSHP. Symptoms and treatment for biological and chemical hazards IAW the SSHP. Daily checks of all communication equipment and emergency contacts.

Hazard Analysis

PROJECT NAME: Seneca Army Depot CUSTOMER: CEHNC ACTIVITY: Perform Quality Control		ANALYZED BY/DATE: George Spenser - 3/14/00
PRINCIPLE STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED CONTROLS**
Quality Control Checking areas. Excavating contacts.	Potential OE, unplanned detonation. Wildlife, insects. Toxic Plants. Slips, trips, falls. Heat/Cold stress. Sunburn/Windburn. Unauthorized personnel within the EZ.	UXO safety precautions IAW the WP and SSHP. Watch for snakes, do not handle wildlife. Use insect repellent; Avoid toxic plants. Wear Level D PPE with gloves when digging; Be alert, watch for trip hazards. Dress for the weather; use Sunscreen, insect repellent/barrier cream as necessary. Do not subject UXO to heat, shock or friction; Only UXO technicians will excavate or handle UXO. Personnel in the immediate vicinity of UXO operations will be kept to the minimum necessary for safe operations. Only hand excavation permitted within 1 foot of UXO; Establish exclusion Zone (EZ); Stop all UXO operations when non-UXO trained are in the EZ.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; extinguishers; first aid kit; communication equipment. shovels, picks, trowels.	Daily PMCS first aid kit contents, extinguishers. Hand tool inspection. Radio or telephone check.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures.

USA Hazard Analysis

PROJECT NAME: SEAD
CUSTOMER: Parsons ES
ACTIVITY: Site Preparation, vegetation clearance **ANALYZED BY/DATE:** George Spenser - 3/14/00

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Vegetation clearance, OE surface clearance.	Potential OE. Wildlife, insects, poison oak. Slips, trips falls. Cuts and lacerations from using cutting tools and brush. Flying debris from grubbing machinery. Noise hazard from gas powered equipment. Heat/Cold Stress. Sunburn/Windburn	Be alert, Mark and report and mark all OE located. Be alert. Watch for snakes, do not handle wildlife. Use insect repellent and barrier cream. Change clothing daily Be alert. Watch for trip hazards; look where you are walking. Keep clear of grubbing machinery. Remain at least 200 feet from the Hydro-Axe and other mechanical grubbing machinery when operating. Wear Level D PPE to include gloves and eye protection. Wear Level D PPE to include: eye and hearing protection, and gloves when operating powered equipment. Use Kevlar chaps when using chainsaw. Dress for the weather. Use sunscreen if necessary. Buddy system monitoring.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicle; heavy equipment grubbing machinery, Hydro-Axe, communication equipment; first aid kit; extinguishers. Hammer and Stakes. Chainsaws, axes, brushhooks, weedeaters.	Daily PMCS IAW Manufacturer's instructions; Radio check. Check chainsaw bar and chain condition, adjustment. check for spark arrestor on all powered equipment. Sharpen all tools	Inspection, maintenance, and adjustment criteria; starting procedures for powered equipment; care, handling and maintenance of cutting tools; required safety equipment for operations; storage and handling of gasoline. MSDSs for gasoline and oil. Daily tailgate meetings, procedures IAW WP, SSHP. Current OSHA qualification.

Hazard Analysis

PROJECT NAME: Seneca Army Depot
CUSTOMER: CEHNC
ACTIVITY: Scrap Inspection and Turn-in **ANALYZED BY/DATE:** George Spenser - 3/14/00

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Recovery and turn-in of OE and non-OE related scrap. Loading vehicles.	Vehicle accident. Potential OE, unplanned detonation. Wildlife, insects. Toxic Plants. Slips, trips, falls. Heat/Cold stress. Sunburn/Windburn. Cuts and lacerations from metal scrap. Lifting hazards.	All scrap inspected by UXO Supervisor and certified by Senior UXO Supervisor. Only UXO technicians will handle UXO; Do not subject UXO to heat, shock or friction. Wear Level D PPE when loading scrap; Wear gloves when handling scrap. No smoking except in designated areas. Be aware of footing and terrain; avoid obstacles when possible. Dress for the weather. Use Buddy system monitoring. Use sunscreen, insect repellent/barrier cream as necessary. Lifting precautions and safe work practices IAW WP SSHP. Use proper lifting techniques.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicles, communication equipment extinguishers, first aid kit, packing material.	Daily PMCS first aid kit contents, extinguishers. Hand tool inspection. Radio or telephone check.	Current state driver license; OSHA Qualifications; UXO personnel are EOD trained. Safe work practices and hazard protection IAW the SSHP. Daily tailgate safety briefings to include evacuation and notification procedures. UXO identification and safety precautions training for non-UXO trained personnel.

UXO HAZARD CONTROL & ACCIDENT PREVENTION

All site personnel will follow the below listed procedures to mitigate the hazards/risks outlined in paragraph B2.2 of the SSHP. Any approach to a suspected UXO will be conducted in accordance with procedures outlined in the U.S. Army Engineering and Support Center (CEHNC) Safety Concepts and Basic Considerations Unexploded Explosive Ordnance (UXO), Revised 16 Feb 96 (see Attachment B-4);

- Any UXO found within the confines of the work area will be positively identified by two UXO qualified technicians;
- UXO items will only be moved or handled by qualified UXO/EOD technicians;
- All personnel will wear as a minimum Level D PPE, sleeves rolled down when in heavy vegetation, leather or canvas work gloves and sturdy work boots. This will minimize contact with potentially irritating and/or toxic plants. In addition to these measures, any person known to have allergic reactions to insect bites or exposure to toxic plants will be identified and will carry appropriate first aid materials at all times;
- While on the job, all personnel will move at a moderate pace and stay alert for possible trip hazards;
- While inspecting suspect OE UXO personnel will ensure equipment and/or truck operators are aware of the UXO Technician's presence;
- If entry to the pit is necessary during excavation, the equipment operator will swing the bucket away from the pit, place the bucket on the ground, and remove his hands from the controls;
- Personnel will avoid, to the maximum extent possible, contact with any wildlife. Should a person become bitten he/she will receive immediate first aid;
- Personnel working in vegetated or wooded areas will be reminded to check themselves for ticks and insect bites after leaving the work area;
- While working on site all personnel will use the "buddy" system. Buddies will be assigned each day prior to beginning work. They will remain in sight of each other at all times to ensure safe working practices. During hazardous operations one buddy will act as a safety observer.

OE SAFETY

These basic safety precautions are the minimum OE safety requirements required of all personnel on site. Other precautions and requirements are in the CEHNC SafetyConcepts and Basic Considerations Unexploded Explosive Ordnance (UXO) at Attachment B-4 and other applicable UXO manuals referenced in this SSHP.

Basic Considerations

The following should be taken into consideration when planning or conducting UXO operations:

- SAFETY IS PARAMOUNT;
- Do not move or disturb unidentified items.
- All OE will be identified independently by two (2) UXO technicians;

- Do not collect souvenirs;
- Do not smoke except in designated areas;
- Do not carry fire or spark producing devices into the site;
- All OE operations will use the "Buddy" system;
- Prohibit unnecessary personnel from visiting the site.

Basic Safety Precautions:

The following safety precautions are applicable to all OE:

- Suspend all operations immediately upon approach of an electrical storm;
- Observe the hazards of electromagnetic radiation (EMR) precautions when working in the vicinity of electrically initiated or susceptible OE;
- Do not handle any UXO unnecessarily;
- Avoid inhalation and skin contact with smoke, fumes, dust, and vapors of detonations and UXO residue;
- Do not attempt to extinguish burning explosives or any fire which might involve explosive materials;
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting OE operations;
- Do not subject OE to rough handling;
- Hand carry no more than two items at a time (one in each hand) and then only as required by the operation being performed;
- Avoid unnecessary movement of armed or damaged OE;
- Avoid the forward portions of munitions employing proximity fuzing;
- Assume unknown fuzes contain cocked strikers or anti-disturbance features.

General Safety Precautions

Projectiles

- Determine if the projectile has been fired and if so consider it armed;
- Check for the presence of unburned tracers;
- Avoid the rear and front of rocket assisted and base ejecting projectiles;

Rockets

- Approach and work on rockets from the side;
- Do not dismantle or strip dud fired rockets or rocket motors;
- Do not expose electrically fired munitions to radio transmissions within 25 feet.
- Approach projectile components such as powder increments, cartridges, and primers with caution.

Grenades

- Do not attempt to re-install safety pins on a dud fired grenade;
- Do not attempt to withdraw impinged firing pins from the fuze of a dud-fired grenade.

B2.3 SAFETY HAZARDS

B2.3.1 Slip, Trip and Fall Hazards

The site may contain slip, trip and fall hazards for site workers, such as:

- Holes, pits, or ditches.
- Slippery surfaces.
- Steep grades.
- Uneven grades.
- Sharp objects, such as nails, metal shards, and broken glass.

Site personnel will be instructed to look for potential safety hazards and immediately contact the UXOSO if hazards are discovered. The UXOSO will inform team members of the locations of slip, trip, and fall hazards during daily site safety briefings.

B2.4 PHYSICAL HAZARDS

B2.4.1 Construction Hazards

Physical hazard awarness and control associated with site activities include:

- Personnel should be cautious of construction debris which may be partially buried or hidden by grass or shrubbery.
- .Personnel must be cautious while working in the vicinity of heavy equipment.
- Personnel should exercise caution while working in the vicinity of a street and near vehicular traffic.

B2.4.2 Safety Hazards

Prior to entry to any work area on-site, USA (UXO Subcontractor) will perform screening (clearance) of areas of interest.

B2.4.3 Heat Stress

B2.4.3.1 Sweating does not cool the body unless moisture is removed from the body. The use of personal protective equipment (PPE) reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. At the Seneca Army Depot site, Level D PPE will be utilized, thus providing minimal increase in the potential for heat stress.

Standard work clothes with long pants, hard hats (when overhead hazard is present), and safety boots (when working around heavy equipment).

B2.4.3.2 Heat related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash occurs because sweat is not evaporating, making the skin wet most of the time. Standing erect and immobile in the heat allows blood to pool in the lower extremities. As a result, blood does not return to the heart to be pumped back to the brain and fainting may occur. Heat cramps are painful spasms of the muscles due to excessive salt loss from profuse sweating. Heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. A person's skin is clammy and moist; and nausea, dizziness, and headaches may be exhibited.

B2.4.3.3 Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red, and spotted. The affected person may be mentally confused, delirious, and convulsions may occur. A person exhibiting signs of heat stroke should be removed from the work area to be shaded area immediately. The person should be soaked with water and fanned to promote evaporation. Medical attention should be obtained immediately. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.

B2.4.3.4 Monitoring of personnel wearing non-breathable coveralls (Tyvek) should begin when the ambient temperature is 70°F or above. Table B2.3 presents the suggested frequency for such monitoring. Monitoring frequency should increase as the ambient temperature increases or as slow recovery rates are observed. Heat stress monitoring should be performed by a person with a current first aid certification who is trained to recognize heat stress symptoms. Other methods for determining heat stress monitoring, such as the wet bulb globe temperature (WBGT) index from American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Values (TLV) booklet can be used.

B2.4.3.1 Early Symptoms of Heat Related Problems:

1. Decline in task performance
2. Lack of coordination
3. Decline in alertness
4. Unsteady walk
5. Excessive fatigue

Table B2.3[1]
Suggested Frequency of Physiological Monitoring
For Fit and Acclimatized Workers[a]
Seneca Army Depot
Romulus, New York

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°- 30.8°C)	After each 90 minutes work	After each 60 minutes of work
77.5°-82.5°F (25.3°- 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°- 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

(1) NIOSH/OSHA/USCG/EPA, 1985.

(a) For work levels of 250 kilocalories/hour.

(b) Calculate the adjusted air temperature (ta adj) by using the equation:
ta adj = ta + (13 x percent sunshine)
where: ta is the air temperature in °F.

Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat.

Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; zero percent sunshine = no shadows.)

(c) A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

6. Muscle cramps
7. Dizziness

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
  - If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
  - If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
  - If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.
  - If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third.
  - Do not permit a worker to wear a semipermeable or impermeable garment when oral temperature exceeds 100.4°F (38.1°C).

B2.4.3.2 Prevention of Heat Stress

Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heart related illnesses. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
  - Modify work/rest schedules according to monitoring requirements.
  - Mandate work slowdowns as needed.
  - Perform work during cooler hours of the day, if possible, or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluids intake must approximately equal the amount of water lost in sweat, i.e, 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kg) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be

drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:

- Maintain water temperature at 50° to 60°F (10°-16.6°C).
- Provide small disposable cups that hold about 4 ounces (0.1 liter).
- Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
- Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.

- Train workers to recognize the symptoms of heat-related illnesses.
- Rotate personnel and alternate job functions.
- Avoid double shifts and/or overtime.

B2.4.4 Cold-Related Illness

Cold-Related Illness is unlikely to be a problem for workers at the former Camp since the winter temperatures are generally mild in the region. However, for completeness and in the event of unseasonably cold temperatures during the field effort Cold-Related Illness is discussed in this SSHP.

B2.4.4.1 Symptoms of Cold-Related Illnesses

Exposure to low temperatures presents a risk to employee safety and health both through the direct effect of the low temperature on the body and collateral effects such as slipping on ice, decreased dexterity, and reduced dependability of equipment. Work conducted in the winter months can become a hazard for field personnel due to cold exposure. All personnel must exercise increased care when working in cold environments to prevent accidents that may result from the cold. The symptoms of cold exposure include frostbite and hypothermia. Wind increases the impact of cold on a person's body. Work will cease under unusually hazardous conditions (e.g., windchill less than 10°F, or wind chill less than 20°F with precipitation). Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities.

- **Hypothermia.** Hypothermia is defined as a decrease in a person's core temperature below 96.8°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interferences with any of these mechanisms can result in hypothermia, even in the absence of "cold" ambient temperatures. The first symptom of systemic hypothermia is shivering. Maximum shivering starts when the core body temperature drops below 95°F. The next set of symptoms as the body's cooling progresses is apathy, listlessness, and sleepiness. The person remains conscious and responsive with normal blood pressure and a core temperature of 93.2°F. The person must be removed immediately to a facility with heat. As hypothermia advances beyond this point, the person has a glassy stare, slow pulse, slow respiratory rate, and may lose consciousness. Severe hypothermia starts when the core body temperature reaches 91.4°F. Finally, the extremities start to freeze hard and death could result.

- **Frostbite.** Frostbite is both a general and medical term given to areas of local cold injury. Frostbite has progressive degrees and this progression may continue until systemic hypothermia occurs. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20°F. Frostbite symptoms are a sudden blanching or whitening of the skin; a waxy or white appearance of the skin and it is firm to the touch; tissues are cold, pale, and solid. Superficial frostbite occurs when the skin is white but the underlying tissue is firm. The skin will return to shape when depressed. Deep frostbite causes the underlying tissue to freeze. The skin will either not depress when pressed by the finger or it will depress but not return to the original contour. DEEP FROSTBITE IS A SERIOUS INJURY.

B2.4.4.2 Prevention of Cold-Related Illnesses

- Educate worker to recognize the symptoms of frostbite and hypothermia.
- Cease work under unusually hazardous conditions.
- Identify and limit known risk factors.
- Assure the availability of an enclosed, heated environment on or adjacent to the site. The nearest heated environment would be the interior of an automobile at the site.
- Assure the availability of insulated dry clothes.
- Develop capability for temperature recording at the site.
- Assure the availability of warm beverages.
- Watch for pain in the extremities, which may be the first early warning of cold stress.

B2.3.4.3 Monitoring at the site will be conducted in accordance with 1999 ACGIH guidelines; at the Field Supervisor's or site health and safety officer's discretion; when suspicion is aroused on changes in worker's performance or mental status; at worker's request; as a screening measure, two times per shift, under unusually hazardous conditions (e.g., windchill less than 30°F); and as a screening measure whenever any worker on the site develops hypothermia. ANY PERSON DEVELOPING MODERATE HYPOTHERMIA MUST BE REMOVED IMMEDIATELY TO A FACILITY WITH HEAT AND CANNOT RETURN TO WORK FOR 48 HOURS.

B2.3.4.4 Evaluation and Control. Continuous exposure should not be permitted to exposed skin. Superficial or deep local tissue freezing will occur only at temperatures below -1°C (30.2°F) regardless of wind speed.

B2.4.4.4.1Speciál protection of the hands is required to maintain manual dexterity for the prevention of accidents:

1. If fine work is to be performed with bare hands for more than 10-20 minutes in an environment below 16°C (60.8°F), special provisions should be established for keeping the workers' hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be used.
2. If the air temperature falls below 16°C (60.8°F) for sedentary, 4°C (39.2°F) for light, -7°C (19.4°F) for moderate work and fine manual dexterity is not required, then gloves should be used by the workers.

B2.4.4.4.2To prevent contact frostbite, the workers should wear anti-contact gloves.

1. When cold surfaces below -7°C (19.4°F) are within reach, a warning should be given to each worker by the supervisor to prevent inadvertent contact by bare skin.
2. It the air temperature is -17.5°C (0°F) or less, the hands should be protected by mittens.

B2.4.4.4.3Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). The workers should wear cold protective clothing appropriate for the level of cold and physical activity:

1. Wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
2. If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wet. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layers by sweat.
3. If exposed areas of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should be supplied in auxiliary heated versions.
4. If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

B2.4.4.5 If work is performed continuously in the cold, heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The workers should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effects.

B2.4.4.6 For work practices at or below -12°C (10.4°F), the following should apply:

1. The worker should be under constant protective observation (buddy system or supervision).
2. The work rate should not be so high as to cause heavy sweating that will result in wet clothing.
3. Unacclimated employees should not be required to work full time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
4. The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
5. The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. The worker should be protected from drafts to the greatest extent possible.

B2.4.5 Other Hazards

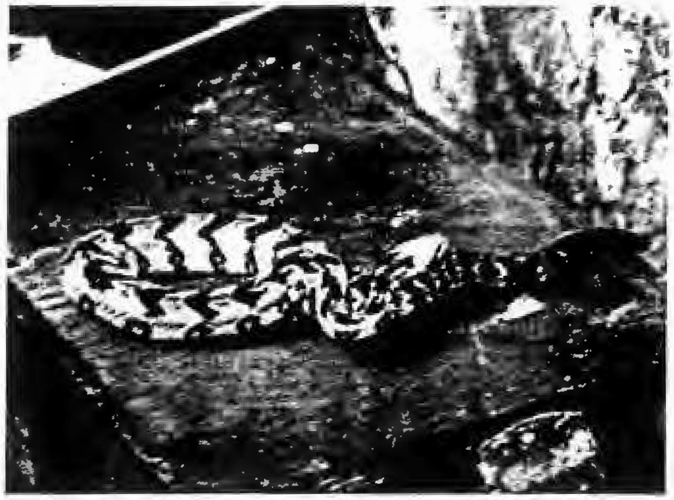
The planned field activities may bring personnel into contact with snakes, spiders, ticks, chiggers, mosquitoes, and poisonous plants (poison ivy and oak). The following precautions will be taken as necessary by field personnel to avoid contact with wildlife/insects:

- Hat to ward off insects;
- Wear a long sleeve shirt
- Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips), and apply the Permethrin repellent spray to field clothing. Note. Allow the Permethrin to dry before using the treated clothing.
- Use of Oak-N-Ivy cleanser or equivalent at field hand-wash station.

B2.4.5.1 Biological

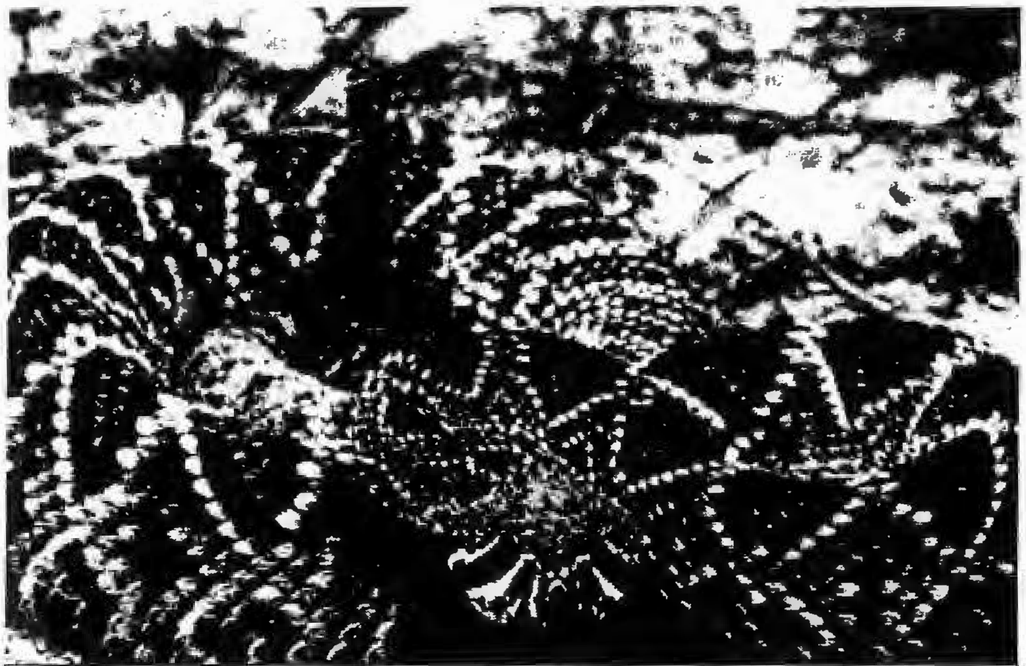
Snakes. B2.3.5.1.3 Venomous snakes that may be encountered at the former Seneca Army Depot, FL include members of the "pit-viper" family, Copperheads, Rattlesnake species, Descriptions and photographs of these snakes are shown below.

Copperhead: These snakes are commonly found near water sources in wooded areas. Copperheads are generally less than four feet in length and are not particularly aggressive. Coloration ranges from golden brown to tan. These snakes have a banded pattern.



Timber Rattlesnake-35-74"

Timber Rattlesnake: These are large, not particularly aggressive snakes with yellow through or gray to black, with dark back and side blotches on front of body and blotches fused to form crossbands on rear of body. Head unmarked and black tail. They can be found in many habitats including rocky hillsides, swampy areas, and canebrake thickets.



Eastern Diamondback Rattlesnake
24-96"

Eastern Diamondback Rattlesnake: These snakes are commonly found in dry habitats throughout the coastal plain including pine and oak hills, pine flatwoods, and abandoned farmland. They are the largest rattlers ranging from 3 to 8 feet in length. These thick-bodied snakes have highly destructive venom and are considered the most dangerous snakes in North America. The back of the snake is distinctively patterned with dark diamonds with light centers and bordered by cream to yellow-colored scales.

B2.3.5.1.4 A snake bite is usually characterized by extreme pain and swelling at the site of the bite; the presence of one or more puncture wounds created by the fangs; and a general skin discoloration. The manifestations of the bite include general weakness, rapid pulse, nausea and vomiting, shortness of breath, dimness of vision, tingling or numbness of the tongue, mouth or scalp, and shock.

B2.4.5.1.5 Physical reactions are aggravated by acute fear, anxiety, the amount of venom injected and the speed of absorption of venom into the victim's circulation, the size of the victim, protection provided by clothing (including shoes and gloves), quick anti-venom therapy, and location of the bite.

B2.4.3.5.1.6 First Aid – The rules to follow if someone is bitten by a snake are:

1. DO NOT cut "Xs" over the bite area as this will intensify the effect of the venom.
2. DO NOT apply suction to the wound since this has a minimal effective in removing venom.

3. DO NOT apply a tourniquet since this will concentrate the venom and increase the amount of tissue damage in the immediate area.
4. If possible, try to get a good look at the snake so it can be identified for proper selection of anti-venom.
5. DO NOT allow the victim to run for help since running increases the heart rate and will increase the spread of the venom throughout the body.
6. Calm, reassure and keep the victim calm and immobile. Do not delay evacuation.
7. Have the victim hold the affected extremity lower than the body while waiting for medical assistance.
8. Transport the victim to medical attention immediately.

B2.4.5.1.6 An incision through the fang marks <u>is not advisable</u>; this procedure is too hazardous to underlying structures and at best removes only 20% of the venom. Do not use cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, or other methods of cold therapy. Several other factors must be considered by the caregiver. A person bitten by a snake should try to lie still and be quiet. If the bite is in the arm or leg, keep the bite lower than the heart. Staying still and holding the bite lower than the heart will help to slow any poison spreading through the body. Get medical care as soon as possible, even if the snake was known to be non-poisonous. The use of snake bite kits is prohibited. Because the fieldwork will be performed in the late fall and in the winter it is doubtful if any snakes would be encountered.

B2.4.5.1.7 Identification Features -- Non-poisonous snakes are often erroneously identified as poisonous. The features identified in Table B2.2 will assist in properly identifying a snake as poisonous or non-poisonous.

Table B2.2
Snake Identification Features

Feature	Poisonous	Non-Poisonous
Eye Pupils	Elliptical, or cat-like	Round
Sensing Pits	Pit between the eyelids and nostrils	No pit between the eyelids and nostrils
Teeth	Two enlarged teeth (fangs) in front of the upper jaw	All teeth are approximately the same size
Scales	Form a single row on the underside and below the tail	Arranged in a double row on the underside of the tail

Feature	Poisonous	Non-Poisonous
Head	Head much wider than the neck	Head slightly wider than the neck
Tail	Single anal plate	Divided anal plate

B2.4.5.1.8 Prevention of Snakebite -- The best snakebite treatment is to avoid getting bitten. The following suggestions will help in this process:

- Learn to identify poisonous snakes - this shall be reviewed during site-specific safety training.
- Watch where you sit and place your hands and feet.
- Avoid rock piles, stacks of old boards, and brush in wooded areas. If movement is necessary, use a remote means to initially relocate the material. Prior to entering a heavily wooded or brush area, look and listen carefully.
- Never handle "dead" snakes; they may not be completely dead.
- Do not attempt to capture or kill *ANY* snakes.

Ticks. B2.4.5.1.9 Lyme Disease is caused by a bacterium which may be transmitted by the bite of a tick. Ticks carrying Lyme Disease may be found throughout the U. S. living in grassy and wooded areas, and feeding on mammals such as mice, shrews, birds, raccoons, opossums, deer, and humans. Not all ticks are infected with the bacterium. When an infected tick bites, the bacterium is passed into the bloodstream of the host, where it multiplies. If detected early, Lyme Disease can be treated with antibiotics.

B2.4.5.1.10 The illness typically occurs in the summer months and is characterized by a slowly expanding red rash, that develops a few days to a few weeks after the bite of an infected tick. The illness can be accompanied by flu-like symptoms, headache, stiff neck, fever, muscle aches, and/or general malaise. At this stage, treatment by a physician is usually effective; but if left alone, these early symptoms may disappear and more serious problems may follow. The most common late symptom of the untreated disease is arthritis; other problems include meningitis, neurological, and cardiac abnormalities. NOTE: some people do not get the characteristic rash but progress directly to the later manifestations. Treatment of follow-on symptoms is more difficult than early symptoms and is not always successful.

B2.4.5.1.11 Rocky Mountain Spotted Fever is another tickborne disease. Nearly all cases of infection occur in the spring and summer, generally several days after exposure to infected ticks. The onset of illness is abrupt and often accompanied by high fever, headache, chills, and severe weakness. After the fourth day of fever, victims develop a spotted pink rash that usually starts on the hands and feet and gradually extends to most of the body. Early detection and treatment significantly reduces the severity of illness. The disease responds to antibiotic therapy with tetracycline or chloramphenicol.

B2.4.5.1.12 If found crawling on a person, ticks should be removed and burned or smashed between two rocks. Do not smash ticks with fingers. If a tick is found to be holding onto the skin, the tick should be covered with Vaseline until it can no longer breathe and backs out of the skin. At that time, all parts of the tick should be removed with tweezers. Do not squeeze the tick's body. Grasp it where the mouth parts enter the skin and tug gently, but firmly, until it releases its hold on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Areas of the skin where the tick may have crawled, as well as bite area will be scrubbed with soap and water. Hot showers are to be taken as soon as possible after site departure to wash away all ticks that have not adhered to the skin.

B2.4.5.1.13 Precautions:

- Wear long pants and long sleeved shirts that fit tightly at the ankles and wrists; tape cuffs if necessary.
- Wear light colored clothing so ticks can be easily spotted.
- Tick repellents such as DEET (vapor-active repellant) and Permethrin may be useful. Apply DEET to any exposed skin surface (except eyes and lips) and permethrin to field clothing (allow to dry prior to wearing).
- Inspect clothing frequently while in tick habitat.
- Inspect head and body thoroughly when you return from the field.
- Remove any ticks by tugging with tweezers. Do not squeeze or crush the tick. If possible, place the tick into a labeled vial for future identification (see also paragraph B2.3.5.1.12).
- Be sure to remove all parts of the tick's body, and wash and disinfect the bite site with alcohol or an antiseptic.
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash that looks like a bulls-eye or an expanding red circle surrounding a light area, frequently seen with a small welt in the center.
- Also look for the signs of the onset of RMSF, such as an inflammation which is visible in the form of a rash comprising many red spots under the skin, which appears 3 to 10 days after the tick bite.

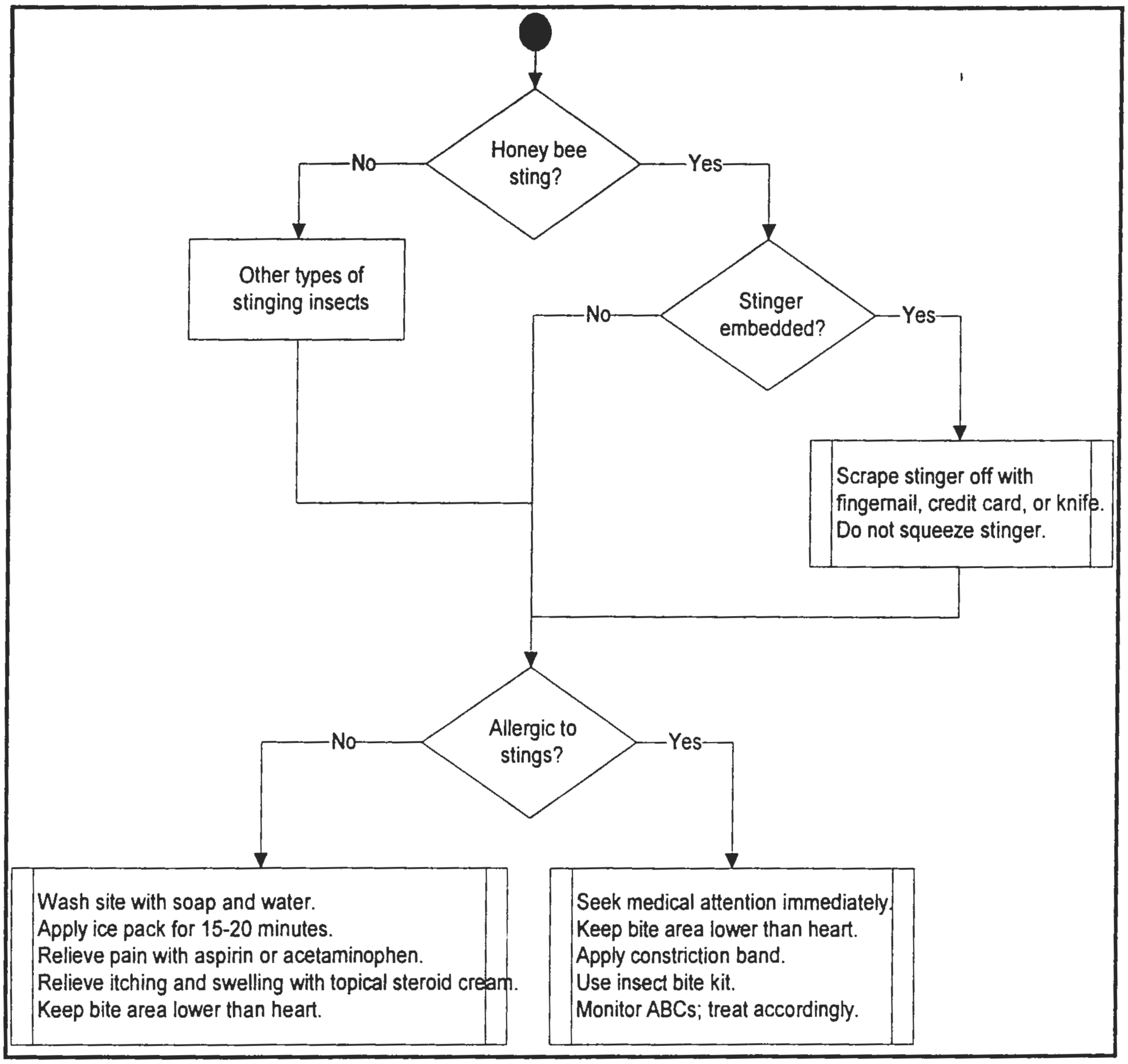
Bees, Wasps, Hornets, and Other Insects. B2.4.5.1.18 Symptoms of an insect bite are normally a sharp, immediate pain in the body part bitten. Poisonous insects and insect-like creatures that may be encountered at former Seneca Army Depot sites include the following:

- Bees (honeybees, bumble bees, wasps, and hornets);
- Scorpions;
- Caterpillars; and
- Beetles/Bugs.

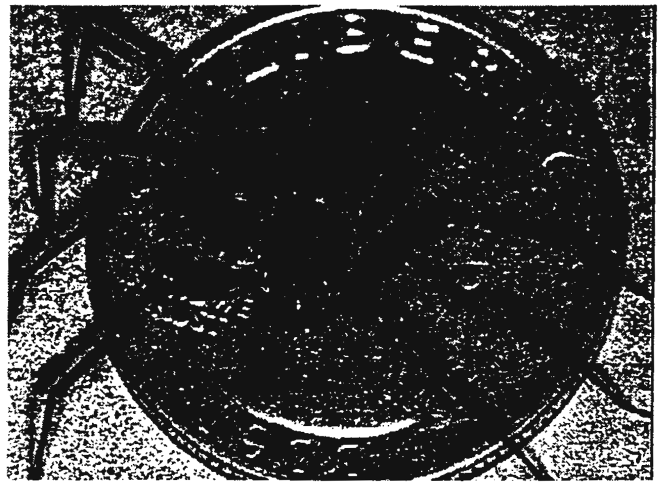
Site personnel will comply with the following work practices:

- Personnel with a known hypersensitivity to bee, wasp, or hornet stings will inform the UXOSO of this condition prior to performing site activities.
- Personnel with a known hypersensitivity condition will keep emergency medication in their possession.
- All personnel will remain vigilant for the presence of these stinging insects. Discovered nests will be flagged and their location reported to other site personnel.
- If stung, immediately inform the UXOSO to receive treatment, per Figure B2.1.

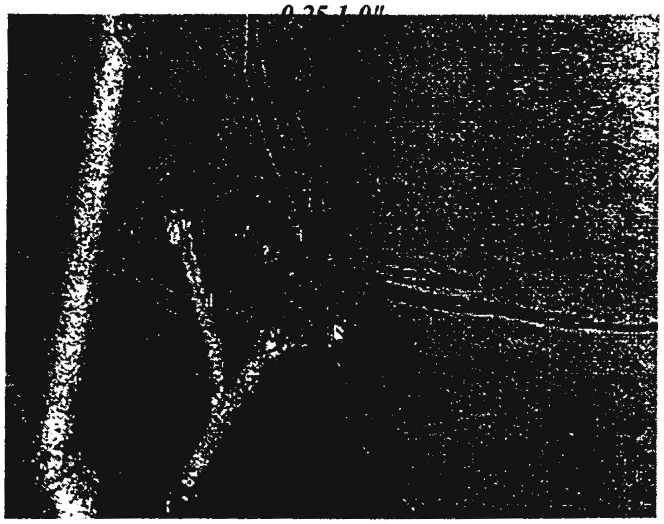
Figure B2.1
Decision Diagram for Stings from Insects



Spiders. B2.4.5.1.19 Use extreme caution when lifting manhole covers, sumps, etc., since spiders are typically found in these areas. The two poisonous spiders that may be encountered on the former Seneca Army Depot project are the Brown Recluse and the Black Widow. The Brown Recluse is up to one inch long with a violin or "fiddle" shaped mark on the top of the head. The Black Widow is a smaller, bulbous black spider with a red hourglass-shaped mark on the underside.



Brown Recluse
0.25-1.0"



Black Widow
0.12-0.75"

B2.4.5.1.20 Persons that have been bitten by a Brown Recluse or Black Widow spider should be immediately transported to a hospital. The spider should be collected (if possible) for confirmation of the species. Reactions to a Brown Recluse spider bite include mild to severe pain within two to eight hours and a star shaped area around the bite within three to four days. Significant tissue death and loss accompanies a Brown Recluse spider bite. Reactions to a Black Widow spider include intense pain at the site of the bite after approximately 15 to 60 minutes, followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils, and generalized swelling of face and extremities.

B2.4.5.1.21 First Aid

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification.
- Clean the bitten area with soap and water or rubbing alcohol.
- To relieve pain, place an ice pack over the bite.
- Keep the victim quiet and monitor breathing.

- Seek immediate medical attention.

Poison Ivy/Poison Oak/Poison Sumac. B2.4.5.1.22 The majority of skin reactions following contact with offending plants are allergic in nature and are characterized by:

- General symptoms of headache and fever;
- Itching;
- Redness; and
- A rash.

B2.4.5.1.23 Some of the most common and severe allergic reactions result from contact with poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

B2.4.5.1.24 The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each (Figure B2.2). In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6-12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas.

B2.4.5.1.25 Avoidance of plant/sap contact is the only effective means of preventing the poisoning. A person experiencing symptoms of poisoning should remove contaminated clothing; wash all exposed areas thoroughly with soap and water. Apply calamine or other poison ivy/oak lotion if the rash is mild. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity. Thorough washing of skin and clothing can be used after site work or after potential exposure to reduce severity of irritation.

Figure B2.2
Poison Ivy/Poison Oak/Poison Sumac

Poison Ivy	Poison Oak	Poison Sumac
		

Bloodborne Pathogens B2.4.5.1.26 Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. However, under the principle of universal precautions (see below) all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens.

B2.4.5.1.27 There are a number of infections that are transmitted by insects and arthropods where the infection cycle includes the human blood system. Examples include malaria and lyme disease, which are transmitted by mosquitoes and ticks, respectively. These diseases are serious, and the possibility for infection should be considered in planning field operations in areas where these disease vectors are present. However, these diseases cannot be transmitted through personal contact with human blood, and are not covered by the OSHA *Bloodborne Pathogen Standard.*

B2.4.5.1.28 Potential bloodborne pathogen exposure include:

- Contact with contaminated medical equipment, medical waste, sharps and other potential infectious material
- Medical emergency response operations such as administering first aid or CPR
- Contact with human wastes such as domestic sewage
- All body fluids in situations where it is difficult or impossible to differentiate between body fluid types

APPENDIX B3

PERSONNEL PROTECTION, MONITORING, AND TRAINING

B3.1 PERSONAL PROTECTIVE EQUIPMENT

B3.1.1 Personnel working in close proximity to the established work zones will be required to wear Level D protection. This will consist of at a minimum:

- Standard work clothes with long pants;
- Hearing protection (when working around heavy equipment or using power tools)
- OSHA approved safety glasses
- Safety boots – Exempted only when using geophysical instruments.
- Hard hat (when overhead hazard is present).
- Tyvek and Disposible Gloves – (Required when there is potential of contact with contaminated objects, soils or liquid).

B3.1.2 Personnel working away from active field investigations will not be required to wear safety boots, safety glasses, or hard hats.

B3.2 MONITORING REQUIREMENTS

Parson Engineering Science personnel and their sub-contractors conducting intrusive activities at designated active hazardous waste sites must be prepared to monitor air quality in the event of recovered buried containers ,(i.e. drums), and when there is potential risk of exposure to contaminated airborne particulate.

B3.2.1 General

Operating Procedures for the calibration and operation of all monitoring instruments and copies of the operating manuals for these instruments will be kept in the command post. Instruments will be field calibrated daily (each day the instrument is used). Calibration log sheets (Attachment B-4) will be kept for each instrument and will become part of the permanent file. Air Monitoring Logs (Attachment B-5) will be maintained as needed.

Instruments will be kept on charge whenever not in use. All monitoring and instrument calibration will be done by persons who have been trained in the use of the equipment.

B.3.2.2 ON-SITE MONITORING (INTRUSIVE OPERATIONS ONLY)

Monitoring Overview

Intrusive work in the designated hazardous waste site will have *on a standby basis* an organic vapor meter (OVM-580B/580S (or equivalent) equipped with a 10.6e V lamp. In the event of unusual odors, stained soil, or suspect containers unearthed during an excavation, work will not continue without VOC air monitoring. A particulate meter (MIE Miniram PDM-3) will be used when there is a risk of exposure to dust. Instrument settings on all direct reading air monitoring instruments will be set on the most sensitive scale unless a reading is detected.

A wind direction indicator (such as survey flagging tied to a stake) will be erected at every active work site. This will enable the site safety monitor and on-site personnel to determine upwind locations necessary for proper health and safety procedure implementation, (work areas relative to the excavation) and, if necessary, evacuation procedures.

Volatile Organics Monitoring

Monitoring of volatile organics will be conducted with an organic vapor meter. Measurements will be taken and logged in the breathing zone, with additional measurements taken at potential sources of hits if safe to do so. The Action Level will be >5.0 PPM (isobutylene standard) measured in the breathing zone. When this Action Level is exceeded the work area will be immediately evacuated to a upwind location and the UXOSO will be contacted. Work may resume upon the return of acceptable readings in the work zone, and approval of the UXOSO.

Particulate Monitoring

Surface and subsurface soils at SEAD 16, 17,45 & 57 have various metals concentrations that exceed TCLP regulatory limits. These metals include cadmium, chromium, copper, lead, nickel, silver, mercury, thallium, and zinc. The concentration of metals in the airborne particulate in work areas **(except SEAD-16)** is below the PEL of "nuisance dust", which is 5.0 mg/m3. It is possible that under dry conditions dust will be a problem, especially at SEAD-45. If working conditions cannot be controlled to minimize the exposure and the production of visible dust in the breathing zone, such as staging equipment and personnel upwind or dampening the soil with water, particulate monitoring will be required. If levels continuously exceed 5.0 mg/m3 (respirable nuisance dust PEL limits) work will stop immediately and the UXOSO notified. **SEAD-16 work areas within 70 ft. of the northeast side of the building**

(see Figure B2.1), the action level for dust shall be 0.1 mg/m^3. Work may resume upon the return of acceptable readings in the work zone, and approval of the UXOSO.

For cadmium, chromium, copper, lead, nickel, silver, mercury, thallium, zinc and PAHs, the following formula is used to justify elimination of the need for real time aerosol monitoring or ambient monitoring of these compounds during work at the site. Accept as noted, the concentration in soil of the metal of concern used for the calculations are the highest detected in all the SEAD work locations.

$$EL_{mix} = \frac{(10^6\ \text{mg/kg})\ (\text{EL mg/m}^3)}{(\text{conc. mg/kg})\ (\text{Safety Factor})}$$

Where:

- EL_{mix}: Air concentration of <u>total</u> <u>dust</u> at which the contaminants of concern would be at their established exposure limit in mg/m3.
- EL: Exposure limit of the contaminant of concern (e.g., its PEL or TLV, whichever is lower, in mg/m^3)
- 10^6: Conversion Factor
- Conc.: Soil concentration of the contaminant of concern in mg/kg.
- Safety Factor: A number between 1 and 10 used to account for the degree of confidence you have in your concentration information. The lower the number used, the more confidence the evaluator has in how well the data represents site conditions.

For **Cadmium** at the site: EL = 0.005 mg/m^3 , Conc. = 16.6 mg/kg , Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6\ \text{mg/kg})\ (0.005\ \text{mg/m}^3)}{(16.6\ \text{mg/kg})\ (2)}$$

$$EL_{mix} = 151\ \text{mg/m}^3$$

For **Chromium** at the site: EL = 0.1 mg/m^3 , Conc. = 39.3 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6\ \text{mg/kg})\ (0.001\ \text{mg/m}^3)}{(39.3\ \text{mg/kg})\ (2)}$$

$EL_{mix}=$ 12.7 mg/m^3

For **Copper** at the site: EL = 1.0 mg/m^3 , Conc. = 37900 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(1.0 \text{ mg/m}^3)}{(37900 \text{ mg/kg})(2)}$$

$EL_{mix}=$ 13.2 mg/m^3

For **Lead** at **SEAD 16**: EL = 0.030 mg/m^3 , Conc. = 140,000 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.03 \text{ mg/m}^3)}{(140{,}000 \text{ mg/kg})(2)}$$

$EL_{mix}=$ 0.1 mg/m^3

For **Lead** at **SEAD 45** and elsewhere: EL = 0.030 mg/m^3 , Conc. = 87.8 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.03 \text{ mg/m}^3)}{(87.8 \text{ mg/kg})(2)}$$

$EL_{mix}=$ 171 mg/m^3

For **Nickel** at the site: EL = 0.015 mg/m^3 , Conc. = 148 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.015 \text{ mg/m}^3)}{(148 \text{ mg/kg})(2)}$$

$EL_{mix}=$ 51 mg/m^3

For **Silver** at the site: EL = 0.01 mg/m^3 , Conc. = 26.2 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.01 \text{ mg/m}^3)}{(26.2 \text{ mg/kg})(2)}$$

$EL_{mix} =$ 190 mg/ mg/m^3

For **Mercury** at the site: EL = 0.1 mg/m^3 , Conc. = 11.4 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.1 \text{ mg/m}^3)}{(11.4 \text{ mg/kg})(2)}$$

$EL_{mix} =$ 4385 mg/m^3

For **Thallium** at the site: EL = 0.1 mg/m^3 , Conc. = 16.6 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.1 \text{ mg/m}^3)}{(16.6 \text{ mg/kg})(2)}$$

$El_{mix} =$ 3012 mg/m^3

For **Zinc** at the site: EL = 5.0 mg/m^3 , Conc. = 14,600 mg/kg, Safety Factor = 2.

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(5.0 \text{ mg/m}^3)}{(14600 \text{ mg/kg})(2)}$$

$EL_{mix} =$ 171 mg/m^3

For total **PAH's** at the site: EL = 0.20 mg/m^3 , Conc. = 1521 mg/kg, Safety Factor = 2.

The total PAH value used is the sum of the maximum values for all polynuclear aromatic hydrocarbons listed in SEAD 16 Data, (Table B.2.2.1, Sample SS16-31)

Therefore:

$$EL_{mix} = \frac{(10^6 \text{ mg/kg})(0.2 \text{ mg/m}^3)}{(1521 \text{ mg/kg})(2)}$$

$EL_{mix} =$ 66 mg/m^3

Except for Lead in SEAD-16, none of the EL_{mix} values were below 5 mg/m^3, the nuisance particulate PEL for respirable dust required by OSHA. Therefore, by controlling dust levels to below visible dust clouds through actions such as wetting down of site soils during open excavation and site grading work, exposure to include cadmium, chromium, copper, lead, silver, mercury, thallium, zinc and PAHs will be avoided.

For SEAD-16 intrusive operations, where the potential exists to stir up dust from site soils, dust control measures will be implemented. MiniRAM readings shall be taken during intrusive work activities on the north east side of the building, (see Figure B2.1), to ensure that total dust concentrations in the breathing zone remain below 0.1 mg/m3 above background. This will ensure that site personnel are not exposed to lead dust levels at or above the action limit for lead dust (30 micrograms/cubic meter).

B3.3 SAFETY TRAINING

B3.3.1 All field personnel must have received 40 hours of initial training in hazardous waste operations before participating in this project, as required by 29 CFR part 1910.120(e). In addition, all field personnel will have had at least three days of field experience under the supervision of a trained supervisor. On-site personnel must be up to date on their annual 8-hour refresher training. The UXOSO will collect and maintain at the site training (40- and 8-hour HAZWOPER) and medical certifications for all workers participating in site operations at SEAD. Additionally, USA Environmental Inc. personnel must provide the UXOSO with documentation of the successful completion of Naval Explosive Ordnance Disposal training. The Field Team Leader must have completed the above training and an additional 8-hours of supervisory instruction. At least two people on-site will be currently certified in First Aid and CPR.

B3.3.2 The UXOSO is responsible for developing a site-specific occupational hazard training program. The UXOSO is responsible for providing training to all Parsons personnel and Parsons subcontractors under Parsons H&S supervision that are to work at SEDA. This training will cover the following topics:

- Names of personnel responsible for site safety and health.
- Safe work practices.
- SEAD Contractor Instructions (Attachment B-6)
- Site history.

- Safety, health, and other hazards at site.
- Work zones and other locations.
- Emergency procedures, evacuation routes, emergency phone numbers.
- Acute effects of compounds at the site.
- Explosive Ordnance recognition and reporting.
- Prohibitions in areas and zones, including:
- Site layout, and
- Procedures for entry and exit of work areas and zones.
- Cold/Heat Illnesses (Depending on time of year)

Visitors to the support zone will receive training in the following areas:

- Emergency signals and procedures.
- Work areas and locations.
- Names of field team leader and site health and safety officer.

B3.3.3 Any visitor entering the work zone must provide documentation of 40-hour training and enrollment in medical monitoring program. The UXOSO will provide initial safety training as outlined above.

B3.3.4 A short briefing will be held each morning. Topics will include a review of safety procedures for that day's activities. Certificates and records of on-site training will be maintained by the UXOSO. Additionally, each field team member will sign the form in Attachment B-2 attesting to their understanding and acceptance of the SSHP and copies of these forms will be kept on file.

B3.4 MEDICAL SURVEILLANCE FOR PERSONNEL

B3.4.1 OSHA (29 CFR Part 1910.120 [f]) requires the enrollment of personnel engaged in operations involving hazardous materials in a medical surveillance program. The content of the examination must be sufficiently detailed to determine an individual's fitness for duty, including ability to work while wearing protective equipment (e.g., respirator, impermeable clothing, etc.). The results of these examinations will be kept on file at least 30 years after employment has been terminated.

B3.4.2 All personnel who will be engaged in hazardous waste operations on this project will present to the UXOSO a physician's certification of completion of a comprehensive medical monitoring examination within the 12 months prior to the beginning of activities. Additionally, the UXOSO will ensure that workers remain current in their medical monitoring throughout the duration of the project as well as meet the medical surveillance inclusion criteria for their specific job assignments. The certification shall attest to the individual's fitness for duty, including his or her ability to work while wearing PPE (e.g., respirator, impermeable clothing, etc.). Copies of employees' Health Status Reports will be available at the site.

APPENDIX B4
WORK ZONES AND DECONTAMINATION/HYGIENE

B4.1 SITE WORK ZONES

The SUXOS and UXOSO coordinate access control and security on site. Due to the hazardous nature of UXO only authorized personnel will be allowed in the exclusion zone (EZ). The EZ is the work site, encompassing an area large enough to prevent personnel injuries from fragmentation resulting from UXO. During all intrusive operations the initial EZ will be a radius of 200 feet from the operating team. The EZ will be adjusted if UXO is encountered to a distance consistent with the fragmentation hazard of the UXO. The limits of the EZ may be marked with hazard tape, painted stakes, pin flags, or other suitable marking material. During UXO operations (excavating anomalies), only UXO trained or personnel are allowed in the EZ (unless escorted by the SUXOS). Authorized personnel are those that have completed the required training and meet medical requirements

Visitors will report to the UXOSO on site. During all operations on individual sites, the site SUXOS/ UXOSO will cease operations if unescorted personnel are observed within the operating area. During duty hour's assigned personnel will provide security at the site. Equipment will be returned to the CP and secured at the end of the workday.

Representatives from regulatory agencies will be permitted to enter the site at any time during business hours or any other reasonable times provided they have completed the required training and meet medical requirements. Further site controls to ensure safety are as follows:

- Eating, drinking, and smoking are prohibited except in designated areas;
- Hazardous UXO operations (intrusive investigations) will cease if non-UXO trained personnel are present;
- The UXOSO or SUXOS will escort all authorized visitors to the site; All personnel entering the site, including visitors, will be in the proper PPE;
- The UXOSO will maintain the site entry control log to ensure accurate accountability for personnel; The UXOSO will brief this SSHP to all personnel entering the site to inform them of the potential site hazards. All personnel will acknowledge this briefing

by signing the SSHP briefing log; In case of an emergency, personnel will exit the site and move to the designated safe area. The safe area will be located upwind of the site outside of the fragmentation area. The UXOSO will determine the severity of the emergency. If the emergency warrants site evacuation, the UXOSO will notify the Project Manager/Task Manager.

B4.2 DECONTAMINATION (CERCLA SITES)

Decontamination is the physical removal of contaminants from clothing and equipment or the chemical change of such contaminants to innocuous substances. Decontamination procedures will take place in the contamination reduction zone. Disposal is an available option in lieu of decontamination when decontamination is impractical.

The following decontamination procedures are intended to meet the requirements of 29 CFR 1910.120(k). No personnel or equipment shall enter the contaminated zone of the site until workers have acknowledged the decontamination procedures and operating procedures intended to minimize contamination. These procedures shall be monitored by the Site Health and Safety Officer to determine their effectiveness. Ineffective procedures will be corrected.

DECONTAMINATION FACILITIES

The main decontamination facilities at the SEAD SWMU areas will be located adjacent to the support zone. These decontamination facilities will be used for vehicle and heavy equipment decontamination and for personnel decontamination. Personnel decontamination must take place prior to leaving the decontamination area and prior to entering any personnel hygiene facilities or before eating, drinking, or smoking.

PERSONNEL DECONTAMINATION

Personnel decontamination will consist primarily of a segregated equipment drop, removal and disposal of any non-reusable protective equipment, and washing of hands and face. No heavy contamination of clothing is expected and disposable protective clothing will be disposed of as non-hazardous waste. However, if contamination is detected (i.e., elevated PID readings, visual evidence, or known contact with potentially contaminated liquids) personal protective equipment and cartridges from respirators will be bagged separately from daily garbage. Facilities for personnel and sampling equipment decontamination will be set up between the equipment decontamination pad and the site trailer. Personnel will not enter the office trailer without first going through decontamination, and hands and face must be thoroughly washed before eating, drinking, etc.

EQUIPMENT DECONTAMINATION

Equipment and vehicle decontamination will consist of pressure washing followed by steam cleaning. Solvent and soap and water washes will be performed when required for sampling or for heavy contamination. Gross contamination, such as caked mud and dirt on augers and split spoons, will be removed at the work site and placed back in the borehole or drummed with other drilling spoils if contaminant indicators (e.g., PID readings) warrant drumming of the soils.

PREVENTION OF CONTAMINATION

In an effort to minimize contact with waste and decrease the potential for contamination, the points outlined below will be adhered to during all phases of field investigation and sampling.

1. Personnel will make every effort <u>not</u> to walk through puddles, mud, any discolored surface, and/or any area of obvious contamination.

2. Personnel will <u>not</u> kneel or sit on the ground in the exclusion zone and/or in the Contamination Reduction Zone (CRZ).

3. Personnel will <u>not</u> place equipment on drums, containers, vehicles, or on the unprotected ground.

4. Where appropriate, personnel will wear disposable outer garments and use disposable equipment

5. An adequate supply of potable (drinkable) water, coolers, disposable cups and ice will be provided on site at all times.
6. Containers of water, clearly marked non-potable, additional water will be available with teams for washing.

7. Toilet facilities will be established and maintained IAW or exceeding 29 CFR 1910.120(n) and EM 385-1-1, Section 2.

8. Hand and face washing facilities are available at the SZ/CP, in the site support vehicles, and will be utilized by all personnel during breaks or exiting the EZ prior to eating,

drinking, tobacco use, or other hand to face activities. Washing facilities in the EZ will consist of water containers, buckets, soap, and drying towels.

9. Site Housekeeping:
All work areas will be maintained in a clean/neat fashion, free of loose debris and scrap. Any materials/equipment not being used will be removed and stored or disposed of accordingly. All work areas will be supplied with a trash receptacle with lid, the contents of which will be emptied daily.

APPENDIX B5
ACCIDENT PREVENTION AND CONTINGENCY PLAN

B5.1 ACCIDENT PREVENTION

B5.1.1 Site Training: The UXOSO will conduct site-specific health and safety training and hazard awareness to all project personnel and qualified visitors before starting any site activities. On a day-to-day basis, individual personnel should watch for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Emergencies can be averted by rapid recognition of dangerous situations. The UXOSO will conduct daily tailgate safety meetings prior to work activities. Discussion should include:

- Tasks to be performed;
- Time constraints (e.g., rest breaks);
- Hazards that have been or may be encountered (including subjects covered in B2.4), including their effects, how to recognize symptoms or monitor them, or danger signals;
- Emergency procedures; and
- Radio communication.

B5.1.2 Basic Protective Clothing: Hard hats, safety eyewear, and safety boots must be worn as a minimum within 50 feet of heavy equipment. The UXOSO & UXOQCS supervises the field team to ensure they are meeting health and safety requirements. If deficiencies are noted, work is stopped and corrective action is taken (e.g., retain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken is forwarded to the Project Manager/Task Manager and PSHO.

B5.1.3 Emergency Equipment : Each vehicle will be equipped with a Fire Extinguisher (10 BC rated), Eyewash Kit, First Aid/Burn Kit, Latex Gloves/CPR Mask, and Bolt Cutters (to cut exit gate chains).

B5.1.4 Emergency Vehicle: At least one vehicle at a work site will be a designated emergency escape vehicle. It will be parked at a easily accessible location, KEYS IN THE IGNITION, and pointed in the direction of escape.

B5.2 CONTINGENCY PLAN

B5.2.1 Introduction

B5.2.1.1 If an emergency develops on site, the procedures delineated herein are immediately followed. Emergency conditions exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure;
- A condition occurs that is more hazardous than anticipated; and/or
- Fires, explosions, structural collapses/failures, and/or unusual weather conditions (thunderstorms, lightning, high winds, etc.) occur.

B5.2.1.2 If an emergency occurs, direct voice communication is used to sound the alarm. If personnel are out of range of direct voice communication, an air horn meeting the requirements of 29 CFR 1910.165 is sounded. General emergency procedures and specific procedures for personal injury are described within this section.

Table B5.1 is a list of emergency contacts.

Figure B5.1 shows best routes to SEAD exits.

Figure B5.3 shows the routes to Geneva General Hospital.

B5.2.2 General Emergency Procedures

The emergency procedures are as follows:

- Notify the contact listed in Table B5.1 of the SSHP when an emergency occurs. This list is posted prominently at the site.
- Use the "buddy" system (pairs).
- Maintain visual contact between "pairs." Each team member remains close to the other to assist in case of emergencies.
- If any member of the field crew experiences any adverse effects or symptoms of exposure, the entire field crew will immediately halt work and act according to the instructions provided by the Site Manager.
- Any condition that suggests a situation more hazardous than anticipated will result in evacuating the field team and re-evaluating the hazard and the level of protection required.
- If an accident occurs, the UXOSO is to complete an Accident Report Form, (Attachment B-1) within 5 working days and submit to the PSHO. Follow-up action will be taken to correct the situation that caused the accident.

B5.2.3 Personal Injury

In case of personal injury at the site, follow the procedures listed below:

- Field team members or on-site emergency medics trained in first aid can administer treatment to an injured worker.
- The victim will be transported to the nearest hospital or medical center. If necessary, an ambulance will be called to transport the victim.
- The Site Manager is responsible for the completion of an Accident Report Form.

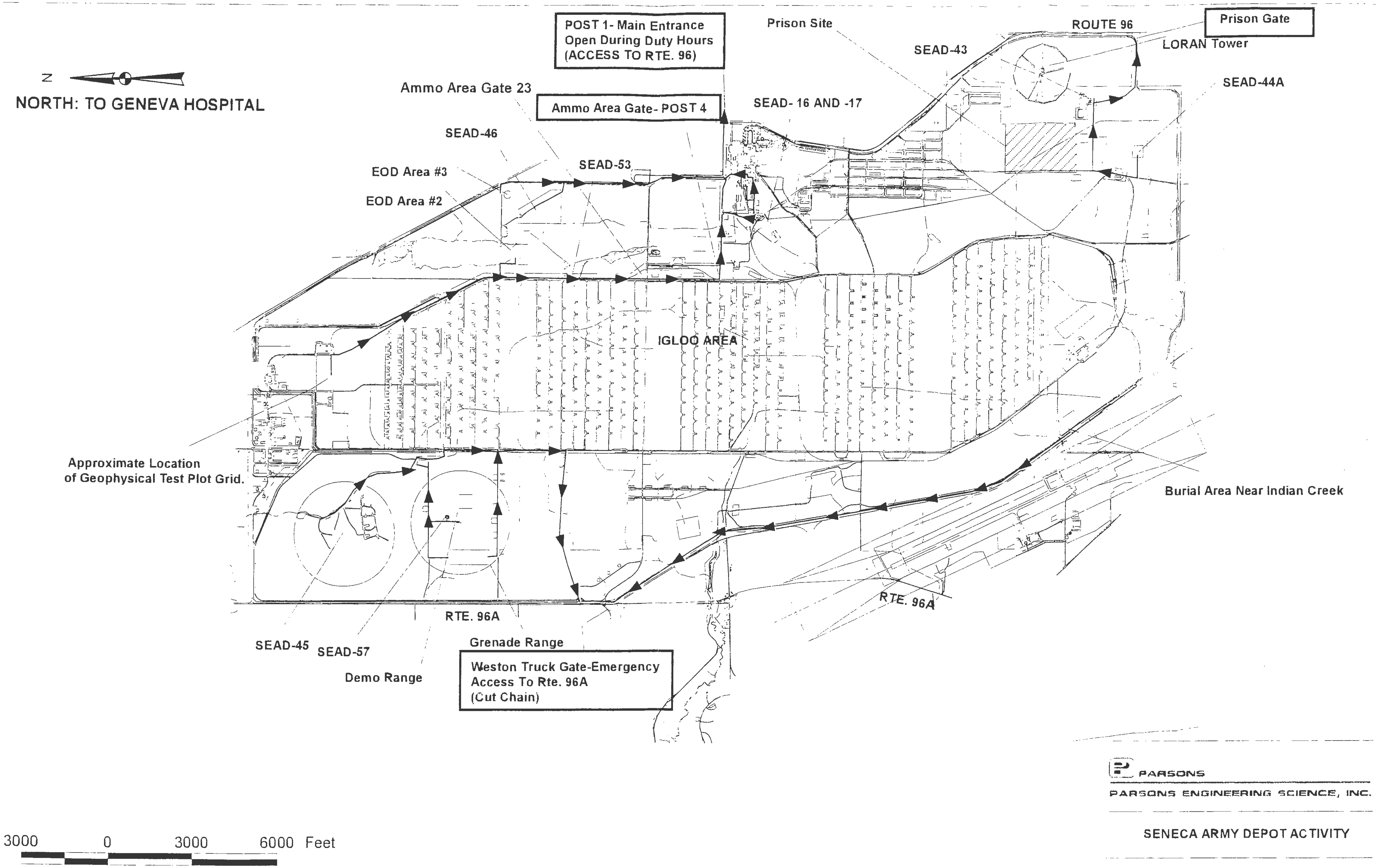
TABLE B5.1
EMERGENCY CONTACTS

These contacts and maps should be posted prominently at the site. Should any situation or unplanned occurrence require outside assistance or support services, the appropriate contact from the following list should be made:

Agency	Telephone Number
Police, Fire, & Ambulance Seneca County Sheriff Dispatch	1-315/539-9241
Geneva General Hospital 186-198 North Street Geneva, NY	1-315/798-4222
SEAD Security	1-607/869-1448
Poison Control Center (NJ)	1-800-962-1253
National Response Center/Chemtrec	1-800-424-9300
USEPA Emergency Response	1-215-596-1260
USEPA Hazardous Waste Hotline	1-800-621-3191

Responsible Person	Telephone Number Work	Telephone Number Home
Mike Duchesneau (Parsons ES Proj. Mgr.)	781-401-2492	508-393-1824
Steve Absolom (SEDA Contact)	607-869-1450	
Brian Powell (Project H&S Officer)	315-451-9560	
Mike Short (Parsons UXO Manager)	800-883-7300 x3115	
Ed Grunwald (Parsons ES Corporate H&S Officer)	678-969-2394	770-594-9760
George Spencer(USA Project Manager)	813 884-5722 x152	
Robert Crownover(USA Project Safety Officer)	813-884-5722 x106	
Medical Services Network (Dr. Mitchell)	1-800-874-4676, ext. 111	

Directions to Geneva General Hospital: The fastest route to the local hospital will depend on where you are on the site. Consult Figure B5.1 to determine which gate to use when emergency exit is required. In most situations the closest exit gate will be locked and will require bolt cutters to cut the chain. **Work crews should include bolt cutters with their emergency equipment.** Figure B5.2 describes directions from SEAD to Geneva General Hospital.



o /seneca/site/sitemap

PARSONS
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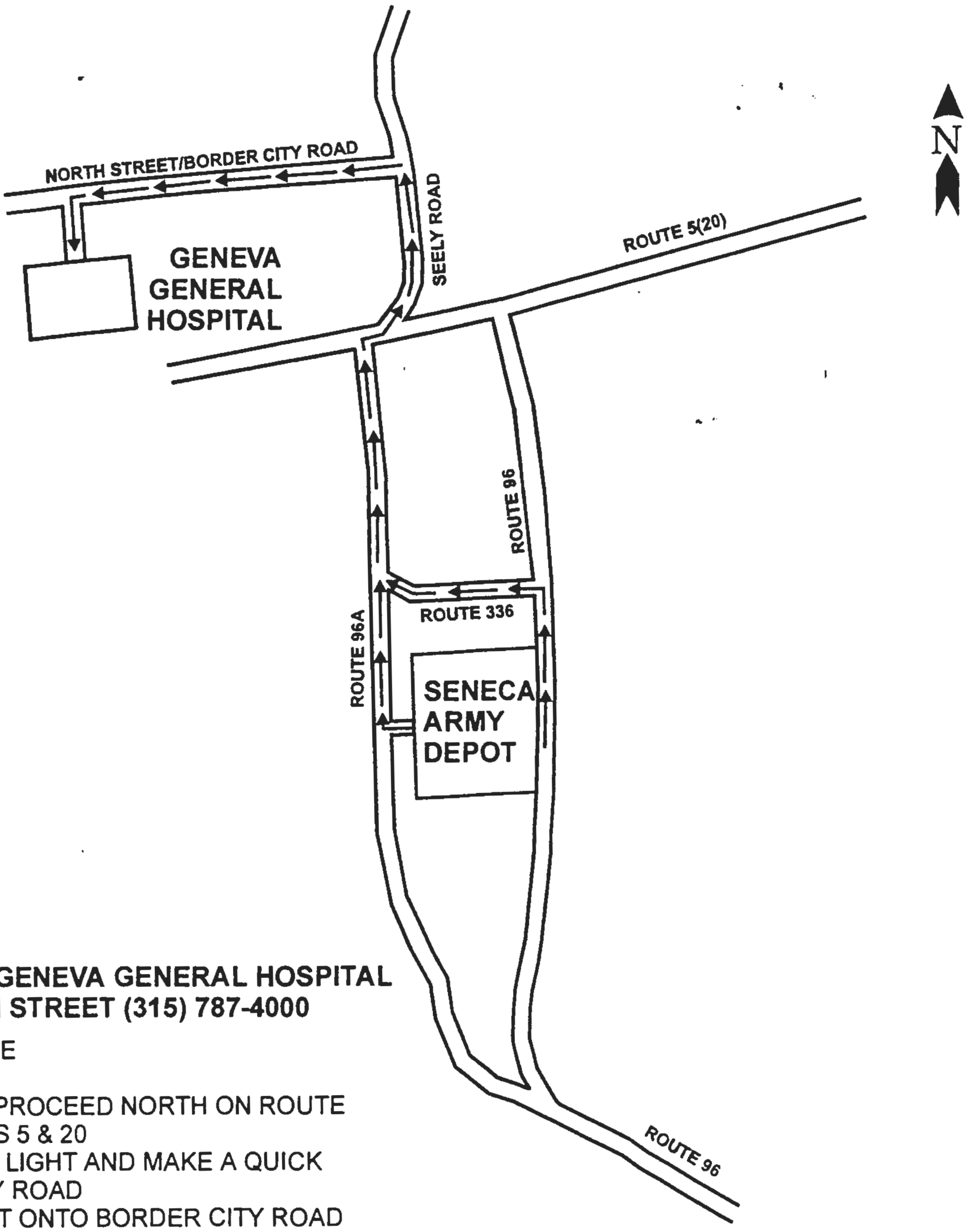
SENECA ARMY DEPOT ACTIVITY

FIGURE B5.1 LOCATION OF EMERGENCY EXIT GATES

MARCH 2000



DIRECTIONS TO GENEVA GENERAL HOSPITAL
196 NORTH STREET (315) 787-4000

FROM WEST SIDE

-EXIT SITE AND PROCEED NORTH ON ROUTE 96A TO ROUTES 5 & 20
-TURN RIGHT AT LIGHT AND MAKE A QUICK LEFT ON SEELY ROAD
-TAKE NEXT LEFT ONTO BORDER CITY ROAD WHICH TURNS INTO NORTH STREET IN GENEVA
-HOSPITAL IS ON LEFT

FROM EAST SIDE (POST 1)

-EXIT SITE AND PROCEED NORTH ON ROUTE 96 TO ROUTE 336
-TURN LEFT ONTO ROUTE 336 AND PROCEED ONTO ROUTE 96A
-PROCEED NORTH ON ROUTE 96A TO ROUTES 5 & 20
-TURN RIGHT AT LIGHT AND MAKE A QUICK LEFT ON SEELY ROAD
-TAKE NEXT LEFT ONTO BORDER CITY ROAD WHICH TURNS INTO NORTH STREET IN GENEVA
-HOSPITAL IS ON LEFT

NOTE:Not to scale

PARSONS
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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | DWG NO

FIGURE B5.2

MAP AND DIRECTIONS TO GENEVA HOSPITAL

SCALE NA | DATE FEBRUARY 1999

R:\PROJECT-GRAPHICS\SENECA\BASEMAP\HOSPITAL.CDR

B5.2.4 Procedures Implemented for a Major Fire, Explosion, or On-Site Health Emergency Crisis

For such emergencies, the UXOSO and/or SUXOS shall:

- Refer to this Site SSHP;
- Notify Seneca County Sheriff Dispatch (1-315/539-9241)
- Notify SEAD Security (869-1448)
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep area surrounding the problem source clear after the incident occurs;
- Complete an Accident Report Form and distribute to appropriate personnel.

APPENDIX B6
STANDARD SAFE WORK PRACTICES AND RECORD KEEPING

B6.0 STANDARD SAFE WORK PRACTICES

The following are considered standard safe work practices.

1. Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in a contaminated or potentially contaminated area or where the possibility for the contamination transfer exists.
2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or the ground. Do not place monitoring equipment on potentially contaminated surfaces (e.g., ground, etc.).
3. All field crew members should be alert to all potentially dangerous situations e.g., presence of strong and irritating or nauseating odors.
4. Field crew members shall be familiar with the physical characteristics of investigations, including
   - wind direction in relation to nearby buildings;
   - accessibility to associates, equipment, vehicles, communication;
   - hot zone (areas of known or suspected contamination)
   - site access; and
   - nearest water sources.
5. All wastes generated during activities on-site should be disposed of as directed by the UXOQCS.
6. Protective equipment as specified in Section B3 will be used by workers during the initial site reconnaissance and follow-on geophysical activities.
7. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided. Employees shall have transportation readily available to nearby washing and lavatory facilities.
8. Buddy system procedures will be enforced during site operations.

9. Site personnel will perform only those tasks which they are qualified to perform.
10. Site visitors are to be escorted by UXO qualified personnel at all times.
11. Running and horseplay are prohibited in all areas of the site.
12. The number of personnel in the work zones will be the minimum number necessary to perform work tasks in a safe and efficient manner.
13. Follow all SEAD Rules and Regulations.

B6.1 SPECIFIC ACTIVITY SAFE WORKING PRACTICES

B6.1.1 Power And Hand Tool Operation

- Power tools have the capability of inflicting serious injury upon personnel if they are not used and maintained properly. To control the hazards associated with power tool operations, the requirements outlined in EM 385-1-1, Section 13 and the safe work practices listed below will be observed when using power tools: Operations are conducted by authorized and trained personnel, familiar with its limitations and safety precautions;
- Power tools are inspected prior to use and defective equipment will be tagged and removed from service for repair or replacement;
- Power tools designed to accommodate guards will have such guards in place prior to use;
- Loose fitting clothing will not be permitted around moving parts;
- Keep hands, feet, etc., away from all moving parts;
- Maintenance of and adjustments to power tools will be made by qualified personnel;
- Power tools will be turned off/shut down prior to maintenance/adjustments;
- An adequate operating area is established, allowing for sufficient clearance of personnel and other operations;
- Personnel will use the required protective equipment for the power tool in use.
- **Hand Tools**

Use of improper or defective tools can contribute significantly to the occurrence of accidents onsite. Therefore, the requirements outlined in EM 385-1-1, Section 13 and the safe work practices listed below shall be observed when using hand tools:

- Hand tools will be inspected for defects prior to each use;

- Defective hand tools will be removed from service and repaired or properly discarded;
- Tools will be selected and used in the manner for which they were designed;
- Be sure of footing and grip before using any tool;
- Do not use tools that have split handles, mushroom heads, worn jaws, or other defects;
- Gloves will be worn to increase gripping ability and/or if cut, laceration or puncture hazards exist during the use of hand tools;
- Safety glasses or a face shield will be used if use of tools presents an eye/face hazard;
- Do not use makeshift tools or other improper tools;
- When working overhead, tools will be secured to ensure they cannot fall on someone below;
- Use non-sparking tools in the presence of explosive vapors, gases, or residue.

B6.1.2 Material Lifting

Many types of objects are handled in normal day-to-day operations. Care should be taken in lifting and handling heavy or bulky items because they are the cause of many joint and back injuries. The following fundamentals address the proper lifting of materials to avoid joint and back injuries:

- The size, shape and weight of the object to be lifted must be considered. Site personnel will not lift more than they can handle comfortably;
- A firm grip on the object is essential, therefore the hands and object shall be free of oil, grease and water, which might prevent a firm grip;
- The hands, and especially the fingers shall be kept away from any points that cause them to be pinched or crushed, especially when setting the object down;
- The item will be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces and pinch points, and gloves shall be used, if necessary, to protect the hands;
- The feet will be placed far enough apart for good balance and stability;
- Personnel will ensure that solid footing is available prior to lifting the object;
- When lifting, get as close to the load as possible, bend the legs at the knees, and keep the back as straight as possible;
- To lift the object, the legs are straightened from their bending position;
- Never carry a load that you cannot see over or around;
- When placing an object down, the stance and position are identical to that for lifting: with the back kept straight and the legs bent at the knees, the object is lowered; and
- If needed, the UXOSO will provide back support devices to aid in preventing back injury during lifting activities.

When two or more people are required to handle an object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each person, if possible, shall face the direction in which the object is being carried.

B6.1.3 Fire Hazards

Causes of Fires and Explosions

Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities, such as moving drums, mixing/bulking of site chemicals and during refueling of heavy or hand held equipment. Some potential causes of explosions and fires include:

- Mixing of incompatible chemicals, which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat;
- Ignition of explosive or flammable chemical gases or vapors by external ignition sources;
- Ignition of materials due to oxygen enrichment;
- Agitation of shock or friction-sensitive compounds;
- Sudden release of materials under pressure.

Fire Prevention

Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel on-site and members of the general public living or working nearby. Site personnel involved with potentially flammable material or operations will follow the guidelines listed below and EM 385-1-1, Section 9, to prevent fires and explosions:

- Potentially explosive/flammable atmospheres involving gases or vapors will be monitored using a combustible gas indicator;
- Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources will be removed or extinguished;
- Non-sparking and explosion-proof equipment will be used whenever the potential for ignition of flammable/explosive gases/vapors/liquids exists;
- Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres;
- Smoking is prohibited at UXO work sites, or in the vicinity of, operations which may present a fire hazard, and the area will be conspicuously posted with signs stating "No Smoking or Open Flame Within 50 Feet";
- Flammable and/or combustible liquids must be handled only in approved, properly labeled metal safety cans equipped with flash arrestors and self-closing lids;
- Transfer of flammable liquids from one metal container to another will be done only when the containers are electrically interconnected (electrically bonded);
- The motors of all equipment being fueled will be shut off during the fueling operations;
- Metal drums used for storing flammable/combustible liquids will be equipped with self-closing safety faucets, vent bung fittings, grounding cables and drip pans, and will be stored outside buildings in an area approved by the UXOSO.

Fire Protection

The following safe work practices will be used to protect against fires:

- Vehicles and equipment will not be fueled while running;
- Flammable/combustible liquid storage areas will have at least one 4A: 20:B: C: fire extinguisher located within 25-75 feet, marked with the appropriate fire symbol and no smoking signs;
- Temporary offices will be equipped with a fire extinguisher of not less than 10:ABC;
- At least one portable fire extinguisher having a rating of not less than 20:ABC will be located at each work site.

B6.1.4 Heavy Equipment Operation

The hazards associated with heavy equipment involve moving parts and exposure to possible pinch points. Safe operating procedures for each type of equipment or activity must be reviewed and followed. Safe work practices must be followed at all times. Hard hats, eye protection, steel-toed boots, and hearing protection will be worn (as necessary) by personnel involved in heavy equipment operations.

Heavy equipment will meet site requirements, be in good working order, and conform to industry standards. Supervisors are responsible for daily checks and inspections. These checks and inspections will be recorded in the daily log or on an inspection form. Only trained personnel will operate equipment. Personnel operating equipment with a roll over protection system (ROPS) will wear seat belts during operations. All personnel will abide by the following:

- Only authorized and trained personnel will be permitted to operate equipment;
- Equipment will be checked/inspected prior to use, including safety equipment;
- Maintenance will be performed in accordance with the operators/owners manual;
- Blades and buckets will be lowered to the ground and parking brakes set before shutting off or dismounting equipment;
- Personnel must remain outside the danger zone of equipment (i.e., Backhoe boom radius);
- All equipment must be operated at an authorized safe speed, consistent with conditions and proximity to other vehicles or personnel;
- Swing radius of booms will be clearly marked by cones, flagging or other appropriate method;
- Communications (Verbal and Hand) will be used between operators and ground personnel.

B6.1.5 Confined Spaces

Permit Required Confined Spaces (PRCS) operations are not anticipated at the SEDA. Should this change, 29 CFR 1910.146 will be reviewed and a PRCS program implemented.

B6.2 DRUG AND ALCOHOL

Parsons and USA is committed to having a drug free work place. The unlawful manufacture, distribution, dispensation, purchase, or sale of illegal drugs or alcohol at work is prohibited. Violation of this rule will result in employee termination. In accordance with the Drug-Free Workplace Act of 1988, any employee convicted of a violation of criminal drug statutes while in the employ of this company must notify the Human Resources Manager or the subsidiary Human Resources representative within 5 days of the conviction.

Parsons employees will abide by Corporate Regulations regarding the use of illegal drugs or alcohol in the workplace.

B6.2.1 SUBSTANCE ABUSE (USA ONLY)

B6.2.1.1 General Conditions

All employees and subcontractors shall at all times comply with all aspects of this Substance Abuse Prevention Program. A copy of the Program is available upon request and is included in this section on the following pages. Employees, or agents, who fail to comply with the Program, will be prohibited from entering the site.

B6.2.1.2 Drug Screening Test

All employees or agents of subcontractors, or independent contractors hired by subcontractor to perform any of the work under the subcontract who participate in this subcontract, may be required to participate in a Drug Screening Test after any project related accident that they may be involved in. The urine sample will be tested as a minimum for the following substances:

- Cocaine Metabolite;
- Amphetamines;
- Opiates;
- Phencyclidine;
- Cannabinoids.

Any person employed or hired by any contractor who receives a confirmed positive test result will be permanently prohibited from entering project property.

B6.2.1.3 Substance Abuse Prevention Program

The use of illegal drugs, on or off duty is inconsistent with law biding behavior expected of all citizens. The use of illegal drugs, or abuse of alcohol or prescription drugs, on or off duty, may impair the ability of project employees to perform tasks that are critical to proper work performance. The result is an increase in accidents and failures, which pose a serious threat to the safety of all employees, visitors and the general public. Impaired employees also tend to be less productive, less reliable and prone to greater absenteeism resulting in the potential for increased cost and delays in the timely completion of our contracts.

Furthermore, employees have the right to work in a drug-free environment and to work with persons free from the effects of drugs and alcohol. Employees who abuse alcohol or drugs are a danger to themselves and to other employees. In addition, drug and alcohol abuse inflicts a terrible toll on the nation's resources and the health and well being of workers and their families.

B6.2.1.3.1 Program Objectives

The substance abuse prevention program has the following objectives and goals:

- To assist in maintaining a safe and healthful working environment for our employees, our customers, visitors, vendors, suppliers, trade/subcontractors and members of the general public;
- To minimize absenteeism and tardiness; to improve productivity; and to ensure quality workmanship;
- To comply with contractual obligations.

B6.2.1.3.2 Program Application

This program will apply to all regular full-time, probationary, and casual or contract employees of all subcontractors and to employees and applicants of this company. This program will be applied to on-site contractors, subcontractors, suppliers and vendors. Compliance with this program will be required of all personnel. Entry onto SEDA property constitutes consent to the right of the company, or its authorized representatives, to enforce any aspect of this Substance Abuse Prevention Program.

B6.2.1.4 Company Premises for Property Defined

For the purpose of this program the term SEDA, (Seneca Army Depot Activity), includes property, offices, facilities, land, buildings, structures, fixtures, installations, automobiles, vessels, trucks and all other vehicles and equipment, whether owned, leased or used. This also includes all areas under control, or any other work locations or mode of transportation to and from those locations (parameters of job site) during working time and while in the course and scope of company employment, or pay status or while the person is on company business during regular work hours.

B6.2.1.5 Unauthorized Drugs, Alcoholic Beverages and Other Items

All employees and subcontractor employees, applicants, suppliers, vendors and visitors that the use, abuse, presence in the body or reporting to work under the influence, bringing onto company property, unlawful manufacture, distribution, dispensation, possession, transfer, storage, concealment, transportation, promotion or sale of the following illegal and unauthorized drugs, controlled substances, alcoholic beverages, drug-related paraphernalia or weapons by employees and others is strictly prohibited from the company premises, or while on company business and/or during working time.

B6.2.1.6 Illegal Drugs
Illegal drugs include:

- Marijuana - pot, dope, hash or hashish;
- Cocaine - coke, rock, crack or base;
- LSD - acid;
- PCP - angel dust, crystal;
- MDMA - ecstasy;
- Heroin - smack, black tar;
- Opium - morphine, white stuff, tar, black stuff;
- Any other unauthorized drugs and abnormal or dangerous substances which may affect an employee's/person's mood, responses, motor functions or alter or affect a person's perception, performance, judgment, reactions, or senses while working.

The foregoing list is provided by way of example only and is not to be considered as all-inclusive. This policy prohibits the presence of any confirmed detectable amount of these drugs in the employee/person while on SEDA property regardless of when or where the substance entered their body.

B6.2.1.7 Prescription Drug Abuse
Employees and others may possess prescription drugs and "over the counter" medications provided:

- The prescription drugs are prescribed by an authorized medical practitioner for current use (within the past 12 months) of the person in possession and the medicine is in its original container and in the employee's/person's name;
- Employees must not consume prescribed drugs more often than as prescribed by the employee's physician, and they must not allow any other person to consume the prescribed drug;
- Any employee who has been informed that the medication could cause adverse side effects while working or where medication indicates such warning, must inform his or her supervisor prior to using such substances on the job;
- The use of drugs/medicine prescribed by a licensed physician for the individual employee is permitted provided that it will not affect work performance. However, the SUXOS reserves the right to have a licensed physician determine if use of a prescription drug or medication by an employee may produce effects, which increase the risk of injury to the employee or others while working. If such a finding is made, the SUXOS may ask the employer to limit or suspend the work activity of the employee during the period that the physician advises that the employee's ability to perform his/her job safely may be adversely affected by the consumption of such medication. Any employee who has been suspended or limited may seek substitute medication from his/her physician and if determination is made that the substitute

medication will not adversely affect the employees' performance, then the suspension of limitations will be lifted.

B6.2.1.8 Prohibited Material

The following material are prohibited by this program:

- Drug related paraphernalia is unauthorized material or equipment or item used or designed for use in testing, packaging, storing, injecting, ingesting, inhaling, or otherwise introducing into the human body a controlled substance;
- Unauthorized Possession of firearms, weapons, or explosive (incendiary) materials including, but not limited to: brass knuckles, illegal knives and other dangerous instruments;
- No firearms are allowed on SEDA property (loaded or unloaded), except when authorized for security purposes.

B6.2.1.9 Program Enforcement Activity

(Work place searches, certified urine, drug and/or breathalyzer testing) The SUXOS also reserves the right to require all project site employees and applicants to undergo medical or physical examinations or tests at any time as a condition of employment or continued employment, including NIDA certified urine drug tests and breathalyzer tests to determine the use of any illegal or unauthorized drugs or substances prohibited in this program or to determine the employee's satisfactory fitness for duty. These tests, through the employee's direct employer, will be utilized under the following circumstances:

- Pre-employment/pre-placement testing will be required of any qualified applicant or candidate as a condition of consideration for employment with this company and trade contractors/subcontractors.
- If an employee suffers an occupational on-the-job injury: (requiring treatment from a doctor) or following a serious or potentially serious accident or incident in which safety precautions were violated, equipment or property was damaged, unusually careless acts were performed, or where the cause was due to an employee's or other person's failure to wear prescribed personal protective equipment or follow prescribed safety rules while working on SEDA property.

B6.2.1.9.1 Searches

Whenever the SUXOS has a reasonable basis to suspect that an employee's work performance or on-the-job behavior may have been affected by alcohol or drugs, or that the employee has sold, purchased, used or possessed alcohol, drugs, or drug paraphernalia on SEDA property, or at all times while entering, departing, or on property, properties, or work areas, the SUXOS may search the employee, the employee's locker, desk or other property under control of the employee, as well as the employee's personal effects or automobile on SEDA property. *AT NO TIME WILL EMPLOYEES OR OTHERS BE TOUCHED*; only outer clothing will be required to be removed during these searches and inspections. Wherever it deems appropriate, the SUXOS may use trained dogs to detect illegal drugs on personnel or on the site.

B6.2.1.9.2 Notice of Disciplinary Action for Program Violations

The SUXOS will require USA employees to participate in such urinalysis, Breathalyzer or search activity as may be necessary to assist in providing a safe, healthful and productive working environment and to comply with Federal Laws. *NO EMPLOYEE OR PERSON SEARCH, URINE DRUG TEST, BREATHALYZER OR INSPECTION WILL BE CONDUCTED WITHOUT THE EMPLOYEE'S CONSENT*, and whenever practicable, the SUXOS will request the employee's written consent. However, failure to comply with the provisions of this program or failure to provide consent when requested shall be grounds for removal from the job site.

B6.2.1.9.3 Offense Discharge

An employee shall be subject to removal from the job site for the following:

- The employee refuses to submit to a search or inspection, or urine drug test when requested by the SUXOS. Refusal to submit to a search, inspection or test will be considered sufficient for removal from the job site.
- While on the site, the employee was using, manufacturing, distributing, dispensing, selling, or possessing any illegal or unlawful drug.
- The employee has failed his/her Substance Abuse Test.

B6.3 RECORD KEEPING

B6.3.1 Logbook

The UXOSO will keep a log recording the following aspects related to safety at the site:

- Training (initial site specific training, tailgate meetings, ect)
- Site visitors;
- Issues or Problems Encountered,
- Accidents, and
- Emergencies.

B6.3.2 Records

The UXOSO will establish and maintain a filing system on-site for Health and Safety records, reports, and information concerning individual training, medical surveillance, etc. Sections in this filing system will include:

- Training Records -- Certificates for training required by 29 CFR1910.120 (40-hour initial HAZWOPER, 8-hr refresher, and supervisory training) and for UXO activities will be maintained at the site. This information will be appended to the SSHP prior to mobilization to the field. Additionally, documentation of CPR and First aid training will be available at the site.
- Medical Monitoring -- Documentation of current enrollment (within last 12 months) in a medical monitoring program will available for each employee working at the site.

Documentatión will consist of the employee's Health Status Report that is written and signed by the examining physician. This information will be appended to the UXOSO prior to mobilization to the field.

- Accident Reports -- Copies of any accident/incident reports and follow-up reports.
- Plan Acceptance Forms -- Copies of the Plan Acceptance Forms documenting that employees have read and understand the SSHP will be maintained at the site.

APPENDIX B7

REGULATIONS AND REFERENCES

Following all applicable requirements and regulations listed in the following publications will ensure the safety and health of on-site personnel and the local community:

- OSHA Occupational Safety and Health Standards, 29 CFR 1910;
- OSHA Construction Standards, 29 CFR 1926;
- Applicable sections of EPA 40 CFR Parts 260 to 299;
- Applicable sections of DOT 49 CFR Parts 100 to 199;
- Parsons I&T Polices and Procedures for Health and Safety;
- USA Safety and Health Program (SHP);
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions;
- USACE OE CX Interim Guidance Document 00-03, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations;
- DOD 6055.9-STD, DOD ammunition and Explosives Safety Standards;
- AR 200-1, Environmental Protection and Enhancement;
- AR 385-10, The Army Safety Program;
- AR 385-16, System Safety Engineering and Management;

PARSONS
PARSONS INFRASTRUCTURE & TECHNOLOGY

ACCIDENT REPORT FORM

EMPLOYER

1. Name: ______________________________

2. Mail Address: ______________________________
(No. and Street) (City or Town) (State and Zip)

3. Location: ______________________________
(if different from mail address)

INJURED OR ILL EMPLOYEE

4. Name: ______________________ Social Sec. No.: ______________
(first) (middle) (last) Employee No: ______________

5. Home Address: ______________________________
(No. and Street) (City or Town) (State and Zip)

6. Age: __________ 7. Sex: male ( ) female ( )

8. Date of injury or illness: ______________ Time of accident: ______________

9. Occupation: ______________________________
(specific job title, **not** the specific activity employee was performing at time of injury)

10. Department: ______________________________
(enter name of department in which injured person is employed, even though they may have been temporarily working in another department at the time of injury)

THE ACCIDENT OR OCCUPATIONAL ILLNESS

11. Place of accident or exposure: ______________________________
(No. and Street) (City or Town) (State and Zip)

12. Project: ______________________________

13. Was place of accident or exposure on employer's premises? Yes ( ) No ( )

14. How did the accident occur? ______________________________
(describe fully the events that resulted in the injury of occupational illness.

____
Tell what happened and how. Name objects and substances involved. Give details on all factors that led to

____
accident. Use separate sheet for additional space).

15. What was the employee doing when injured? ______________________________
(be specific—was employee using tools or equipment
____
or handling material?)

16. Witness to Accident: ______________________________
(Name) (Affiliation) (Phone No.)

____
(Name) (Affiliation) (Phone No.)

17. Name the object or substance that directly injured the employee: ______________
(for example, object that struck
____
employee; the vapor or poison inhaled or swallowed; the chemical or radiation that irritated the skin; or in
____
cases of strains, hernias, etc., the object the employee was lifting, pulling, etc.)

18. Did the accident result in employee fatality? Yes ( ) No ( )

19. Number of lost days _____/ restricted workdays ____ resulting from injury or illness?

OTHER

20. Name and address of physician: ______________________________
(No. and Street) (City or Town) (State and Zip)

21. If hospitalized, name and address: ______________________________
(No. and Street) (City or Town) (State and Zip)

22. Initial diagnosis of injury/occupational illness: ______________________

Date of report: ____________________ Prepared by: ______________________

Official position:________________________

23. Treatment rendered: ☐ first aid ☐ medical treatment

____

____

PARSONS

PARSONS INFRASTRUCTURE & TECHNOLOGY

ACCIDENT REPORT FOLLOW-UP

Employee: ______________________ Date of injury or illness: ________________

ANALYSIS – What caused the accident. Why did it happen:

Primary cause:

___

___

___

___

___

Contributing factors:

___

___

___

___

___

PREVENTIVE/CORRECTIVE ACTION – State what will be done to prevent reoccurrence.

Immediate action:

___

___

___

___

___

Who is responsible: __________________ Completion date(s): __________________

Long-term action:

___

___

___

___

___

Who is responsible: __________________ Completion date(s): __________________

Closed by: ____

3. Facility Health and Safety Representative Date

PARSONS

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PLAN ACCEPTANCE FORM
SITE SAFETY AND HEALTH PLAN

I have read and agree to abide by the contents of the Safety and Health Plan for the following project:

____

____

Name (print)

____

Signature

____

Date

Return to Project Health and Safety Officer **before** work at the site.

Attachment B-3

OSHA Job Health and Safety Protection Poster

(Posted in the Field Office at Seneca Army Depot – Building 116)

Attachment B-4

BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR ORDNANCE AND EXPLOSIVES OPERATIONS

U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE

22 May 2000

TABLE OF CONTENTS

BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR ORDNANCE AND EXPLOSIVES (OE) OPERATIONS

CHAPTER 1
INTRODUCTION

1-1. Purpose. This pamphlet establishes the safe operating procedures for dealing with ordnance and explosives (OE) and unexploded ordnance (UXO) items on formerly used defense sites (FUDS), base realignment and closure (BRAC) and installation restoration (IR) projects. Because there are no absolute safe procedures for dealing with OE, merely procedures considered being least dangerous, it is essential that a planned and systematic approach be established.

1-2. Applicability. This pamphlet applies to all Headquarters, United States Army Corps of Engineers (HQUSACE) elements, United States Army Corps of Engineers (USACE) commands, and their contractors having the responsibility for performing OE response activities. For the purpose of this document, all references to OE include UXO.

1-3. References. Required and related publications are listed in appendix A.

1-4. Distribution. Approved for public release; distribution is unlimited.

1-5. Policy. It is the policy of the USACE to produce products and services that fully meet the customers' expectations of quality, timeliness and cost effectiveness. All OE response procedures must be formulated to ensure harmony with the USACE Strategic Vision and should be in concert with activities presented in other USACE guidance. There should be no compromise of health and safety requirements to meet production or quality goals. Safety is the leading edge of quality.

1-6. Responsibilities. It is the responsibility of all USACE and contractor personnel involved with OE response projects to safely execute them in accordance with (IAW) the approved Site Safety and Health Plan (SSHP), Work Plan (WP), and all applicable laws, regulations, and policies.

1-7. Terms and Definitions.

a. Ordnance and Explosives. Ammunition, ammunition components, chemical or biological warfare materiel, or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried or fired. Such ammunition components and explosives are no longer under accountable record control of any DOD organization or activity.

b. Explosive Soil. Explosive soil refers to a mixture of explosives in soil, sand, clay or other solid media at concentrations such that the mixture itself is explosive.

c. Unexploded Ordnance (UXO). Military Munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to the operations, installations, personnel, or material, and remain unexploded either by malfunction, design, or any other cause.

d. UXO Qualified Personnel. The term UXO Qualified Personnel applies only to personnel meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and the Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18, Ordnance and Explosives Response.

e. OE Procedures. These procedures include, but are not limited to, the following actions performed by a UXO qualified individual.

(1) Gaining access to (manual excavation) and identifying subsurface anomalies and assessing the condition of buried OE.

(2) Identifying and assessing the condition of surface OE.

(3) Recovery and final disposal of all OE.

f. OE Related procedures: These OE related procedures include, but are not limited to, the following and can be performed by a non-UXO qualified individual:

(1) Location and marking of subsurface anomalies.

(2) Location and marking of suspected surface OE.

(3) Transportation and storage of recovered OE.

(4) Utilizing earth-moving machinery (EMM) to excavate overburden from suspected OE.

1-8. General Safety Concerns and Procedures.

a. OE operations will not be conducted until a complete plan for the site is prepared and approved. These plans will be based upon limiting exposure to the minimum number of personnel, for the minimum time, to the least amount of OE consistent with safe and efficient operations.

b. Only UXO qualified personnel will perform OE procedures. Non-UXO personnel may be utilized to perform OE related procedures when supervised by a UXO Technician III. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III.

c. Personnel who will be handling OE items will not wear outer or inner garments having static electricity generating characteristics. Materials made of 100 percent polyester, nylon, silk and wool, are highly static producing. Refer to DA Pam 385-64 for more information regarding non-static producing clothing.

d. Prior to any action being performed on an ordnance item, all fuzing will be positively identified. This identification will consist of fuze type by function, condition (armed or unarmed), and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/sheared, etc.

CHAPTER 2
OE SAFETY PRECAUTIONS

2-1. OE Safety Precautions.

a. Every effort will be made to identify a suspect OE item. Under no circumstances will any OE be moved in an attempt to make a positive identification. The OE item will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown OE item is encountered, the on-site USACE representative will be notified immediately. If there is no USACE personnel on-site, the District or Design Center's OE Safety representative will be notified as soon as possible. If external research is required, it will be initiated by the U.S. Army Engineering and Support Center, Huntsville. The following are additional considerations for the safe handling of OE items:

(1) Projectiles containing Base Detonating (BD) fuzes are to be considered armed if the round is fired.

(2) Arming wires and pop-out pins on unarmed fuzes should be secured prior to any movement.

(3) Do not depress plungers, turn vanes, rotate spindles, levers, setting rings or other external fittings on OE items. Such actions may arm or activate the OE.

(4) Do not attempt to remove any fuze(s) from the OE. Do not dismantle or strip components from any OE items.

(5) UXO Personnel are not authorized to inert any OE items found on-site.

(6) OE /UXO items will not be taken from the site as souvenirs/training aids.

(7) Civil War ordnance will be treated as any other OE.

b. Prior to entering areas/ranges contaminated with Improved Conventional Munitions (ICM) an approved DA waiver must be obtained. The District and/or Design Center's OE Safety representative must be notified.

c. Any time suspect chemical warfare materiel (CWM) is encountered during conventional OE site activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area.

(1) On Formerly Used Defense Sites (FUDS), the UXO team will notify the local Point of Contact (POC) designated in the Work Plan. The local POC will facilitate Explosives Ordnance Disposal (EOD) response and two personnel will secure the site until EOD's arrival. If the local POC designated in the Work Plan is not the local law enforcement agency, the local POC will inform the local law enforcement agency of the discovery. The EOD unit will notify the Technical Escort Unit (TEU) and secure the area until TEU's arrival. After notifying the local law enforcement agencies, the local POC will notify the USAESCH Safety Office to inform them of the actions taken.

(2) On active installations, the UXO team will normally notify the Range Control Officer, Facility Engineer, Post Headquarters, or POC designated in the Work Plan.

d. Avoid inhalation and skin contact with smoke, fumes, and vapors of explosives and other related hazardous materials.

e. Consider OE items, which may have been exposed to fire and detonation, as extremely hazardous. Chemical and physical changes may have occurred to the contents, which might render it more sensitive than its original state.

f. Do not rely on the color coding of OE for positive identification. Munitions having incomplete or improper color codes have been encountered.

g. Avoid approaching the forward area of an OE item until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped charge munitions contain a piezoelectric (PZ) fuzing system until identified. PZ fuzing is extremely sensitive. They can function at the slightest physical change and can remain hazardous for an indefinite period of time.

h. Approach an unfired rocket motor from the side at a 45-degree angle. Accidental ignition can cause a missile hazard and hot exhaust.

i. Do not expose unfired rocket motors to any Electromagnetic Radiation (EMR) sources.

j. Consider an emplaced landmine armed until proven otherwise. It may be intentionally booby-trapped to deceive.

(1) Many training mines contain spotting charges capable of inflicting serious injury.

(2) Exercise extreme care with wooden mines that have been buried for long periods of time. Certain soil conditions can cause the wood to deteriorate and any inadvertent movement or pressure may initiate the fuze.

k. Assume that practice OE contains a live charge until it can be determined otherwise. Expended pyrotechnic and practice devices can contain red or white phosphorus residue. Due to incomplete combustion, the phosphorous residue may re-ignite spontaneously if the crust is broken and exposed to air.

l. Do not approach a smoking white phosphorous (WP) munition. Burning WP may detonate the explosive burster charge at anytime.

m. Foreign ordnance was returned to the United States for exploitation and subsequent disposal. Every effort will be made to research the applicable documentation and publications prior to commencement of a project.

n. Anomaly Avoidance Operations. Anomaly Avoidance procedures are detailed in

- ETL 385-1-2, (Draft) Generic Scope of Work for Ordnance Avoidance Operations, August 1996, and

- Ordnance and Explosives (OE) Center of Expertise (CX) Interim Guidance Document 99-01, Unexploded Ordnance (UXO) Support for Other Activities, 5 February 1999.

  These documents can be located on the OE Home Page at:

  http://www.hnd.usace.army.mil/oew/policy/regpro.html.

CHAPTER 3
OE STORAGE

3-1. OE Storage. During OE projects, explosive storage falls into two categories, on-DOD installations and off-DOD installations.

a. On-DOD installations the provisions of DOD 6055.9 STD will be followed. Generally, the installation should have an explosive storage area that meets DOD standards. The permitting and compliance requirements are the responsibility of the installation. The compatibility of explosives found in Chapter 3, DOD 6055.9 STD will be followed. OE items awaiting final disposition will not be stored with other explosives. Storage of commercial explosives requires DOD hazard class storage compatibility group.

b. In the event the installation does not have an existing storage facility, the provisions of paragraph c, in this section, will apply.

c. Off-DOD installations, the contractor will be responsible for the construction of a temporary explosive storage area. This temporary storage area will meet all local, state, and 27 CFR, Bureau of Alcohol Tobacco and Firearms (BATF) requirements and as much of DOD 6055.9 STD as is practical to implement. The establishment of a temporary explosive storage area must meet the following requirements.

(1) The area will, if possible, meet the inhabited building and public traffic route distances specified in DOD 6055.9 STD. If the distances are less than required by the DOD guidance, a proposed barricading plan to protect the public from accidental detonation must be submitted and approved by the Huntsville Center's Engineering Directorate.

(2) Magazines must meet the requirements of the BATF regulations, and each magazine must have a Net Explosive Weight (NEW) established for the explosives to be stored.

(3) Each magazine must be grounded as specified in NFPA 780 and must meet the intermagazine distances as defined in the DOD guidance.

(4) A physical security survey will be conducted to determine if fencing or guards are required. This survey will be coordinated through local law enforcement agencies. Generally, a fence around the magazine is not needed IAW BATF regulations. However, it is the responsibility of the contractor for determining the degree of protection to prevent the theft of explosives and OE items.

(5) A fire plan for either on or off-installation explosive storage areas will be prepared and coordinated with the local fire department. All magazines will have placards IAW 27 CFR/ATF P 5400.7 or DOD 6055.9 STD.

CHAPTER 4
OE TRANSPORTATION

4-1. OE Transportation. In the event that OE items must be transported off-site, the provisions of 49 CFR, DA Pam 385-64 state and local laws will be followed. These additional considerations are provided for the safe transportation of OE items:

a. USACE contractors are prohibited from transporting OE off-site for destruction until the provisions of paragraph 1-9, TB 700-2 are followed.

b. Do not transport WP munitions unless they are immersed in water, mud or wet sand.

c. If loose pyrotechnic, tracer, flare or similar mixtures are to be transported, they will be placed in #10 mineral oil or equivalent to minimize the fire and explosion hazards.

d. Incendiary loaded munitions should be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

e. If an unfired rocket motor must be transported, it will be positioned in the vehicle parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

f. If a base-ejection projectile must be transported to a disposal area, the base will be oriented in the vehicle so that it is parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

g. OE with exposed hazardous fillers such as High Explosive (HE), will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding should be added to protect the exposed filler from heat, shock and friction.

CHAPTER 5
EXCLUSION ZONE OPERATIONS

5-1. Exclusion Zone Operations. On OE project sites, it is the responsibility of the contractor's UXO Safety Officer (UXOSO) to establish the exclusion zone for each UXO team. This exclusion zone should not be confused with the safe separation distance, which is maintained between teams.

a. The purpose of the exclusion zone is for the protection of non-essential project personnel and the public from blast overpressure and fragmentation hazards. There are two criteria for calculating exclusion zones;

(1) Intentional Detonations. When destroying ordnance, both the hazards from fragmentation and overpressure must be considered. The minimum separation distances in DOD 6055.9 STD will be used unless otherwise stated. The maximum fragmentation and overpressure distances may also be calculated IAW HNC-ED-CS-S-98-1, Methods for Predicting Primary Fragmentation Characteristics of Cased Munitions.

(2) Unintentional Detonations. If the identification of OE on an OE site is unknown, the minimum separation distance specified in DOD 6055.9 STD, Chapter 5, Paragraph C5.5.4, will be used to establish the exclusion zones. When the identification of OE items are known, the exclusion zones will be determined by the U.S. Army Engineering and Support Center, Huntsville, (USAESCH) Engineering Directorate using HNC-ED-CS-S-98-1.

b. When multiple teams are working on site, a safe separation distance will be established. The minimum distance maintained between teams will never be less than 200 feet or the K50 overpressure distance. The one that is greater will be used.

c. While OE operations are being conducted, only personnel essential for the operation will be allowed in the exclusion zone. When non-essential personnel enter the exclusion zone, all OE operations will cease. In addition to this work stoppage, the following actions will be accomplished:

(1) The individual(s) must receive a safety briefing and sign the visitor's log prior to entering the zone.

(2) The individual(s) will be escorted by a UXO qualified individual.

(3) All OE operations will cease within the radius of the exclusion zone for the areas to be visited.

d. All personnel working within the exclusion zone will comply with the following:

(1) There will be no smoking within the exclusion zone, except in areas designated by the UXOSO.

(2) There will be no open fires for heating or cooking (gas stoves, grills, etc.) within the exclusion zone, except where authorized by the UXOSO.

(3) During magnetometer operations, workers will have no metal parts in or on their shoes that would cause the magnetometer to present false indications.

CHAPTER 6
OE EXCAVATION OPERATIONS

6-1. OE Excavation Operations.

a. Hand excavation is the most reliable method for uncovering OE provided the item is near the surface. Hand excavation exposes personnel to the hazard of detonation for longer periods of time than any other method. Taking this into consideration, only UXO qualified personnel will be used to accomplish this task.

b. Earth-Moving Machinery (EMM) may be used to excavate overburden from suspected OE. EMM will not be used to excavate within 12 inches of a suspected OE. Once the EMM is within 12 inches of the OE, the excavation will be completed by hand excavation methods. Personnel who are not UXO qualified may operate EMM only when supervised by a UXO Technician III.

(1) If more than one EMM is to be used on site, the same minimum separation distances required for multiple work teams applies.

(2) EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926 Subpart P.

c. Excavation operations, whether by hand or EMM, will employ a step down or offset access method. Under no circumstances will any excavation be made directly over the suspected OE.

CHAPTER 7
OE DISPOSAL OPERATIONS

7-1. OE Disposal Operations. All demolition operations will be conducted IAW TM 60A 1-1-31 and the USAESCH Procedures for Demolition of Multiple Rounds on OE Sites. No other publications are to be used for these operations.

a. As a general rule, all demolition operations will be accomplished by electrical means to assure maximum safety. There are exceptions to this requirement in situations where static electricity or Electromagnetic Radiation (EMR) hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from TM 9-1375-213-12 are to be followed.

(1) Premature detonation of electric blasting caps by induced current from radio frequency (RF) signals is possible. Refer to TM 9-1375-213-12 that shows the minimum safe distance in respect to transmitter power and indicates distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

(2) Lightning is a hazard to both electric and non-electric blasting caps. A strike or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by proximity to conducting elements, such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities during electrical storms and when one is impending.

(3) Electric power lines also pose a hazard for electric initiating systems. It is recommended that any demolition operation closer than 155 meters to electric power lines be done with a non-electric system such as NON-EL. This non-electric firing system provides the same amount of safety and control as electrical firing systems, but without the interference of EMR and static electricity hazards.

(4) Provisions of paragraph 1-9, TB 700-2 will be fully complied with prior to USACE contractors transporting OE off-site for destruction.

a. Only serviceable condition explosive material will be used for disposal operations.

b. The only acceptable disposal method is the one stated in the appropriate TM60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

NOTE

Oil well perforators/conventional shape charges are not acceptable substitutes for bulk explosives and will not be used for disposal operations except where applicable, refer to

TM 60A-2-1-51. Otherwise these items are to be used only for the venting OE items prior to their turn-in as scrap.

c. If a situation dictates, protective measures to reduce shock, blast overpressure, and fragmentation will be taken. The USAESCH Engineering Directorate will assist in any design work and will review and approve all proposed protective works. As a minimum requirement all demolition shots will be tamped with clean earth or sand. IAW DOD 6055.9 STD the following separation distances will be observed unless otherwise directed by the Engineering Directorate.

(1) Minimum separation distance for non-fragmenting explosive materials will be no less than 1250 feet.

(2) Minimum separation distance for fragmenting explosive ordnance will be no less than 2500 feet. For bombs and projectiles with a diameter of 5 inches or greater, use a minimum distance of 4000 feet.

(3) Ordnance items with lifting lugs, strong backs, base plates, etc., will be oriented away from personnel, as fragments from these items tends to travel farther than normal.

d. Once demolition operations are completed, a thorough search of the demolition area will be conducted with a magnetometer to ensure a complete disposal was accomplished.

g. Inert ordnance will not be disposed of for scrap until the internal fillers/voids have been exposed and unconfined. Heat generated during the reclamation process can cause the inert fillers, moisture or air to expand and burst the sealed casings. In this situation, Oil Well Perforators can be used for venting these ordnance items which require demilitarization.

Appendix A

27 CFR 55	Alcohol, Tobacco Products and Firearms
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 100-199	Hazardous Materials Transportation
DOD 6055.9 STD	DOD Ammunition and Explosives Safety Standards, August 1997
AR 190- 11	Physical Security
DA PAM 385-64	Ammunition and Explosives Safety Standards
TM 9-1375-213-12	Operators and Organizational Maintenance Manual; Demolition Materials
TM 60A 1-1-22	EOD Procedures /General EOD Safety Procedures, April 1991
TM 60A 1-1-31	EOD Procedures/General Information on EOD Disposal Procedures, May 1994
EM 385-1-1	USACE Safety and Health Requirements Manual, September 1996
USAESCH	Procedures for Demolition of Multiple Rounds (consolidated shots) on Ordnance and Explosive Sites, August 1998
ER 1110-1-8153	Ordnance and Explosives Response, 19 May 1999
EP 1110-1-18	Ordnance and Explosives Response, 24 April 2000
ATF P 5400.7	ATF Explosives Laws and Regulations, June 1990
HNC-ED-CS-S 98-1	Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998
HNC-ED-CS-S 98-2	Methods for Calculating Range to No More Than One Hazardous Fragment Per 600 Square Feet on OE Sites, January 1998
HNC-ED-CS-S 96-8	Guide Selection and Siting of Barricades for Selected OE, September 1997

Attachment B-5

Air Monitoring Instument
Calibration Log

arsons Engineering Science,Inc.	Client:	Date:
Project:		Project #:
Instrument Type:	Instrument Model:	Instument S/N:

Date	Calibration Gas Concentration	Pre-adjusted Reading	Adjustment Required? Yes/No	Span Gas Concentration Setting	Post-Cal Span Gas Reading	Maintenance Notes	Initials

Attachment B-6

Field Monitoring Form

Parsons Engineering Science

Date:

Project:

Location:

Weather: AM

PM

Project No.:

Inspector:

Crew:

Location:

Time:	PID	Particulate	Comments:

seneca\oe-eeca\attachB-6.xls

Attachment B-7

HEADQUARTERS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY 14541-5001

11 April 1994 (revised 3/2/00)

CONTRACTOR AND CONTRACTOR EMPLOYEES INSTRUCTION

The following information is furnished for contractor/persons having government contracts at Seneca Army Depot Activity to facilitate entry and exit of employees and to maintain security.

1. Personnel Registration:

   a. A list of all contractors, sub-contractors and suppliers indicating firm name and address will be furnished through POC/COR to the Security Brand, Bldg. 103, 72 hours prior to commencement of work.
   b. A confirmation of employment (SDSSE-5C Form 268) will be executed by the primary contractor concerning each employee, to include all sub-contractors and their personnel. No Form 268s will be transferred to another file if you have several on-going contracts. Each contractor will provide a list of personnel who are authorized to sign Form 268 for the firm. A sample of each signature is required. Security Branch must be notified, in writing, of any changes to any active contract. All completed forms will be provided through POC/COR to the Security Branch 72 hours prior to commencement of work. Failure to complete Form 268 correctly will result in employee's denial of access to Seneca. The Security Branch must be notified, in writing through POC/COR, at least 72 hours prior to requesting any action. The chain of command for all contract actions will be Contractor through POC/COR to Security Branch. There will be no exceptions.
   c. All access media will be destroyed upon expiration date of contract. If an extension is required, a list of employee names and new expiration date must be furnished to the Security Branch through the POC/COR. Contract extensions must be made prior to the contract expiration date or new Form 268s will be required for each individual that requires an extension.

2. Traffic Regulations:

   a. Traffic laws, State of New York, apply with emphasis on the following:
   b.
      1. Speed Limit: The speed limit on Seneca Army Depot Activity is 25 mph except where posted otherwise.

2. The posted speed limit is subject to change with road conditions.

3. Parking:

Usually parking will be permitted within close proximity to your work site. Do not park within 30 feet of a depot fence, as these are clear zones.

4. Gates:

Post 1, Main Gate – NY Highway 96, NY is open for personnel entrance and exit Monday – Friday : 0600-1800.

5.. Security Regulations:

a. Prohibited Property:

1. Illegal Drugs, Alcoholic Beverages, Weapons will not be introduced to the Depot.
2. Flame permits required for gas operated tools, heaters, etc.
3. All vehicles and personal parcels, lunch pails, etc., are subject to routine security inspections at any time while on depot property.
4. All building materials, equipment and machinery must be cleared by the Chief, Public works who will issue a property pass for outgoing equipment and materials.

6. Contractor Employee Circulation:

a. Employees are cleared for entrance to the location of contract work only. Sight-seeing tours or wandering from work site is NOT AUTHORIZED.
b. Written notification will be provided to the Security Branch (ext. 41202) at least 72 hours prior to overtime work or prior to working on non-operating days.
c. Security Police (Ext. 41448/41366) will be notified at least two hours in advance of any construction or movement of slow moving heavy equipment that may interfere with normal flow of traffic, parking or Security.

7. Unions:

Representatives will be referred to the Depot Industrial Labor Relations Officer (ext. 41444).

8. Offenses: (Violations of law or regulations)

a. Minor: Offenses committed by contractor personnel which are minor in nature will be reported by the Chief, Security Branch to the contracting Officer who in turn will report such incidents to the employer for appropriate disciplinary action.
b. Major: Serious offenses committed while on the installation will be reported to the FBI. Violators may be subject to trial in Federal court.
c. Any offenses may be reported to the Seneca County Sheriff for adjudication in local court.

9. Explosive Laden Vehicles:

a. Vehicles such as vans, cargo trucks, etc., carrying explosives will display placards or signs stating "EXPLOSIVES". All explosive laden vehicles must enter or exit the installation through Post/Gate 2.
b. Explosive ladened vehicles will not be passed.
c. When an explosive laden vehicle is approaching, pull over to the side and stop.
d. When catching up with an explosive laden vehicle, slow down and allow that vehicle to remain at least 100 feet ahead.
e. When approaching an intersection where an explosive laden vehicle is crossing – STOP – do not enter the (intersection until such time as the explosive carrier has passed through and cleared the intersection.
f. When passing a vehicle/trailer or ammunition/explosives in open storage displaying "Explosive" signs, slow down to 10 miles per hour and take every precaution to allow more than ample clearance.

10. Clearing Post:

All contractor employees are required to return all identification badges and vehicle passes on the last day of employment on the depot. The contractor is responsible for the completion of all turn-ins by his employees, and informing the Security Branch and the depot organization administering the contract, for termination of any employee's access to the depot.

Attachment B-8

Material Safety Data Sheets & Safety Cards

(Office and Field Copies Only)

Arsenic
Barium Oxide
Barium Hydroxide
Cadmium Oxide
Cast Boosters
Cuprous Oxide
Detonation Cord
Dinitrotoluene (DNT)
Electric Detonators & Non Electric Detonators
Gasoline
Lead
Lubricating Oil
Mercury
Mercuric Oxide
Nickel Oxide
Shaped Charge Products
Silver Nitrate
Thallium
Thallium Oxide
Zinc

Attachment B-9

Resumes: Brian Powell (Project Safety Officer)

Howard Stepp (UXO Safety Officer)

Biographical Data

Brian J. Powell, CIH, CSP

Industrial Hygienist

Experience Summary

Industrial hygienist and health and safety representative for office and field staff involved in hazardous waste projects. Experienced in assessing the level of compliance with OSHA regulations and corporate guidelines, assisting industrial plant staff in lowering lost time and recordable accident rates and providing training for basic safety and health issues. Experienced in providing air sampling, data interpretation and recommendations for work practice, engineering or personal protective equipment controls to lower exposure levels.

Experience Record

03/1992-Date Parsons Engineering Science. **Industrial Hygienist.** Industrial hygienist and health and safety representative for office and field staff involved in hazardous waste projects. Responsibilities include reviewing health and safety plans for hazardous waste site activities; monitoring and auditing field activities to ensure compliance with OSHA regulations, corporate policies, and the appropriate health and safety plan; ensuring proper personal protective equipment is being worn and personal exposure monitoring is taking place. Provide employees with needed training for Hazardous Waste and Emergency Response, Hazard Communication, First Aid, CPR, Lockout/Tagout, Confined Space Entry, Respiratory Protection, DOT Hazardous Materials Shipping, Radiation Safety, Ergonomics, and other applicable standards. Project Health and Safety Officer for remedial investigation and remedial action at former manufactured gas plant (MGP) sites. Created written Lockout / Tagout procedures for a Syracuse based steel mill. Performed OSHA-type walk-through inspections for various manufacturing and municipal facilities. Recently inspected a Michigan based toothbrush manufacturer, a Syracuse, NY based steel mill, and a Binghampton, NY based toiletries manufacturer. Prior OSHA-type inspections include over 300 airport facilities for the Federal Aviation Administration. Performed lead abatement air monitoring for clean-up operations at two indoor firing ranges. Recently performed diesel particulate and carbon monoxide sampling for an indoor air quality assessment.

01/1991-03/1992 Corning, Inc. **Senior Industrial Hygienist**. The Corporate Safety and Health Department performing safety and health assessments for seven Corning owned facilities. This involved assessing the level of compliance with OSHA regulations and corporate guidelines, assisting plant staff in lowering lost time and recordable accident rates and providing training for basic safety and health issues. Served as Corporate Radiation Safety Officer.

06/1988-01/1991 NET Atlantic **Industrial Hygienist**. Providing air sampling, data interpretation and recommendations for work practice, engineering or personal protective equipment controls to lower exposure levels. Provided oversight on asbestos abatement work in NYS. Provided training per client needs to meet OSHA requirements. This included Hazard Communication Training, Heat Stress Training, Respirator program management and training for approximately 100 people.

06/1985-06/1988 State University of New York (SUNY). Research and Technical Specialist involved in lung tissue analysis at SUNY Health Science Center at Syracuse, Department of Anatomical Pathology.

Education

B.A. in Biology, 05/1983, Hamilton College, Clinton, NY

M.S. in Industrial Hygiene, 05/1985, University of Cincinnati, School of Environmental Health, Cincinnati, OH.

Professional Affiliations

American Industrial Hygiene Association, National and Central New York Chapters.

Certified Industrial Hygienist, CP 5596, American Board of Industrial Hygiene

Certified Safety Professional, Cert. No. 12721, Board of Certified Safety Professionals

Recent Course Work

Radiation Safety Officer Training, Ohmart Corporation, Cincinnati, Ohio (April 1991).

Incident Commander Training, American Industrial Hygiene Association Conference, St. Louis, Missouri, (May 1995).

DOT/IATA Shipping Hazardous Materials for Industrial Hygienists, American Industrial Hygiene Association Conference, Washington, DC, (May 1996).

Naturally Occurring Radioactive Materials (NORM) in Industry, - American Industrial Hygiene Association Conference, Toronto, Ontario, (May 1999).

HOWARD STEPP
UXO SUPERVISOR

CITIZENSHIP—US
MILITARY EOD EXPERIENCE—20.5 YEARS
COMMERCIAL UXXO EXPERIENCE—5 YEARS

EDUCATION/TRAINING

EOD SCHOOL, INDIAN HEAD, MD (1971)
OSHA 40 HOUR HAZWOPER COURSE(1994)
OSHA 8 HOUR REFRESHER COURSE(1995, 1998, 1999)

CIVILIAN UXO EXPERIENCE

05/00-05/00 UXO Specialist, Seneca Army Depot, Romulus, NY

03/00-04/00 UXO Specialist, Camp Gordon Johnson, Carrabelle, FL

11/99-12/99 Senior UXO Supervisor, Seneca Army Depot, Romulus, NY

04/99-11/99 SSHO/QC, Seneca Army Depot, Romulus, NY

03/99-04/99 UXO Supervisor/SSHO, Denver Research Institute, Aurora, CO

02/99-03/99 UXO Supervisor, Sierra Army Depot, Herlong, CA

10/98-11/98 UXO Specialist, Denver Research Institute, Aurora, CO

07/98-10/98 UXO Supervisor, Southwest Proving Grounds, Hope, AR

04/98-05/98 UXO Supervisor, Southwest Proving Grounds, Hope, AR

01/98-04/98 UXO Supervisor, Southwest Proving Grounds, Hope, AR

01/94-10/95 SSHO/QC, Camp Elliot Ordnance Removal, San Diego, CA

09/92-01/94 UXO Supervisor, Tierrasanta Ordnance Removal, San Diego, CA

MILITARY EOD EXPERIENCE

05/90-04/92 Unit First Sergeant, 17th Ord Det (EOD), Ft. Campbell, KY

07/84-05/90 Range NCOIC, Senior Instructor/Evaluator, EOD Training and Evaluation Division, Redstone Arsenal, AL

06/81-07/83 EOD Supervisor/Platoon Sergeant, US Army Technical Escort Unit, Aberdeen Proving Grounds(Edgewood Area), MD

10/77-06/81 EOD Sergeant/Supervisor, 19th Ord Det (EOD), Vicenza, Italy

06/74-10/77 EOD Specialist/Sergeant, 66th Ord Det (EOD), Homestead AFB/ Cape Canaveral, FL

11/71-06/74 EOD Specialist, 47th Ord Det (EOD), Ft. Hood, TX

04/71-10/71 EOD School, Ft. McClellan, AL/Indian Head, MD

APPENDIX C

SITE SPECIFIC GEOPHYSICAL PROVEOUT

U.S. Army Corps of Engineers
Huntsville Center

Mandatory Center of Expertise & Design Center
Ordnance and Explosives

FINAL

Report on
Geophysical Equipment Test Prove-Out

Engineering Evaluation / Cost Analysis (EE/CA)
Seneca Army Depot Activity (SEDA)

Contract No. DACA87-95-D-0018
Delivery Order 52

Prepared by:

Parsons Engineering Science
30 Dan Road
Canton, MA 02021

JUNE 2000

SENECA ARMY DEPOT ACTIVITY
SITE SPECIFIC GEOPHYSICAL PROVE-OUT

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Parsons Engineering Science, Inc. (PARSONS) will perform an ordnance and explosives (OE) Engineering Evaluation / Cost Analysis (EE/CA) investigation at the Seneca Army Depot Activity (SEAD). As part of this effort, a site-specific geophysical prove out analysis was conducted to identify the geophysical technique or techniques that will be the most effective for this EE/CA project. SEAD is a 10,587-acre military facility (**Figure 1)** in Seneca County, New York, that has been owned by the United States Government and operated by the Department of the Army since 1941. The site is located approximately 40 miles south of Lake Ontario, near Romulus, New York (**Figure 2**). The prove-out grid analysis was performed to provide a comparative analysis of the geophysical techniques recommended by PARSONS and agreed to by the U.S. Army Engineering and Support Center, Huntsville (USAESCH). The fieldwork was conducted on January 10-12, 2000.

2.0 OBJECTIVES

The site-specific geophysical prove-out at SEAD was designed to achieve the following objectives:

- Determine the capability of each geophysical instrument to locate buried simulated unexploded ordnance (UXO) items under the conditions anticipated at SEAD.

- Compare the applicability of the various geophysical instruments for completing surveys in the type of terrain encountered in the geophysical survey areas at SEAD.

- Compare the overall results obtained from the various techniques, their applicability at the site. and recommend a technique, or techniques, for the geophysical investigation and anomaly reacquisition tasks at SEAD.

- Evaluate different sensor heights, and optimum lane widths.

- Verify conformance with DIDOT-005-05 for anomaly depth detection criteria.

- Verify the ability of the contractors to transfer data (including raw geophysical data) to USAESCH.

- Verify the integration of the geophysical and Global Positioning System (GPS) survey procedures.

- Verify that the entire anomaly acquisition process will be determined and specified.

The processes followed, and the procedures employed and/or developed during the site-specific geophysical prove-out are the methods, processes. and procedures to be used during the project.

3.0 UXO TYPE, COMPOSITION, AND QUANTITY

3.01 Eleven different areas have been identified at the former SEAD facility as potentially containing OE items. Each area is identified in **Table 1**, along with the former use of the area, the probable type of munitions that may be located in the area, and the approximate acreage.

Table 1. UXO Types and Locations

Project Area	Area Used For	Potential Type of Munition	Approximate Acreage
SEADs 16&17	Popping Plants	small arms	15 acres
SEAD - 57	Former EOD range	Flares, small arms, 10 lb. explosive limit	58 acres
SEAD - 45	Open detonation grounds	Small arms to 155mm HE. 200 lb. explosive limit, fuses and rocket motors	60 acres
Demo Range	Demolition of projectiles	75mm projectile	40 acres
Burial Area near Indian Creek	Rumored burial	Unknown	2 acres
Grenade Area	Grenade training	Practice grenades/ no H.E.	15 acres
SEAD - 53	Munitions storage	Unknown	3000 acres
SEAD - 46	Small arms range/ small rocket range	3.5 " rockets and small arms including blanks and tracers	40 acres
EOD area # 3	Former EOD area	Unknown	5 acres
EOD area # 2	Former EOD area	Explosive destroyed and non-explosive ordnance thrown in water, 3-4 pound limit	5 acres

4.0 TERRAIN AND VEGETATION

SEAD consists mostly of former farmland that has been overgrown by dense underbrush between buildings and within the igloo area. Woodlands predominate in most of the areas that are not immediately associated with a former facility or building complex, there is slight change in topographic relief trending towards Seneca Lake to the west.

5.0 ENVIRONMENTAL SETTING

5.1 Geology and Soil Conditions

5.1.1 SEAD is located within one distinct unit of glacial till that covers the entire area between the western shore of Lake Cayuga and the eastern shore of Lake Seneca. The till is continuous across the entire depot and it ranges in thickness from less than 2 feet to as much as 15 feet with the average being only a few feet thick. This till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably rip-up clasts removed by the active glacier during the late Pleistocene era. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). Grain size analyses statistics on glacial till samples collected during the installation of monitoring wells at SEAD show a wide distribution of grain sizes. The glacial tills in this area have a high percentage of silt and clay with trace amounts of fine sand and some gravel.

5.1.2 A zone of gray weathered shale of variable thickness is present below the till in almost all locations at SEAD. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay. Under the test grid, this shale was between 2 and 4 feet in depth. This meant that no objects in the test grid could be buried greater than a depth of about 3.5 feet.

5.1.3 The underlying bedrock is a member of the Ludlowville Formation of the Devonian age Hamilton Group. The Hamilton Group, which is 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEAD is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales, mudstones and thin limestones with numerous zones of abundant invertebrate fossils.

6.0 PROVE-OUT GRID

6.1 Location of Prove-Out Grid

The prove-out grid is located in SEAD-12 at the northern end of SEAD, and is laid out trending north to south along true magnetic north. An extensive EM-31 electromagnetic terrain conductivity survey had been performed in this area of the site as part of ongoing remedial investigation activities, and this area was known to be free of large geophysical anomalies. The location of the prove-out grid is presented in **Figure 3**.

6.2 Grid Construction

6.2.1 The prove-out grid is rectangular with dimensions of 150 feet by 50 feet trending north-south along the true magnetic north declination. The corners of the grid were located by tape measure from the centers of two telephone poles, C3.14-2 and C3.14-3, approximately 200 feet from the survey grid site. Each of the four corners of the test plot grid was marked with a wooden stake in order to easily reference the location of the grid, as it will continue to be used as a calibration area for the geophysical instruments throughout the UXO investigation

6.2.2 PARSONS conducted geophysical surveys of the test grid prior to the placement of the seed items. This pre-survey was performed to provide the baseline geophysical conditions for the site. Both EM-61 and magnetic (total field and gradient) data were collected across the grid at two foot line spacings. The pre-survey results for both sensor types are displayed in **Figures 4 and 5.** The several unexplained anomalies visible in these maps were taken into account during analysis of the geophysical surveys performed after the seed items had been planted. In addition, the EM-61 and magnetometer were operated over open seed holes to test the effect of the excavation holes and water on the observed readings. No observable effect was seen with either instrument over open hole regions. However, variations in magnetic susceptibility due to differences in depth to bedrock may have contributed to slight variations in background magnetic field readings across the grid in both the N-S or E-W directions.

6.2.3 A total of 26 simulated UXO targets (non-OE items with a similar mass to the OE item expected to be found at the particular location and SEAD facility) were buried by Parsons at various locations within one half of the grid. All items were demagnetized prior to burial with a hand-held degausser. The simulated OE items were placed at depths and orientations designed to show both the strongest and weakest signals that the selected OE items are capable of producing at the site. Parsons personnel also dug a number of holes on the other half of the prove-out grid. OE items placed in these holes were placed by USAESCH personnel on-site for the prove-out. This half of the grid was the "unknown" section of grid, and Parsons had no prior knowledge as to which holes actually contained UXO. **Table 2** provides a listing of the seed items buried by Parsons. The northing and easting coordinates for the items were determined by measuring the distance to each item from the northwest and southwest corners of the grid.

Table 2. Seed Items in OE test grid
(Locations in State Plane, NAD83)

ITEM NUMBER	OE TYPE	DEPTH (inches)	ORIENTATION	EASTING	NORTHING
1	3.5" Warhead	15	V	743547.74	1013130.25
2	Fuze	12	V	743543.18	1013141.40
3	75mm	31	N-S	743542.22	1013151.81
4	3.5" Motor	11	V	743535.02	1013173.78
5	155mm	35	E-W	743531.37	1013197.59
6	3.5" Warhead	21	N-S	743520.51	1013228.63
7	3.5" Warhead	45	E-W	743516.99	1013243.14
8	Slap Flare	20	N-S	743511.82	1013256.88
9	Fuze	7	N-S	743516.12	1013263.71
10	3.5" Warhead	32	V	743519.17	1013248.79
11	75mm	18	E-W	743532.73	1013205.98
13	3.5" Motor	9	E-W	743540.91	1013171.28
14	Grenade	13	V	743542.35	1013156.61
15	Slap Flare	12	V	743555.37	1013137.26
16	Grenade	20	V	743534.20	1013219.48
17	75mm	32	E-W	743520.89	1013264.32
18	3.5" Motor	10	E-W	743524.32	1013258.56
19	Grenade	10	V	743530.15	1013244.78
20	3.5" Warhead	30	N-S	743554.24	1013160.39
21	3.5" Motor	23	E-W	743566.31	1013134.25
23	Fuze	23	E-W	743555.88	1013171.74
24	Slap Flare	15	E-W	743551.06	1013182.31
25	75mm	16	N-S	743550.92	1013188.68
27	155mm	21	N-S 30deg V	743544.70	1013221.51
28	3.5" Motor	18	N-S	743539.55	1012233.35
29	75 mm	18	V	743535.41	1013251.70
COE 1	BLU-66/B	18	None	743572.86	1013211.72
COE 2	Fuze, PD, M5	12	None	743541.44	1013258.85
COE 3	Fuze, Mech.	11	NE-SW	743552.27	1013272.67
COE 4	M-69 Grenade	6	None	743564.8	1013189.73
COE 5	M-69 Grenade	6	None	743553.5	1013236.45
COE 7	40 mm HEDP	7	N-S	743566.31	1013205.14
COE 8	40 mm w/case	10	N-S	743584.93	1013159.08
COE 9	40 mm Al. dummy	16	N-S	743572.67	1013160.72
COE 11	3. 5 Motor	21	E-W	743572.86	1013220
COE 12	3.5 Motor	25	N-S	743581.47	1013140.22
COE 13	M203	18	E-W	743591.62	1013137.68
COE 14	M203	17	300 NW	743580.57	1013170.6

ITEM NUMBER	OE TYPE	DEPTH (inches)	ORIENTATION	EASTING	NORTHING
COE 15	12 oz. steel can	11	315 NW	743573.34	1013182.21
COE 16	2 12 oz. Al. cans	19	0	743563.03	1013237.58
COE 17	3.5" Warhead	20	0	743576.61	1013199.74

Note: Items 12, 22, and 26 were M203 grenades that were not buried after discussion with the USAESCH geophysicist on-site.

E-W = East-West
N-S= North-South
V= Vertical

7.0 GEOPHYSICAL SURVEY EQUIPMENT

7.1 Geophysical Instruments

7.1.1 Four geophysical survey methods were tested in the prove-out grid. The GEONICS EM-61 TDMD was tested in both single coil and double coil configurations and the G-858 cesium vapor magnetometer was tested in both gradient and total field configurations.

7.1.2 The EM-61 device generates an electromagnetic pulse that triggers eddy currents in the subsurface. The eddy current decay rate produces a secondary magnetic field that is monitored by a receiving coil. These secondary magnetic fields are received as data and stored in a data logger until it can be downloaded to a PC for interpretation. The two arrays of this system are single and double receiving coil configurations. The double coil system receives the signal in two receiving coils at two separate heights above the ground surface. The upper and lower coils are separated by a height of forty centimeters giving separate measurements. The EM-61 data logger collects data at automatic time intervals determined by the user (up to six times per second) or at a pre-programmed distance interval measured by an attached set of wheels with all terrain tires.

7.1.3 The G-858 uses two cesium vapor magnetometer sensors that are comprised of a miniature atomic absorption unit from which a signal proportional to the intensity of the ambient magnetic field is derived. The sensitivity of the instrument is 0.05nT (nanoTesla) and can be read as fast as ten times per second depending on required sensitivity. The device was operated as a gradiometer with two sensors collecting magnetic field intensity data separated by a vertical distance of approximately 1.5 feet. The difference between the two sensor readings (divided by the sensor separation) was recorded as the magnetic gradient at the measured location.

7.2 Global Positioning System Equipment

7.2.1 A Trimble ProXRS Global Positioning System was used to provide survey and mapping coordinates. The ProXRS system is an integrated parallel channel GPS/Beacon receiver and antenna system that can be used for reception of DGPS corrected signals from U.S. Coast Guard land based beacon transmitters. GPS accuracy can be obtained with sub-meter accuracy using this unit.

7.2.2 QC of the GPS system was accomplished by taking static readings at two survey monuments already established in SEAD-63 and checking the correlation between the known survey coordinates and the GPS readings. A moving test, simulating the meandering path method of data collection, was also performed using these two monuments. In this case, EM-61 and GPS data were collected simultaneously and combined to make sure that surveyed anomalies are located with acceptable spatial accuracy.

8.0 GEOPHYSICAL SURVEY LAYOUT AND PROCEDURE

8.1 EM-61

The prove-out was designed to test both the EM-61 and the magnetometer at a number of different line spacings, sensor heights, and line orientations. A geophysical survey team operated each of the instruments over the prove-out area and recorded the data.

The EM-61 was run along lines trending north-south at 1 and 2.5-foot line spacings using both the upper and lower coils. Data were collected each time the instrument tire rotated .654 feet, and markers were inserted manually by the operator every 50 feet (marked by a string on the ground).

The data were compared after processing to determine the most effective transect interval (in terms of data quality and survey time) for the site geophysical survey.

8.2 G-858 Magnetometer

Three magnetometer surveys were conducted along lines trending north-south. The first was conducted with the bottom sensor 1.5 feet above the ground and a line spacing of 1 foot. The next two were performed with the bottom sensor 1-foot above the ground and line spacings of 2 and 2.5 feet. One further survey was carried out using east-west trending lines to check the effect of line orientation on the observed data. For this survey, the bottom sensor was at a height of 1 foot, and the line spacing was 2 feet. In each survey, the separation between the bottom and top sensors was 1.5 feet, and data were collected continuously along the survey lines. For the three surveys conducted using north-south lines, data markers were inserted every 50 feet as in the EM-61 surveys. Lines run east-west were deemed short enough that markers were not necessary.

The data were compared after processing to determine the most effective transect interval (in terms of data quality and survey time) for the site geophysical survey.

9. 0 DATA PROCESSING AND ANALYSIS

9.1 Data Post-Processing

9.1.1 The data collected with the geophysical instruments were post-processed in the field after downloading using software provided with each instrument. Post-processing for the electromagnetic and magnetic surveys primarily involved ensuring that the survey lines were correctly recorded with respect to their survey direction, distance, and grid coordinates. Post-processing particular to each instrument is described below.

9.1.2 EM-61- During the EM-61 survey, the survey lines are traversed over a known distance with data being collected incrementally with distance. Data markers are inserted each time the instrument tire rotates a specific distance. Data markers can also be inserted manually by the operator. Post-processing compresses or expands the data collected along the survey line to cover the known survey distance. This is necessary because of variations in terrain along the survey line, which effect the rotation of the wheels.

9.1.3 G-858 - During the G-858 survey, the survey lines are traversed over a known distance with data being collected incrementally with time. Data markers are inserted by the operator into the data file at specified distance intervals over the course of the traverse. Post-processing compresses or expands the data collected between each marker to cover the same distance interval. This is necessary because of minor variations in the speed at which the operator walks along the survey line.

9.2 Data Analysis

After post-processing and data checking is complete and the data has been backed up on disc and on the computer, the geophysical data from the surveys was processed into delimited files. The data were presented in delineated fields as "X", "Y", "Z1" and "Z2" where "X" and "Y" are the local State Plane Easting and Northing coordinates and "Z1" and "Z2" are the top and bottom coil/magnetometer sensor readings. The data were then transferred into a database and Geosoft's Oasis Montaj™/UX Detect software was used to further process the data by resampling the lines to get a more even spacing of the data along and across the lines. This software was also used to level (adjust to a common baseline), lag correct, and contour the data.

After this step was finished, lines were cut from the original data sets to form simulated sets of data for surveys with different line spacings. Lines were cut from the 1-foot EM survey to form simulated data sets for surveys with 2-, 3-, and 4-foot line spacings; and lines were cut from the 2.5-foot survey to form a data set for a 5-foot survey. The 1-foot line spacing magnetometer survey was cut to simulate 2- and 3-foot surveys with a 1.5-foot bottom sensor height; the 2-foot survey was cut to simulate a 4-foot survey with a 1-foot bottom sensor height; and the 2.5-foot survey was cut to simulate a 5-foot survey with a 1-foot bottom sensor height. A raster image was used to produce contour maps that identify the locations of the anomalies.

10.0 RESULTS

10.1 EM-61 Survey

In the case of each of the EM-61 data sets contoured, the best results were achieved using the responses detected by the bottom coil (**Figures 6-11**). Overall, there seemed to be little difference between the bottom coil data sets that had line spacings of up to 2.5 feet. This is fairly consistent with the actual width (3 feet) of the EM-61 coils. Therefore, in terms of data quality and acquisition time, grids with 2.5-foot line spacings have been determined to be the most effective survey configuration to optimize accuracy and survey time. The contour map generated from the 2.5-foot line spacing data set was used to pick targets in the grid. Anomaly depths were also picked with the Geosoft's UX-Detect software and are shown for comparison. There is some agreement with the known buried depths; however, agreement is not good enough that these numbers can be used for any other purposes than rough estimates of anomaly depth.

The anomalies were selected in three stages; first, obvious anomalies were picked from the geophysical anomaly data. They were then compared to the locations of pre-existing anomalies, and removed from the list if they were found to have existed already. Finally, smaller anomalies were picked and checked in the same manner, with the smaller anomalies picked on the basis of how much they stood out from the surrounding background level. Based on this method twelve anomalies were picked on the USAESCH, or unknown, side of the grid and were plotted on the map as U 1 to U 12 (**Figure 7**). The locations for each are contained in **Table 3a**. Note that these picks were later matched to seed item location data provided by USAESCH after Parsons had picked targets on the unknown side of the grid. **Table 3b** shows a comparison of the anomalies picked from the EM-61 2.5-foot line spacing data with the actual locations of the seed items on both sides of the grid.

Finally, there were three items, a 3.5" rocket warhead (#20), a slap flare (#24), and a 3.5" rocket motor (#28), which were buried in the vicinity of pre-existing anomalies. For each of these locations the response of the EM-61 was higher after the seed items had been placed. The maximum peak in the vicinity of item 20 increased from 68mV to 91mV, the peak in the vicinity of item 24 increased from 5mV to 14mV, and the peak in the vicinity of item 28 increased from 10mV to 14.5mV. Note that this is only an indication that the EM-61 was able to detect these items at these depths and orientations, not that it was able to discriminate between ordnance and the cause of the pre-burial anomaly.

Table 3A: EM Picks on Unknown Grid Section
(Locations in State Plane Coord., NAD83)

ANOMALY	EASTING (ft)	NORTHING (ft)
U 1	743580.17	1013143.01
U 2	743583.85	1013160.47
U 3	743578.29	1013171.42
U 4	743575.21	1013200.41
U 5	743563.46	1013204.91
U 6	743570.41	1013220.83
U 7	743552.06	1013236.95
U 8	743552.89	1013273.08
U 9	743562.38	1013189.39
U 10	743564.21	1013212.37
U 11	743569.41	1013230.86
U 12	743553.41	1013260.63

Table 3B. EM-61 Picks vs. Actual Seed Item Locations
(Locations in State Plane Coord., NAD83)

ITEM #	OE TYPE	DEPTH (inches)	DEPTH (computed	ORIENTATION	KNOWN EASTING	KNOWN NORTHING	ANOMALY EASTING	ANOMALY NORTHING	DELTA E	DELTA N
1	3.5" Warhead	15	20	V	743547.74	1013130.25	743548.93	1013129.82	1.19	0.43
2	Fuze	12	11	V	743543.18	1013141.40	743542.77	1013140.84	0.41	0.56
3	75mm	31	11	N-S	743542.22	1013151.81	743541.74	1013151.47	0.48	0.34
4	3.5" Motor	11	19	V	743535.02	1013173.78	743533.03	1013173.04	1.99	0.74
5	155mm	35	16	E-W	743531.37	1013197.59	743530.18	1013197.21	1.19	0.38
6	3.5" Warhead	21	19	N-S	743520.51	1013228.63	743518.77	1013227.96	1.74	0.67
7	3.5" Warhead	45	x	E-W	743516.99	1013243.14	x	x	x	x
8	Slap Flare	20	13	N-S	743511.82	1013256.88	743510.86	1013256.78	0.96	0.1
9	Fuze	7	17	N-S	743516.12	1013263.71	743516.76	1013263.70	0.64	0.01
10	3.5" Warhead	32	13	V	743519.17	1013248.79	743518.29	1013248.64	0.88	0.15
11	75mm	18	14	E-W	743532.73	1013205.98	743531.93	1013205.51	0.8	0.47
13	3.5" Motor	9	x	E-W	743540.91	1013171.28	743541.78	1013171.11	0.87	0.17
14	Grenade	13	19	V	743542.35	1013156.61	743542.71	1013155.88	0.36	0.73
15	Slap Flare	12	20	V	743555.37	1013137.26	743555.95	1013136.21	0.58	1.05
16	Grenade	20	14	V	743534.20	1013219.48	743533.38	1013219.25	0.82	0.23
17	75mm	32	x	E-W	743520.89	1013264.32	743519.76	1013264.49	1.13	0.17
18	3.5" Motor	10	10	E-W	743524.32	1013258.56	743523.52	1013258.01	0.8	0.55
19	Grenade	10	12	V	743530.15	1013244.78	743529.21	1013244.94	.94	0.16

ITEM #	OE TYPE	DEPTH (inches)	DEPTH (computed	ORIENTATION	KNOWN EASTING	KNOWN NORTHING	ANOMALY EASTING	ANOMALY NORTHING	DELTA E	DELTA N
20	3.5" Warhead	30	19	N-S	743554.24	1013160.39	743555.28	1013159.94	1.04	0.45
21	3.5" Motor	23	29	E-W	743566.31	1013134.25	743564.38	1013133.76	1.93	0.49
23	Fuze	23	19	E-W	743555.88	1013171.74	x	x	x	x
24	Slap Flare	15	19	E-W	743551.06	1013182.31	743551.37	1013182.28	0.31	0.03
25	75mm	16	27	N-S	743550.92	1013188.68	743551.20	1013188.35	0.28	0.33
27	155mm	21	14	N-S 30deg V	743544.70	1013221.51	743544.55	1013221.61	0.15	0.1
28	3.5" Motor	18	12	N-S	743539.55	1013233.35	743538.11	1013235.82	1.44	2.47
29	75mm	18	48	V	743535.41	1013251.70	743535.10	1013251.16	0.31	0.54
COE 1	BLU-66/B	18	x	None	743572.86	1013211.72	x	x	x	x
COE 2	Fuze, PD, M5	12	48	None	743541.44	1013258.85	x	x	x	x
COE 3 (U8)	Fuze, Mech.	18	x	NE-SW	743552.27	1013272.67	743552.89	1013273.08	0.62	0.41
COE 4 (U9)	M-69 Grenade	11	x	None	743564.80	1013189.73	743562.38	1013189.39	2.42	0.34
COE 5 (U7)	M-69 Grenade	6	27	None	743553.50	1013236.45	743552.06	1013236.95	1.44	0.5
COE 7 (U5)	40mm HEDP	6	7	N-S	743566.31	1013205.14	743563.46	1013204.91	2.85	0.23
COE 8 (U2)	40mm w/case	10	25	N-S	743584.93	1013159.08	743583.85	1013160.47	1.08	1.39
COE 9	40mm Al Dummy	16	25	N-S	743572.67	1013160.72	x	x	x	x
COE 11 (U6)	3.5 Motor	21	10	E-W	743572.86	1013220.00	743570.41	1013220.83	2.45	0.83
COE 12 (U1)	3.5 Motor	25	x	N-S	743581.47	1013140.22	743580.17	1013143.01	1.3	2.79
COE 13	M203	18	16	E-W	743591.62	1013137.68	x	x	x	x
COE 14 (U3)	M203	17	25	300 NW	743580.57	1013170.6	743578.29	1013171.42	2.28	0.82
COE 15	12oz. Can (steel)	11	x	315 NW	743573.34	1013182.21	x	x	x	x
COE 16	2 12oz. Cans (Al)	19	x	0	743563.03	1013237.58	x	x	x	x
COE 17 (U4)	3.5 Warhead	20	14	0	743576.61	1013199.74	743575.21	1013200.41	1.4	0.67
								AVG. DELTA	1.12	.58

Note: Parsons items 12, 22, and 26 were M203 grenades that were not buried after discussion with the USAESCH geophysicist on-site.

E-W = East-West
N-S= North-South
V= Vertical
x not located

The locations picked from the anomaly map vary from the actual locations on average by a total of about 1.26 feet. This is approximately the accuracy desired for this survey. Note that the EM-61 data did not have sufficient resolution to determine the orientation of the anomalies; however it was capable of distinguishing larger objects (155 mm rounds) from smaller ones (grenades). Three anomalies, U10, U 11, and U12, that do not correspond to any seeded items were picked on the unknown section of grid. While this suggests that anomalies picked during the project may be false positives, this may be necessary as U9, an anomaly in the same response range as the three false positives chosen, was caused by an M-69 grenade.

10.2 G-858 Magnetometer Survey

Gradient data were used for all of the magnetics contour maps. **Figures 12-14** show the surveys for which the bottom sensor was at a height of 1.5 feet. **Figures 15-18** show the surveys for which the bottom sensor was at a height of 1-foot. The separation between the top and bottom sensors was 1.5 feet for all of the magnetometer surveys.

The gradient data recorded with a 1-foot bottom sensor height shows better resolution of the smaller UXO targets than the data collected at a 1.5-foot bottom sensor height, however, it also showed more resolution of the background field. The higher sensors appeared to give slightly better overall signal to noise ratio. In most cases, we intend to use a configuration with a 1-foot bottom sensor height in order to identify smaller ordnance, as at the grenade range. However, in areas where relatively large ordnance is expected or where there is a large amount of surface clutter, as at the open detonation area, the 1.5-foot configuration will be used.

An examination of the magnetic results indicated that 2.5-foot spacing appeared to give us optimal results in terms of resolution and survey time. Reducing the spacing distance below 2.5 feet did not significantly improve the chances of detecting any of the seeded items, and increasing the spacing to 3 feet did reduce some anomaly amplitudes to the point that they were not evident above background. As the 2.5-foot spacing was chosen as optimal, picks on the unknown section of grid were made on the 2.5-foot spacing contour map. The picks from the unknown section of the grid are contained in **Table 4a**.

Table 4A: Magnetics Picks on Unknown Grid Section
(State Plane Coord., NAD83)

ANOMALY	EASTING (ft)	NORTHING (ft)
U 1	743581.79	1013138.98
U 2	743570.93	1013181.56
U 3	743562.26	1013188.91
U 4	743563.36	1013204.90
U 5	743571.59	1013219.70
U 6	743551.95	1013236.79

The E-W magnetometer survey (**Figure 19**) showed that most of the anomalies were located about as well in this mode as in the north-south mode. However, the responses over two anomalies, #23 and U 4 near COE 7, did drop into what would be considered background in this survey. And, while most of the seeded items were still detected in the east-west survey, many had lower amplitude peaks than those seen in the north-south survey. As survey direction does seem to have an effect on the data collected, an effort will be made to collect all magnetics data along north-south trending grid lines.

It is important to note that the G-858 gave clearly distinguishable anomaly orientations for most of the larger ordnance items on the grid. We were able to identify items # 13, a 3.5" rocket motor, as an E-W anomaly, item #20, a 3.5" rocket warhead as a N-S anomaly, item #21, a 3.5" rocket motor as an E-W anomaly, item #25, a 75mm round as a N-S anomaly, and item #27, a 155mm round as a N-S anomaly. (Note that item #5, a 155mm round, was near the edge of the grid and did not give a strong bi-polar anomaly). Anomaly depths were obtained from the Geosoft UXO program. They are not particularly accurate; we therefore have no intention of using them in the project.

Once again, most anomalies on all of the contour maps were within 1-2 feet of the location of the seed item. A detailed comparison of the anomalies with the actual locations is given in **Table 4b**. Anomalies from the unknown section of the grid were matched with the closest item location provided by USAESCH after Parsons' personnel had already made the unknown picks. The anomaly between Parsons item #15 and PB07 was not selected as it was believed to be caused by surface or near surface items on the Parsons side of the grid.

Table 4 B. Magnetometer Picks vs. Actual Seed Item Locations
(Locations in State Plane Coord., NAD83)

ITEM #	OE TYPE	DEPTH (inches)	DEPTH (computed)	ORIENTATION	KNOWN EASTING	KNOWN NORTHING	ANOMALY EASTING	ANOMALY NORTHING	DELTA E	DELTA N
1	3.5" Warhead	15	28	V	743547.74	1013130.25	743548.29	1013130.97	0.55	0.72
2	Fuze	12	23	V	743543.18	1013141.40	743544.02	1013140.54	0.84	0.86
3	75mm	31	12	N-S	743542.22	1013151.81	743542.02	1013152.03	0.2	0.22
4	3.5" Motor	11	5	V	743535.02	1013173.78	743535.74	1013174.90	0.72	1.12
5	155mm	35	23	E-W	743531.37	1013197.59	743529.30	1013200.78	2.07	3.19
6	3.5" Warhead	21	25	N-S	743520.51	1013228.63	743520.93	1013227.64	0.42	0.99
7	3.5" Warhead	45	x	E-W	743516.99	1013243.14	x	x	x	x
8	Slap Flare	20	x	N-S	743511.82	1013256.88	x	x	x	x
9	Fuze	7	17	N-S	743516.12	1013263.71	743516.44	1013263.42	0.32	0.29
10	3.5" Warhead	32	x	V	743519.17	1013248.79	743518.21	1013247.83	0.96	0.96
11	75mm	18	28	E-W	743532.73	1013205.98	743531.31	1013206.01	1.42	0.03
13	3.5" Motor	9	19	E-W	743540.91	1013171.28	743539.20	1013171.18	1.71	0.1
14	Grenade	13	17	V	743542.35	1013156.61	743541.52	1013157.35	0.83	0.74
15	Slap Flare	12	18	V	743555.37	1013137.26	x	x	x	x
16	Grenade	20	x	V	743534.20	1013219.48	743535.10	1013219.93	0.9	0.45
17	75mm	32	51	E-W	743520.89	1013264.32	743522.07	1013263.03	1.18	1.29
18	3.5" Motor	10	20	E-W	743524.32	1013258.56	743523.59	1013256.36	0.73	2.2
19	Grenade	10	19	V	743530.15	1013244.78	743529.22	1013244.69	0.93	0.09
20	3.5" Warhead	30	19	N-S	743554.24	1013160.39	743555.44	1013159.61	1.2	0.78
21	3.5" Motor	23	29	E-W	743566.31	1013134.25	743565.33	1013133.87	0.98	0.38
23	Fuze	23	19	E-W	743555.88	1013171.74	743556.81	1013171.82	0.93	0.08
24	Slap Flare	15	19	E-W	743551.06	1013182.31	x	x	x	x
25	75mm	16	26	N-S	743550.92	1013188.68	743551.10	1013188.96	0.18	0.28
27	155mm	21	14	N-S 30deg V	743544.70	1013221.51	743543.86	1013222.26	0.84	0.75
28	3.5" Motor	18	12	N-S	743539.55	1013233.35	743540.32	1013232.15	0.77	1.2

ITEM #	OE TYPE	DEPTH (inches)	DEPTH (computed)	ORIENTATION	KNOWN EASTING	KNOWN NORTHING	ANOMALY EASTING	ANOMALY NORTHING	DELTA E	DELTA N
29	75mm	18	48	V	743535.41	1013251.70	743535.58	1013250.72	0.17	0.98
COE 1	BLU-66/B	18	x	None	743572.86	1013211.72	x	x	x	x
COE 2	Fuze, PD, M5	12	21	Nome	743541.44	1013258.85	x	x	x	x
COE 3	Fuze, Mech.	18	x	NE-SW	743552.27	1013272.67	x	x	x	x
COE 4 (U 3)	M-69 Grenade	11	18	None	743564.8	1013189.73	743562.26	1013188.91	2.54	0.82
COE 5	M-69 Grenade	6	x	None	743553.5	1013236.45	743551.95	1013236.79	1.55	0.34
COE 7 (U 4)	40mm HEDP	6	x	N-S	743566.31	1013205.14	743563.36	1013204.90	2.95	0.24
COE 8	40mm w/case	10	x	N-S	743584.93	1013159.08	x	x	x	x
COE 9	40mm Al Dummy	16	x	N-S	743572.67	1013160.72	x	x	x	x
COE 11 (U 5)	3.5 Motor	21	32	E-W	743572.86	1013220	743571.59	1013219.70	1.27	0.3
COE 12 (U 1)	3.5 Motor	25	31	N-S	743581.47	1013140.22	743581.79	1013138.98	0.32	1.24
COE 13	M203	18	x	E-W	743591.62	1013137.68	x	x	x	x
COE 14	M203	17	x	300 NW	743580.57	1013170.6	x	x	x	x
COE 15 (U 2)	12oz. Can (steel)	11	x	315 NW	743573.34	1013182.21	743570.93	1013181.56	2.41	0.65
COE 16	2 12oz. Cans (Al)	19	x	0	743563.03	1013237.58	x	x	x	x
COE 17	3.5 " Warhead	20	x	0	743576.61	1013199.74	x	x	x	x
								Avg. Delta	0.98	0.76

Note: Items 12, 22, and 26 were M203 grenades that were not buried after discussion with the USAESCH geophysicist on-site.

E-W = East-West
N-S= North-South
V= Vertical
x not located

The locations picked from the anomaly map vary from the actual locations on average by a total of about 1.24 feet.

There were a number of seeded items buried on top of pre-existing magnetics anomalies. For the most part, however, the pre-burial anomalies were negative gradient anomalies. It is, therefore, fairly easy to tell that the seeded items were detected by the magnetometer, as the post-burial anomalies all have some positive gradient component to them. Two cases in which it is a little more difficult to tell whether the seeded items were detected are item #1 near PB01 and item #20 near PB08. The response for item #1 included a negative component, and the positive peak increased from 7nT to 14nT. After the burial of item #20, the positive and negative peaks in the vicinity of PB08 switched places, with the positive peak going from the north to the south side of the negative.

10.3 Instrument Comparison

The results for both instruments over the known anomalies are summarized in **Table 5**. The comparisons are between the EM-61 survey using 2.5-foot line spacing and the magnetometer survey using 2.5-foot spacing.

Table 5: Ordnance detection results Y – detected; N - not detected

SEED ITEM	DEPTH (in)	ITEM ID#	RESULT EM-61	RESULT G-858
155mm	35	5	Y	Y
155mm	21	27	Y	Y
3.5" Warhead	15	1	Y	Y
3.5" Warhead	21	6	Y	Y
3.5" Warhead	45	7	N	N
3.5" Warhead	32	10	Y	Y
3.5" Warhead	23	20	Y	Y
3.5" Motor	11	4	Y	Y
3.5" Motor	9	13	Y	Y
3.5" Motor	10	18	Y	Y
3.5" Motor	23	21	Y	Y
3.5" Motor	18	28	Y	Y
75mm	31	3	Y	Y
75mm	18	11	Y	Y
75mm	32	17	Y	Y
75mm	16	25	Y	Y
75mm	18	29	Y	Y
Fuze	12	2	Y	Y
Fuze	7	9	Y	Y
Fuze	23	23	N	Y
Grenade	13	14	Y	Y
Grenade	20	16	Y	Y
Grenade	10	19	Y	Y
Slap Flare	20	8	Y	N
Slap Flare	12	15	Y	N
Slap Flare	15	24	Y	N
BLU-66/B	18	COE 1	N	N
Fuze, PD, M5	12	COE 2	N	N
Fuze, Mech.	18	COE 3	Y	N
M-69 Grenade	11	COE 4	Y	Y
M-69 Grenade	6	COE 5	Y	Y
40mm HEDP	6	COE 7	Y	Y
40mm w/case	10	COE 8	Y	N

SEED ITEM	DEPTH (in)	ITEM ID#	RESULT EM-61	RESULT G-858
40mm Al Dummy	16	COE 9	N	N
3.5 Motor	21	COE 11	Y	Y
3.5 Motor	25	COE 12	Y	Y
M203	18	COE 13	N	N
M203	17	COE 14	Y	N
12oz. Can (steel)	11	COE 15	N	Y
2 12oz. Cans (Al)	19	COE 16	N	N
3.5 Warhead	20	COE 17	Y	N

As far as location of specific ordnance items is concerned, there were some small differences between the instruments. The magnetometer missed the three slap flares, a mechanical fuze, an M203 rifle-fired grenade, and a 3.5-inch warhead that were detected by the EM-61. The EM-61 missed one fuze that the magnetometer detected. As the flares and M203 simulants were constructed out of non-ferrous aluminum, it is unsurprising that they were not detected by the G-858, while the mechanical fuze at 18 inches was, apparently too small to be seen with the magnetometer. The fuze missed by the EM-61 was apparently too deep to detect at 23 inches. Other than these exceptions, the two instruments proved to be nearly equal in their abilities to detect buried OE items. However, in most cases, the EM-61 showed more clearly identifiable anomalies. The EM-61 also seemed to have a less variable background field than the magnetometer.

Both instruments were able to detect the buried OE simulants on the Parsons side of the grid to and beyond the depths specified in USAESCH Data Item Description (DID) OE-005-05, which defines geophysical investigation performance goals. The one item missed by both instruments, a 3.5" rocket warhead was buried below the detection limit for both of the instruments, as was the fuze missed by the EM-61.

10.4 GPS Static and Meandering Path Surveys

The static test performed at monuments SEAD-63 and SEAD-63-1 indicated that the GPS equipment did function within the accuracy stated by the manufacturer (sub-meter), with less than 1.5' of difference between the surveyed and actual coordinates of the monuments. A second comparison of GPS data with actual data was performed by comparing the hole locations surveyed using the GPS to the final measured locations of the items (**Table 6**). The average error is about 1.6 feet.

Table 6. GPS Locations of Holes Compared to Taped Locations

ITEM NO.	OE TYPE	DEPTH (in)	ORIENTATION	EASTING (NAD 83)	NORTHING (NAD83)	GPS EASTING	GPS NORTHING	DELTA X	DELTA Y
1	3.5" Warhead	15	V	743547.74	1013130.25	743548.21	1013129.17	0.47	1.08
2	Fuze	12	V	743543.18	1013141.40	743542.41	1013140.31	0.77	1.09
3	75mm	31	N-S	743542.22	1013151.81	743542.2	1013149.63	0.02	2.18
4	3.5" Motor	11	V	743535.02	1013173.78	743534.39	1013173.39	0.63	0.39
5	155mm	35	E-W	743531.37	1013197.59	743529.42	1013196.63	1.95	0.96
6	3.5" Warhead	21	N-S	743522.65	1013229.75	743520.06	1013228.26	2.59	1.49
7	3.5" Warhead	45	E-W	743516.99	1013243.14	743515.19	1013241.53	1.8	1.61
8	Slap Flare	20	N-S	743512.94	1013257.71	743511.9	1013256.65	1.04	1.06
9	Fuze	7	N-S	743516.12	1013263.71	743517.14	1013263.31	1.02	0.4
10	3.5" Warhead	32	V	743519.17	1013248.79	743519.23	1013248.48	0.06	0.31
11	75mm	18	E-W	743532.73	1013205.98	743531.93	1013205.35	0.8	0.63
13	3.5" Motor	9	E-W	743540.91	1013171.28	743540.96	1013171.21	0.05	0.07
14	Grenade	13	V	743542.35	1013156.61	743542.4	1013156.31	0.05	0.3
15	Slap Flare	12	V	743555.37	1013137.26	743555.81	1013136.98	0.44	0.28
16	Grenade	20	V	743534.20	1013219.48	743534.75	1013219.45	0.55	0.03
17	75mm	32	E-W	743520.40	1013264.29	x	x	x	x
18	3.5" Motor	10	E-W	743524.32	1013258.56	743524.71	1013258.22	0.39	0.34
19	Grenade	10	V	743530.15	1013244.78	743530.43	1013244.39	0.28	0.39
20	3.5" Warhead	30	N-S	743554.24	1013160.39	743553.95	1013158.42	0.29	1.97
21	3.5" Motor	23	E-W	743566.31	1013134.25	743565.81	1013132.54	0.5	1.69
23	Fuze	23	E-W	743555.88	1013171.74	743555.2	1013171.32	0.68	0.42
24	Slap Flare	15	E-W	743551.06	1013182.31	743550.52	1013180.80	0.54	1.51
25	75mm	16	N-S	743550.92	1013188.68	743549.98	1013187.05	0.94	1.63
27	155mm	21	N-S 30deg V	743544.70	1013221.51	743544.24	1013220.42	0.46	1.09
28	3.5" Motor	18	N-S	743544.12	1013234.07	743539.34	1013232.26	0.78	1.81
29	75mm	18	V	743535.41	1013251.70	743535.61	1013249.92	0.2	1.78
COE 1	BLU-66/B	18	None	743572.86	1013211.72	743566.9	1013209.00	5.96	2.72
COE 2	Fuse, PD, M5	12	None	743541.44	1013258.85	743542.2	1013256.00	0.76	2.85
COE 3	Fuze, Mech.	18	NE-SW	743552.27	1013272.67	743554.1	1013269.00	1.83	3.67
COE 4	M 69 Grenade	11	None	743564.80	1013189.73	743563.1	1013188.00	1.7	1.73
COE 5	M69 Grenade	6	None	743553.50	1013236.45	743551.2	1013234.00	2.3	2.45
COE 7	40mm HEDP	6	N-S	743566.31	1013205.14	743563.2	1013203.00	3.09	2.14
COE 8	40 mm w/case	10	N-S	743584.93	1013159.08	743582.5	1013160.72	2.43	1.64
COE 9	40 Mm Alum.	16	N-S	743572.67	1013160.72	743570.9	1013160.00	1.77	0.72
COE 11	3.5" Motor	21	E-W	743572.86	1013220.00	743571	1013218.00	1.86	2
COE 12	3.5" Motor	25	N-S	743581.47	1013140.22	743579.5	1013138.00	1.97	1.78
COE 13	M203 Simulant	18	E-W	743591.62	1013137.68	743590	1013137.00	1.62	0.32
COE 14	M203 Simulant	17	300 NW	743580.57	1013170.60	743577.7	1013171.00	2.23	0.4
COE 15	12 oz. Steel can	11	315 NW	743573.34	1013182.21	743570.3	1013181.00	3.04	1.21
COE 16	2 12 oz. Cans (Al)	19	0	743563.03	1013237.58	743561	1013235.00	2.03	2.58
COE 17	3.5" warhead	20	0	743576.61	1013199.74	743574.7	1013198.00	1.91	1.74
						Avg. DX	Avg. DY	1.29	1.47

The results of the meandering path survey suggest that combining GPS and EM-61 or magnetometer data by time stamping both sets of data will be effective. The coordinates calculated for the two survey monuments using the GPS and EM data were within the stated accuracy of the GPS. The calculated and actual coordinates are summarized in **Table 6A.**

Table 6A: Results of Meandering Path Survey
(State Plane Coord., NAD83)

Monument	Easting Calculated (ft)	Easting Actual (ft)	Northing Calculated (ft)	Northing Actual (ft.)	Delta E (ft.)	Delta N (ft.)
SEAD-63	741195.42	741193.71	1013315.94	1013315.09	1.71	. 85
SEAD-63-1	741208.97	741208.22	1012830.66	1012828.47	.75	2.19

11.0 RECOMMENDATIONS

11.0.1 This survey shows that the EM-61 consistently did a better job of locating the anomalies than the G-858. However, the G-858 did give useful results for most of the items emplaced. Note also that the polarity of the magnetic signal is useful in locating larger objects buried in a specified direction. This means that the G-858 may be useful when used in conjunction with the EM-61 for some of the areas where larger or longer ordnance, such as rockets or 75 mm shells, are expected in the subsurface.

11.0.2 We recommend that the EM-61 be used in the majority of the areas on-site at lines on 2.5-foot spacings. The G-858 can be used along cross lines in 2.5-foot spacings in areas, such as SEAD-45, where a number of large anomalies are expected, in order to help aid in anomaly discrimination prior to excavation. The G-858 can also be used in wooded and heavily overgrown areas where it would be difficult to maneuver with the EM-61. It may be useful for locating smaller magnetic anomalies, as expected at the grenade range, although field tests of both the G-858 and the EM-61 will be required at this area.

11.0.3 After consultation with the Corps of Engineers, it was concluded that the level of accuracy of the Trimble Pro XRS was not sufficient for use for this project, at least for the purpose of locating the corners of the grids. We may recommend it for anomaly location for anomalies located using the meandering path method, if this is agreeable to the Corps. However, we do not recommend using this unit for the purpose of locating grids on this project. Instead, we recommend using a similar Trimble unit, the 4800 which uses a base station and a larger number of satellites. This unit provides location accuracy to within 1-2 cm. This will be used for locating the corners of the survey grids for each area. The survey grids will then be laid out using standard surveying methods.

QUALITY CONTROL

Quality control was established for the geophysical surveys by performing the following:

1. Function checks of the EM-61 were performed by repeat surveying of line 50 on the test grid. In the case of each instrument, two lines, one north-south the other south-north, were run with no surface anomalies along the line. Two more lines (north-south and south-north) were run with a grenade placed on the ground surface at 50' N along the line. Two final lines were run, also with the grenade on the surface. The first of these was run north-south at a relatively fast pace, and the second was run south-north at a relatively slow pace. The profiles and comparisons of these six lines are shown in **Figure A-1**.

   The magnetometer was checked in a similar fashion. The composition of the first four QC lines were the same as the EM-61 QC lines, with the first two anomaly free and the next two with the grenade at 50 feet. For each of these lines, the bottom sensor of the magnetometer was at a height of .5 feet. The final two QC lines were run with the bottom sensor at a height of 1.5 feet rather than at different walking speeds. The QC results for the magnetometer are shown in **Figure A-2**.

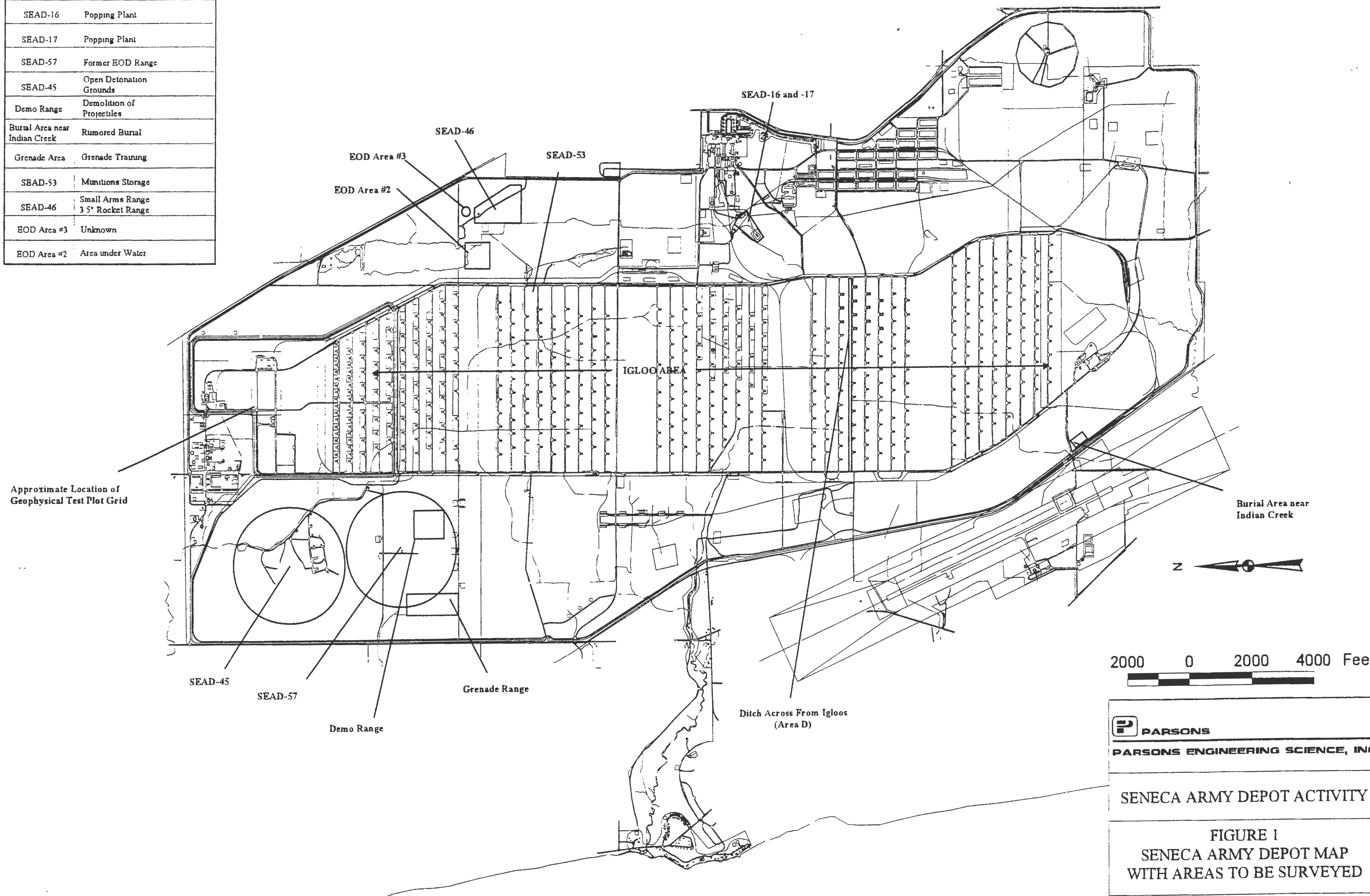
   For both instruments, the only discrepancy seen in the comparison of the six QC lines is the location of the peaks. This discrepancy is caused by the "lag" in instrument response associated with collecting data in different directions over the same anomaly. The lag error can easily be corrected using Geosoft, and will be corrected for all of the grids surveyed during the project.

2. A static test of the EM-61 was also performed to warm up the EM-61 prior to data collection in order to minimize instrument drift. The instrument was left in a stationary position and set to collect data once a second for five minutes. The results are shown in **Figure A-3**, and indicate that drift was not a problem. Note, however, that the instrument was not static tested over a spike in the field; this test was not requested by the COE at the time of the testplot work plan preparation or field data collection.

3. A heading test of the G858 was performed by continuously collecting data over one location while the magnetometer sensors were rotated 360° through each point of the compass (N, E, S, and W). This test was performed to allow for the correction of any discrepancies in magnetometer readings due to the direction that the operator (and, thus sensors) was facing at the time of collection. The test results are shown in **Figure A-4** and illustrate that there was generally less than a 1nT difference between the readings in any given direction.

4. As previously stated, the GPS was checked using two survey monuments in SEAD-63. If the indicated position was within 3 feet of the actual location, the GPS was assumed to be working correctly.

SITE	DESCRIPTION
SEAD-16	Popping Plant
SEAD-17	Popping Plant
SEAD-57	Former EOD Range
SEAD-45	Open Detonation Grounds
Demo Range	Demolition of Projectiles
Burial Area near Indian Creek	Rumored Burial
Grenade Area	Grenade Training
SEAD-53	Munitions Storage
SEAD-46	Small Arms Range 3 5" Rocket Range
EOD Area #3	Unknown
EOD Area #2	Area under Water



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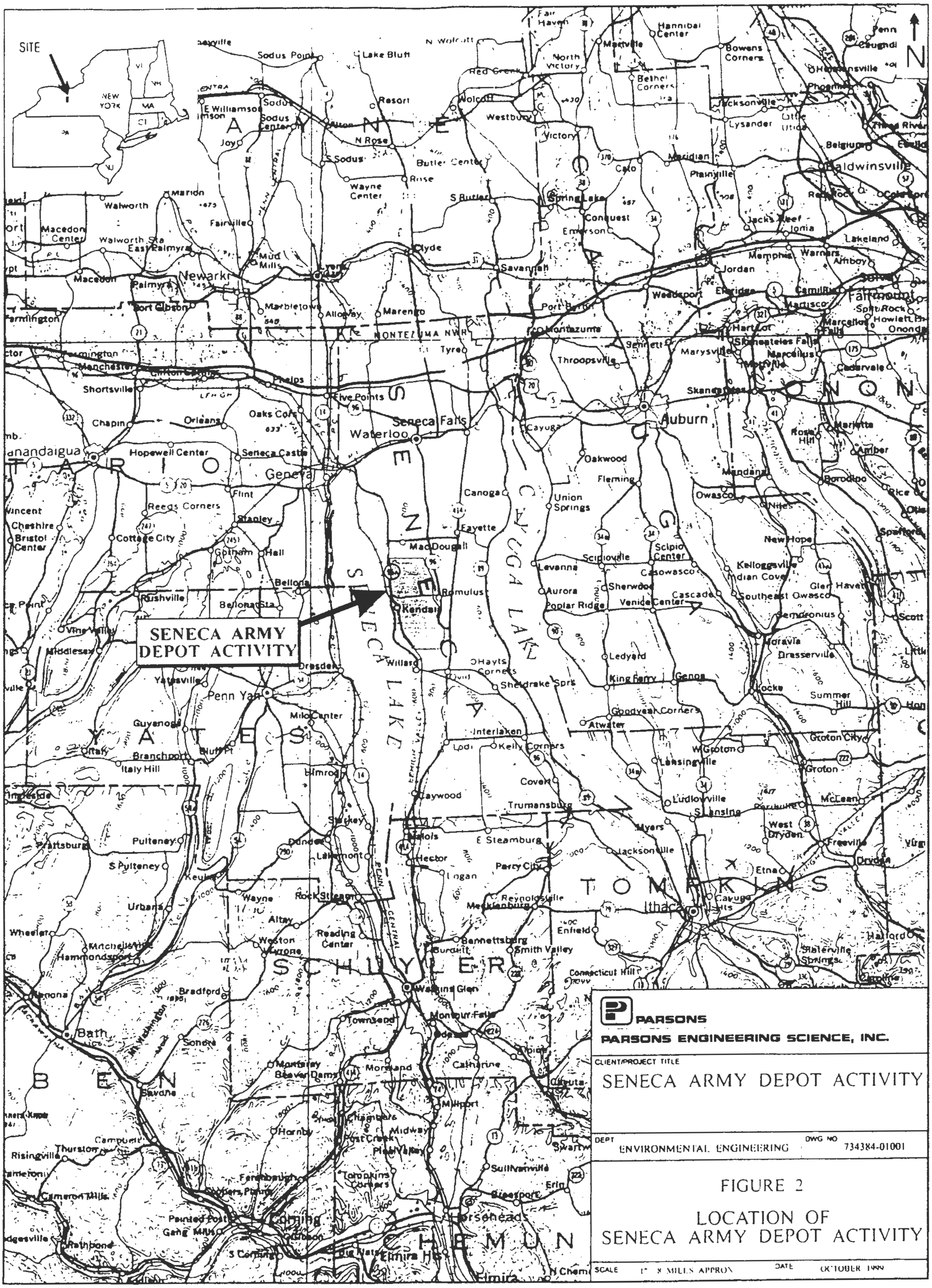
SENECA ARMY DEPOT ACTIVITY

FIGURE 1
SENECA ARMY DEPOT MAP
WITH AREAS TO BE SURVEYED

APR 2000



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CLIENT/PROJECT TITLE: SENECA ARMY DEPOT ACTIVITY

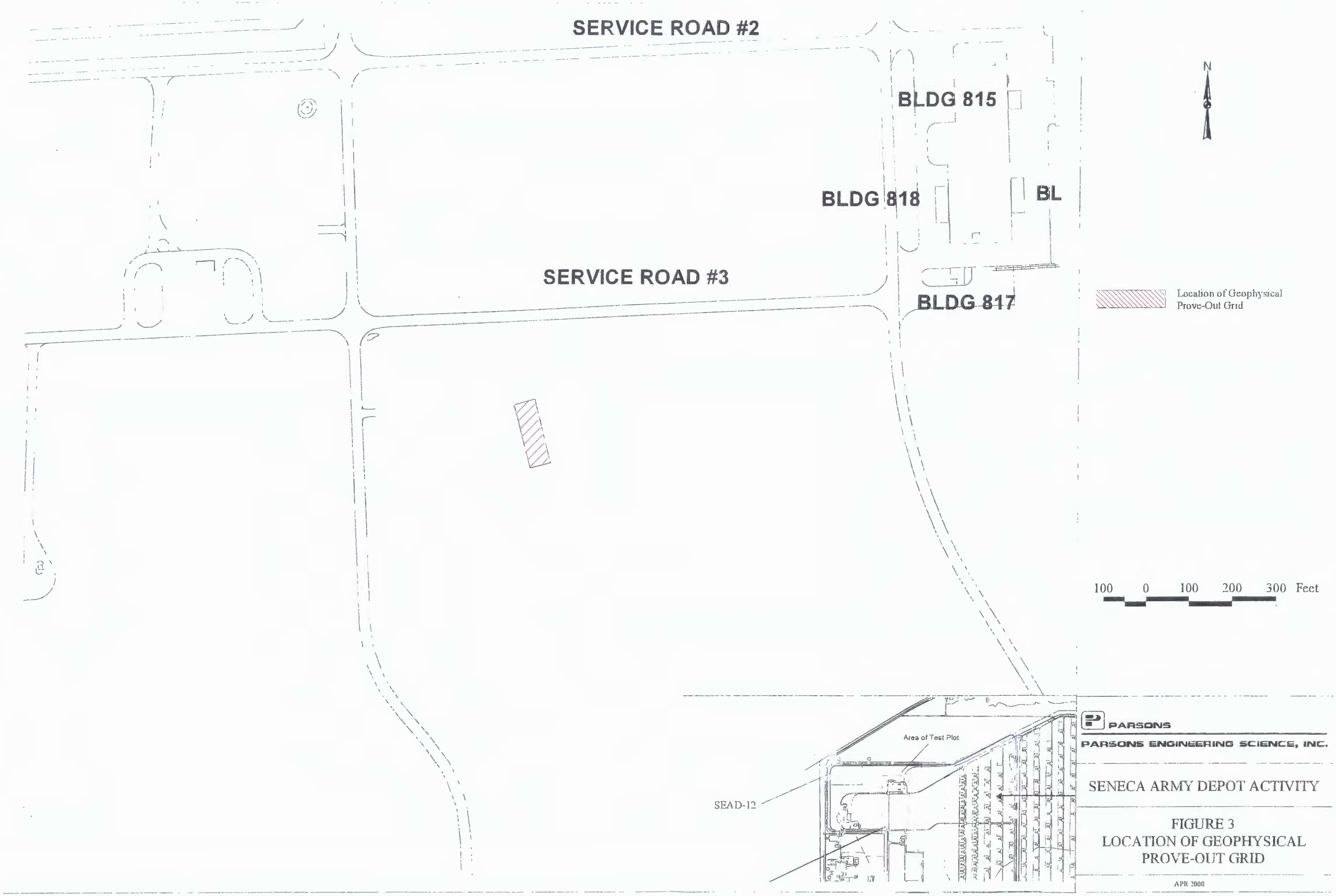
DEPT: ENVIRONMENTAL ENGINEERING | DWG NO: 734384-01001

FIGURE 2

LOCATION OF SENECA ARMY DEPOT ACTIVITY

SCALE: 1" = 8 MILES APPROX. | DATE: OCTOBER 1999

R:\GRAPHICS\SENECA\LOCMAP.CDR(CVM)



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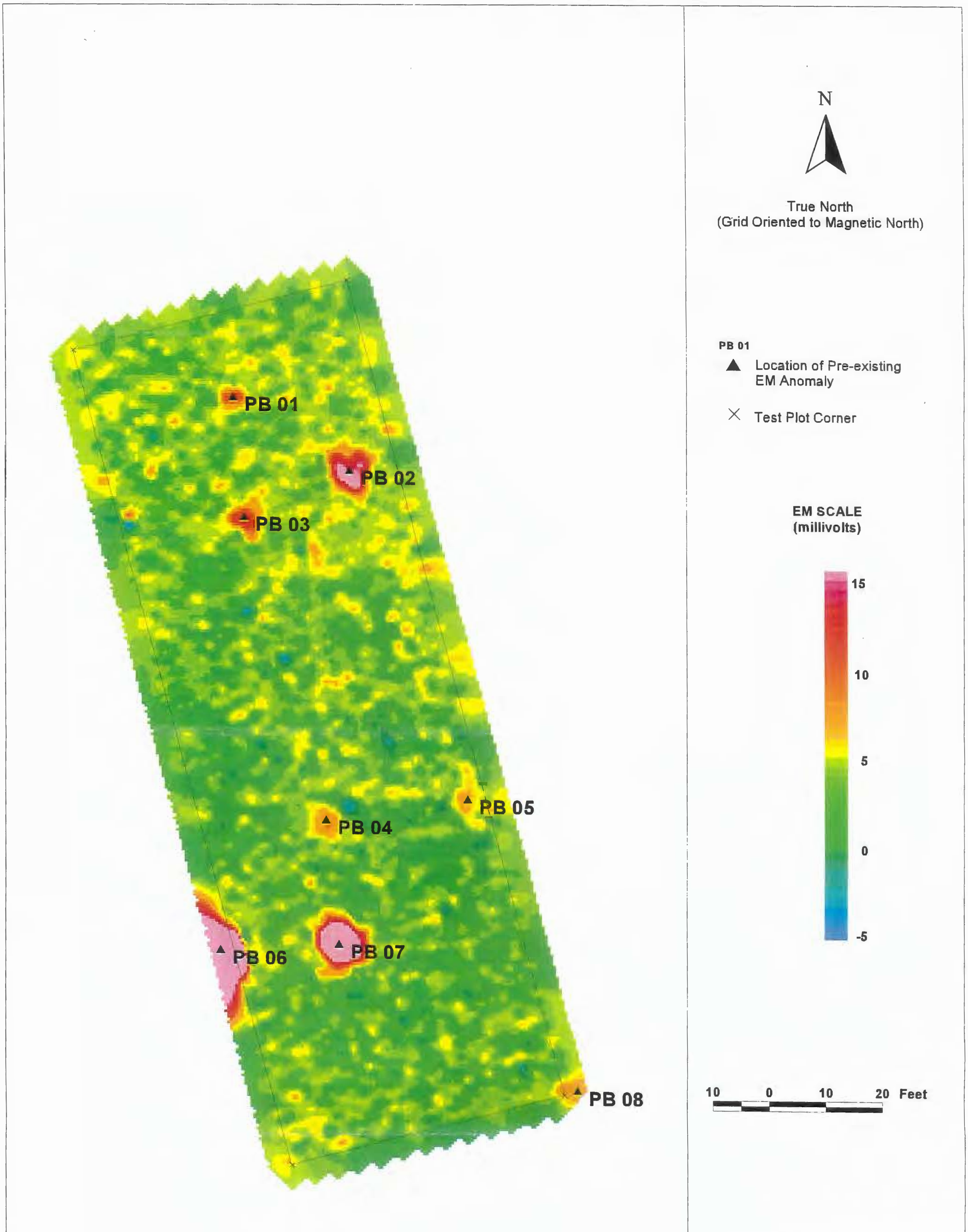
SENECA ARMY DEPOT ACTIVITY

FIGURE 3
LOCATION OF GEOPHYSICAL
PROVE-OUT GRID

APR 2000



SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 4
EM-61 BOTTOM COIL DATA
BASELINE SURVEY - 2-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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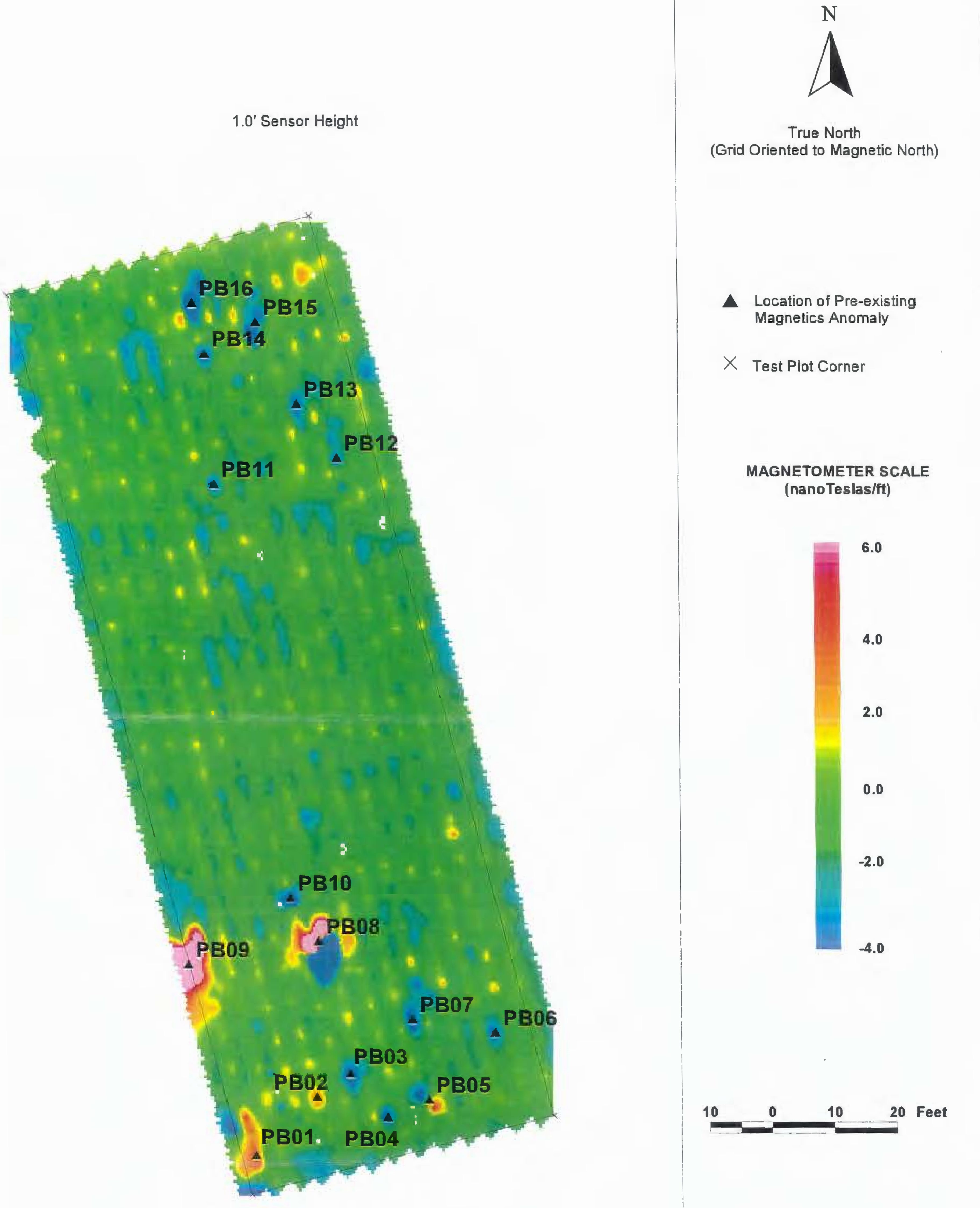

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 5
MAGNETOMETER GRADIENT DATA
BASELINE - 2-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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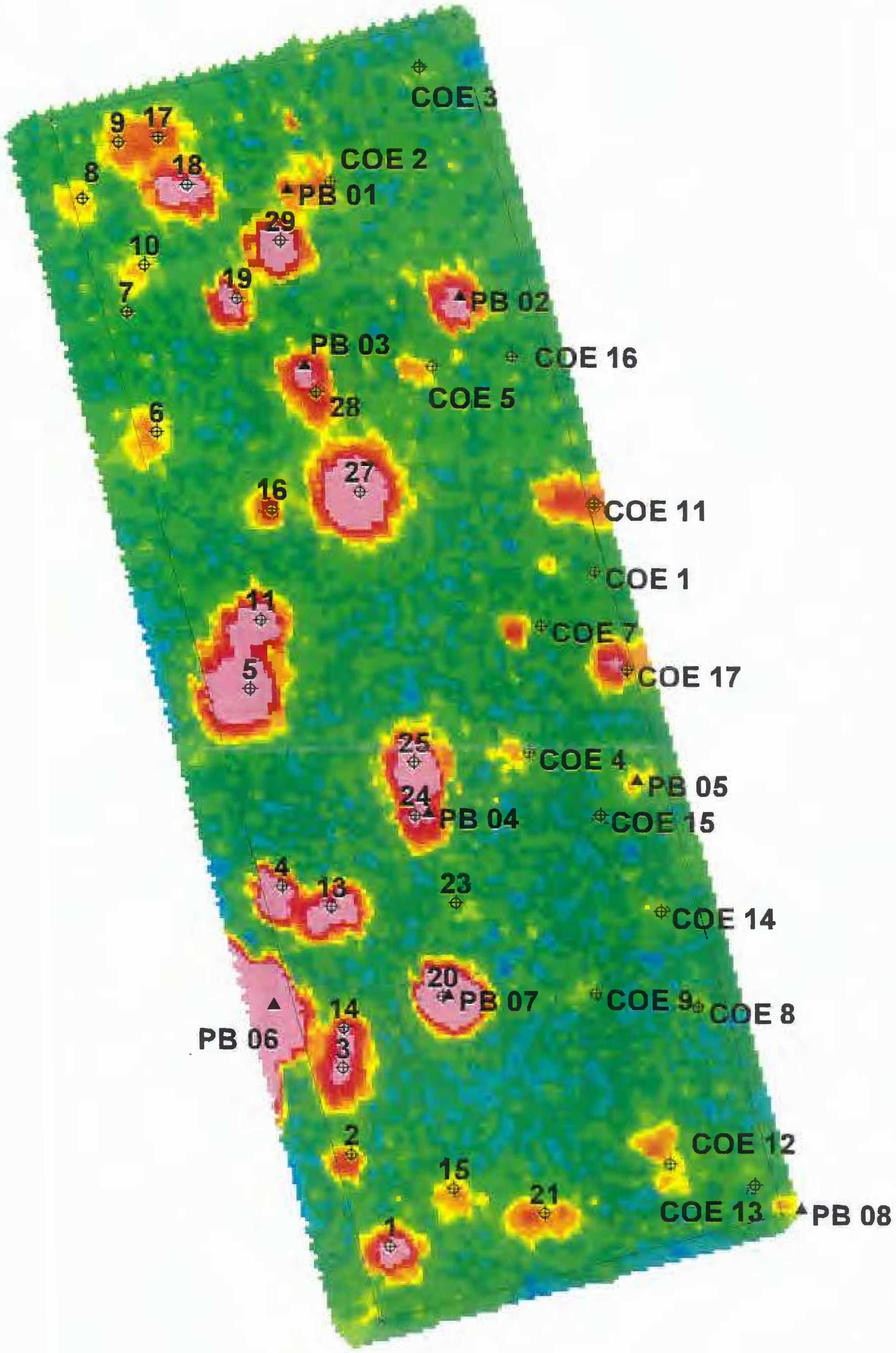

N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing EM Anomaly

6
⊕ Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)

15
10
5
0
-5

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 6
EM-61 BOTTOM COIL DATA
1-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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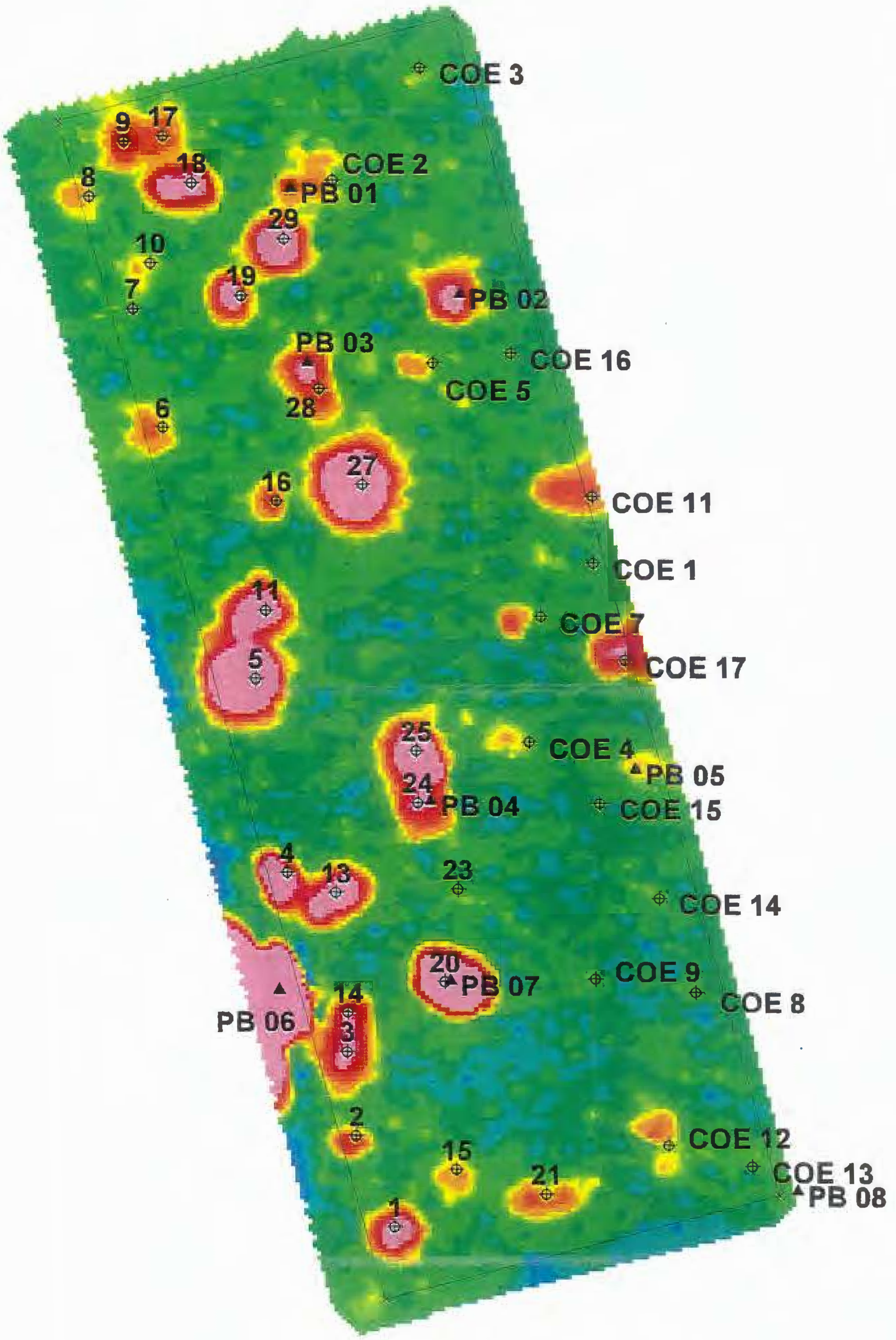


N

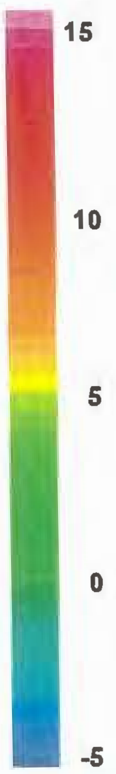
True North
(Grid Oriented to Magnetic North)

▲ Location of Pre-existing EM Anomaly

6 ⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)



10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 7
EM-61 BOTTOM COIL DATA
2-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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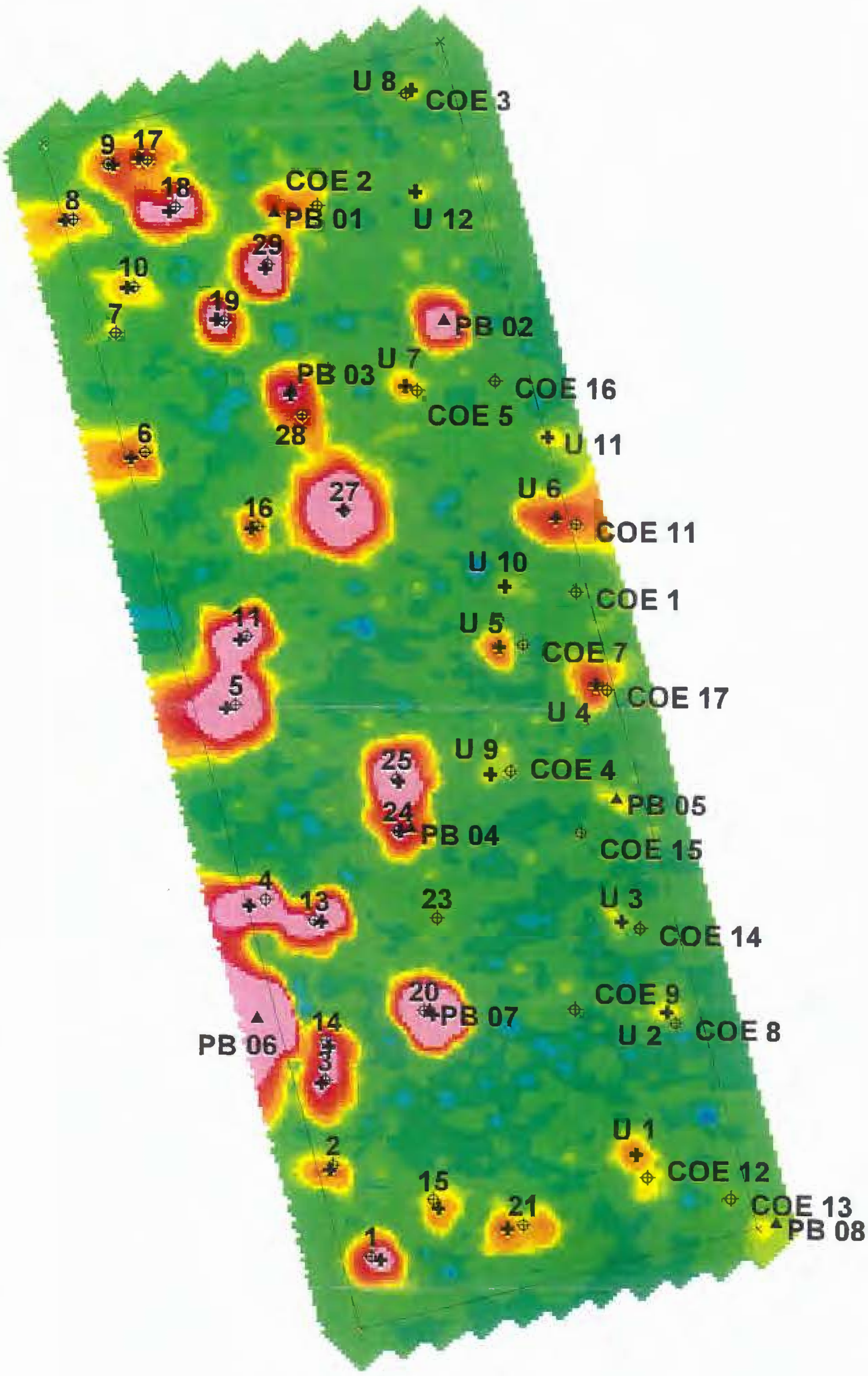


N

True North
(Grid Oriented to Magnetic North)

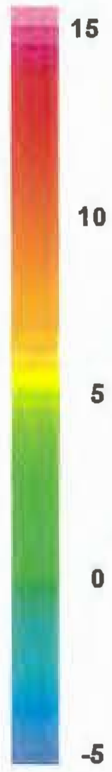
▲ Location of Pre-existing EM Anomaly

✚ Target Pick Based on Contour Data

6
⊕ Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)



10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 8
EM-61 BOTTOM COIL DATA
2.5-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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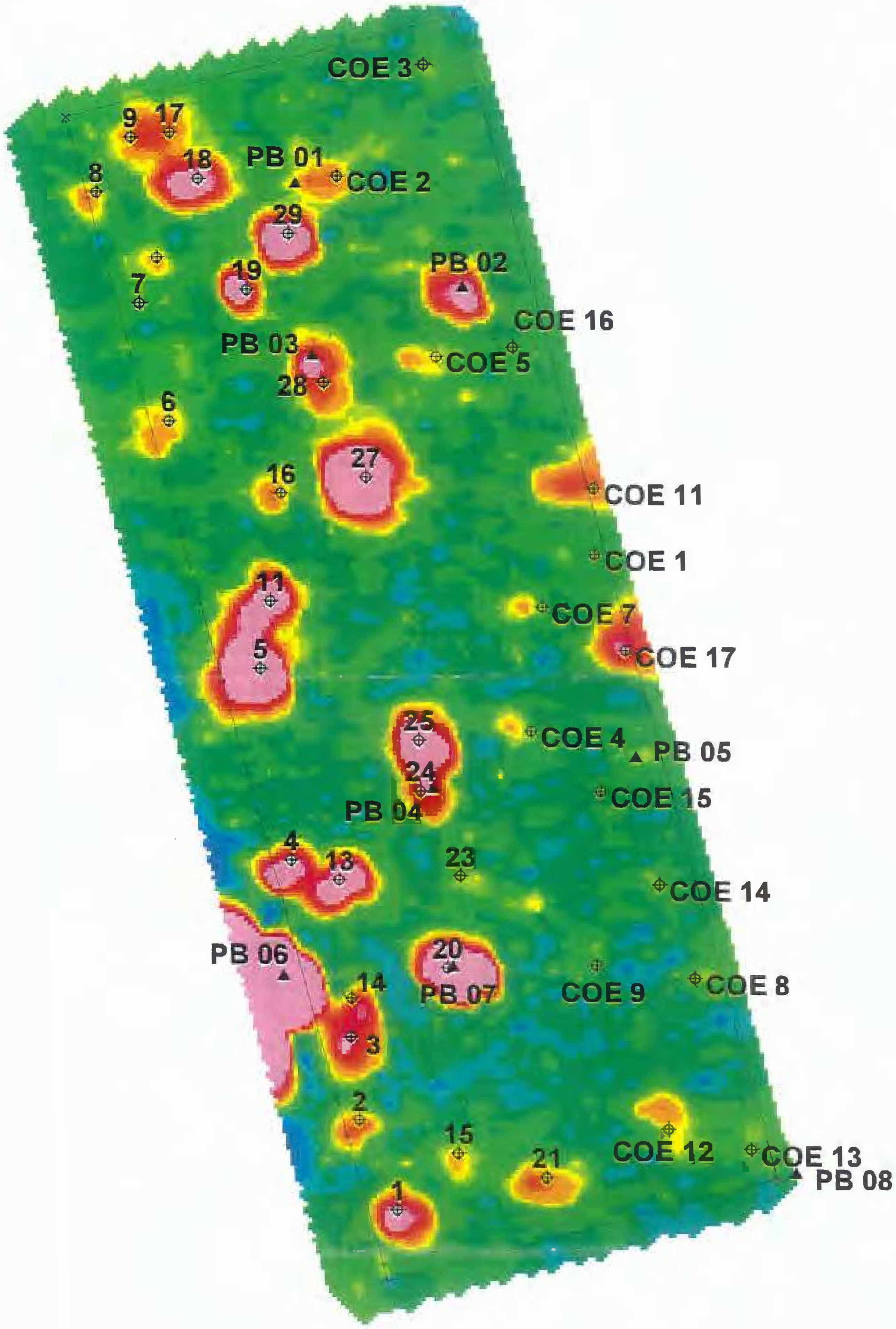

N

True North
(Grid Oriented to Magnetic North)

▲ Location of Pre-existing EM Anomaly

6
⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)

15
10
5
0
-5

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 9
EM-61 BOTTOM COIL DATA
3-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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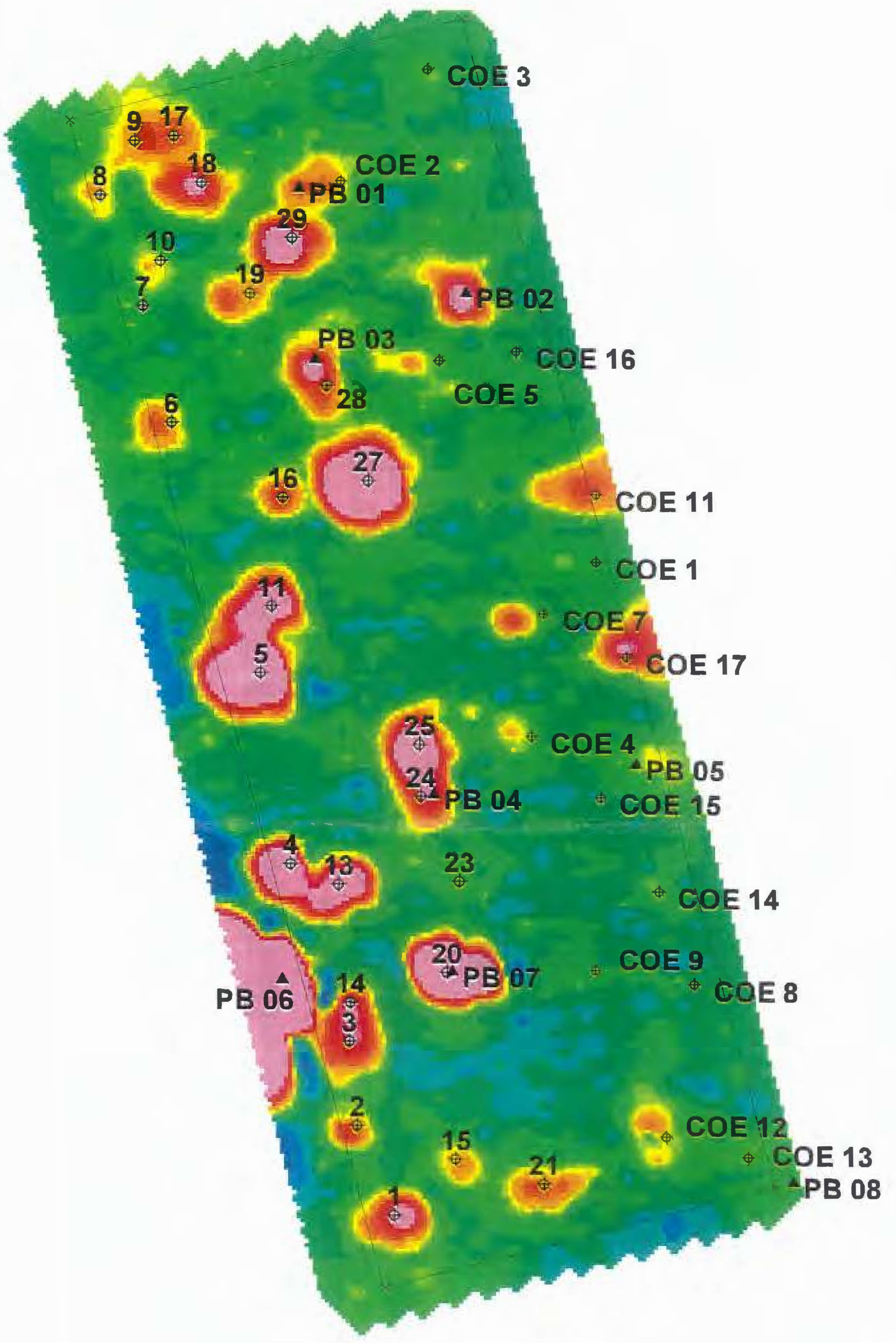

N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing EM Anomaly

6
Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)

15
10
5
0
-5

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 10
EM-61 BOTTOM COIL DATA
4-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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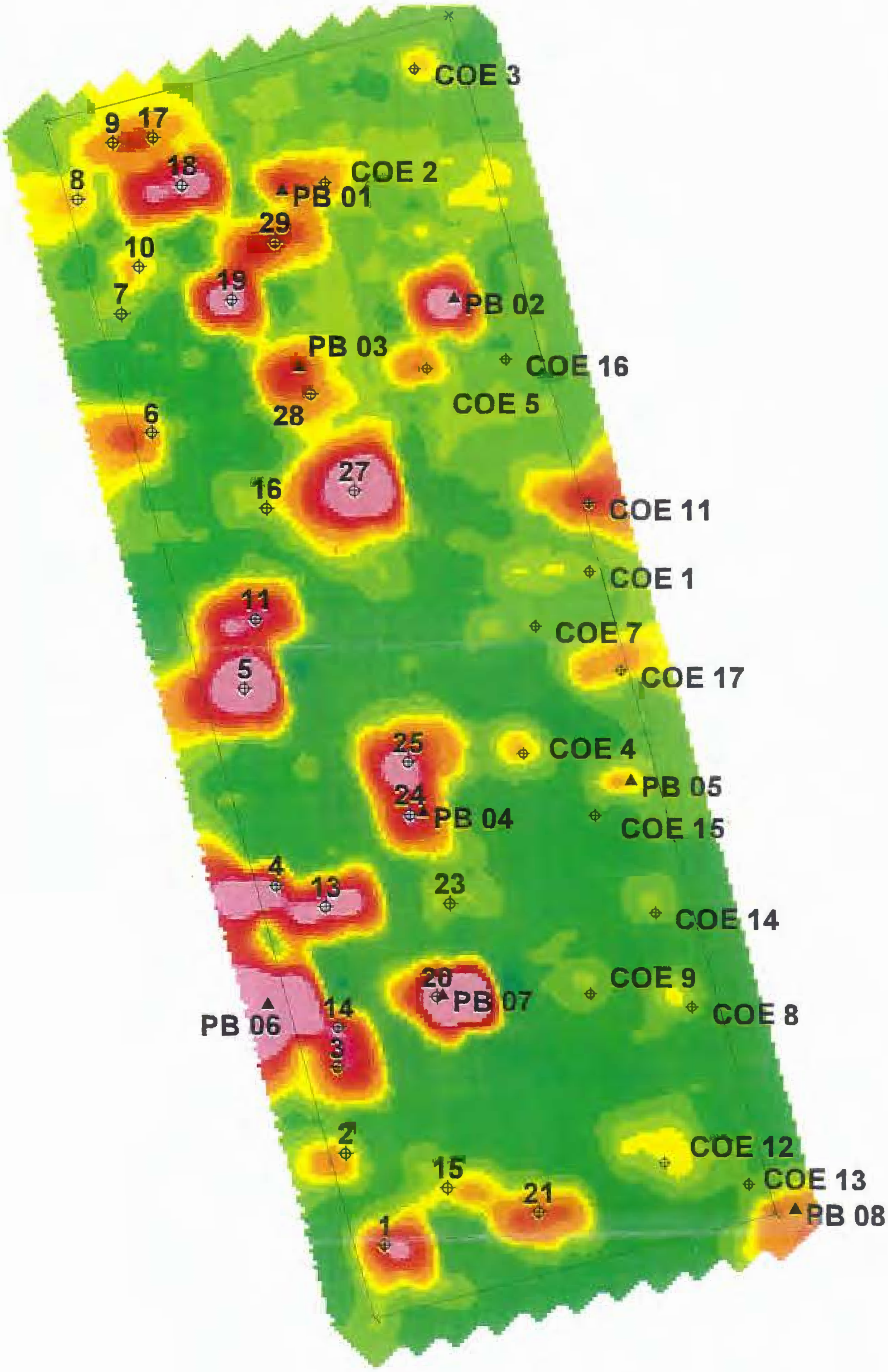

N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing EM Anomaly

6
⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

EM SCALE
(millivolts)

15
10
5
0
-5

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 11
EM-61 BOTTOM COIL DATA
5-FOOT SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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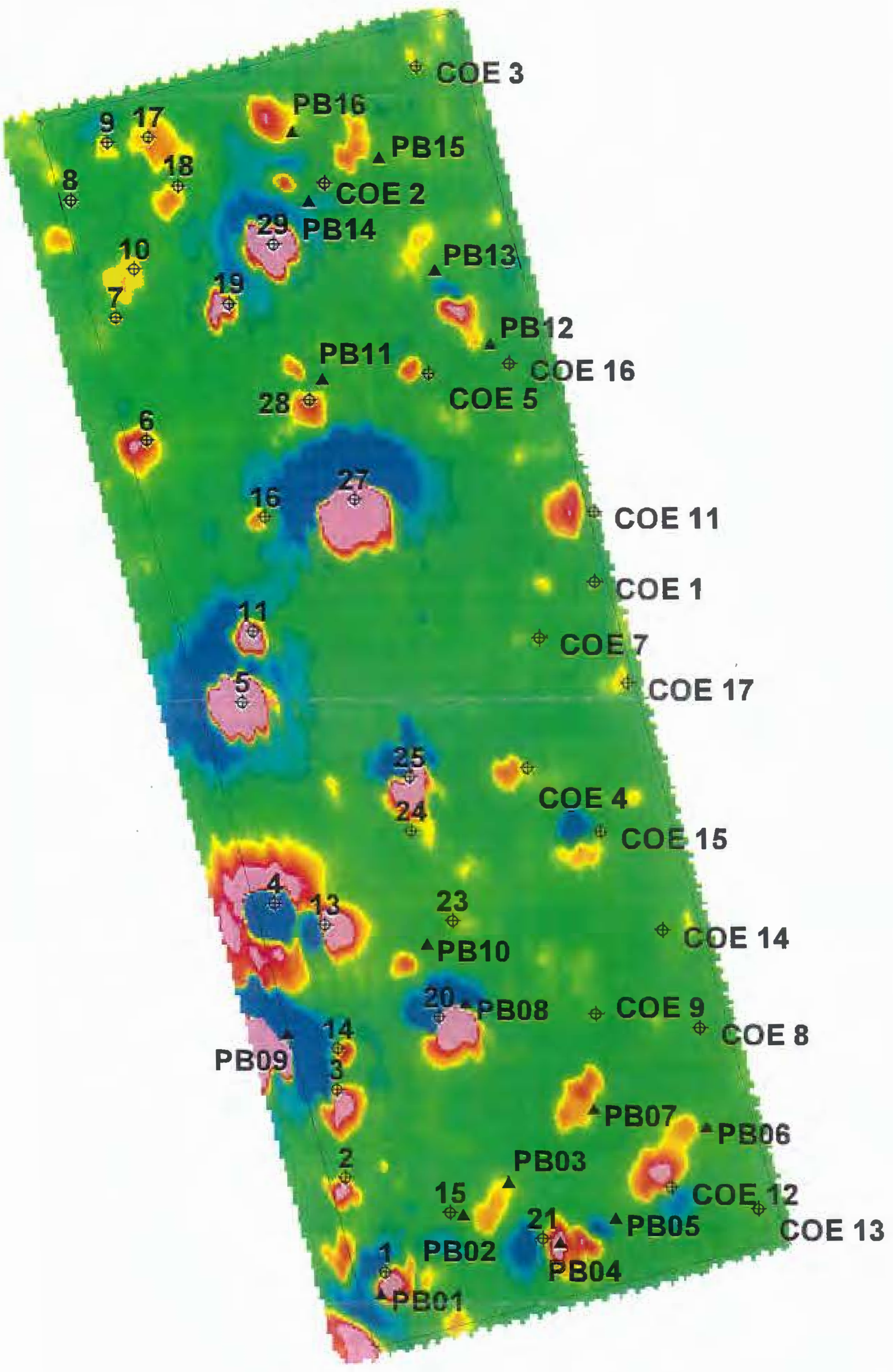
1.5' Sensor Height



N

True North
(Grid Oriented to Magnetic North)

PB 01

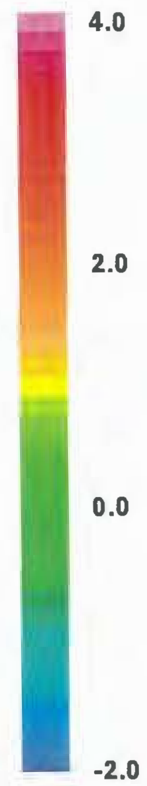
▲ Location of Pre-existing Magnetics Anomaly

6

⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE
(nanoTeslas/ft)



10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 12
MAGNETOMETER GRADIENT DATA
1-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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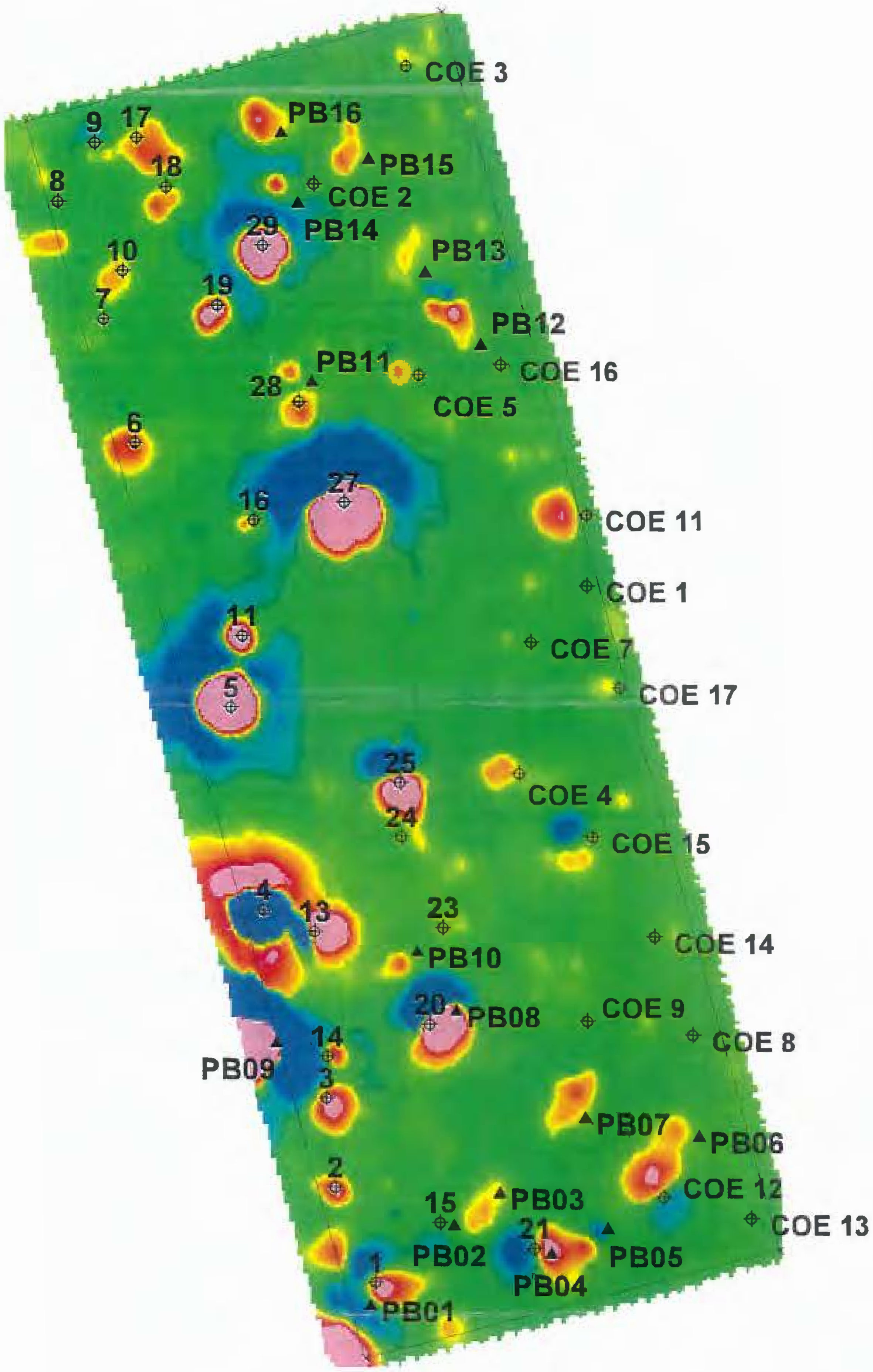
1.5' Sensor Height



N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing Magnetics Anomaly

6
⊕ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE (nanoTeslas/ft)

4.0
2.0
0.0
-2.0

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 13
MAGNETOMETER GRADIENT DATA
2-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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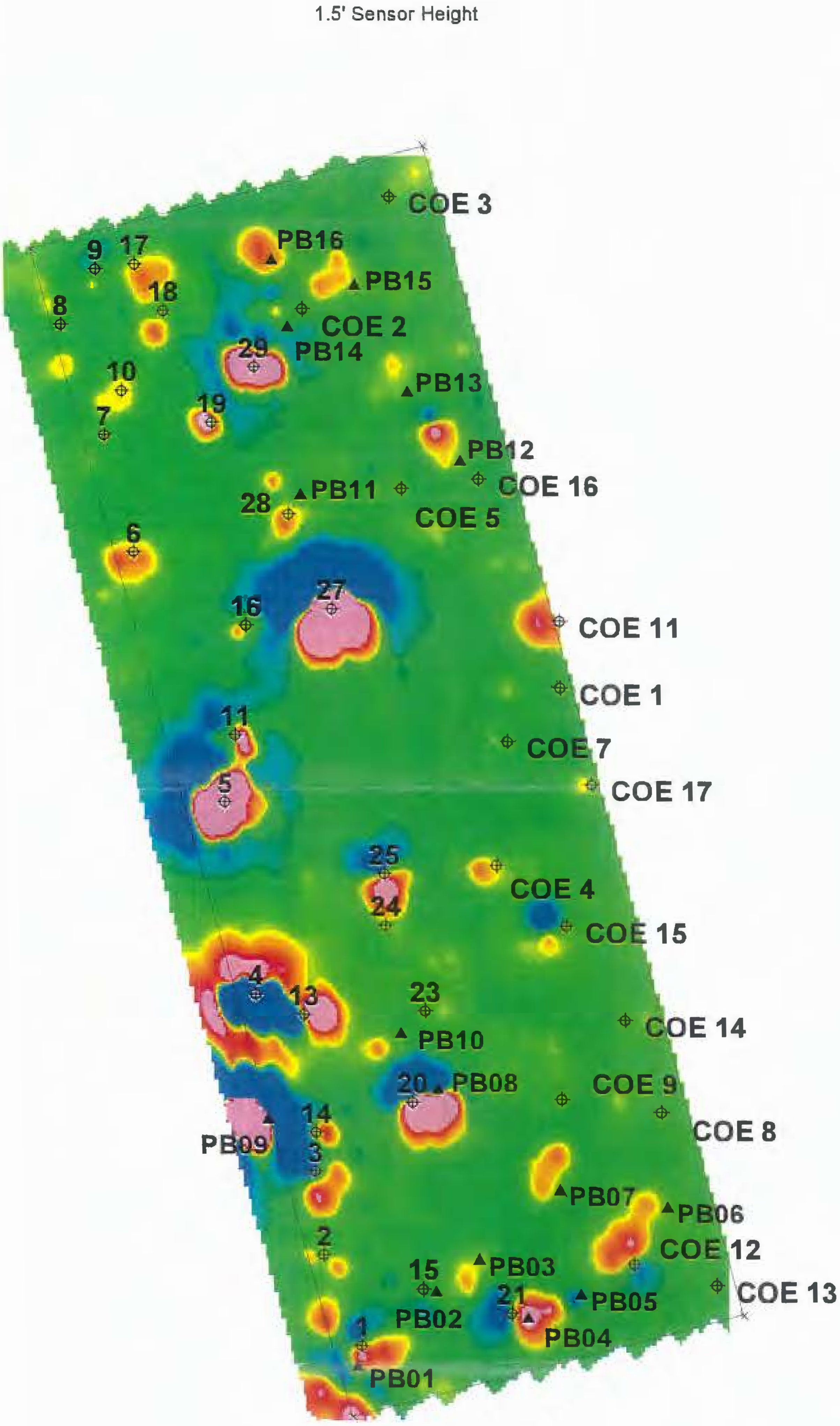

N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing Magnetics Anomaly

6
⊕ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE
(nanoTeslas/ft)

4.0
2.0
0.0
-2.0

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 14
MAGNETOMETER GRADIENT DATA
3-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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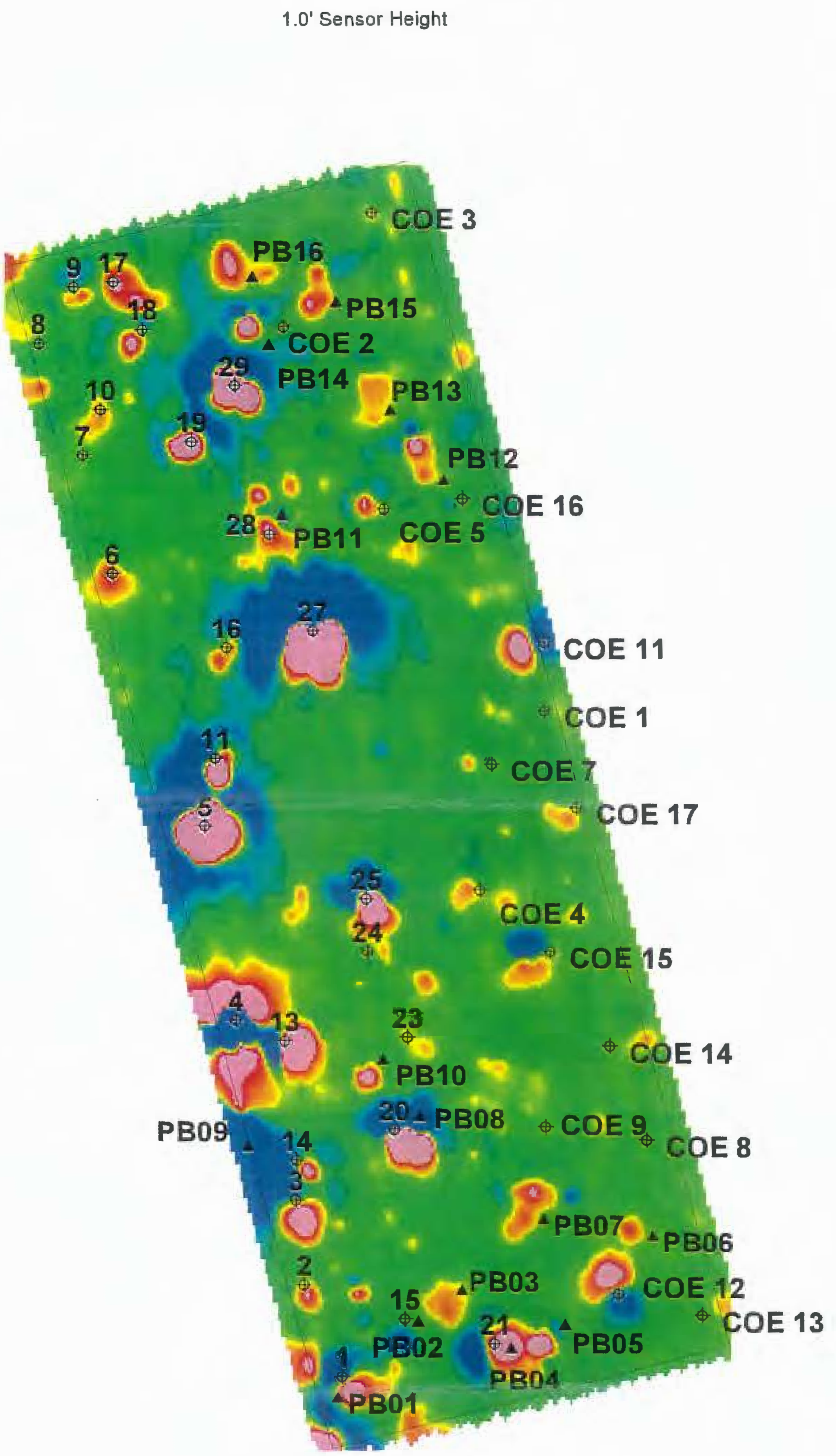

N

True North
(Grid Oriented to Magnetic North)

PB 01
Location of Pre-existing Magnetics Anomaly

6
Location of Buried OE Item with Item Number

Test Plot Corner

MAGNETOMETER SCALE
(nanoTeslas/ft)

4.0
2.0
0.0
-2.0

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

FIGURE 15
MAGNETOMETER GRADIENT DATA
2-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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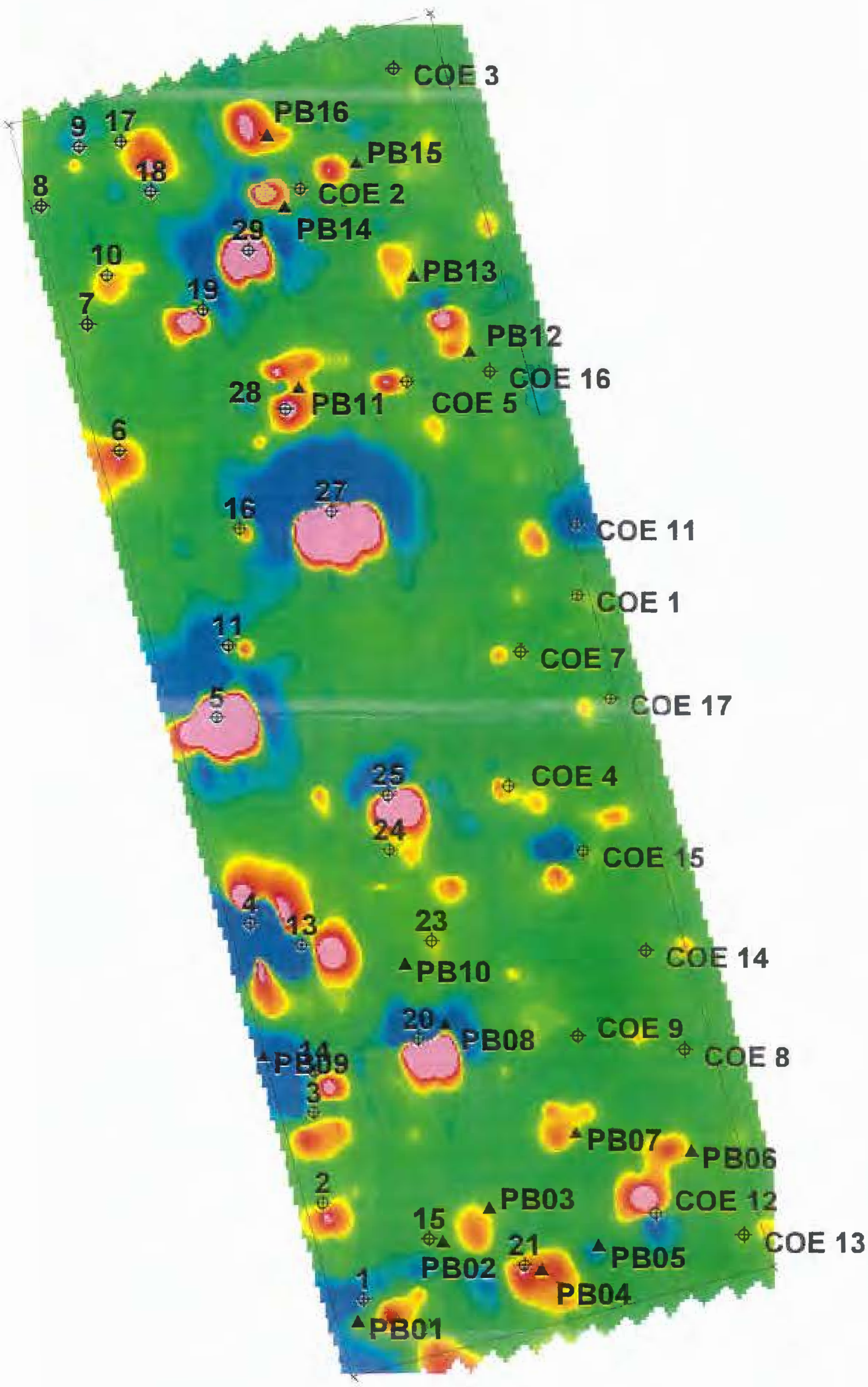
1.0' Sensor Height



N

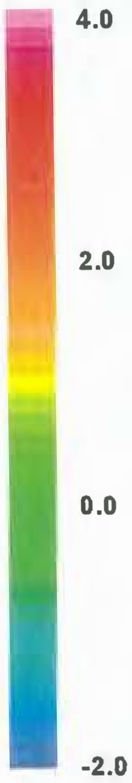
True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing Magnetics Anomaly

6
⊕ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE
(nanoTeslas/ft)



10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 16
MAGNETOMETER GRADIENT DATA
4-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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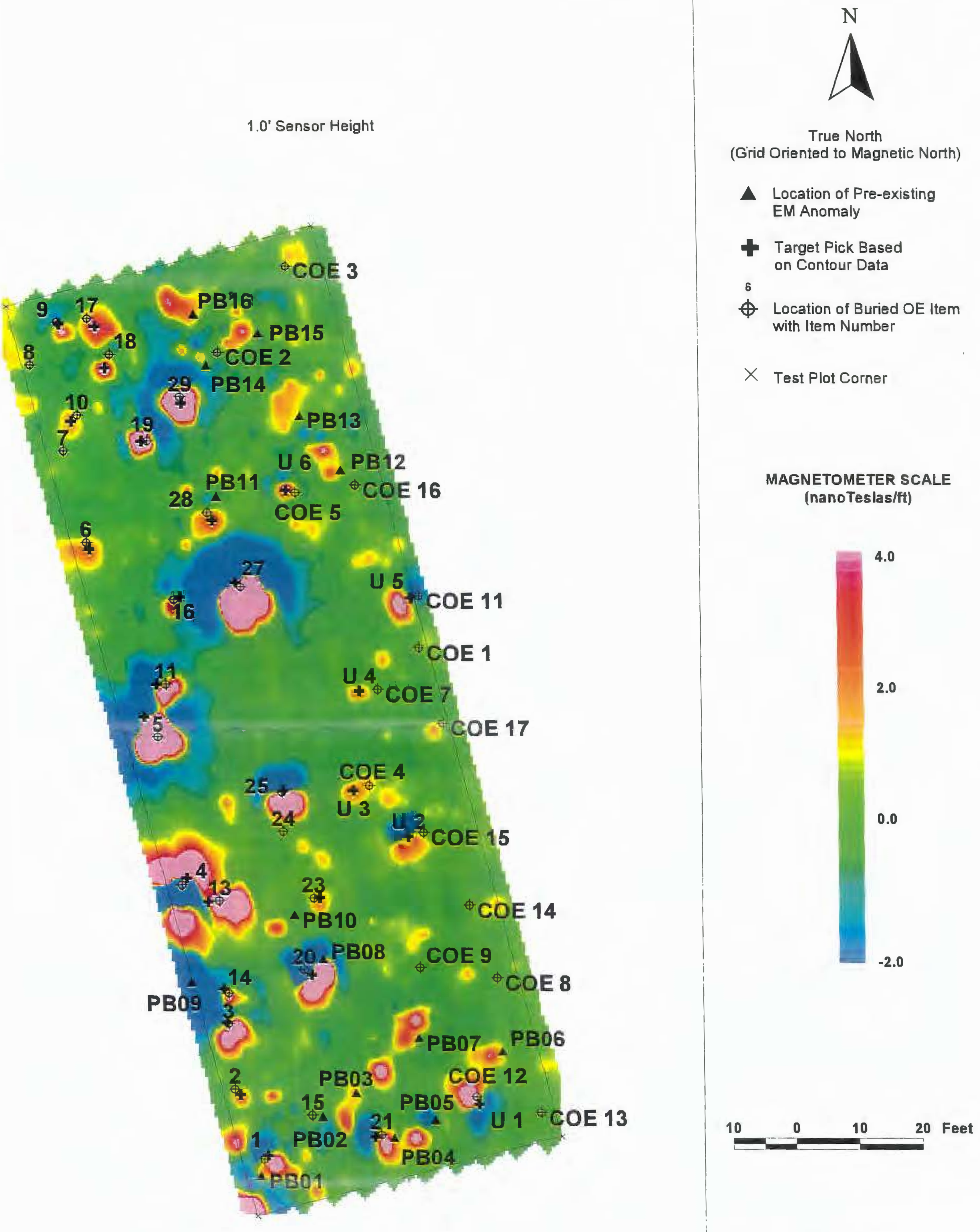

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 17
MAGNETOMETER GRADIENT DATA
2.5-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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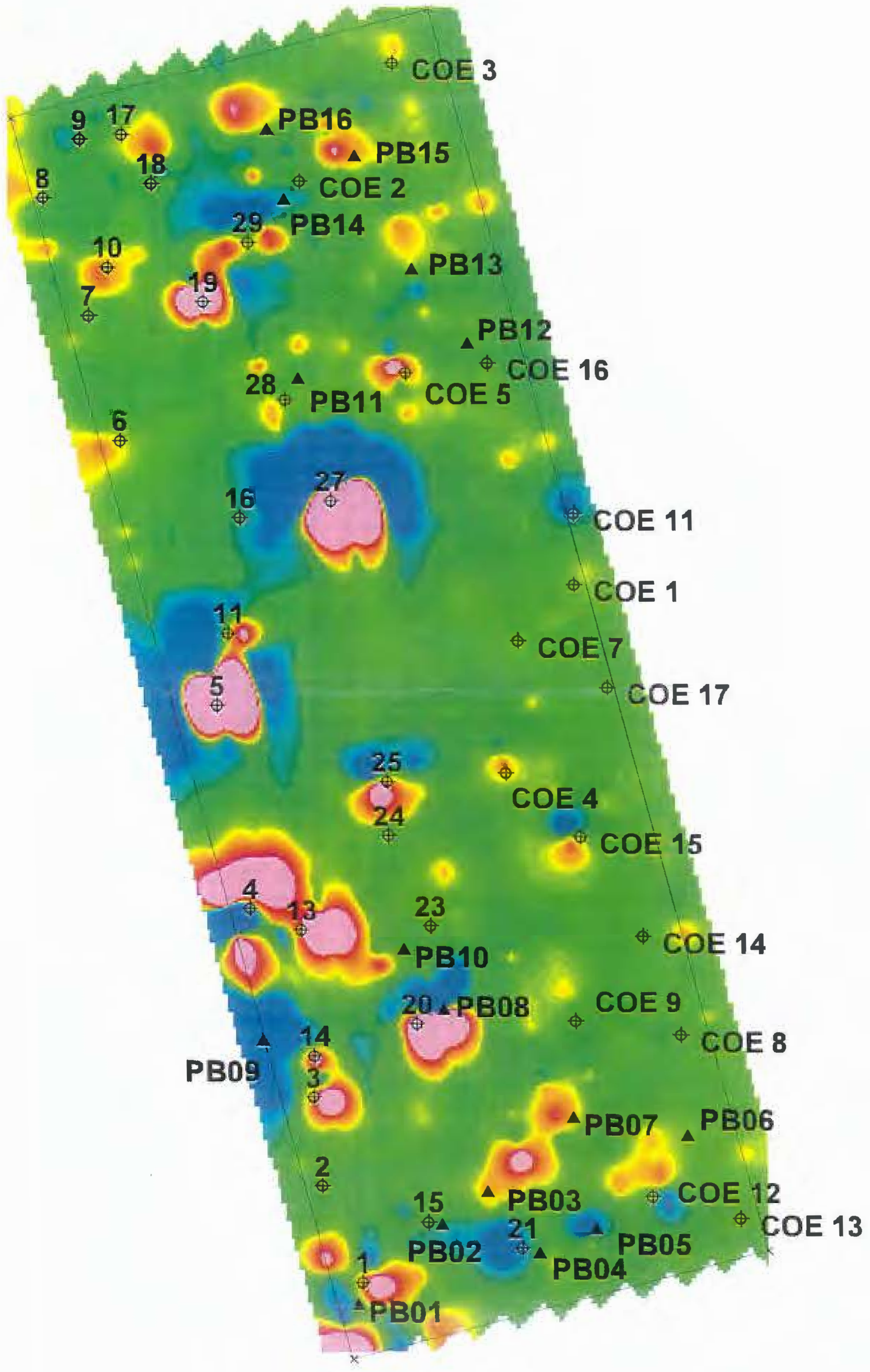
1.0' Sensor Height



N

True North
(Grid Oriented to Magnetic North)

PB 01
▲ Location of Pre-existing Magnetics Anomaly

6
⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE (nanoTeslas/ft)

4.0
2.0
0.0
-2.0

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 18
MAGNETOMETER GRADIENT DATA
5-FOOT LINE SPACING
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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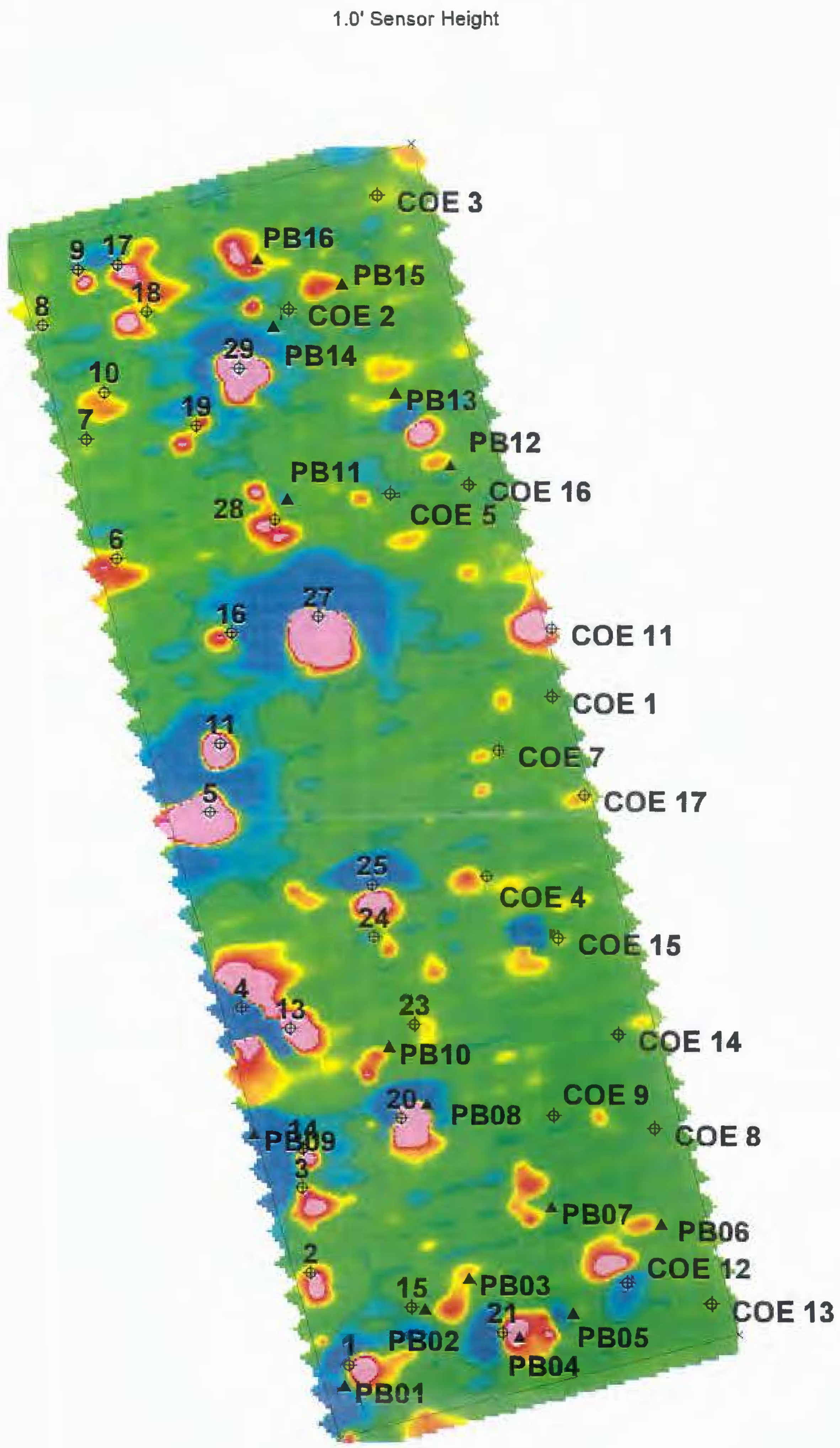

N

True North
(Grid Oriented to Magnetic North)

PB 01 ▲ Location of Pre-existing Magnetics Anomaly

6 ⌖ Location of Buried OE Item with Item Number

× Test Plot Corner

MAGNETOMETER SCALE
(nanoTeslas/ft)

4.0
2.0
0.0
-2.0

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 2 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 19
MAGNETOMETER GRADIENT DATA
EAST-WEST SURVEY LINES
SENECA GEOPHYSICAL PROVEOUT

JUNE 2000

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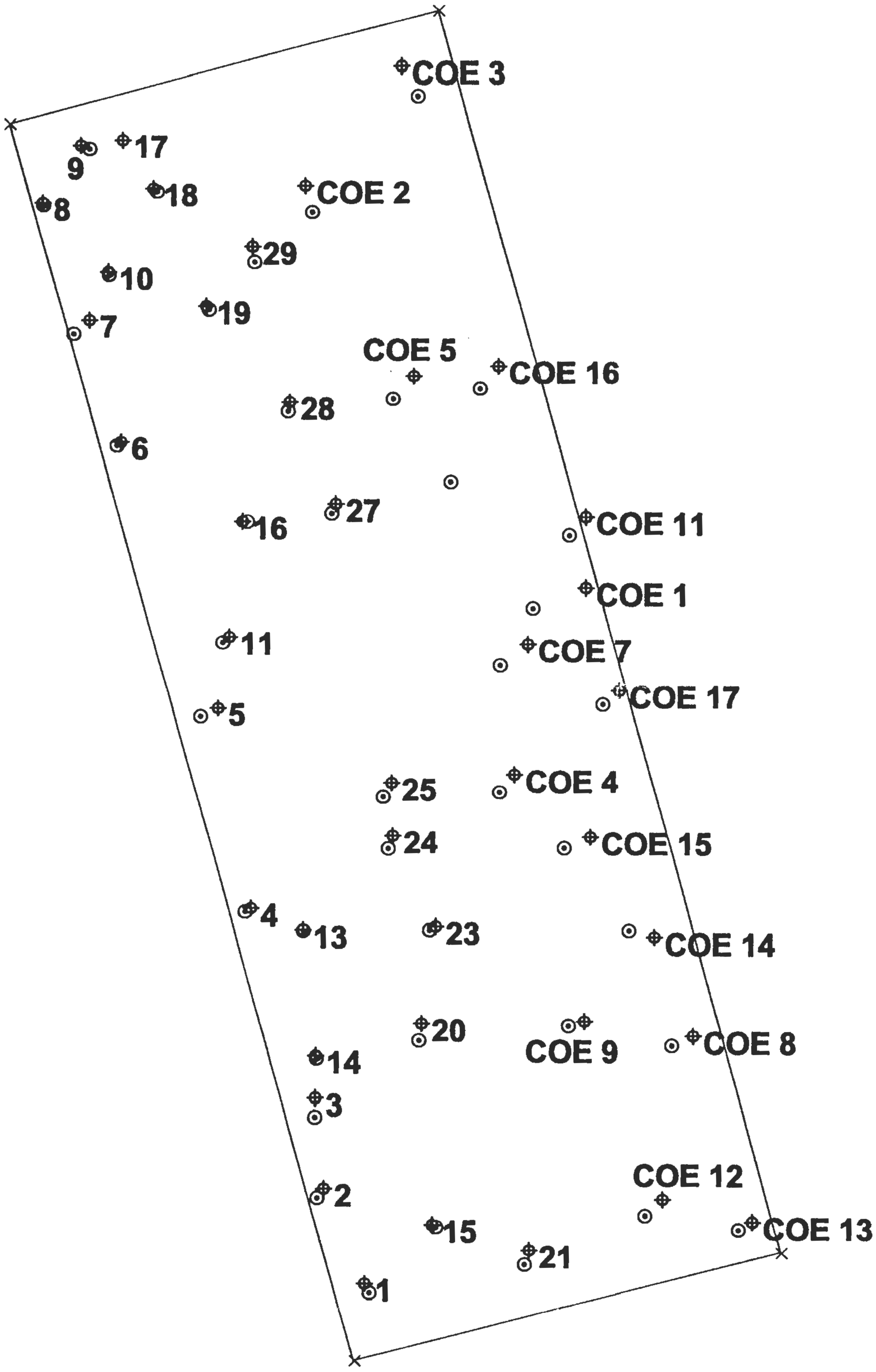

N

True North
(Grid Oriented to Magnetic North)

6
Location of Buried OE Item with Item Number

Position of Seed Hole Determined Using GPS

Test Plot Corner

10 0 10 20 Feet

Note: Item Descriptions can be found in Table 3 of the Proveout Report

SENECA ARMY DEPOT ACTIVITY
GEOPHYSICAL TEST PLOT

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FIGURE 20
GPS AND MEASURED SEED ITEM LOCATIONS
SENECA GEOPHYSICAL PROVEOUT

APRIL 2000

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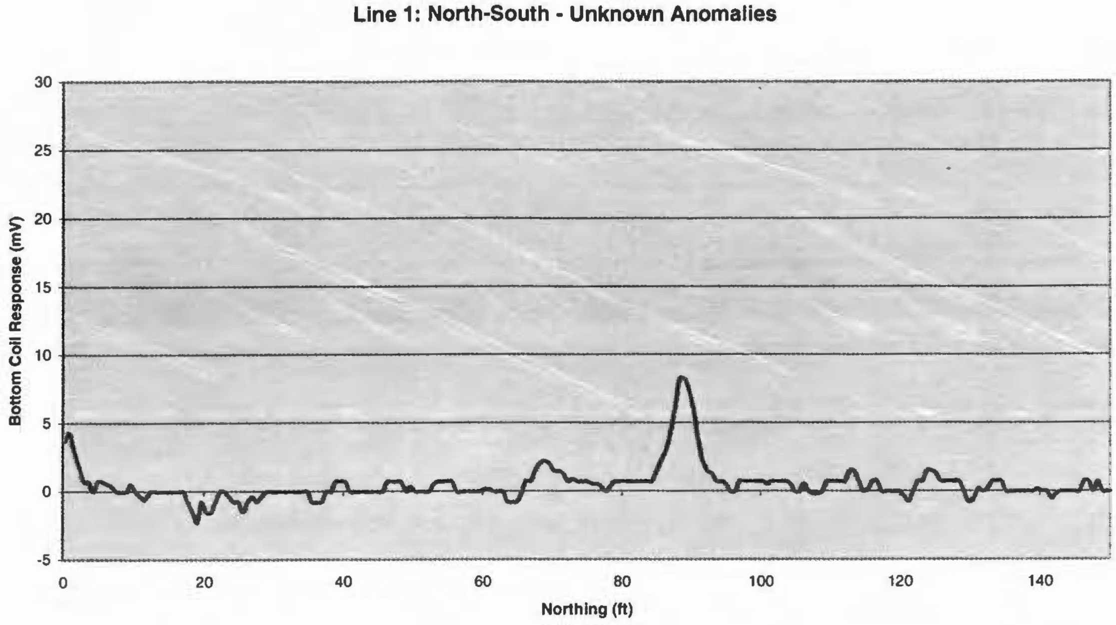
Figure A-1: EM-61 QC Lines



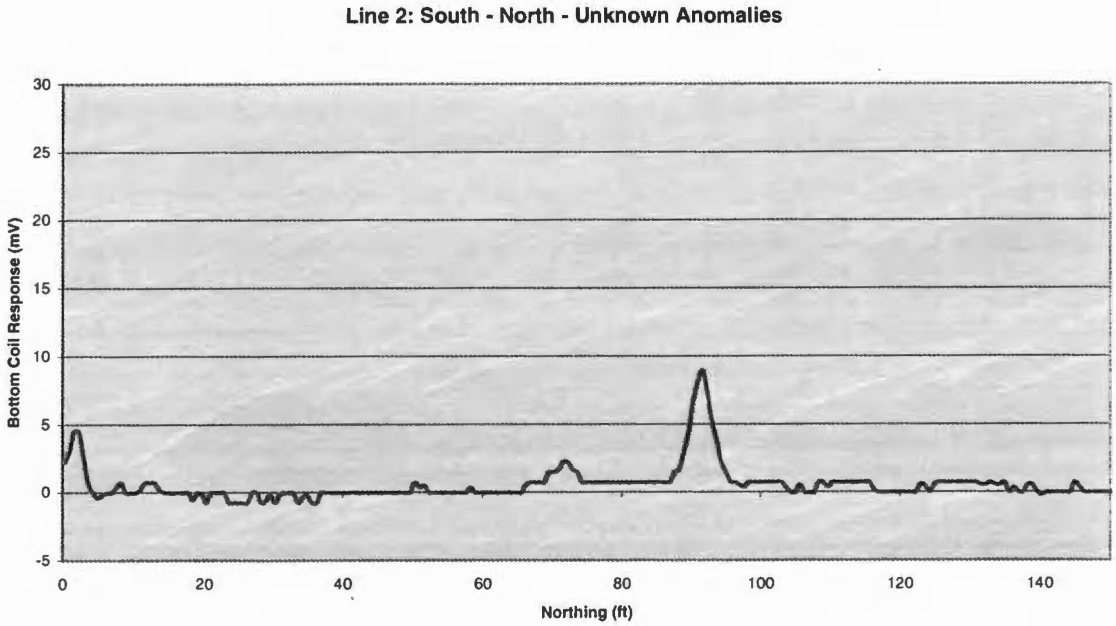
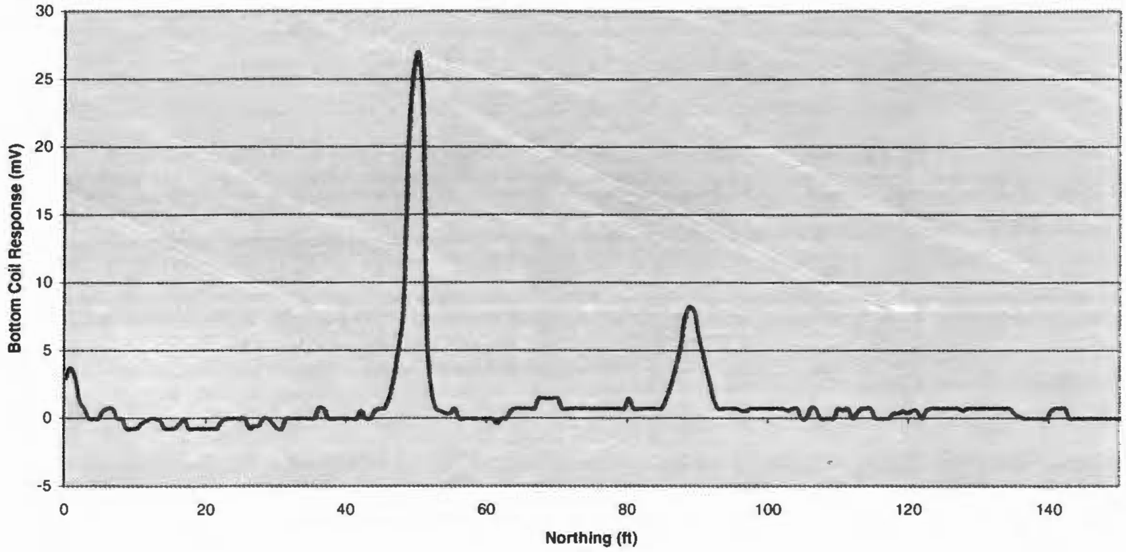


Figure A-1: EM-61 QC Lines

Line 3: North-South - Grenade at 50'



Line 4: South-North - Grenade at 50'

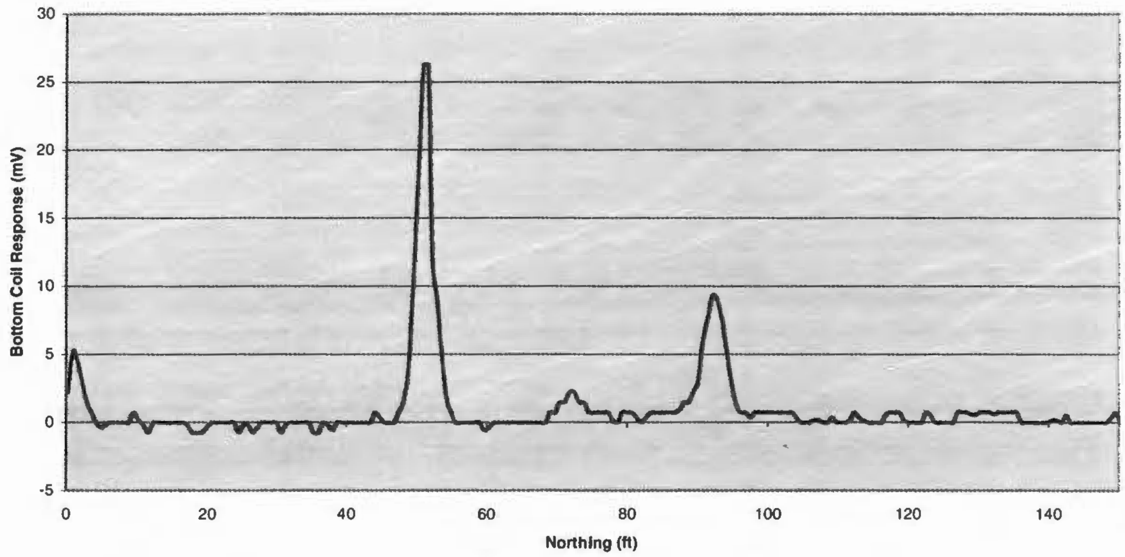
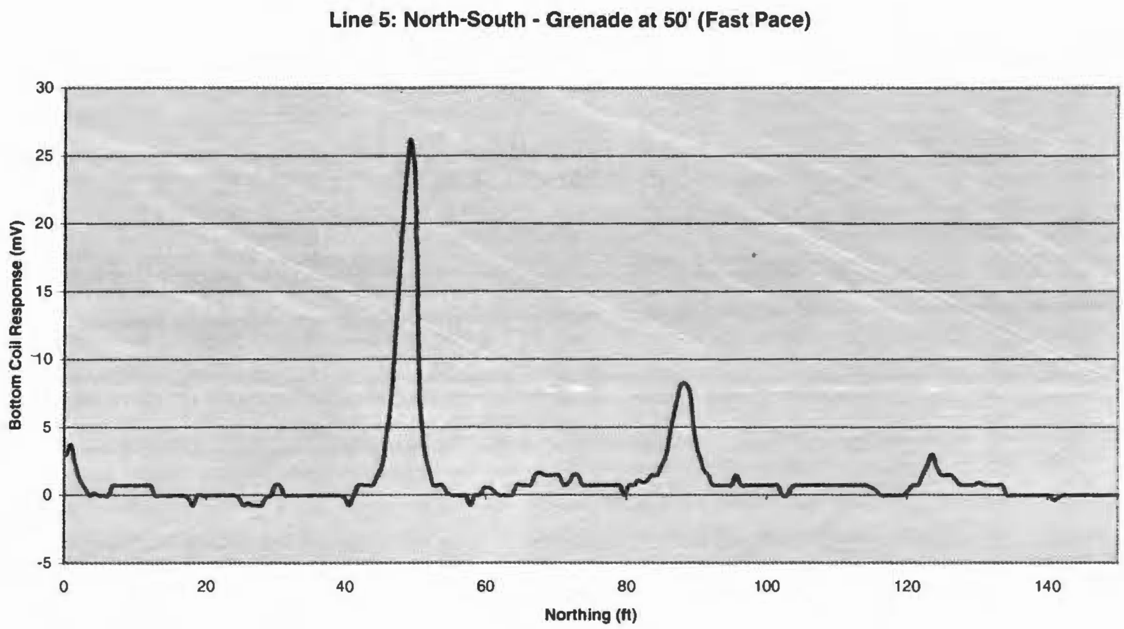


Figure A-1: EM-61 QC Lines



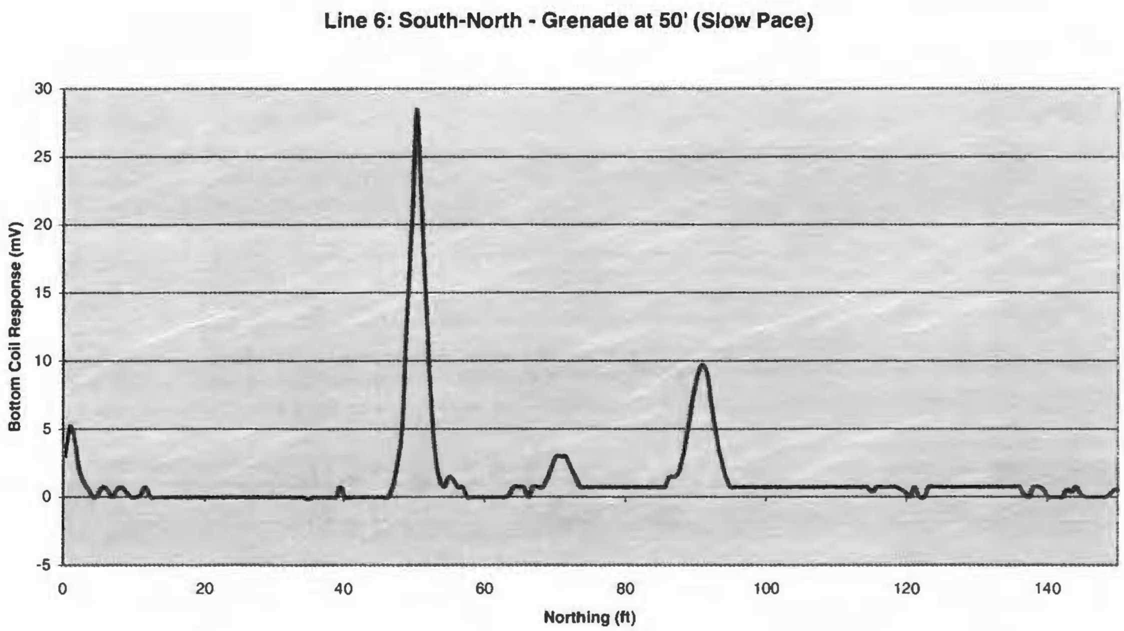


Figure A-1: EM-61 QC Lines

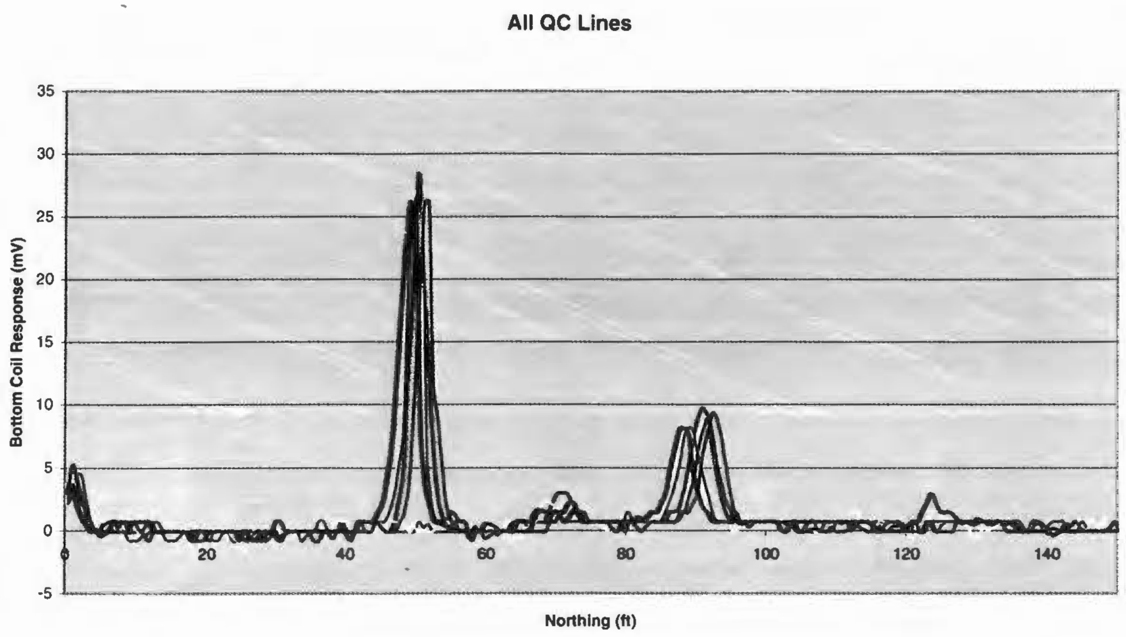
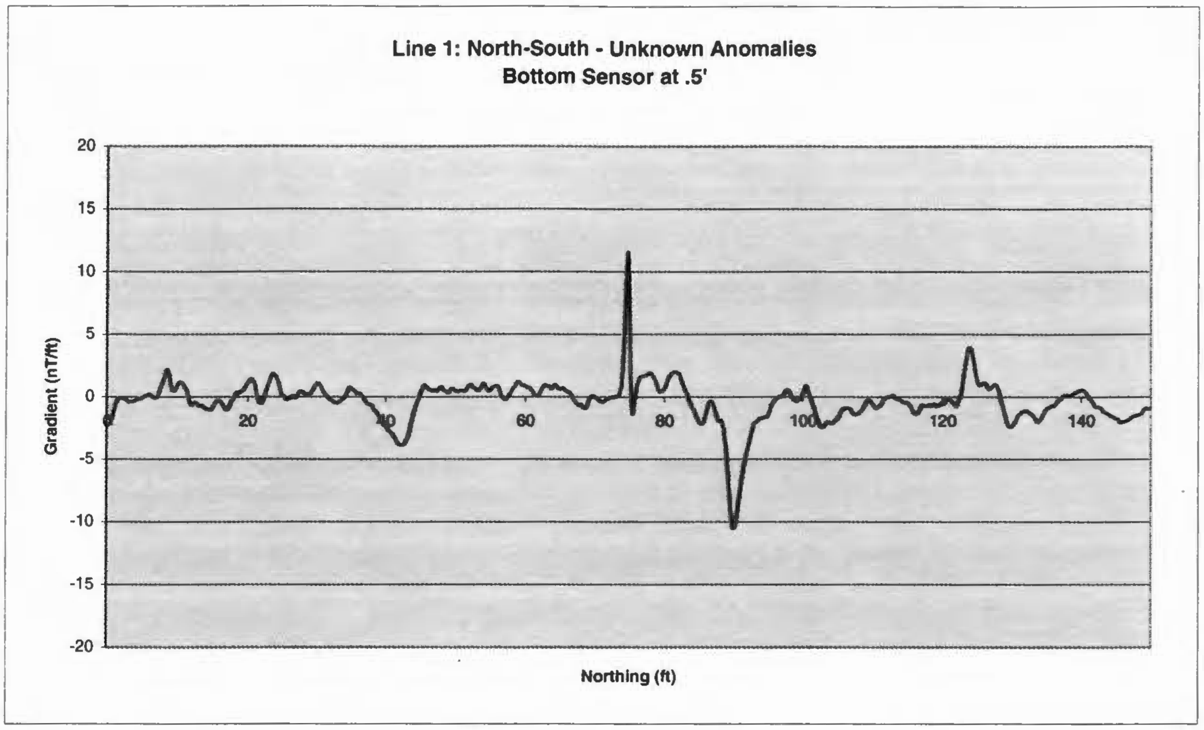


Figure A-2: G-858 QC Lines



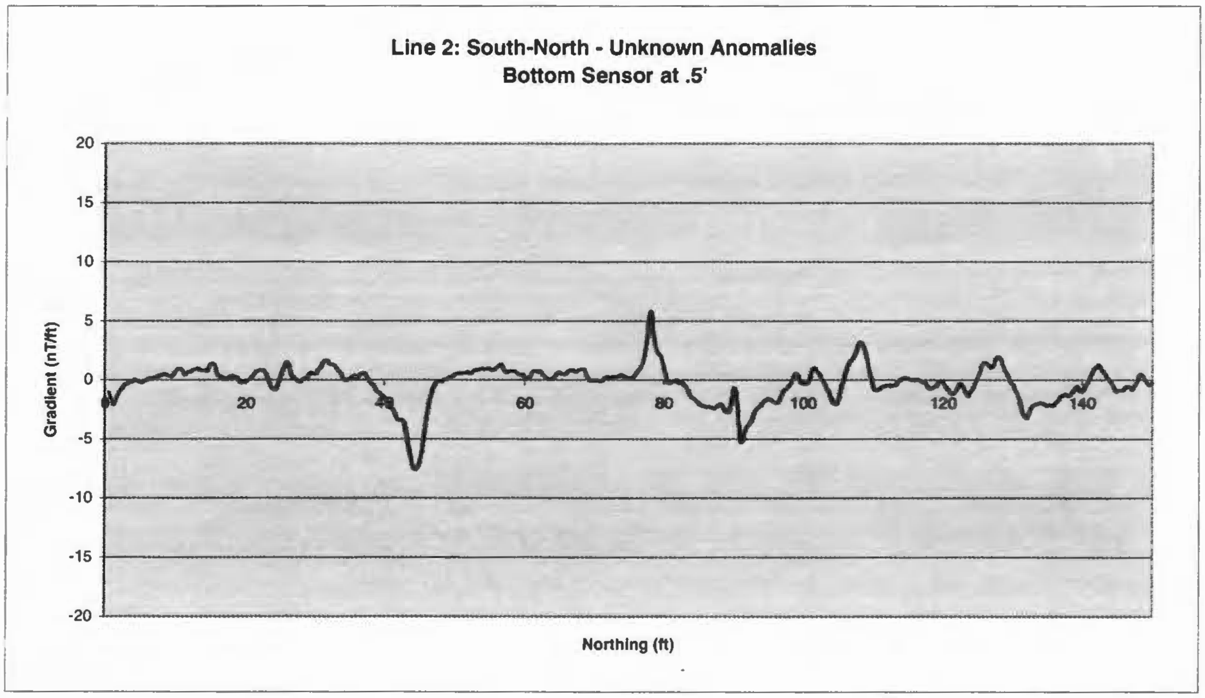
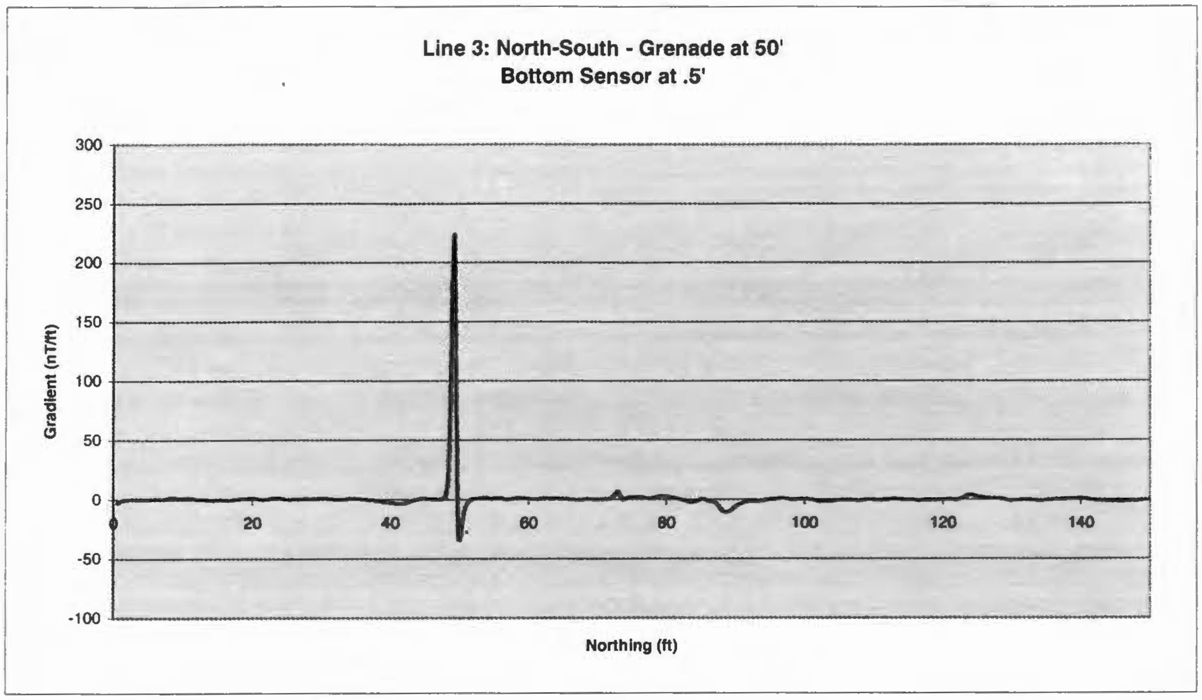


Figure A-2: G-858 QC Lines



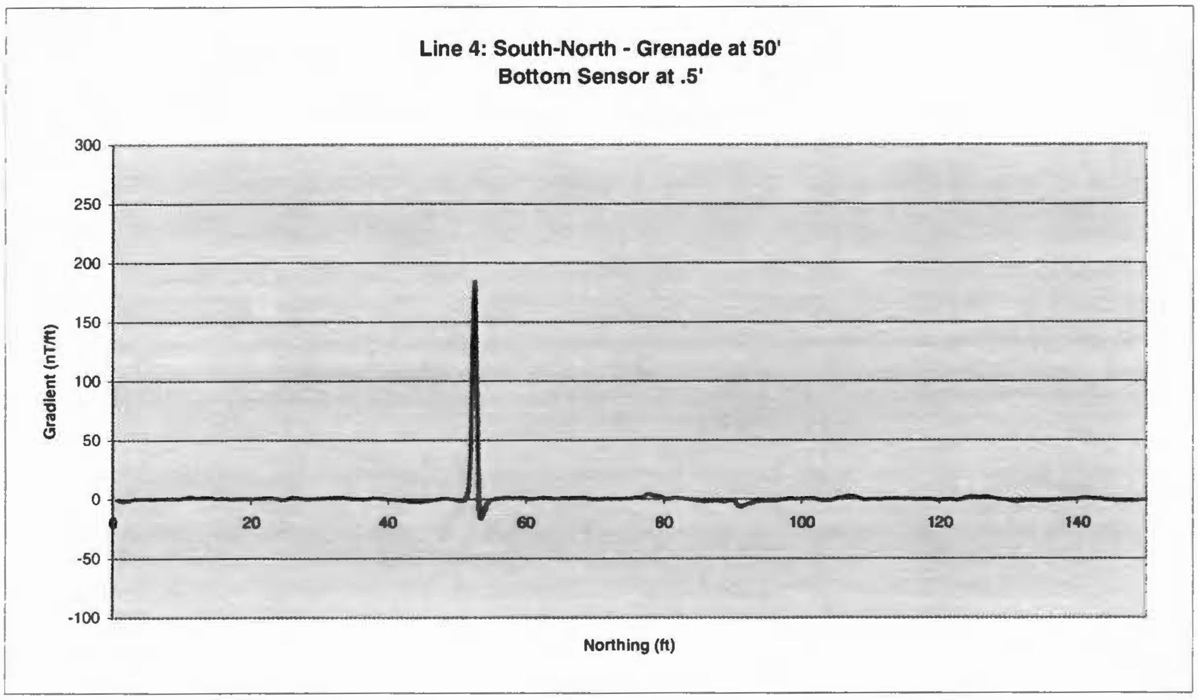
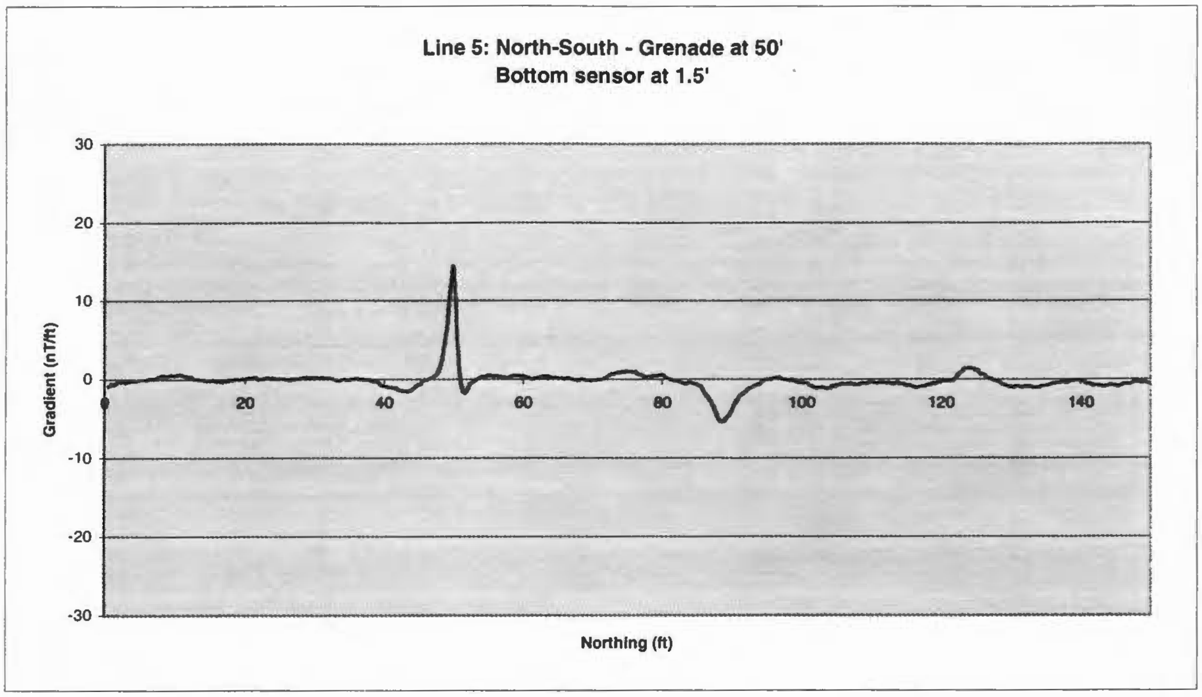


Figure A-2: G-858 QC Lines



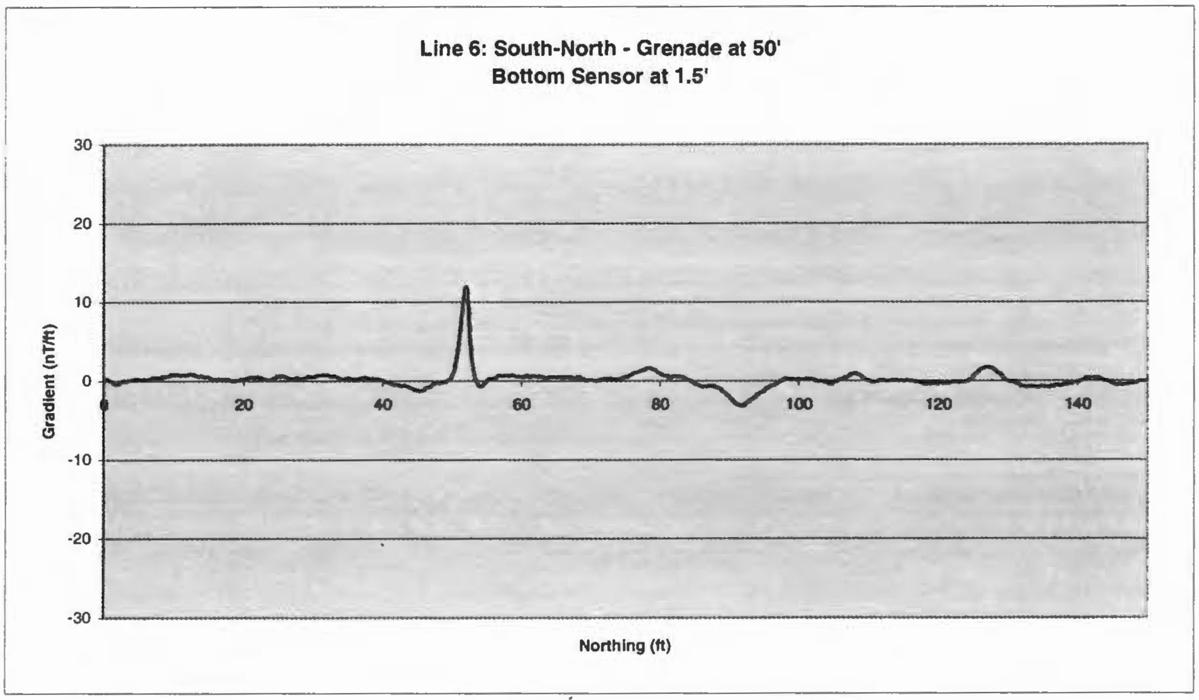


Figure A-2: G-858 QC Lines

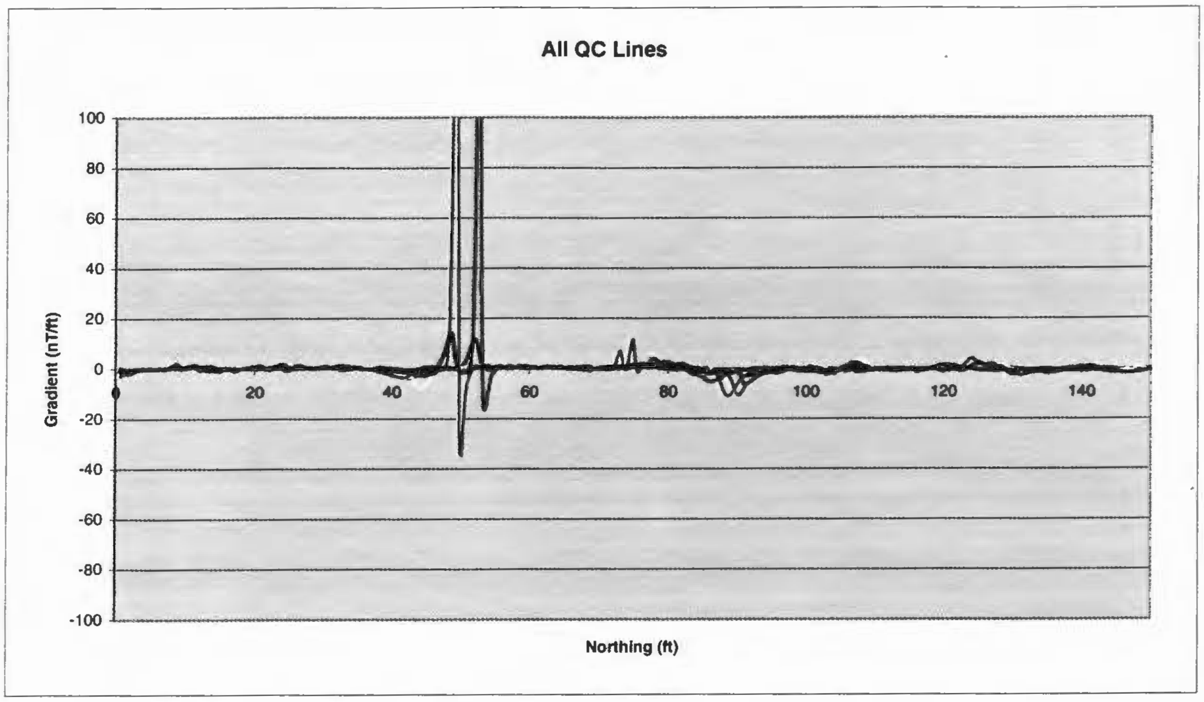
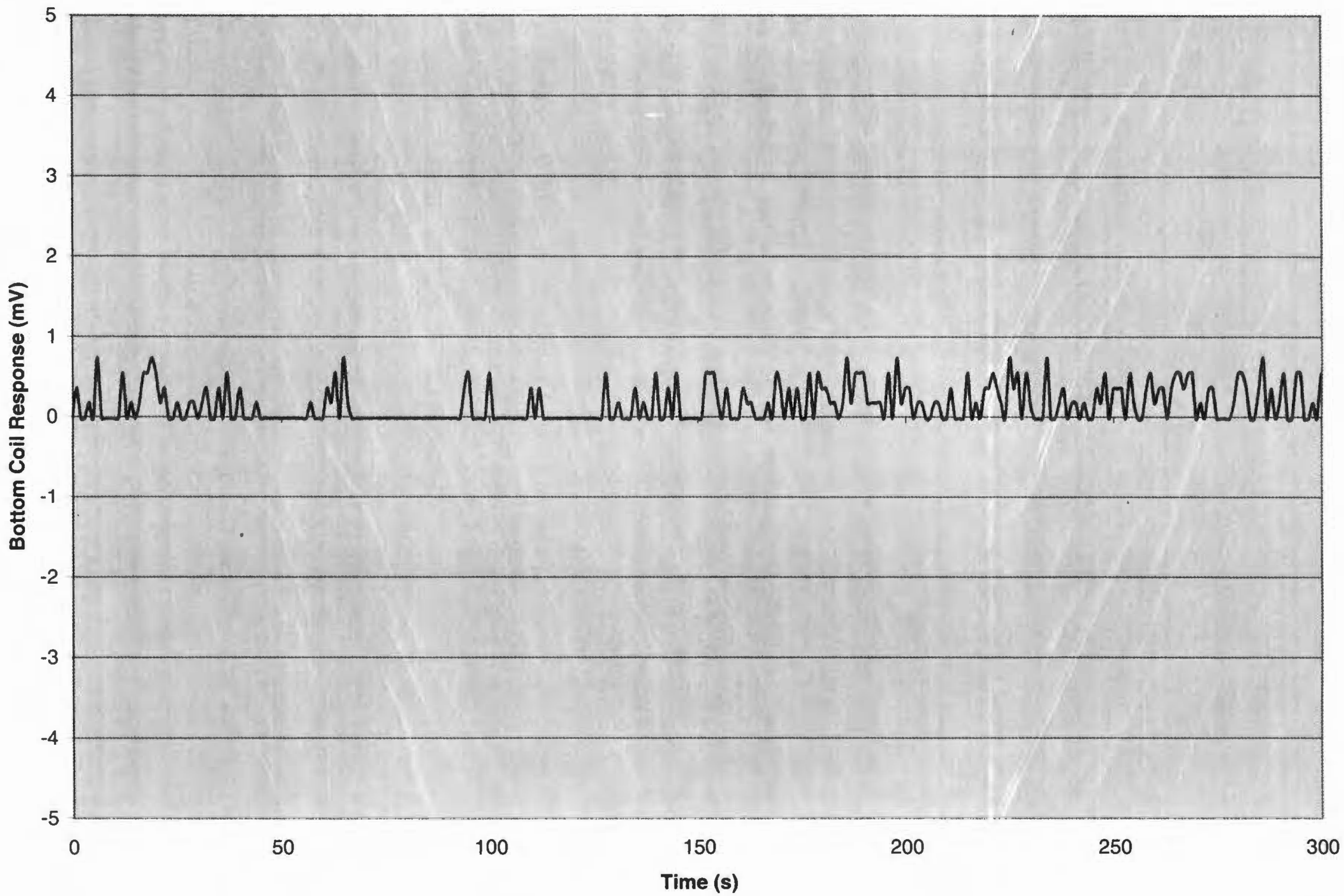
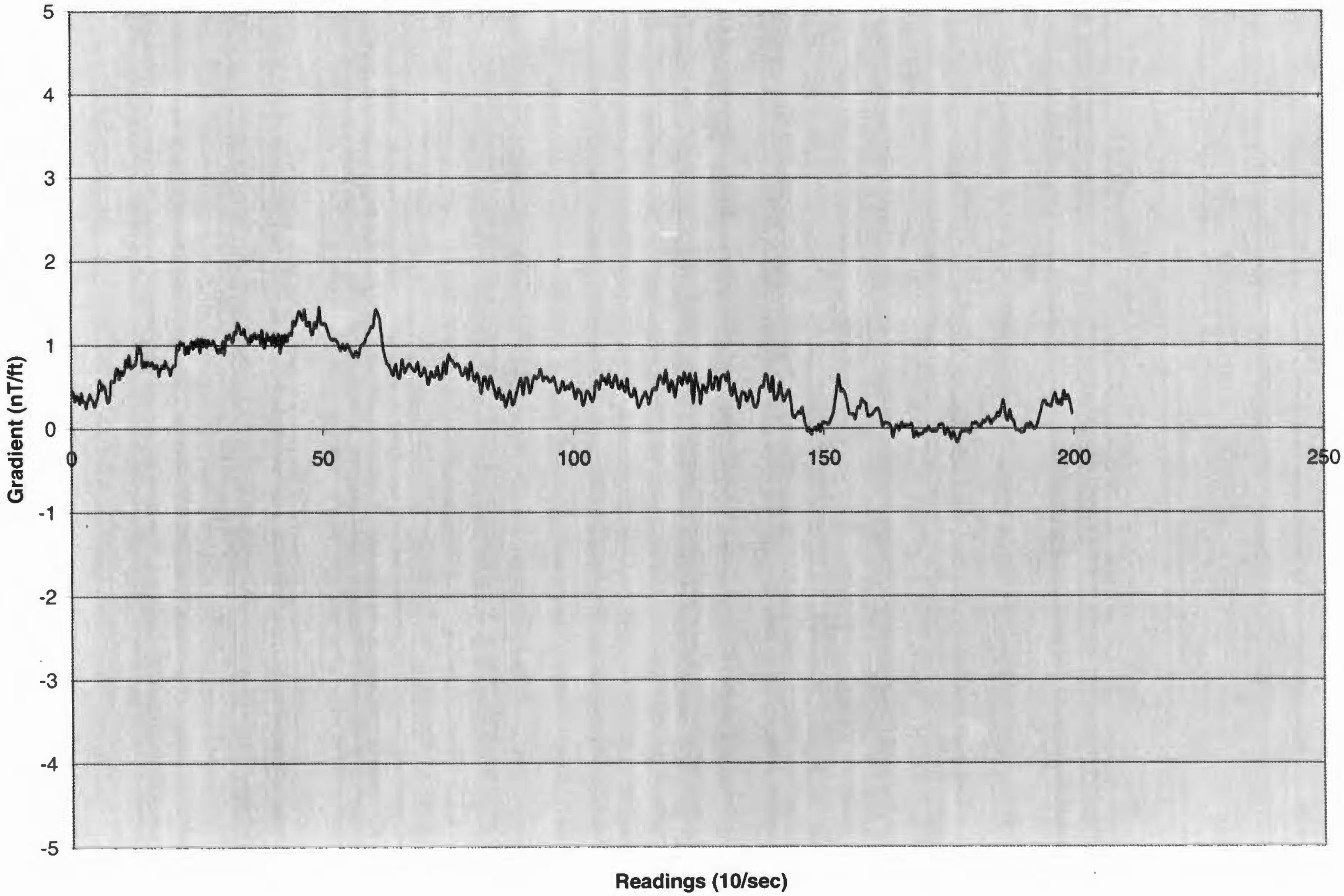


Figure A-3: EM-61 Static Test



p:\pit\projects\seneca\oe-eeca\testplot\figA-3.xls

Figure A-4: G858 Heading Test



p:\pit\projects\seneca\oe-eeca\testplot\figa-4.xls

APPENDIX D

SCHEDULE

The schedule is designed to ensure that all activities are coordinated so that each successive phase of operations is executed in a timely manner. Sufficient lead time between phases has been built in to allow for rain and other delays so that work will be completed in time for each subsequent phase to proceed on schedule. We have scheduled SEAD 45 first for all phases of the project, as removal work in an adjcacent area will also be occurring during the course of OE/EECA operations. Geophysical operations have been scheduled to allow for different methods to be used at SEAD 45 and the Grenade range, if necessary. Intrusive activities have been scheduled to allow for a sufficient backlog of geophysical data to accumulate prior to the beginning of operations, so that the intrusive sampling crew can work continuously through the summer after being mobilized.

The schedule has been planned around the following production rates.

UXO clearance, two man clearance crew: 2 acres/day

Brush clearing, one crew with brush hog: 2 acres/day

Brush clearing, one crew with hydro-axe: 4 acres/day

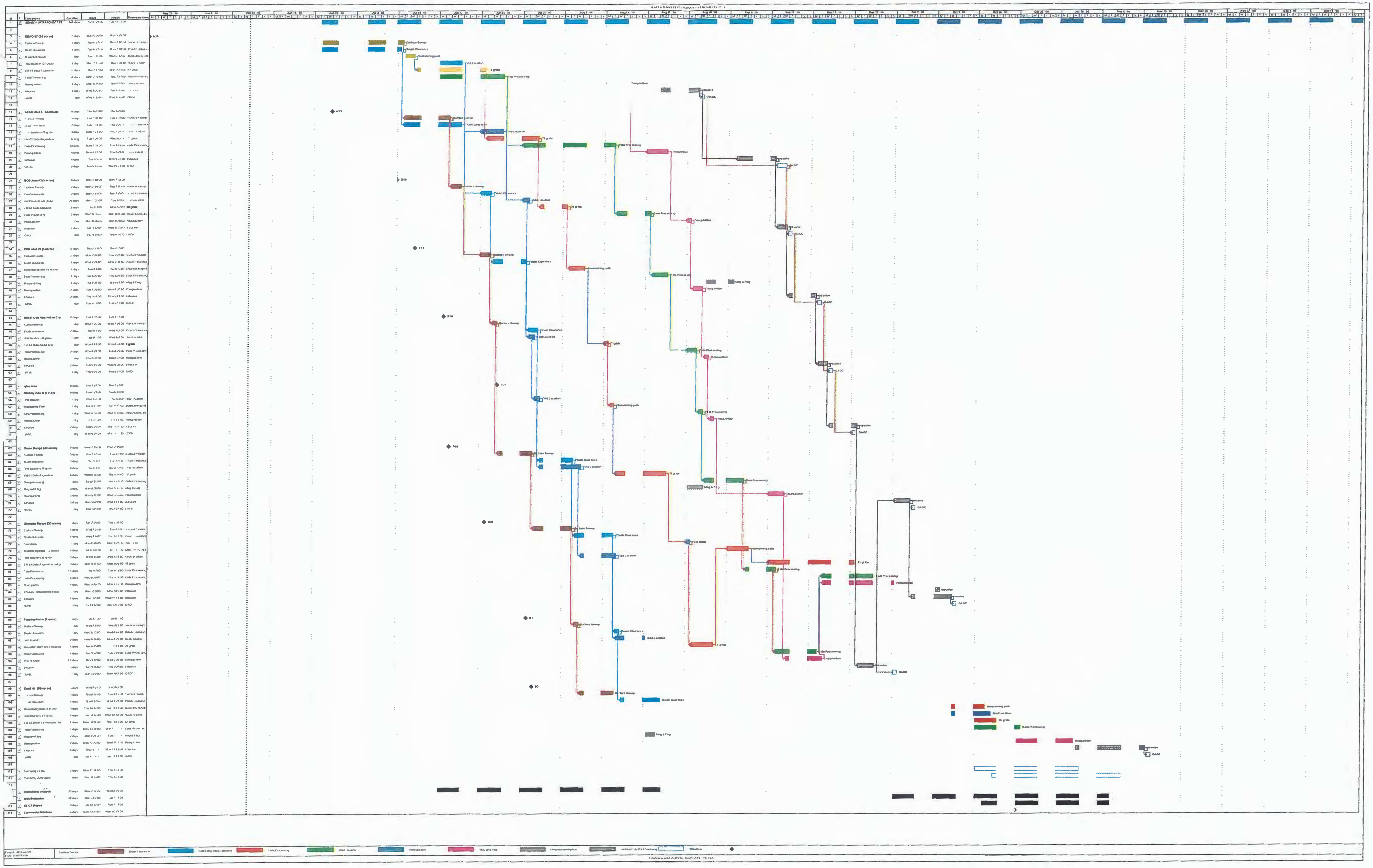
Location and surveying, one 2 man crew: 12 grids/day

Geophysical surveying, one 2 man crew with EM-61 or magnetometer: 8 grids/day

Geophysical data processing, one man crew: 8 grids/day

Anomaly reaquisition with Schonstedt: 16 grids/day

Dig time/Anomaly: 3 minutes



Task Name
Duration
Start
Finish
Resource Name

APPENDIX E

INSTITUTIONAL ANALYSIS WORK PLAN

1.1 Institution Controls

Institution Controls rely on behavior modification and access control strategies to reduce or eliminate OE risk. Institutional controls are implemented to utilize existing powers and authorities of government agencies that have jurisdiction over the site to protect the public at large from OE risks. Institutional controls also include programs to inform and educate the public at large as to the potential for ordinance contamination in an area, how to identify ordinance, and how to react if ordinance is found.

1.2 Institutional Analysis

The Institutional Analysis (IA) is prepared to accompany an OE Engineering Evaluation/Cost Analysis (EE/CA). The IA is generally included as a chapter in or an appendix to the EE/CA document. The IA will provide an overview of Seneca Army Depot. Potential reuse of the land will be discussed, potential Institutional Controls that could be instituted will be defined, and recommendations for the Institutional Controls that should be instituted will be made.

The institutional control actions to be recommended in the IA are controls by federal, state and/or local governmental agencies that exercise jurisdiction over the land with ordnance contamination. Land use restrictions such as zoning and regulatory controls such as permitting are effective tools for restricting use of contaminated land. Notice on deeds provides awareness to property owners. Access controls such as signage and fencing are not considered to be institutional controls, but can be somewhat effective in defining and providing warnings about areas of OE contamination.

The IA will document the government agencies having jurisdiction over Seneca Army Depot and assesses their capability and willingness to assert the control that is required to protect the public at large from explosive hazards. The IA will also document the obligation of the government, corporate or private landholders of OE contaminated lands to protect citizens from safety hazards under the law. The IA will be coordinated through Mr. Steve Absolom to include the BCT, RAB, LRA, and local, State, and Federal agencies.

Other institutional controls to be included in the IA are programs for public awareness. Public awareness programs for OE threats can be organized and publicized through the use of printed and video media, school and civic club programs, and public exhibits and displays. Web sites that are prepared to relate to a specific area and specific OE contamination can be very effective. Citizen committees can be organized to oversee the ongoing coordination of public awareness for OE risk.

1.3 Site Information

Seneca Army Depot is located in Seneca County, New York. The entire depot includes approximately 10,592 acres. Eight sub sites for potential OE contamination have been identified. These include approximately 6,715 acres. The intended reuse of the land is for a conservation recreation site. Cities and towns within close proximity include Geneva, Ovid, Seneca Falls, and Waterloo,.

PART 2, IA WORK PLAN

2.1 Task 1, Data Research and Analysis

2.1.1 Identify local government jurisdictions and large dominant corporate jurisdictions impacting the property.

2.1.2 Set appointments to interview representatives of jurisdiction and corporate entities.

2.1.3 Interview representatives to obtain answers to the following questions:

- What government authority, corporate institutions, and/or private owners have jurisdiction over the site?
- What authority do they have?
- Do they have specific responsibility in land-use control and/or public safety?
- What capabilities do they have?
- What resources do they have?
- Are they willing to play a role?

2.1.4 An interview form will be presented to and discussed with all interviewees. The purpose of the form will be to document the actual jurisdiction and responsibility of the interviewee and the agency or ownership represented. The form includes the following data:

- Origin of Institution - What is a brief history of the organization?

- Basis of Authority -Where does the organization derive its power?

- Sunset Provision - Part of a law that requires a legislative committee to consider if an organization still serves a necessary and useful purpose.

- Geographic Jurisdiction - In what geographic area does the organization have authority?

- Public Safety Function - Does the organization have the responsibility for the health and welfare of the public in the practice of its authority?

- Land-Use Control Function - Does the organization have zoning, subdivision, and planning authority within its jurisdiction?

- Financial Capability - Does the organization have its own funding source? Is and how much is the organization able to support the institutional controls through its own resources?

- Constraints - How comparable or how related is the mission of the organization to ordnance safety? What are the limitations for this organization to aid the various institutional controls implementation?

- Acceptance of Joint Responsibility - How willing and able is the organization to work with the USACE?

- Technical Capability - Is the technical mission similar and/or is the personnel of an organization proficient in explaining explosive ordnance history, general location and safety procedures?

- Intergovernmental Relationships - Does this organization work with other agencies on the local, state, and federal level?

- Stability - How sure were the interviewees that their mission was going to continue into the foreseeable future?

- Funding Sources - Where are funds derived that support the organization activities?

2.1.5 Conduct a site visit and overview of the region to identify general site characteristics and other information that may be significant in defining appropriate institutional controls. This will include information on local government not included in the interviews above; land uses within the OE area; development within the OE area; local press, television and radio; school districts; colleges or universities; power companies; chambers of commerce/tourist bureaus; and local civic groups.

2.2 Task 2, Preparation of the Institutional Analysis (IA) Report

2.2.1 The IA Report will be prepared to include the following:

- Section 1.0 – Includes an introduction, definition of Institutional Controls, and a study approach.
- Section 2.0 - Summarizes the site background, the institutional control methodology, and interviews with agencies that have site jurisdiction and/or react with current and future land users.
- Section 3.0 - Describes the proposed institutional control alternatives. The effectiveness, implementability, and cost of each alternative are discussed, and management execution, and support roles are defined.
- Section 4.0 - Presents institutional control recommendations to reduce the risk of exposure to ordnance. The recommendations are defined according to their effectiveness, implementation, initial cost to implement, and annual cost to maintain.
- Appendices - All interviews, meeting notes, and telephone records will be included as appendices.

2.2.2 Preliminary and final submittals will be made as defined in the Scope of Work.

APPENDIX F

IMPACT ANALYSIS WORK PLAN

to be submitted under separate cover

APPENDIX G

EXPLOSIVE SEPARATION DISTANCE CALCULATIONS

Minimum Separation Distances
Seneca Army Depot
3.5" M28A2 Rocket (Case Only)
1 March 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1420 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 235 ft
Range to 0.9 psi Overpressure = 70 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1420 ft
K328 Overpressure Range = 457 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

Minimum Separation Distances
Seneca Army Depot
3.5" M28A2 Rocket (Case Only)
1 March 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 3/1/00
Subject Matter Expert

William H. Zehrt, Jr. 1 Mar 00
CEHNC-ED-CS-S Branch Chief

Explosion Distances
Seneca Army Depot
75 mm M48
1 March 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1701 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 234 ft
Range to 0.9 psi Overpressure = 60 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1701 ft
K328 Overpressure Range = 396 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

Minimum Separation Distances
Seneca Army Depot
75 mm M48
1 March 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 3/1/00
Subject Matter Expert

William H. Zehrt, Jr. 1 Mar 00
CEHNC-ED-CS-S Branch Chief

Minimum Separation Distances
Seneca Army Depot
Mk II Grenade
1 March 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 650 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 400 ft
Range to 0.9 psi Overpressure = 27 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 650 ft
K328 Overpressure Range = 174 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 12 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 25 ft
Minimum Separation Distance = 200 ft

Minimum Separation Distances
Seneca Army Depot
Mk II Grenade
1 March 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 3/1/00
Subject Matter Expert

William H. Zehrt, Jr. 1 Mar 00
CEHNC-ED-CS-S Branch Chief

Minimum Separation Distances
Seneca Army Depot
81 mm M374
8 March 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1233 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 234 ft
Range to 0.9 psi Overpressure = 72 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1233 ft
K328 Overpressure Range = 474 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 20 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

Minimum Separation Distances
Seneca Army Depot
81 mm M374
8 March 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 3/8/00
Subject Matter Expert

Wallace A Zaterale 3/8/00
CEHNC-ED-CS-S Branch Chief

Minimum Separation Distances
Seneca Army Depot
155 mm M112
22 May 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1084 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 53 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1084 ft
K328 Overpressure Range = 351 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 36 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 220 ft
Minimum Separation Distance = 220 ft

Minimum Separation Distances
Seneca Army Depot
155 mm M112
22 May 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 5/22/00
Subject Matter Expert

William H. Zehrt Jr. 22 May 00
CEHNC-ED-CS-S Branch Chief

Minimum Separation Distances
Seneca Army Depot
20 mm M56A4
10 May 2000

REQUESTED BY: Kevin Healy
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 318 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 16 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 318 ft
K328 Overpressure Range = 107 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 12 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 25 ft
Minimum Separation Distance = 200 ft

Minimum Separation Distances
Seneca Army Depot
20 mm M56A4
10 May 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance or 200 ft or the K328 distance for the total NEW (munition plus donor charge). A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

MINIMUM SEPARATION DISTANCES WHILE USING MOFB DURING INTRUSIVE ACTIVITIES

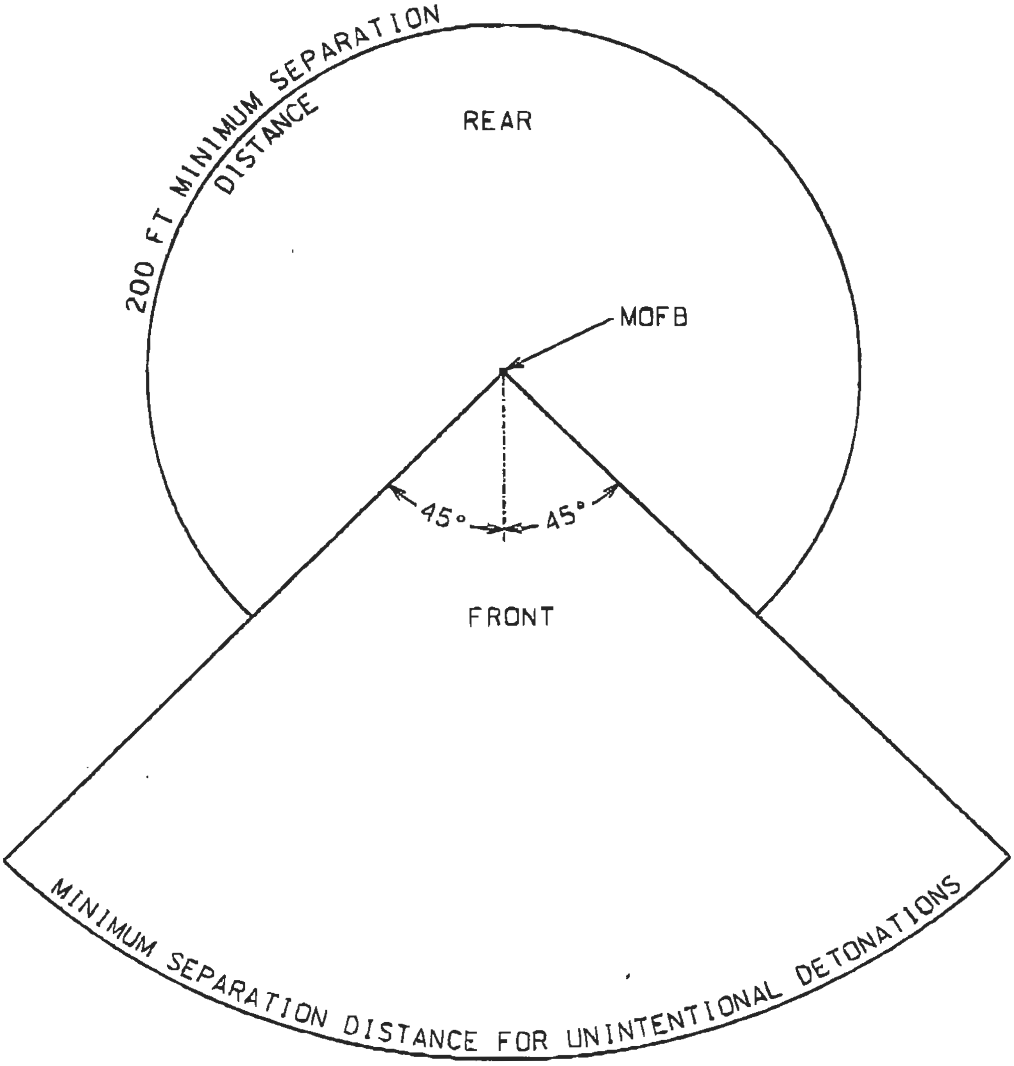
Design of the Miniature Open Front Barricade (MOFB) is in accordance with HNC-ED-CS-S-98-8, "Miniature Open Front Barricade". This document was approved by the DDESB. It may be found on HNC's website at www.hnd.usace.army.mil and select "Product Lines", "Ordnance & Explosives", "Innovative Technology", and "Analytical Tools". DDESB has placed certain restrictions on the approved usage of the MOFB. These are listed in the approval letter in the front of the report.

Thickness of Aluminum Required to Prevent Perforation = 0.17 in

The MOFB is designed to defeat fragments to the rear and sides of the MOFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the MOFB are the same as the fragment distances without the MOFB (see figure). The MOFB is not designed to reduce the effects of blast overpressure. The MOFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the MOFB must be maintained based on the expected throw distance of the MOFB itself.

Minimum Separation Distance to sides and rear = 200 ft
Minimum Separation Distance to front = 318 ft
K50 distance = 16 ft

Minimum Separation Distances
Seneca Army Depot
20 mm M56A4
10 May 2000



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING MINIATURE OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Michelle Crull 5/10/00
Subject Matter Expert

Dallas A. Ratemeke 5/10/00
CEHNC-ED-CS-S Branch Chief

APPENDIX H

RESPONSE TO COMMENTS AND BACKCHECK

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: Seneca Army Depot, NY. (Cntrl. No. 4-49-00) S: 19 April 2000

☒ SITE DEV & GEO ☐ ENVIR PROT& UTIL ☐ ARCHITECTURAL ☐ STRUCTURAL ☐ MECHANICAL ☐ MFG TECHNOLOGY ☐ ELECTRICAL ☐ INST & CONTROLS ☐ SAFETY ☐ ADV TECH ☐ ESTIMATING ☐ SPECIFICATIONS ☐ SYSTEMS ENG ☐ VALUE ENG ☐ OTHER

REVIEW: Draft OE EE/CA Work Plan
DATE: 17 May 2000
NAME: Tommy Hunt/ED-CS-D/mp

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Chapter 5, All Figures	All of the Figures within this chapter should be labeled more precisely for planimetric features. These Figures do not convey any type of information, they are just a bunch of line on paper. None of the physical features are labeled; There are not any coordinates convey on the maps; None of the road are labeled or marked; etc. What purpose do these map have within the report, if they do not convey some specific information?	They are replaced by rectified aerial photos on which all features are labeled, including roads and buildings, when possible.
2.	Par. 7.2	The end of the second paragraph states that the GIS will be provided in AutoCADD version 12. To the best of my knowledge AutoCADD is not a GIS capable system. ArcView, ArcInfo, Intergraph MGE, Bentley GeoGraphic are GIS systems. What system platform with the Seneca GIS be based?	We use Microstation; we can furnish all files in Microstation format.
3.	Par. 7.3.1.	The acronym should be CEHNC, not CENCH, as shown.	Corrected.

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CEHND FORM 7 (Revised)

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

U. S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS PROJECT EE/CA, Seneca Army Depot, Romulus, New York 5 April 2000

☐ SITE DEV & GEO ☐ MECHANICAL ☒ OE SAFETY ☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL ☐ MFG TECHNOLOGY ☐ ADV TECH ☐ VALUE ENG
☐ ARCHITECTURAL ☐ ELECTRICAL ☐ ESTIMATING ☐ OTHER
☐ STRUCTURAL ☐ INST & CONTROLS ☐ SPECIFICATIONS

REVIEW Draft EE/CA Work Plan 4-49-00
DATE 7 April 2000
NAME Frederick J. Allan Jr., 5-1558

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	This Work Plan is not in the proper format, per EE/CA TAB 001. Not in compliance with SOW, paragraph 3.3.	Agreed; however, all relevant information is included in this work plan. This format has been approved by the Corps.
	Table 1.1	This Work Plan outline is not in compliance with EE/CA TAB 001.	See above.
3	Paragraph 2.4	Change ER-385-1-92 to 29 CFR 1910.120, and DID OT-025.	Corrected.
4.	Paragraph 2.4.2	The Site Manager must also have the appropriate training under 29 CFR 1910.120.	He does have the appropriate trarining and the change has been made in the work plan.
5.	Paragraph 2.4.4.3	Clarify – You have the UXO SSO (Parson's (Prime Contractor)) reporting to the UXO QC (USA (Subcontractor)). Is this correct, and if so, Why?	This has been changed to have the UXO SSO report to the Project Safety Office and the Site Manager..
		In 2nd Sentence add "(per DID OT-025)" after UXO Supervisor.	Corrected.
6.	Paragraph 2.4.4.4	In 4th Sentence add "(per DID OT-025)" after EOD experience.	Corrected.
7	Paragraph 2.4.4.5	In 9th Sentence add "(per DID OT-025)" after UXO Supervisor.	Corrected.
8.	Paragraph 2.4.4.5	Clarify – In this paragraph you state that USA is providing the QCS, but in paragraph B 1.51, and page 1-14 of the SSHP, Parson's is supplying the QCS. Which is correct?	Corrected. Parsons is supplying the QCS.
9.	Paragraph 2.4.4.6	In 5th Sentence add "(per DID OT-025)" after OE experience.	Corrected.
10.	Paragraph 2.7.1	Clarify – This paragraph states you will be reacquiring anomalies using tape measures from the corners of the grid. In paragraph 5.9, you state that you will	Reacquisition will be done with the hand-held EM-61 and G.P.S.. Trimble 4800, which has

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS PROJECT EE/CA, Seneca Army Depot, Romulus, New York 5 April 2000

☐ SITE DEV & GEO ☐ ENVIR PROT& UTIL ☐ ARCHITECTURAL ☐ STRUCTURAL ☐ MECHANICAL ☐ MFG TECHNOLOGY ☐ ELECTRICAL ☐ INST & CONTROLS ☒ OE SAFETY ☐ ADV TECH ☐ ESTIMATING ☐ SPECIFICATIONS ☐ SYSTEMS ENG ☐ VALUE ENG ☐ OTHER

REVIEW Draft EE/CA Work Plan 4-49-00
DATE 7 April 2000
NAME Frederick J. Allan Jr., 5-1558

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		reacquire using the EM-61 and ProXRS. Which way will be used? Note: Also, I believe the ProXRS has a + or – error of 2 feet in positioning. Yet your intrusive excavation limit is a radius of 1.5 feet. Using the tape measure may be even more inaccurate. Is there a potential problem here with reacquistion?	an accuracy of 5 cm. Where these methods cannot be used, mag and flag will be done which has no reacquisition.
11.	Paragraph 2.7.2.2	Clarify the use of the $ sign.	Replaced with bullet symbols.
12.	Paragraph 2.8	Change all reference to USAECH to UASESCH throughout the document.	Corrected.
13.	Paragraph 2.8.1	Add USA Demolition SOP to the Work Plan. Can not approve the Work Plan without it.	USA Demolition SOP added to Work Plan
14.	Paragraph 2.9	Rewrite turn-in procedures. Not in compliance with paragraph 3.4.3.6 of SOW.	Rewritten per paragraph 3.4.3.6 of SOW
15.	Paragraph 2.8, subpara 5, 2nd sentence	Change this to reflect MSD's in Table 4.4, all other area's not listed will use the default distance.	Corrected. Now references table 4-4 directly.
16.	Paragraph 3.3	Need to request permission to store commercial explosives in a military magazine. This request is submitted through Huntsville. Can not store explosives without this approval.	Parsons will submit this request.
17.	Paragraph 3.4.1, bullet 1	Add (IME-22 container or equivalent) after separate container.	Change added.
18.	Paragraph 3.6.2	Complete last sentence.	Corrected.
19.	Paragraph 4.1	See comment #16.	See response # 16.
20.	Table 4-1	Move the last 500 in Column 6 up one line. Move the last 300 in Column 7 up one line. Change total NEW to 112.	Corrected.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS PROJECT EE/CA, Seneca Army Depot, Romulus, New York 5 April 2000

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☐ STRUCTURAL ☐ INST & CONTROLS ☐ SPECIFICATIONS

REVIEW Draft EE/CA Work Plan 4-49-00
DATE 7 April 2000
NAME Frederick J. Allan Jr., 5-1558

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
21.	Paragraph 4.1.4, 1st sentence	Add "and with concurrence of USAESCH Safety Specialist" after public road.	Change added.
22.	Paragraph 4.2	Need to add the CEHNC Engineering Directorate, Structural Branch calculation sheets to the Work Plan in order to approve the MSD's in Table 4.4. Note: If the Contractor wants to use the 1/600', a separate request must be submitted (with justification) for approval to CEHNC OE-Safety before it can be used.	These will be included as appendix G.
23.	Paragraph 4.3	1st Sentence – Add Period after MSD.	Corrected.
24.	General Figure 4-1 thru 4-8	Mark on each map, what the circles represent (e.g. xxxfeet (MSD), xxxfeet (1/600), 1/600 area boundary).	Circles will be labeled according to # of feet to each circle, 1/600 and M.S.D. distance
25.	Figure 4-1	Clarify – Table 4.4 shows the MSD for SEAD-45 as 2577 feet. This map shows it as 1800 feet. Correct to the right MSD. Note: The map shows the MSD covering Hwy 96A and the HTRW construction site. This will be a problem during intrusive activities, as neither one of these area's will be able to be shutdown. Need to address this now (e.g. request for 1/600', change by ordnance personnel on Rte. 96 if possible;	See new figures. Note that the 1800 foot radius is the distance around the berms from detonations there; if any UXO was kicked out to 1800 feet, the safe distance is another 2577 feet beyond that for blow in place. We will attempt to use the 1/600 distance for intrusives and stop the road for actual planned detonations; if this is not appropriate, we will coordinate with local authorities.
26.	Figure 4-2	Clarify – Table 4.4 shows the MSD for SEAD-57 as 1233 feet. This map shows as 1800 feet. Correct to the right MSD.	Corrected. See figure 4-2.
27.	Paragraph 5.3	Change Twele to Twelve.	Corrected.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE | CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

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REVIEW: Draft EE/CA Work Plan 4-49-00
DATE: 7 April 2000
NAME: Frederick J. Allan Jr., 5-1558

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
28.	General Section 5	Missing Personnel Qualifications for Geophysicist and Survey Personnel, per DID OT-005-05 and DID OT-025.	Included in new work plan.
29.	Paragraph 6.1.3	Clarify – This paragraph makes it sound like there are two SSHP's (one for Parson's and one for USA).	Clarified to be one.
30	Section 6	Clarify the meaning of ES.	ES means Engineering Science; deleted here and in rest of work plan.
31.	Paragraph 7.2, subpara 2	Change reference to TAB EE/CA-005-07 to DID OT-005-07.	Corrected.
32.	Paragraph 8.2.3.2	EECA TAB-001 does not require some of the sub-plans listed. Work Plan is not in accordance with EECA TAB-001.	See comment # 1
33.	Paragraph 9.10.4	Rewrite – not in compliance with paragraph 3.4.3.6 of the SOW.	Corrected by U.S.A.- see new version
34.	Paragraph 9.11.7.2.(1)	Include type of inert ferrous and non-ferrous items and depth which it is buried. Note: The Schonstedt only detects ferrous items. Delete non-ferrous or change magnetometer.	Corrected.
35.	Paragraph 9.11.9.1	Clarify – There is no Section 1.13 below.	Corrected; reference removed.
36.	Section 9	Explain how the QCS will conduct QC of the grids sampled.	Section 9.5.1 describes grid Q.C.S.
37.	Paragraph 9.11.5	Clarify – The only QCS listed works for Parsons. Is USA going to have a QCS too?	Corrected. Parsons will have the only QCS.
38.	Appendix B2	Need MSDS's for all Hazardous Material on-site.	MSDS's will be bound and placed on - site for all compounds believed present.

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REVIEW: Draft EE/CA Work Plan 4-49-00
DATE: 7 April 2000
NAME: Frederick J. Allan Jr., 5-1558

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
39.	Appendix B2	Based upon the information contained in this section, has the CIH taken this into consideration when preparing his hazardous analysis sheets, and his settings of the appropriate PPE levels?	Hazardous Analysis Sheets amended relevant to task to include risk of exposure to contamination,use of PPE,& air monitoring
40.	Appendix B, B5.1	Missing Qualification and Responsibilities of CIH.	B5.1.1 amended to specify training & daily Safety meetings held by the UXOSO.
41.	Appendix B	Missing Hazardous Analysis Sheet for Brush Cutting Operations.	Now included.
-------	--------------------	------NOTHING FOLLOWS--	

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE | CORPS OF ENGINEERS

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PROJECT EE/CA, Seneca Army Depot, Romulus, New York 5 April 2000

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REVIEW Draft EE/CA Work Plan 4-49-00
DATE 7 April 2000
NAME Frederick J. Allan Jr., 5-1558

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC, SEAD Installation-Wide OE EE/CA (4-49;S:19 Apr)

☒ SITE DEV & GEO ☐ ENVIR PROT& UTIL ☐ ARCHITECTURAL ☐ STRUCTURAL ☐ MECHANICAL ☐ MFG TECHNOLOGY ☐ ELECTRICAL ☐ INST & CONTROLS ☐ SAFETY ☐ ADV TECH ☐ ESTIMATING ☐ SPECIFICATIONS ☐ SYSTEMS ENG ☐ VALUE ENG ☐ OTHER

REVIEW: Draft Work Plan
DATE: 17 May 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1	Figure 1	In the Description Key, recommend adding SEAD-s 43 and 44A. These sites are also covered under this EE/CA even though no field work is planned.	They will be added to the site map. However, we do not at present know the nature of the data for these sites. They will be included in the report when they come in.
2	Section 2.2, Page 2-1	In the first paragraph, verify that "USA" stands for "Underground Service Association", Inc. This reviewer was of the impression that the name of the company is USA Environmental, Inc. and that the "USA" stands for "United States of America". Also, in paragraph 2.2.1 (and throughout the document), the references to CENWK, CESAJ and St. Louis need to be revised. New York District (CENAN) is the Project Manager for all Seneca work with USAESC, Huntsville (USAESCH), the Technical lead. Also, SEDA has their own PAO office so all PAO will be performed by SEDA unless requested otherwise.	Corrected. USA stands for United States of America. District is changed to New York.
3.	Section 2.2.4 Page 2-2	Please verify the name of the UXO subcontractor.	Corrected. USA Environmental.
4.	Section 2.3.2, Page 2-3	Recommend additional specificity here. The Geophysical Test Plot (Proveout Plot) has already been performed. The daily check will be performed using a test strip or calibration plot.	Clarified to read test strip.
5.	Section 2.4.4, Page 2-4	More important than "3 years of relevant" experience is whether the personnel meet the USAESCH quailification requirements.	Corrected to include these changes.
6.	Section 2.7 Page 2-13	Reacquisition parameters for grids andmeandering path are stated here. Please clarify whether these meet the requirements laid out in the EE/CA TABS and DID's.	Reacquisition will meet the parameters laid out in DID OT-005-05.

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DESIGN REVIEW COMMENTS

PROJECT: BRAC, SEAD Installation-Wide OE EE/CA (4-49;S:19 Apr)

- [x] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
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REVIEW: Draft Work Plan
DATE: 17 May 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		Also, we discuss reacquisition for the grids. We need to specify what will be done when using the meandering path method also.	Procedures have been added for meandering path.
7.	Paragraph 2.13, Page 2-17	Delete the TM reference here since it is the BRAC Environmental Coordinator, Mr. Absolom, who will be responsible for public affairs. Besides, I doubt Ms. Newton-Lund has any cares about Seneca ADA (and probably not as nice a beard as the <u>REAL</u> TM).	Corrected to read Mr. Absolom.
8.	Table 4-3, Page 4-3	o SEAD-44A was apparently used at some point as a rifle-fired grenade range (not a hand grenade range).	Corrected to read rifle-fired grenade.
		o Recommend that the MPM for SEAD-57 needs to be a lot smaller than an 81mm mortar. There is more of a likelihood that small UXO and flares, etc., were prevalent here.	The MPM is actually the largest most probable munition. Left as is after consultation with USA. and Corps.
		o The MPM for the Grenade Area (an M203 Range as per Mr. Absolom) should be a rifle-fired grenade.	Corrected.
		o The MPM for the EOD Ranges needs to be smaller items such as flares, etc.	See second bullet above.
		o The MPM for the Popping Plants should be a 20mm HE projectile. The concern at these sites is that 20mm HE projo's may have been demilled here as has been the. case at other sites in the US. As the smallest of the universe of potential UXO's, the 20mm is a conservative choice for MPM at these two sites.	Changed to include 20 mm. OE.
		o Maintain consistency in table designations. Use a "-" or a ".", but not both.	Corrected.
9.	Table 4.4,	o Keep in mind that the 1/600 distance is only to be used in special circumstances and from Mr. Galloway (OE Safety) on a case by case basis. I believe these	Noted. A 1/600 distance exception will be needed at SEAD 45.

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REVIEW: Draft Work Plan
DATE: 17 May 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	Page 4-5	distances were gleaned from Dr. Crull's input. However, the distances were given for information and completeness only.	We will send the request in writing when we need it.
10.	Section 5.2.4.1, Page 5-4	o We state that grids at SEAD-57 will be placed evenly to sample the entire 58 acres. Recommend that we place a higher density of grids in and around the berm area so as to get 100% coverage where most of the OE activity took place. Also, the figure which depicts this site should be changed as well.	We have placed 4 new grids to cover the area on and around the berm.
		o Please verify that the 25 foot spacing is not too extensive based upon the smaller UXO expected at this site and the recent Test Plot results.	Changed. We decided to remove transects in favor of grids. See new section on SEAD 57.
		o Please define "accurate GPS". The GPS unit used during the Test Plot was not accurate enough and some difficulties were introduced as a result. The accuracy of any GPS used for this project needs to be on the order of 0-5cm.	G.P.S. will be changed to Trimble 4800, accurate to within 5 cm.
		o Correct here and throughout the document, uses of the personal tense such as "we", etc	Corrected.
11.	Section 5.2.4.2, Page 5.4	o There would appear to be an error between the "Nineteen acres" and "(15 acres) used in the first sentence of the second paragraph.	Corrected.
		o We need to reword the sentence "there is some possibility that large ordnance...". If we have not proven by now that we have excellent capability in finding something as large as a 155 round here, than we need to throw in the towel!	Rewritten to clarify use of magnetometer.
11.	Section 5.2.4.3, Page 5-5	References made here and elsewhere to the Schonstedt are tenuous since the Schonstedt was not tested at the Proveout Plot and much of what we will be looking for at the EOD Ranges is likely to be aluminum (flares, etc.). We need to stay away from using a ferrous	Will use White's all metal detectors, in EOD areas # 2 and #3 and SEAD 57.

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REVIEW: Draft Work Plan
DATE: 17 May 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		Fisher 1266XB would be more appropriate at some of the sites, depending upon the targets.	
12.	Section 5.2.4.5, Page 5-6	o In the first paragraph we suggest that it is difficult to use the EM-61 and 858 here. In paragraph 3, we state that the Proveout results showed each method worked well. Please clarify this apparent contradiction. o Correct the personal tense used throughout this page.	Clarified to state that the signal was received, but not always identified on the deeper objects. Corrected.
13.	Page 5-7	o In paragraph one of Section 5.2.4.7, correct "it is has". o In the second paragraph and at the bottom of this page, revise the references to "Schonstedt" as previously discussed.	Corrected. Corrected to include White's.
14.	Section 5.2.4.9, Page 5-8	The purpose for investigating the popping plants is to assure that no 20mm HE projectiles were demilled at these sites as has been the case at other installations. Consequently, the intent would be to prove/disprove that there is <u>any presence</u> of OE rather than to derive "an accurate estimate of the UXO density".	Reference deleted. New section addresses possible presence of 20 mm.
15.	Section 5.2.4.10, Page 5-8	Is it our intention to run geophysics in only one of the trenches that exist on either side of the D Row road?	Both sides, using mag and G.P.S. Text corrected to indicate this.
16.	Section 5.3,	o Correct "twele".	Corrected.

ACTION CODES
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC, SEAD Installation-Wide OE EE/CA (4-49;S:19 Apr)

- [X] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
- [ ] ARCHITECTURAL
- [ ] STRUCTURAL
- [ ] MECHANICAL
- [ ] MFG TECHNOLOGY
- [ ] ELECTRICAL
- [ ] INST & CONTROLS
- [ ] SAFETY
- [ ] ADV TECH
- [ ] ESTIMATING
- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW: Draft Work Plan
DATE: 17 May 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	Page 5-9	o Delete the reference to the penetration analysis. This is meant more for impact ranges which do not exist on SEDA. Also, the list of conservative assumptions that went into developing this table render it essentially useless.	Deleted.
17	Table 5-1	Correct this table as per the previous version. Rifle-fired practice grenades were used at SEAD-44A and the Grenade Area, the type of munition expected at the EOD Ranges is small stuff (flares, fuzes, small UXO) and the 20mm HE projectile is the MPM at the two popping plants.	Corrected.
18	Section 5.5, Page 5-11	Correct "O/E" to "OE".	Corrected.
19	Figures	o Figure 5-1 Please add SEAD's 43 and 44A to the Description Key and the drawing. o Figure 5-2 Revise to show slight change in grid density as proposed in a previous comment. o Figure 5-6 It would be a benefit if physical features were shown (existing targets, firing line, etc.).	They are added to the new figures. Grids relocated -see new figure. These are labeled on the photos.
20	Page 8-4	o In the discussion of SEAD's 43 and 44A, clarify the discussion of past investigations. Parsons did HTRW investigations (SI which may have included geophysics) but it was another Contractor that performed the OE investigations that led us to the point we are at o The institutional analysis needs to be coordinated fully, through Mr. Absolom, to include the BCT, RAB, LRA and local, State and Federal agencies. Also, those responsible for	Agreed. Clarified. See page 8.3. Corrected.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC, SEAD Installation-Wide OE EE/CA (4-49;S:19 Apr)

☒ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG	REVIEW	Draft Work Plan
☐ ENVIR PROT& UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG	DATE	17 May 2000
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER	NAME	Kevin Healy/ED-CS-G/5-1627
☐ STRUCTURAL	☐ INST & CONTROLS	☐ SPECIFICATIONS			

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		decision making after base closure need to be fully included as well.	
		o The Risk Assessment called for in the SOW is no longer espoused. An Impact Analysis is what is to be provided. A descriptive paragraph will be forwarded from Mr. Wilcox for inclusion in the next version.	An Impact Analysis will be prepared; description to be sent under separate cover.
21.	Section 8.2.12, Page 8-6	This task is optional.	Will not be done unless required by CEHNC.
22.	Section 9	The rewrite of this section needs to reflect the detail of Mr. Durham's input..	Rewrite of Chapter 9. reflects Mr. Durham's input.
23.	Appendix C	The rewrite of the Geophysical Proveout report needs to reflect the detail of Mr. Durham's input.	Sent to Mr. Durham under separate cover. New proveout report is enclosed as Appendix C.

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Add to QC-Check Narratives.

Daily. For both the EM61 and G858, each morning find a quiet area and zero out the instrument.

1. Put polycorder on automatic & fast sample rate (4x/sec). Shake cables to make sure no shorts in cable & connectors while watching readings. Tape cables down.

2. Static test for 3 minutes

3. Static test with a spike for 3 minutes (round metal object such as a M69 is best to use as the spike).

4. Graph the data in Excel. Is there noise? Anything greater than +/- 3 mV for the EM61 is high. If there is noise, look for noise source and eliminate.

On the first day of the project, before any surveys, lay out a 100' non-metallic tape.

4. Run approx. 100' line going one direction (N).

5. Run approximately 100' line in reverse direction (S).

Is the background line data repeatable?

Put target (M69) on clean area of line (25' or 50' or 75'?)

6. run 100' lane in one direction with spike in it.

7. run 100' lane in opposite direction with spike in it.

Are the 2 readings over the target item approximately the same?

8. Repeat item 6 walking very fast.

9. Repeat item 7 walking very slow.

Compare the location of the target item with the data peak. The difference is your location error that is typically caused by the temporal time lag of the detector (normally the problem) or the spatial correction due to placement of their location device (rarely).

For each grid, use three files. Run the first line as one file, the remaining grid as the second file, and repeat the first line as the third file. The data from the first and third file should pretty much overlay each other in an Excel line plot.

Also for the G858, document a heading error test results for the optically pumped magnetometer.

For the GPS, each day, run a meandering path over three known monuments. Submit, corrected and uncorrected position data to CEHNC.

Will an ATV be used? If so, follow these procedures:

1. Move the 61 data pack towards the rear of the ATV. It is simpler & cheaper to add lengths of RS232 cable between the 61 data pack & the computer than buying longer lengths of the EM-61 shielded signal cable.

2. From the picture, it looks to me that you would see an improvement in signal-to-noise characteristics if you increase the distance between the EM-61 and the tow vehicle by another 2-4 feet. To test this, collect & monitor the data from the EM-61 in a static mode, then start up your ATV from about 25' away and slowly back up towards the coils. Find out where you start seeing the influence of the ATV spark plugs & body metal, then back off at least 2 feet. Collect a 5-10 minute static count dataset and compare with a static count collected when the ATV was not running and far from the EM-61.

3. If you see the noise start occurring during the survey. Close out the file you are collecting. Make field notes why you closed out the file. Start a new data file and monitor the EM-61 values. Does the noise only occur when you are moving or is it present in a static mode (Your QC data indicates it was present in the static mode - if this were not the case, start checking your cable connections, cables, and stability of the GPS antenna - secure them so they are not flopping around when you move.) Turn the ATV ignition off. If you still see the noise you have now removed the ATV from your fault diagnosis tree. Check your cable connections and cables again and this time move them around to make sure the pins on the end of the cables are not shorting out. If noise is still present, see if your cables or GPS antenna is stable. Next power down the GPS antenna, noise is still present - remove the GPS antenna and wire from the vicinity of the EM-61 coils. At this point you are now down to the EM-61 system itself. Its time to start swapping out the 61 data pack then the coils. You can see the rough trouble-shooting flow chart I have just described. You want to eliminate major portions of the system to quickly isolate the component subsection that is causing the problem. Be systematic in your approach. Let the data monitoring direct you to isolate each of the independent variables. You will likely find more than one source of noise.

4. Purchase new resistor spark plugs and wires for the ATV before you go to the field- you will probably need them. Also visually inspect the ATV for loose wires that could be shorting against the metal body/frame of the ATV & producing spurious eddy currents.

5. It looks as if you are using a Trimble GPS system, contact your rental supplier and request the low magnetic/metallic signature antenna rather than the standard antenna. This will allow you to lower the antenna height down closer to the coils without causing undo interference. If the GPS antenna is swaying a lot - stiffen up the supports (? - add 2 more PVC supports from the other 2 corners or use rope (bluewater type perlon - low elasticity - you don't want any play to develop in the rope) from each of the 4 corners to tension the GPS mount into a more rigid structure).

6. Do you need detachable "outriggers/floats" to keep the 61 coils from overturning on Hills? If you attach them, remember to angle them off the front portion of the side skids with a 45 so that brush will slide off the outrigger & not catch on the supports & upset the cart.

Submit all QC data files electrically to the PM at the end of each week along with a readme file.

Section 5. What is the logic behind selecting the grids in the different areas of SEAD?

A maximum EM61 line-spacing of 3 feet is OK!.

A maximum line spacing for the G858 of 3 feet is OK!

p. 5-12. section 5.5.1.3. Make fiducials as follows: For 100-foot transects, fiducial at the 50-foot mark. For 150-foot transects, fiducials at the 50-foot and 100-foot mark. For 200-foot transects, fiducials at the 50-foot, 100-foot, and 150-foot mark.

p. 5-13. section 5.5.2.1. The G858 should not be used in areas suspected of having slap flares. What is the vertical gradient to be used? Sensors must be oriented vertically.

p. 5-15. section 5.8.1. Submit XYZ ASCII data-files to the PM at the end of each week. If data filter, explain the filtering in an attached readme file.

p.9-1. section 9.2.2. From the discussion of page 9-3, section 9.4.3, the two seed items must be a M-9 grenade buried at 2 feet and a 155 mm buried at 4 feet. Also, seed a slap flare, a 40mm, and a fuse.

Response to Jon Durham's comments

The changes for the daily Q.C. procedures have been added to section 9.2 ; see revised work plan.

Note also we do not plan to use an A.T.V. on this project.

Section 5. The grid selection was done using several criteria. First, sufficient acreage was chosen to adequately characterize the site according to statistical methodology; see SOW. Second, grids up to the area size were dispersed evenly around the sites. Special areas (the berms at SEAD 57) were given more or less grids; the detonation area at SEAD 45 got no grids due to steepness and the presence of fragments. On sites where the acreage in the SOW was almost as large as the site, we covered the entire area (grenade range, SEAD 16) Meandering path was put in where grids could not be placed, or where the area was too large and contained too few fragments to be covered by grids. Mag and flag was put in in heavily wooded areas where we could not recieve G.P.S.

p. 5-13 The vertical sensors will be set at 1.5 feet apart. Actually, we will probably use the sensors in total field mode, as this worked much better in the prove-out.

p 5-15 Data files will be submitted as required.

p 9 -1 Changes made as indicated; appropriate items will be seeded.

U. S. ARMY ENGINEER DIVISION HUNTSVILLE | CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS PROJECT ____________

- [X] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
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- [ ] MFG TECHNOLOGY
- [ ] ELECTRICAL
- [ ] INST & CONTROLS
- [ ] SAFETY
- [ ] ADV TECH
- [ ] ESTIMATING
- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW: EE/CA Work Plan
DATE: 4/14/00
NAME: Michelle Crull, PhD, PE (256) 895-1653

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	Section 1.4.1	2^{nd} sentence references Figure 1.1. There are figures numbered Figure 1 and figure 2 but none numbered figure 1-1. Resolve this Numbering conflict.	Figure numbering has been changed.
	Section 4.1.1	Bullet 3, 2^{nd} and 3^{rd} sentences. Put a period at the end of the 2^{nd} sentence And capitalize beginning of 3^{rd} sentence, i.e. "…the ground. The ground…"	Corrected.
	Section 4.2	States "The safe separation distances for the public during intrusive Operations will be the default distances in Chapter 2, paragraph 2.5 if the type of OE is unknown…" This is incorrect. The default distances in DoD 6055.9-STD, Chapter 5, paragraph C5.5.4 must be used. Also, be certain to include the reference to DoD 6055.9-STD. As it's written, it isn't stated in what document these distances may be found.	Corrected to reference second document.
	Section 4.3.2	References "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordance and Explosives (OE) Sites". Make sure you have the latest version dated August 98 (Terminology Update March 2000). This may be downloaded from the HNC homepage	U.S.A. has downloaded the correct procedures and will have them on-site.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

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- [ ] SPECIFICATIONS
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REVIEW ______
DATE ______
NAME ______

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		At www.hnd.usacc.army.mil.	
	Appendix B, Section B2.1	Refers to possible explosives sediments and explosives in the groundwater. Does this mean there is an explosive soil problem At this site? If so, the plans for remediating the explosive soil should Be included in this work plan. If there are no explosive soils, CLEARLY STATE THAT THERE ARE NO EXPLOSIVE SOILS AT THIS SITE. Discussion with the HNC lead engineer revealed that the purpose For this portion of the SSHP is to give possible toxic exposures to determine if PPE's are required. This purpose is not made clear. The purpose of this section should be clearly stated at the beginning of the section.	Amended second paragraph to clarify that explosive compounds could exceed exposure limits & soil is not explosive. Last line discusses purpose of section.
	Appendix B, Page B2-45	General Safety Precautions, Rockets, 4th bullet- This bullet doesn't make any sense, it seems to be incomplete. Reword.	Amended beginning of sentence.
	Chapter 4,Maps	Darden/thicken lines for separation distances. These lines cannot Be seen on some of the maps on the copy of the work plan I reviewed.	New lines darkened.
	Chapter 4,Maps	Either use different line types with a legend to show which line goes	New lines labeled.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT ____________________

☒ SITE DEV & GEO ☐ ENVIR PROT& UTIL ☐ ARCHITECTURAL ☐ STRUCTURAL
☐ MECHANICAL ☐ MFG TECHNOLOGY ☐ ELECTRICAL ☐ INST & CONTROLS
☐ SAFETY ☐ ADV TECH ☐ ESTIMATING ☐ SPECIFICATIONS
☐ SYSTEMS ENG ☐ VALUE ENG ☐ OTHER

REVIEW ____________________
DATE ____________________
NAME ____________________

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		with which distance or label the lines with the applicable text.	
	Chapter 4,Maps	The shape of the exclusion zone(s) should be approximately the same Shape as the work area. For example, if the work area is a rectangle Then the exclusion zone should be a rectangle (with rounded corners). Likewise, if the work area is L-shaped then the exclusion zone should Be L-shaped (with rounded corners). See the attached drawing.	New areas adjusted to correct shapes.
	Minimum Separation Distances	MSD calculation sheets are attached. These should be included in the appendix. This appendix should also include any 1/600 approval letter(s).	MSD sheets will be included as a separate appendix.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: OE Engineering Evaluation/Cost Analysis, Seneca Army Depot, N.Y.

- [ ] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
- [ ] ARCHITECTURAL
- [ ] STRUCTURAL
- [ ] MECHANICAL
- [ ] MFG TECHNOLOGY
- [ ] ELECTRICAL
- [ ] INST & CONTROLS
- [x] SAFETY
- [ ] ADV TECH
- [ ] ESTIMATING
- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW: Draft Work Plan
DATE: 05/17/00
NAME: M.Parker/ED-SY-S/mp-185-4-49-00/5-1585

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	Ensure material safety data sheets (MSDS), for each anticipated hazardous substances (I.e., lead, arsenic, barium, cadmium, nickel, and mercury), to be encountered on site, are made accessible to site personnel.	All MSDS sheets will be bound and placed on-site
2.	Paragraph B2.4 Pg. B2-46, Construction Hazards General	Ensure the AHA are reviewed and followed prior to beginning work.	Amended B5.1.1 (training & daily safety Meetings) to reference B2.4 (Physical Hazards)
3.	Paragraph B2.4.3.1, Pg., B2-47	Will a WBGT, direct reading instrument, be used to take effective temperature? The WBGT combines the wet bulb, dry bulb and black globe temperatures to yield perceived equal sensations of "temperature."	A WBGT would not be necessary unless conditions required an upgrade of PPE to include tyvek. The SSHP addresses this option (B2.4.3.4). This paragraph has been amended to specify type of PPE.
4.	Paragraph B.3.2.2, Pg. B3-2	Particulates (Dust). Should a combination HEPA and organic vapor filter be used to protect against the volatilization and soil disturbance during intrusive activities?	The SSHP does not include the option of working in Level C conditions. It does include monitoring (B3.2.2) and engineering controls to be taken if action levels are exceeded. This rational is based on site history, Parson's site experience, and the additional risk associated with UXO work while wearing a respirator. UXO work while wearing respiratory protection will require an up-scope to the project and modification to the SSHP(B1.2.1). Should respiratory protection be required combination P-100/OV Filter Cartridges will be used.
5.	Paragraph B3.4, Pg. B3-7, General	Ensure that employees meet the medical surveillance inclusion criteria for their job assignments.	The UXOSO will insure employees will be in compliance with medical monitoring requirements (Page B1-13 UXOSO Bullet 5).

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: OE Engineering Evaluation/Cost Analysis, Seneca Army Depot, N.Y.

☐ SITE DEV & GEO	☐ MECHANICAL	☒ SAFETY	☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☐ OTHER
☐ STRUCTURAL	☐ INST & CONTROLS	☐ SPECIFICATIONS	

REVIEW: Draft Work Plan
DATE: 05/17/00
NAME: M.Parker/ED-SY-S/mp-185-4-49-00/5-1585

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
6.	Page B4-3, General	Ensure disposable cups are available for personnel to use to drink potable water.	Page B4-3 has been amended to include disposable cups.

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CEHND FORM 7 (Revised)
15 Apr 89

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT ____________________

- [x] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
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- [ ] ADV TECH
- [ ] ESTIMATING
- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW: Draft
DATE: 4/10/00
NAME: Scott Bradley ED-CS-P / 895-1637

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
	Section 2.10.2	Documentation should also be provided for field changes in response To Section 10.2.4 (impact on protected or cultural resources).	See section 10.5. Changes in the field will be documented with the monthly report.
	Section 3.4.2 Page 3-3	A speed limit of 10 MPH for vehicles carrying explosives should be Identified.	Added to work plan.
	Figure 4-1	The OD Area should be specifically identified on this figure.	All sites identified on figures below.
	Figure 4-2	The EOD Range should be specifically identified on this figure.	
	Figure 4-3	The Grenade Range should be specifically identified on this figure.	
	Figure 4-4	The Rocket Range should be specifically identified on this figure. The title block should identify this site as SEAD 46.	
	Figure 4-5	The Burial Area should be specifically identified on this figure.	
	Figure 4-6	EOD Area # 3 should be specifically identified on this figure.	
	Figure 4-7	EOD Area # 2 should be specifically identified on this figure.	
	Figure 4-8	The Demo Range should be specifically identified on this figure.	
	Figures	Site maps for SEAD 16 and SEAD 17 must be provided.	New aerial photos have been obtained and made into site maps.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

☐ SITE DEV & GEO ☐ MECHANICAL ☐ ☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL ☐ MFG TECHNOLOGY ☐ ☐ VALUE ENG
☐ ARCHITECTURAL ☐ ELECTRICAL ☐ ☐ OTHER
☐ STRUCTURAL ☐ INST & CONTROLS ☐

REVIEW: Draft EE/CA WP Backcheck
DATE: 15 June 2000
NAME: Greg Bayuga

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	A backcheck of Mr. Fred Allan's comments dated 7 April 2000 was performed. All comments were satisfactorily incorporated except for Mr. Allan's #'s 14, 17 and 34. Please readdress these comments.	A: Mr. Allan's comments have been readdressed. The responses follow.
FA #14	Paragraph 2.9	Rewrite turn-in procedures. Not in compliance with paragraph 3.4.3.6 of SOW.	A: Paragraph 2.9.2 has been rewritten to agree with the SOW.
FA #17	Paragraph 3.4.1, bullet 1	Add (IME-22 container or equivalent) after separate container.	A: The suggested phrase has been added to Section 3.4.1.
FA #34	Paragraph 9.11.7.2 (1)	Include type of inert ferrous and non-ferrous items and depth which it is buried. Note: The Schonstedt only detects ferrous items. Delete non-ferrous or change magnetometer.	A: The items buried have been added to Section 9.11.7.2, and the workplan has been amended to state that a White's metal-detector will be used in areas where non-ferrous UXO is expected.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

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REVIEW: Draft EE/CA WP Backcheck
DATE: 15 June 2000
NAME: Greg Bayuga

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
2.	General	The document needs to use consistent terminology for UXO personnel. For example: paragraph 2.4.7.3 and 2.4.7.4 refer to "UXO Supervisor" and "UXO Specialist" and paragraph 3.4.1 refers to "UXO Technician III", "UXO Technician II", and "UXO Technician I". Please clarify or use the proper titles from DID OE-025.	A: The appropriate terminology has been used throughout the workplan, and Sections 2.4.7.3 and 2.4.7.4 has be revised to reference "UXO Technician III" and UXO Technician II" respectively.
3.	Table 4-1	This table does not accurately represent what is stated in paragraph 3.1.2 (the first paragraph 3.1.2., not the 2nd paragraph 3.1.2) which states"… at no time will storage quantities exceed 100 lbs NEW." Table 4-1 states 112 lbs NEW.	A: Table 4-1 has been revised to indicate an EW of 92 lbs.
		Also, paragraph 3.1.3 states "80 grain per foot, PETN" and the table states "50 grain." Please clarify.	A: Table 4-1 has been revised to say "80 grain."
4.	Table 4-2	"1". Delete this note. The 1/600 distance is never used for intentional detonations.	A: The note has been deleted.
		"2." Is also incorrect. The public will be the MSD for the MPM away.	A: The note has been deleted.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT BRAC – Seneca Installation Wide OE EE/CA

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☐ STRUCTURAL ☐ INST & CONTROLS ☐

REVIEW Draft EE/CA WP Backcheck
DATE 15 June 2000
NAME Greg Bayuga

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
5.	Table 4-4	Specific approval must be requested to use the 1/600 distances. Either provide the appropriate approvals or delete the column.	A: The column has been deleted from Table 4-4.
6	Para 9.10.4	This paragraph is correct. Make paragraph 2.9 read the same. The correct form is the DD 1348-1A.	A: The correct turn-in procedures are now contained in paragraph 2.9.2.
7.	Attachment B-4	This has been superceded with OE CX Interim Guidance Document 00-03.	A: The original Attachment B-4 has been replaced with the referenced document.
8.	Activity Hazard Analysis	Clarify who has analyzed these as required by EM 385-1-1 page 4.	A: George Spencer's name and the date analyzed have been added to the Activity Hazard Analysis form.

ACTION CODES W - WITHDRAWN
A - ACCEPTED/CONCUR N - NON-CONCUR
D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC - Seneca Installation-Wide OE EE/CA (5-262; S:2 Jun)

- [x] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
- [ ] ARCHITECTURAL
- [ ] STRUCTURAL
- [ ] MECHANICAL
- [ ] MFG TECHNOLOGY
- [ ] ELECTRICAL
- [ ] INST & CONTROLS
- [ ] SAFETY
- [ ] ADV TECH
- [ ] ESTIMATING
- [ ] SPECIFICATIONS
- [ ] SYSTEMS ENG
- [ ] VALUE ENG
- [ ] OTHER

REVIEW: Draft EE/CA Work Plan
DATE: 12 June 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	Previous comments were not all satisfactorily disposed. The following should be rectified.	
2.	Previous Comment 2.	Although the paragraph title was changed to "New York District", there still remains about half a dozen incorrect references to CENWK (Kansas City District) and CESAJ (Jacksonville District), neither of which have anything to do with this project.	A: These references have been removed throughout the document.
3.	Previous Comment 5.	The reference to the qualification requirements was included for the discussion of the SUXOS. However, it should be understood that all positions are required to meet the appropriate qualification requirements. Also, there is an extraneous occurrence of "UXOQCS."	A: The extraneous "UXOQCS" has been removed in Section 2.4.4, and it is understood that the personnel on-site should meet the qualification requirements for their positions.
4.	Previous Comment 8.	I recall the conversation regarding the definition of an MPM. However, this reviewer recalls that the conversation was generic in nature and not specific to this issue. USA's definition of an MPM is more relevant to safety (do we use a smaller item that is prevalent or a single occurrence that is greater in size). When it comes to determining if an item can be located by a certain geophysical method, we need to use a geophysically-relevant MPM (in addition to a safety -relevant MPM, if need be). It is doubtful that an 81mm mortar is prevalent on the small EOD Ranges at Seneca and it is equally doubtful that a method chosen to find an 81mm mortar will be sufficient to locate fuzes, which are much more likely at this site. Consequently, would like to reiterate that a much smaller MPM should be used at these EOD Range sites for determination of our effectiveness at locating the smaller OE that is likely to be found. Something the size of a 20mm HE should be	A: The references to the MPM for the purpose of safe separation distances have been described as MPMs for safety. A column has been added to Table 4-3, listing the MPMs for the geophysical surveys.

ACTION CODES
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U. S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS PROJECT BRAC - Seneca Installation-Wide OE EE/CA (5-262; S:2 Jun)

[X] SITE DEV & GEO [ ] MECHANICAL [ ] SAFETY [ ] SYSTEMS ENG
[ ] ENVIR PROT& UTIL [ ] MFG TECHNOLOGY [ ] ADV TECH [ ] VALUE ENG
[ ] ARCHITECTURAL [ ] ELECTRICAL [ ] ESTIMATING [ ] OTHER
[ ] STRUCTURAL [ ] INST & CONTROLS [ ] SPECIFICATIONS

REVIEW Draft EE/CA Work Plan
DATE 12 June 2000
NAME Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		sufficient (smallest HE item-ferrous) or possibly a 40mm rifle-fired grenade (small item-non ferrous).	
5.	Previous Comment 8.	With reference to the comment presented in the third bullet, there was no evidence that the MPM for the Grenade Range was changed from a hand grenade to a rifle-fired grenade. Also, Tables 4-3 and 4-4 should be coordinated since one shows no MPM for several areas and the other shows the wrong MPM. Both tables should say the same thing.	A: The 40mm Rifle-fired grenade has been added to the list of potential munitions for the Grenade Range in Table 4-3. All of the MPMs for safety purposes from Table 4-3 are now contained in Table 4-4.
6.	Previous Comment 11.	Although the White's would appear to be a better choice of instrument than the Schonstedt (due to the likelihood of non-ferrous OE), neither was tested during the proveout. This will create a difficulty.	A: In order to help make up for the lack of Schonstedt or White's testing during the prove-out, a smaller test grid will be established in order to QC these instruments each day. Section 9.2.2 describes this grid and the QC procedures which will be used during the project
7.	Previous Comment 13.	See Comment 6, above, dealing with the choice of the White's detector.	A: The testing of the Schonstedts and White's is described in Section 9.2.2.
8.	Previous Comment 17	There's no indication that the MPM at the Grenade Range was changed from a hand grenade to a rifle-fired grenade.	A: The 40mm rifle-fired grenade has been added to the list at the Grenade Range in Table 5-1.
9.	Previous Comments 22 and 23.	Mr. Durham's current backcheck/review reveals numerous instances in both the Work Plan and the Final Geophysical Proveout report where his comments were not satisfactorally disposed/addressed. This reviewer would like to reiterate that all of Mr. Durham's input	A: Mr. Durham's comments will be addressed to his satisfaction.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE | CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC - Seneca Installation-Wide OE EE/CA (5-262; S:2 Jun)

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REVIEW: Draft EE/CA Work Plan
DATE: 12 June 2000
NAME: Kevin Healy/ED-CS-G/5-1627

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		needs to be properly addressed or else this project will not be allowed to proceed.	

ACTION CODES
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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: Final OE Engineering Evaluation/Cost Analysis Work plan, Seneca

- [ ] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
- [ ] ARCHITECTURAL
- [ ] STRUCTURAL
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- [ ] SPECIFICATIONS
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- [ ] VALUE ENG
- [ ] OTHER

REVIEW: EE/CA work plan, Back-check/Review
DATE: 06/13/00
NAME: M.Parker/ED-SY-S/mp-191-5-262-00/5-1585

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	I reviewed the previous comments, and the action taken on the comments were adequately addressed.	A: No further action will be taken based on this reviewer's comments.

ACTION CODES
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U. S. ARMY ENGINEER DIVISION HUNTSVILLE | CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: CN 5-262-00, Seneca Army Depot, Final Work Plan for EE/CA, Task Order 52

☐ SITE DEV & GEO ☐ MECHANICAL ☐ SAFETY ☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL ☐ MFG TECHNOLOGY ☐ ADV TECH ☐ VALUE ENG
☐ ARCHITECTURAL ☐ ELECTRICAL ☐ ESTIMATING ☐ OTHER
☐ STRUCTURAL ☐ INST & CONTROLS ☐ SPECIFICATIONS

REVIEW: Final EE/CA Work Plan
DATE: 06/15/00
NAME: Michelle Crull, PhD, PE (256) 895-1653

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Appendix G	The MSD calculation sheets are not complete. In most cases, only page 1 of 2 is included. Include all pages for each item.	A: The missing pages have been added to Appendix G.
2.		All other previous comments have been incorporated.	A: No further action will be taken based on this reviewer's comments.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: Seneca ADA, Draft EE/CA DACA87-95-D-0018, TO#52

☐ SITE DEV & GEO ☐ MECHANICAL ☐ SAFETY ☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL ☐ MFG TECHNOLOGY ☐ ADV TECH ☐ VALUE ENG
☐ ARCHITECTURAL ☐ ELECTRICAL ☐ ESTIMATING ☐ OTHER
☐ STRUCTURAL ☐ INST & CONTROLS ☐ SPECIFICATIONS

REVIEW
DATE 06/15/00 L63934
NAME Bryant Allen, (256) 895-1773

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Draft EE/CA	No Comments.	A: No further action will be taken based on this reviewer's comments.

ACTION CODES
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BACKCHECK COMMENTS

U. S. ARMY ENGINEER DIVISION HUNTSVILLE CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

- [x] SITE DEV & GEO
- [ ] ENVIR PROT& UTIL
- [ ] ARCHITECTURAL
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REVIEW: EE/CA Work Plan
DATE: 06/15/00
NAME: Jon Durham

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.		For both the EM-61 and G858, each morning find a quiet area and zero out the instrument. Put polycorder on automatic and fast sample rate (4x/sec) Shake cables to make sure no shorts in cable and connectors while watching readings. Tape cables down. Static test for three minutes Static test with a spike for three minutes (round metal object such as a M69 is best to use as the spike) Graph the data in Excel. Is there noise? Anything greater than ± 3mV for the EM-61 is high. If there is noise, look for the source and eliminate.	A: The procedures for the static test are included in Section 9.2.3, paragraph 2. The only portion of this comment not included in the revised QC procedures is the zeroing of the instruments, as it is not possible to zero the magnetometer, and some EM-61 backpacks are not equipped with the knobs required to zero the coils. If the backpack has zeroing knobs, the coils will be zeroed.
2.		Alluded to but not specifically stated. 4. Run approx. 100' line going in one direction (N). 5. Run approx. 100' line in reverse direction (S). Is the background line data repeatable? Put target (M69) on clean area of line (25', or 50', or 75'?) 6. Run 100' lane in one direction with spike in it. 7. Run 100' lane in opposite direction with spike in it. Are the two readings over the target item approximately the same? 8. Repeat item 6 walking very fast. 9. Repeat item 7 walking very slow.	A: These procedures will be carried out at least once a week for each piece of equipment used. The process is described in Section 9.2.4.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

☒ SITE DEV & GEO ☐ ENVIR PROT& UTIL ☐ ARCHITECTURAL ☐ STRUCTURAL ☐ MECHANICAL ☐ MFG TECHNOLOGY ☐ ELECTRICAL ☐ INST & CONTROLS ☐ SAFETY ☐ ADV TECH ☐ ESTIMATING ☐ SPECIFICATIONS ☐ SYSTEMS ENG ☐ VALUE ENG ☐ OTHER

REVIEW: EE/CA Work Plan
DATE: 06/15/00
NAME: Jon Durham

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
3.		For each grid, use three files. Run the first line as one file, the remaining grid as the second file, and repeat the first line as the third file. The data from the first and third file should pretty much overlay each other in an Excel line plot.	A: This procedure has been included in Section 9.2.3, paragraph 4.
4.		Also for the G858, document a heading error test results for the optically pumped magnetometer.	A: The heading error test is described in Section 9.2.3, paragraph 3.
5.		For the GPS, each day, run a meandering path over three known monuments. Submit corrected and uncorrected position data to CEHNC.	A: However, as the survey monuments at SEAD are not very close to each other, only one permanent survey marker will be used for the meandering path QC. The survey marker will be constant throughout the project, and two additional points will be established in the vicinity of this marker using metal spikes. The locations of these spikes will also remain constant throughout the project, and the meandering path line pulled over the survey marker will include these two points as well. GPS and meandering path QC procedures are described in Section 9.2.5.
6.		Submit XYZ ASCII data-files to the PM at the end of each week. If data is filtered, explain the filtering in an attached readme file.	A: The attachment of a readme file to the ASCII data was described in section 5 and has been included in section 9.2.5.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

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REVIEW: EE/CA Work Plan
DATE: 06/15/00
NAME: Jon Durham

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
7.	Section 9.4.1	Parsons states that, "data will be provided to CEHNC… typically within 36 hours". The WP also needs to include the one-week requirement as a minimum submittal requirement that they have agreed to in Appendix H.	A: Section 9.4.1 has been changed to read "unprocessed geophysical data will be provided to CEHNC, typically within 3 working days. However, as stated in Appendix H, the time limit for delivery of data will be one week."
8.	P. 9-3 Section 9.4.3	From the discussion of page 9-3, section 9.4.3, the two seed items must be a M-9 grenade buried at two feet and a 155mm buried at 4 feet. Also, seed a slap flare, a 40mm, and a fuze. Section 9.2.3 includes this requirement but it is left out in section 9.4.3.	A: These items have been added to section 9.4.3. Please note that the hand-held magnetometers (Schonstedt, White's) will be the only equipment QC'd on the test grid each day. The other equipment will be tested using the QC procedures described in sections 9.2.3 and 9.2.4.
9.		Finally, Parsons keeps mentioning that data reacquisition more than 25% is considered failure. I question this but I need to speak with Bob Selfridge about what this means.	A: The maximum responses collected over a spike before and after the survey of each grid, as well as weekly QC lines, will be compared to a base value determined for each instrument used. The peaks from each line must be within 20% of this base value to ensure that data collected throughout the project is consistent.

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U. S. ARMY ENGINEER DIVISION HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT: BRAC – Seneca Installation Wide OE EE/CA

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- [ ] OTHER

REVIEW: EE/CA Prove-out Report
DATE: 06/15/00
NAME: Jon Durham

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
8.	Figure 17	I am curious as to what the unselected anomalies are between PB 06 and PB 05: 15 and U2: and 21 and U1.	After the switch to gradient rather than single sensor magnetics data, a re-evaluation of fig. 5 (baseline mag map) produced additional pre-burial anomaly picks. These additional pre-burial anomalies accounted for two of the anomalies in question. The third, between 15 and U2 on the original map (now between PB03 and PB07), is believed to be a surface or near surface anomaly on the Parsons side of the grid, as it is present only on the 1.0' sensor height maps (figs. 17 and 18). A discussion of the anomaly is included in the last paragraph on p. 13.

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