MKM Engineers, Inc.

01302

WORK PLAN

Removal of Oversize Stockpile

Seneca Army Depot Activity
Romulus, New York

Contract No. DAAA09-03-C-0046

Submitted to:

U.S. Army HQ Joint Munitions Command
BRAC Technical Support Office
1 Rock Island Arsenal
Rock Island, IL 61299-6000

Submitted by:

MKM Engineers, Inc.
4153 Bluebonnet Drive
Stafford, Texas 77477

April 2, 2004

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ACRONYMS

°F	Degrees Fahrenheit
AMSL	Above Mean Sea Level
AOC	Area Of Concern
AR	Army Regulations
BATF	Bureau of Alcohol, Tobacco and Firearms
BEC	BRAC Environmental Coordinator
BIP	Blow(n)-In-Place
BRAC	U.S. Army Base Realignment and Closure Office
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
CIH	Certified Industrial Hygienist
CRZ	Contamination Reduction Zone
CTHA	Certification of Task Hazard Assessment
CWM	Chemical Warfare Materiel
CY	Cubic Yard
DA	Department of the Army
DDESB	Department of Defense Explosives Safety Board
DID	Data Item Description
DOD	Department of Defense
DOT	Department of Transportation
EM	Engineering Manual
EMM	Earth-Moving Machinery
EOD	Explosive Ordnance Disposal
EP	Engineering Pamphlet
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
EZ	Exclusion Zone
HARC	Historic, Archeological and Cultural
HAZWOPER	Hazardous Waste Operations and Emergency Response
HQ	Headquarters
IAW	In Accordance With
JMC	Joint Munitions Command
lb	Pound
LDR	Land Disposal Restrictions
LRA	Local Reuse Authority
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
mg/kg	Milligrams per Kilogram
MKM	MKM Engineers, Inc.

mm	Millimeter
MSD	Minimum Separation Distance
MSDS	Material Safety Data Sheet
NEW	Net Explosive Weight
NPL	National Priority List
NYSDEC	New York State Department of Environmental Conservation
OBG	Open Burning Grounds
ODG	Open Detonation Grounds
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
ppm	Part Per Million
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
QD	Quantity-Distance
QP	Quality Program
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SEAD	Seneca Army Depot
SEDA	Seneca Army Depot Activity
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHP	Site Safety and Health Plan
SSHO	Site Safety and Health Officer
SUXOS	Senior UXO Supervisor
SZ	Support Zone
TCLP	Toxicity Characteristic Leaching Procedure
TEU	Technical Escort Unit
TM	Technical Manual
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded Ordnance
UXODS	UXO Demolition Supervisor
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
WP	Work Plan
WZ	Work Zone

1.0 INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1 Project Authorization and Background

This Work Plan (WP) has been developed in response to the Scope of Work (SOW) for the removal of the Oversize Stockpile at the Seneca Army Depot Activity (SEDA), Romulus, New York. This WP describes all procedures, operational sequences, and resources MKM Engineers, Inc. (MKM) will utilize to perform the Oversize Stockpile removal, scrap metal retrieval, and sifted soil testing and disposal. The work will be performed on behalf of the U.S. Army Headquarters (HQ), Joint Munitions Command (JMC) and monitored by the U.S. Army Base Realignment and Closure (BRAC) Technical Support Office. Authorization for performance is contained in contract DAAA09-03-C-0046 issued to MKM by JMC, Rock Island, Illinois.

1.1.2 Objective and Scope

The objective of this project is to remove a large pile of "oversize" material left on-site following previous Munitions and Explosives of Concern (MEC) removal actions performed at the OBG. This objective will be achieved by:

- Separating, clearing, desensitizing, and removing dangerous items including MEC, suspect unexploded ordnance (UXO), and Munitions Debris (MD) from the Oversize Stockpile;
- Sampling, segregating, and (if necessary) treating and disposing of lead contaminated soil; and
- Restoring the site.

The contract SOW is included in Appendix A.

1.1.3 Work Plan Organization

The Work Plan and the Site Safety and Health Plan (SSHP) outline the goals, methods, procedures, and personnel used for the field activities for the removal of the Oversize Stockpile. This WP has been designed to meet the requirements for an MEC removal WP as specified in the U.S. Army Corps of Engineers (USACE) Data Item Description (DID) OE-005-01.01. This WP contains the necessary sub-plans as required by DID OE-005-01.01 and is structured as specified with the exception of the SSHP. According to DID OE-005-01.01, the

SSHP is to be presented in Appendix D of the WP. However, because of its size and specificity, MKM has elected to present the SSHP as a separate document.

1.1.4 Changes to the Work Plan

This WP was prepared after a review of archival data, study of prior investigations, several site visits, discussions with BRAC Technical Support Office personnel, and a thorough evaluation of the site. The WP is based on the information available at the time of its preparation and may require modification if unforeseen circumstances arise during the execution of this WP. Should the WP require modification, changes will be made using the following procedures:

1. Under no circumstances will any change to the approved WP be executed without prior approval of the MKM Project Manager (PM) and the BRAC Technical Support Office.
2. The Senior UXO Supervisor (SUXOS) will notify the MKM PM of the required changes and the rationale for the changes.
3. The MKM PM will develop the changes in conjunction with the BRAC Technical Support Office.
4. Changes to this WP will be provided in writing by MKM to the BRAC Technical Support Office for approval.
5. On-site implementation of changes may be initiated prior to inclusion of the formal written changes if verbal approval is provided to MKM by the BRAC Technical Support Office.
6. If the recommended modifications to the WP are related to safety or quality, unless directed otherwise by the BRAC Technical Support Office, the affected task(s) will be suspended until written procedures are developed by MKM and approved by the BRAC Technical Support Office.

1.2 SITE LOCATION

SEDA is a 10,587-acre installation located in Seneca County in the northwestern portion of New York State, between Cayuga Lake and Seneca Lake in the Finger Lakes region. The city of Romulus, New York borders the eastern side of SEDA. A regional map indicating the location of SEDA is presented in Appendix B as Figure 1. The Oversize Stockpile is located in the northwestern portion of SEDA. A site map showing the location of the Oversize Stockpile is presented in Appendix B as Figure 2. As shown in Figure 2, the Oversize Stockpile is actually

located north of the Open Burning Grounds (OBG), on the south side of the Open Detonation Grounds (ODG).

1.3 SITE HISTORY

SEDA was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since that date. The mission of SEDA was the receipt, storage, maintenance and supply of military items, including munitions and equipment. Ordnance stored at SEDA included all classes of ammunition and explosives except for chemical ammunition (other than smoke).

As part of SEDA's mission, it was necessary for the facility to treat, store and dispose of hazardous wastes including waste munitions. SEDA applied for a Resource Conservation and Recovery Act (RCRA) permit in May 1987. Final closure of the OBG under RCRA guidelines was deferred in July 1989 when SEDA was proposed for the National Priority List (NPL). In August 1990, SEDA was placed on the NPL. In 1993, the Army entered into a Federal Facilities Agreement with U.S. Environmental Protection Agency (USEPA) Region II and New York State Department of Environmental Conservation (NYSDEC) whereby future corrective actions required for any targeted sites would be regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The OBG was designated as Area of Concern (AOC) SEAD-23, and the ODG was designated as SEAD-45.

In 1995, SEDA was approved for closure by Congress under the BRAC program. As part of the BRAC requirements, the Seneca Army Depot Local Redevelopment Authority (LRA) was established from volunteer community leaders representing the broad range of the community at large. The responsibility of the LRA was to prepare a plan for redevelopment of SEDA. The plan adopted by the LRA for redevelopment of SEDA was approved in October 1996 by the Seneca County Board of Supervisors. Under this plan the OBG was located within an area designated for reuse as a Conservation/Recreation area. SEDA formally closed and moved into caretaker status in September 2000.

In July 1998, the draft final Record of Decision (ROD) was issued for the OBG. The ROD summarized the investigation activities conducted at the site, the risk assessment, evaluation of remedial alternatives, and selected alternative. The ROD presented the selected remedy for the soil and sediment remediation involving excavation, treatment, and off-site disposal of impacted soils and sediments, and included the following elements:

- Clearance of UXO for use as a conservation/recreation area;
- Excavation of soils with lead concentrations over 500 mg/kg (milligrams per kilogram) [or parts per million (ppm)] and sediment from Reeder Creek with concentrations of copper and lead above NYSDEC criteria of 16 mg/kg and 31 mg/kg, respectively;
- Treatment of soil exceeding the Toxicity Characteristic Leaching Procedure (TCLP) limits via stabilization, such that the soil could be disposed of in an off-site landfill, in accordance with the requirements of Land Disposal Restrictions (LDR) of RCRA;
- Disposal of all excavated and solidified soil in an off-site Subtitle D landfill;
- Construction of a clean soil cover of at least 9 inches over the areas of the OBG with soil containing lead concentrations above 60 ppm and vegetation of the cover to prevent erosion;
- Control of surface water runoff to prevent erosion of the vegetative cover and reduce sediment loading to Reeder Creek; and
- Conducting a monitoring program for site ground water and sediment in Reeder Creek to monitor for metals.

Under the authority of the ROD, MEC and contaminated soil removal actions were performed at the OBG. The removal actions involved the excavation and screening of OBG soils to remove all MEC and MD. The screening effort removed all oversize material greater than 20 millimeters (mm). These oversize items were stockpiled, to be addressed at a later time. A portion of the contaminated soils were treated and sent for off-site disposal. Additional contaminated soils were also stockpiled. At some point, the oversized item and soil stockpiles were combined and additional unscreened soil was added, with the end result being the Oversize Stockpile, also known as "Mt. Molle." As shown in Figure 2 (Appendix B), this pile is located on the southern edge of the ODG (SEAD-45), is underlain with plastic lining and covers approximately 1.5 acres of land.

Based on site visits conducted by MKM in 2003, the Oversize Stockpile is approximately 350 feet long, 200 feet wide, and up to 20 feet tall, with an estimated volume of 20,000 cubic yards (CY). The stockpile also contains rocks and boulders, mostly shale and glacial till, up to 6 inches in diameter. Because the materials were stockpiled on plastic lining within a bermed area, and have been exposed to the environment, much of the stockpile was and continues to be saturated with water.

1.4 SITE TOPOGRAPHY

Ground surface elevations at SEDA vary from approximately 760 feet above mean sea level (AMSL) in the eastern part of the installation to approximately 600 feet AMSL in the western part of the installation. As shown in Figure 2 (Appendix B), the OBG and ODG occupy approximately 90 acres on gently sloping terrain in the northwest portion of SEDA, with elevations ranging from 630 feet AMSL to 610 feet AMSL. The OBG and ODG are partially vegetated with grasses and brush.

1.5 SITE CLIMATE

The climate at SEDA is cool, with average temperatures ranging from 23.7 degrees Fahrenheit (°F) in January to 71.2 °F in July. Precipitation is well distributed, with monthly averages ranging from 1.82 inches in January to 3.77 inches in June. Snowfall averages range from none in June through September to 16.9 inches in January. Winds are typically northwesterly to westerly.

2.0 TECHNICAL MANAGEMENT PLAN

2.1 GENERAL INFORMATION

2.1.1 MEC Operational Guidance and Regulations

The work conducted under this SOW will be performed within the relevant requirements presented in 29 CFR 1910.120, USACE Engineering Pamphlet (EP) 385-1-95a, and other relevant Department of the Army (DA) and Department of Defense (DOD) requirements regarding personnel, equipment, and procedures.

An Explosives Safety Submission (ESS) has been prepared and was submitted to the Department of Defense Explosives Safety Board (DDESB) on 2 April 2004. DDESB approval of the ESS is required any time that property owned by DA is to be transferred to the public for reuse. This is to ensure that the potential for explosive hazards has been eliminated prior to public use.

2.1.2 Chemical Warfare Material Discovery

The U.S. Army Technical Escort Unit (TEU) at Aberdeen Proving Ground, Maryland will be contacted in the event that any item is located and suspected of containing Chemical Warfare Materiel (CWM). If a suspect CWM item is located, the MKM PM will notify the BRAC Technical Support Office PM and the SEDA BRAC Environmental Coordinator (BEC). The SEDA BEC will make a determination whether or not TEU support is necessary. In the event that TEU is required, MKM personnel will be stationed in a safe upwind position to observe and secure the area until TEU support arrives. The BEC will be responsible for contacting any local law enforcement agencies needed to secure any public roads that require blocking or to evacuate local residents.

2.1.3 Special UXO Contingencies

The 725th Ordnance Company, Fort Drum, New York, will provide Explosive Ordnance Disposal (EOD) support if UXO or explosives are located which cannot be identified. If UXO or explosives are located which cannot be identified, the MKM PM will contact the BRAC Technical Support Office PM and the BEC, who will make the determination whether or not EOD support is necessary. MKM personnel will maintain security at the site until military EOD support arrives and will provide the military EOD with support if so directed by the BRAC Technical Support Office PM and the BEC.

2.1.4 Changed Site Conditions

Based upon MKM's site visits and the archival research conducted previously by MKM and JMC/BRAC Technical Support Office personnel, it is not anticipated that site conditions will vary significantly from those expected.

In the event that site conditions are significantly different than those expected, the MKM SUXOS will inform the MKM PM of the potential issues and resolutions. The MKM PM will then contact the BRAC Technical Support Office PM to determine the impact of the change on site operations and project funding. All changes will be resolved and all changes to site plans will be generated, submitted and approved prior to conduct of tasks associated with the change.

2.2 PROJECT TEAM ORGANIZATION

2.2.1 Management Roles and Responsibilities

In addition to MKM, the project team consists of Mr. William Ingold, who will serve as the BRAC Technical Support Office PM, and Mr. Steve Absolom, the SEDA BEC. Table 1 depicts the overall project organization and identifies key Government/SEDA and MKM personnel, whereas Table 2 identifies primary roles/responsibilities of MKM personnel assigned to the project.

TABLE 1 Project Team Organization Chart

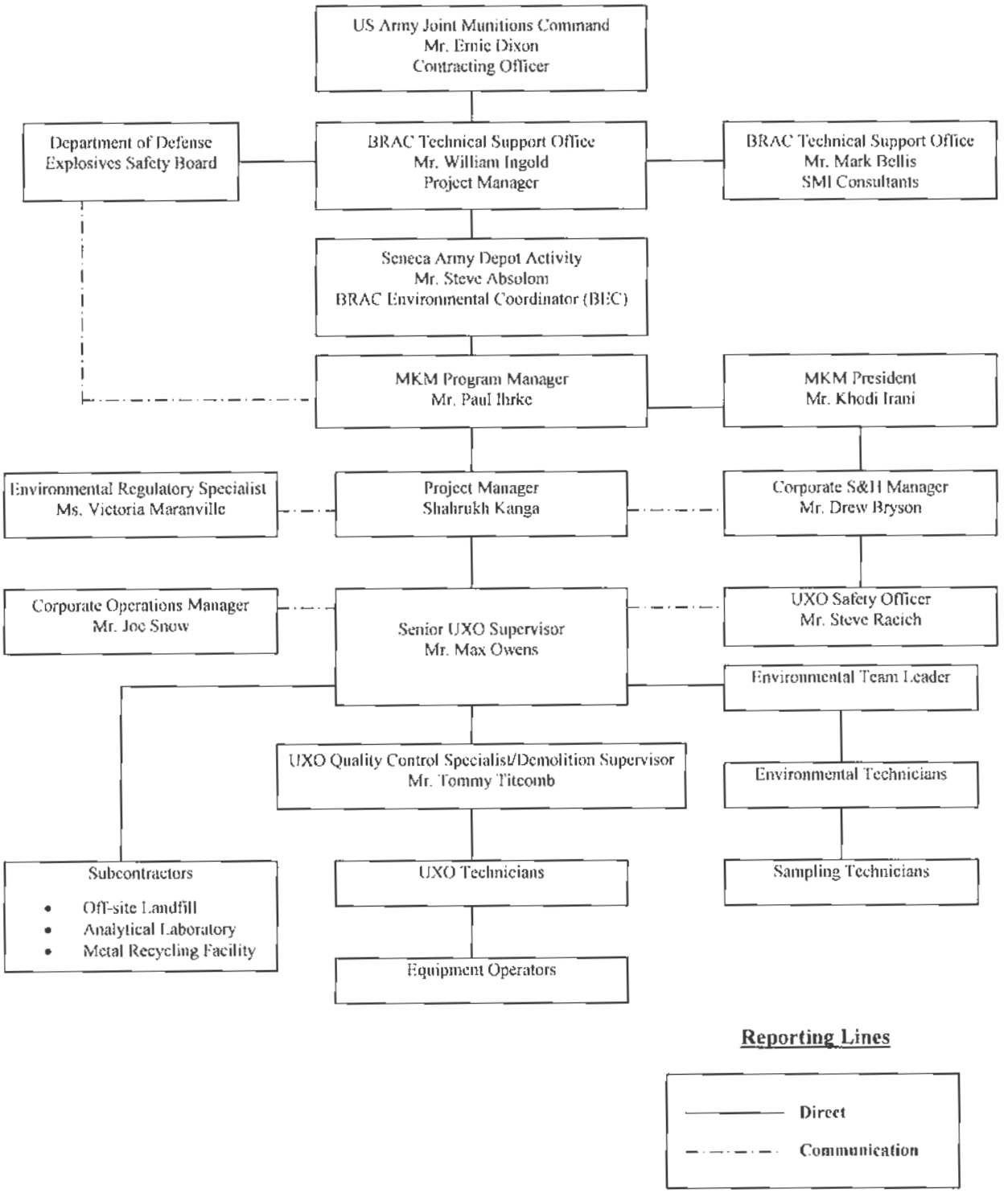


TABLE 2 MKM Project Team Member Roles and Responsibilities

TITLE/NAME/PHONE	RESPONSIBILITIES
Program Manager *Paul Ihrke, Col. (Ret.)*	- Ensures resources are available - WP/SSHP Review - Conflict Resolution/Stop Work
Project Manager *Shahrukh Kanga*	- Responsible Project Budget - Resolve Regulatory-Level Issues - Work Plan preparation - SSHP Review - Notification - Conflict Resolution/Stop Work
Senior UXO Supervisor (SUXOS) *Max Owens*	- SSHP Review - SSHP & WP Implementation - Inspection and Certification for scrap metal - Notification - Conflict Resolution/Stop Work
Corporate Safety and Health Manger (CSHM) *Andrew Bryson*	- SSHP Preparation and Approval - SSHP Review and Implementation Audits - SSHP Modification/Deviation Recommendation - Conduct/assist with site, task & hazard specific training - Conflict Resolution/Stop Work
UXO Safety Officer (UXOSO) *Steve Racich*	- SSHP & WP Implementation - Ensure UXO related QA/QC - Documentation/Reporting - Inspection and Certification for scrap metal - Notification - Safety Inspection - Site Safety Control - Accident Prevention - Conflict Resolution/Stop Work
UXO Quality Control Specialist (UXOQCS)/UXO Demolition Supervisor (UXODS) *Tommy Titcomb*	- Ensure UXO related QA/QC - Work Plan & SSHP Implementation - Prepare daily and weekly field reports
Field Personnel	- SSHP Adherence - Accident Prevention

2.2.1.1 Program Manager

Col. Paul Ihrke, U.S. Army Retired, is the Program Manager for this project. Mr. Ihrke will manage the MKM resources needed for site operations and is responsible for the overall implementation of the project. He has substantial technical and management experience with environmental and explosive remediation projects.

2.2.1.2 Project Manager

Mr. Shahrukh Kanga is the PM for this project. Mr. Kanga has substantial experience in the management of UXO/MEC remediation projects and will have the following responsibilities:

- Managing the funding, manpower, and equipment necessary to conduct site operations;
- Acting as the point of contact for communicating with the BRAC Technical Support Office through the BRAC Technical Support Office PM;
- Overseeing the overall performance of all MKM individuals assigned to the project;
- Reviewing the SOW and ensuring that necessary elements are addressed in project plans; and
- Coordinating all contract and subcontract work and controlling costs and schedules.

2.2.1.3 Senior UXO Supervisor

Mr. Max Owens is the SUXOS for this project. The SUXOS will be responsible for the daily supervision of all site activities, which include the following:

- Managing the MKM on-site manpower and equipment necessary to conduct site operations;
- Identifying problems and coordinating with the MKM PM to institute corrective measures;
- Ensuring that all site activities are conducted according to this WP and relevant BRAC Technical Support Office regulations;
- Conducting on-site training sessions for MKM personnel;

- Acting as the lead technical consultant for all on-site MEC-related matters; and
- Coordinating site operations and activities with SEDA on a daily basis.

2.2.1.4 Corporate Safety and Health Manager

Mr. Andrew Bryson is the MKM Corporate Safety and Health Manager (CSHM). He is a board certified industrial hygienist (CIH) with over 15 years of industrial hygiene, safety, and hazardous waste experience, including over 11 years experience working on projects with MEC contamination. During this project, Mr. Bryson will provide occupational safety and health management duties as presented in detail in the Site Safety and Health Plan for this project.

2.2.1.5 UXO Safety Officer

Mr. Steve Racich is the UXO Safety Officer (UXOSO) for this project. The UXOSO will be responsible for the operational items listed below in addition to the safety and health responsibilities:

- Issuing and/or approving "Stop Work" orders for safety and health reasons;
- Conducting on-site safety and health training for MKM personnel;
- Identifying and evaluating any known or potential safety problems that may interfere with or interrupt site operations and endanger site personnel;
- Consulting with the SUXOS on identifying and implementing any necessary safety-related corrective actions; and
- Coordinating with the SUXOS for the implementation of the safety requirements in the SSHP.

2.2.1.6 UXO Quality Control Specialist/UXO Demolition Supervisor

Mr. Tommy Titcomb is the UXOQCS/UXODS for this project. The UXOQCS/UXODS will be responsible for ensuring that all site MEC/demolition operations are conducted in accordance with (IAW) recognized performance criteria and checking all fieldwork prior to MKM quality assurance (QA) inspections, and ensuring that all site activities are conducted IAW this WP and relevant Federal, state, and local regulations.

2.2.2 Functional Relationships

The MKM PM will interact with and report directly to Mr. William Ingold, the BRAC Technical Support Office PM, for all matters concerning management and the SOW. All contract-related issues will be reported directly to the BRAC Technical Support Office for consideration and/or approval. The MKM SUXOS will report directly to the MKM PM for all matters concerning site operations. MKM Team Leaders (UXO Technician IIIs) will report directly to the SUXOS, and the team members (UXO Technician IIs or other field team personnel) will report directly to their respective Team Leader. Regarding safety issues, the UXOSO will have direct access to and will report functionally to the CSHM. The UXOSO will report administratively to the PM/SUXOS. For matters concerning quality control, the UXOQCS/UXODS will have direct access to and will report functionally to the MKM SUXOS.

2.3 MOBILIZATION AND SITE PREPARATION

2.3.1 Mobilization of Manpower and Equipment

MKM will schedule the arrival of the work force in a manner designed to facilitate immediate productivity. All MKM personnel mobilized to the site will meet requirements for Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training and medical surveillance requirements as specified in the SSHP.

2.3.1.1 Site-Specific Training

As part of the mobilization process, MKM will perform site-specific training for all on-site personnel assigned to this project. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used by MKM at SEDA. Individual responsibilities and safety and environmental concerns associated with operations will also be covered in the training. The SUXOS and the UXOSO will conduct the training sessions which will include the topics identified below.

- Field equipment operation, including the safety and health precautions, field inspection and maintenance procedures that will be used.
- Interpretation of relevant sections of this WP and SSHP as they relate to the tasks being performed.
- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.

- Public relations to ensure that personnel will not make any public statements to the media without prior coordination with and approval of BRAC Technical Support Office.
- Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural (HARC) issues.
- Additional OSHA or BRAC Technical Support Office required training as required by the SSHP.
- Identification of features, hazards, and disposal methods of ordnance that may be encountered.

2.3.1.2 Equipment

As described in the ESS, earth-moving machinery (EMM) handling unprocessed materials or MEC/MD will be shielded to withstand the Munition with the Greatest Fragmentation Distance (MGFD) prior to mobilization. The MGFD is discussed in Section 2.4.2. Blast shielding constructed of 3-inch thick Plexiglas (or Lexan of equivalent strength) will be installed on all EMM.

All equipment will be inspected as it arrives to ensure it is in proper working order. Any equipment found damaged or defective will be repaired or returned to the point of origin, and a replacement will be secured. All instruments and equipment that require routine maintenance and/or calibration will be checked initially upon its arrival and then checked again prior to its use each day. This system of checks ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. A request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

As part of the initial equipment set-up and testing, MKM will also install and test its communication equipment that includes the following:

- Security Band Radios to maintain communication with SEDA security personnel;
- Hand-held portable radios used to maintain communications between the office trailer, SUXOS, and the field teams; and
- Cellular telephones (very high frequency band) to be used as back up communications between the office trailer, SUXOS, and the field teams.

2.3.1.3 Field Office Set Up

MKM will provide two mobile office trailers and an equipment shed that will be used for storage and maintenance of site equipment used for removal of the Oversize Stockpile. One trailer will be located outside the Minimum Separation Distance (MSD), and will be used as the site project office trailer, to be occupied/used by both essential and non-essential personnel. The second trailer will be located within the MSD, and will serve as a site operations trailer for essential personnel only. The office trailers will be located as shown in Figure 5 (Appendix B). The MSD and the distinctions between essential and non-essential personnel are discussed further in Section 2.4.2.

2.3.2 Project Notifications

At least one week prior to the initiation of Oversize Stockpile removal operations, the MKM SUXOS will contact all local emergency services to verify the availability of requisite services and confirm the means used to summon those services. General notifications will be made to key project personnel at this time as well. A list of points of contact is included in Appendix C of this WP.

2.3.3 Site Preparation

Because the proposed area of operations is located adjacent to the ODG (SEAD-45) as shown in Figure 2 (Appendix B), the potential exists for MEC/UXO to be present on the ground surface as a result of kick-out from past operations at the ODG. For this reason, MKM personnel will conduct surface clearance of the proposed area of operations to locate MEC/UXO hazards. The site control provisions discussed in Section 2.4.2 will also be applied during the initial site preparation operations. The following operational sequence will be used to perform the surface clearance.

- The boundaries of the operational area and the access lanes from the roads will be delineated and marked with flagging or some other high-visibility markers.
- The interior of the operational area will then be marked to create five foot search lanes that the UXO personnel will use to perform a magnetometer-assisted surface sweep of the proposed operational area. All surface anomalies located will be inspected to determine their identity and the level of hazard associated with the item. All anomalies that are identified as MEC by the UXO technician who discovers the item will have their identity and hazard level verified by a second UXO technician. Items that are confirmed or

suspect MEC found during the surface clearance will be quantified and documented.

- All MEC found to contain explosives or other hazardous materials (e.g., white phosphorous) will be disposed of through detonation. The location of the demolition site is presented on Figure 6 (Appendix B). Those items that are determined to be safe to move will be collected and placed in the MEC storage magazine as discussed in Section 2.4.6. If an item is fuzed or otherwise unsafe to move, the item will be disposed of using blow-in-place (BIP) procedures. Disposal of unsafe items by BIP procedures will occur as needed using approved demolition procedures for the MEC item being disposed.

Following completion of the MEC surface clearance, gravel base (i.e., up to 6-inches) will be constructed to cover the footprint of separation operations as needed to improve operations and reduce site hazards. Sorting and processing equipment will then be sited and assembled, and blast-resistant shielding installed.

2.4 OVERSIZE STOCKPILE REMOVAL OPERATIONS

The general operational sequence, EMM, sorting/conveying system, and personnel for the removal of the Oversize Stockpile are described below. A general site layout schematic is shown in Figure 3 (Appendix B), and a conceptual process diagram of the approach outlined below is presented in Figure 7 (Appendix B). Because this is a performance-based removal action, the approach described below may be modified as necessary based on field operation conditions.

2.4.1 Potential Site Issues

Based on information provided in the SOW, review of relevant site documents, and field observations during site visits, the following issues regarding performance of this work have been identified.

- A potential remains for UXO as well as MEC and MD to remain within the stockpile.
- Soil placed on the sifted stockpile is unsifted and may contain MEC and MD.
- MEC and MD may be embedded in chunks of clay.

- Most of the MEC and MD is ferrous metal; however non-ferrous MEC and MD may also be within the stockpile.
- Saturated materials will need to be dewatered prior to sorting.
- The soil at the site is contaminated with lead; soil exceeding the RCRA toxicity limits will be treated by stabilization prior to disposal.
- Glacial till rocks typically would not absorb significant concentrations of metals and therefore should not exceed concentrations of lead requiring treatment and/or off-site disposal.

The manner in which these potential issues will be addressed is described in the sections below.

2.4.2 Establishing Site Control

2.4.2.1 Personnel Designation

For the purpose of this WP, it is necessary to define the terms "essential personnel" and "non-essential personnel." Essential personnel are defined as those MKM and subcontractor personnel essential to the safe and effective performance of the Oversize Stockpile removal operations. Essential personnel will be designated as such by the SUXOS. Non-essential personnel are those such as SEDA personnel, other contractors working at SEDA, visitors to the site, and the public.

2.4.2.2 Minimum Separation Distance (MSD)

As described in Section 1.2, the Oversize Stockpile is located within the northwestern portion of SEDA. The nearest public road is on the western boundary of SEDA, approximately 2,300 feet from the site.

As described in the ESS, the operational area where the equipment for sorting the Oversize Stockpile will be set-up and where the processed soils will be staged is within the boundary of the ODG located north of the OBG. During past site characterization operations at the ODG, the M374 81mm mortar was identified and approved by the DDESB as the MGFD for the ODG. Therefore, during the surface clearance of the operational area, the M374 81mm mortar will also be used as the MGFD and the determination of the MSD for the surface clearance of the operational area. Use of the M374 81mm mortar as the MGFD will only occur during this initial surface clearance of the area within the ODG. As stated in Table B-1 of DDESB Technical Paper (TP) 16, the MSD for the

M374 81mm will be the Maximum Fragment Range of 1,233 feet. This MSD is shown in Figure 4 (Appendix B).

As described in the ESS and based upon the known fuzed items previously located and identified during the OBG MEC removal actions that generated the Oversize Stockpile, the 37mm projectile will be used as the MGFD for the Oversize Stockpile. This MGFD was previously submitted in Amendment 1 to the OBG ESS dated July 1998 and was approved by the DDESB as the MGFD. As stated in Table B-1 of DDESB TP 16, the MSD for the 37mm will be the Maximum Fragment Range of 980 feet. This MSD is shown in Figure 5 (Appendix B).

MSD restrictions from MEC areas to non-essential personnel will be applied during both the clearance of the operations area and Oversize Stockpile removal operations. The team separation distance for the site will be 200 feet, which is greater than the K50 (0.9 psi over pressure) for the MGFD listed.

The MSD for intentional detonations will the Maximum Fragment Range or K328, whichever is greatest. The Maximum Fragment Range for the MGFD (M374 81mm) during clearance of the operational area is 1,233 feet. The Maximum Fragment Range for the Oversize Stockpile MGFD (37mm) is 980 feet. These MSDs are shown in Figure 6 (Appendix B). In the event that a MEC item with a Maximum Fragment Range greater than above must be detonated, a new MSD for intentional detonations will be established using DDESB TP 16 and an ESS amendment with the new MSD will be prepared and submitted for approval.

When an explosive detonation episode is scheduled, the MKM SUXOS will ensure that all essential personnel not involved in demolition operations and non-dedicated equipment are located outside the MSD. Non-essential personnel will not be allowed inside the MSD during set up or conduct of demolition operations. Roadblocks will be strategically placed along the facility roads as necessary during demo operations. No persons or vehicles will be permitted past the roadblocks without direct permission from the MKM SUXOS.

After the roadblocks have been established, the MKM SUXOS (or his designee) will verify which persons are physically present within the roadblocks. Only personnel authorized by the SUXOS that have attended the Daily Site Safety Meeting, the Daily Task Order Meeting, and signed in on the Daily MKM Sign-In/Out Form will be permitted within the roadblocks. The MKM SUXOS, or his designee, will account for the presence/location of each person present at the site within the roadblocks before each explosive detonation episode. The

physical location of each person may be confirmed by the MKM SUXOS either visually or by direct two-way communication. Work will resume upon notification that the person(s) have cleared the MSD.

2.4.2.3 Set-Up of Work Zones

In addition to the MSD, three work zones (WZ) will be established prior to initiating stockpile removal operations. An Exclusion Zone (EZ) will be established around the operations area defining the area of real or potential contamination. Contaminant Reduction Zones (CRZs) will then be established (as needed) at designated entrance points around the EZ. CRZs will be no smaller than 10 feet by 10 feet and will also be delineated with caution tape. CRZs may be larger in size depending on the activities that may take place within them. If more than one CRZ is established at any particular EZ, then one CRZ will be designated as the primary CRZ. The areas outside of the EZ/CRZs will serve as the Support Zones (SZs). A designated muster will be established within the SZ and will contain a first aid kit, an eyewash station, a fire extinguisher, and emergency communications.

2.4.3 Gross Removal of Ferrous Metal

Because there are large amounts of ferrous materials present on the surface and within the Oversize Stockpile, a shielded excavator with an electro-magnet attachment will be used to perform a gross removal of these surface materials prior to excavation. The electro-magnet will deposit the ferrous materials within the swing radius of the excavator, creating a stockpile. This electro-magnet will deposit the ferrous scrap metal within its swing radius and create a stockpile that will be taken as needed by shielded front-end loader to a storage area on the north/northwest side of the existing Oversize Stockpile. During the use of the electro-magnet, the magnet operator will work in conjunction with the operator in either another shielded excavator or front end loader who will scarify the pile as needed to expose as much of the ferrous metal as possible. This planned use of an electro-magnet will allow for the gross removal of the large ferrous objects, thereby minimizing the potential for large items to interfere with the conveying and sorting operations in the remainder of the system. Metals removed by the magnet will be stored at the specified location until such time as the entire Oversize Stockpile has been initially processed. These stockpiled materials will then be transported by a shielded front end loader to the inspection conveyor on the ferrous metals inspection line for processing as described in Section 2.4.5.1.

2.4.4 Initial Sorting/Screening and Moisture Reduction Process

Because the Oversize Stockpile materials were stockpiled on plastic lining within a bermed area, and have been exposed to the environment, much of the stockpile was and continued to be saturated with water. Removal of water from the Oversize Stockpile without having to spread out the materials and allow them to dry naturally is essential to the timely and safe separation of MEC and MD from the materials. Dewatering of the materials will minimize the handling of the oversize material and enhance the removal of MEC and MD in the separation processes described in Section 2.4.5. As such, several techniques will be explored to identify the best technology that may be applied. The possible dewatering technologies that will be assessed both individually and together to determine the most effective dewatering process are described below. All dewatering processes presented below will be conducted in accordance with (IAW) the general guidelines which require all personnel to be located either behind an approved blast shield or within the cab of shielded EMM.

In the event that an MEC item that is not safe to move is identified or a smoking white phosphorus round is observed during these initial processing steps, all operations will be halted. All personnel on-site will either evacuate outside the MSD (Figure 5, Appendix B), or will relocate behind appropriate blast shielding. After all personnel are adequately protected, a shielded front-end loader will be used to remove the item from the pile and transport it to the demolition area (Figure 6, Appendix B). If the item is a smoking white phosphorus round, it will be allowed to burn itself out before personnel approach it to inspect and (if needed) conduct further demolition operations on the item. If it is an explosively configured item, it will be disposed of before the end of the day. After the item has been moved to the demolition area, site operations may resume.

2.4.4.1 Use of a Trommel Screen

One technology to be evaluated is the trommel screen. A trommel screen is a revolving cylindrical screen used to segregate materials based on size. Materials are fed into a hopper, and as the screen rotates, materials smaller than the screen openings and water will drop through. Larger materials are retained within the screen. Use of this as the initial feed handler for the overall separation process will provide some degree of dewatering, and will also allow for smaller materials (i.e., less than two or three inches) to be initially removed from the larger items and fed separately into the conveyor separation process described in Section 2.4.5. This will create a more uniform flow of similar sized items through the conveyor separation process and may allow for better removal of

items from the Oversize Stockpile by not allowing small items to be masked or interfered with by larger items. Any items not passing through the trommel screen (i.e., those greater than two to three inches) will also be fed into the conveyor separation process, but will be done so separately from the smaller items. It is anticipated that this staged approach to feeding the conveyor separation process will enhance the MEC and MD removal described in Section 2.4.5.

2.4.4.2 Use of a Rotar Attachment

If the use of a trommel screen alone does not provide enough moisture reduction to allow for effective sorting of materials, a shielded excavator equipped with a Rotar screening bucket attachment may be added ahead of the trommel. Information on the Rotar is included in Appendix E. The Rotar attachment combines excavation and soil screening in one attachment. After the Rotar attachment has been loaded with materials, the bottom of the bucket rotates to the top, exposing a screen on the bottom. The materials in the bucket are then spun using the hydraulic system. The spinning action will remove excess water from the excavated materials, making it easier for MEC/MD to be seen and removed in subsequent operations. In addition, objects smaller than the chosen screen size will be spun out of the attachment, creating two process streams, small materials (screened soil and other small objects) expelled through the screen, and larger objects (MEC/MD and rocks) retained within the screen. The size of the screen used on the Rotar will be determined in the field and will be optimized to remove water and enhance the MEC segregation process. After the moisture and smaller debris are spun out of the Rotar onto a pile, the excavator will dump the remaining oversize material in an additional pile. Each pile will then be transported separately to the trommel screen by a hardened front end loader for processing through the conveyor system.

2.4.4.3 Use of Lime or Other Dewatering Materials

During the initial startup and processing of the Oversize Stockpile materials, lime may be applied to the materials after the electro-magnet has been used. Lime is commonly used in construction to reduce moisture and stabilize expansive soils. The lime absorbs moisture and creates small granules of moisture-laden lime. The lime treated materials will then be transported to the trommel screen by a hardened front end loader for processing through the conveyor system.

2.4.5 Conveyor Processing System

The primary goal of the conveyor separation process is to safely and effectively remove all MEC and MD from the Oversize Stockpile materials, so that the soils and other materials can be certified as free of explosive hazards and MEC. The layout for this separation process is presented in Figure 3 (Appendix B).

2.4.5.1 Ferrous Metals Separation Process

As shown in Figure 3 (Appendix B), materials processed in the trommel screen will fall on the main conveyor. A ferrous metal separator (overhead drum magnet) will remove ferrous MEC/MD, which will then pass through a blast shield (constructed as described in the ESS) and move along an inspection conveyor manned by UXO personnel. Any MEC item that may contain energetic materials will be inspected to determine if it is safe to move. If safe to move, MEC will be removed from the conveyor and placed in a temporary storage container. Because warheads containing white phosphorus were found during previous MEC removal actions at the OBG, buckets of water and wetted sand will be located within the area, as specified in the ESS. Periodically, the flow of ferrous metals down the inspection conveyor will be halted, and the accumulated items will be thoroughly inspected for explosive hazards. Items found to be free of explosive hazards will be returned to the conveyor and carried to the ferrous MD stockpile at the end of the conveyor. Items with known or potential explosive hazards will be transported daily to a storage magazine located east of the site (Figure 5, Appendix B). MEC stockpiled in the magazine will be managed as described in Section 2.4.6. Ferrous MD will be removed at the end of the inspection belt and transported to the shredding operation by a shielded front end loader.

A team separation distance of at least 200 feet will apply to the sorting process, and all other essential personnel will either be located at least 200 feet from the sorting operation, behind appropriate blast shielding, or inside shielded EMM.

In the event that an MEC item that is not safe to move is identified on the conveyor, a kill switch will be activated and all operations halted. All personnel on-site will either evacuate outside the MSD (Figure 3, Appendix B), or will relocate behind appropriate blast shielding. After all personnel are adequately protected, a UXO technician behind a blast protection device will activate the conveyor remotely, allowing the MEC item to roll off the end of the conveyor. A shielded front-end loader will then be used to remove the item from the pile and transport it to the demolition area (Figure 3, Appendix B). If it is an explosively

configured item, it will be disposed of before the end of the day. After the item has been moved to the demolition area, site operations may resume.

In the event that a smoking white phosphorus round is observed on the conveyor, it will be allowed to run off the end of the belt and all operations will be halted. All personnel on-site will either evacuate outside the MSD (Figure 5, Appendix B), or will relocate behind appropriate blast shielding. After all personnel are adequately protected, a shielded front-end loader will be used to remove the item from the pile and transport it to the demolition area (Figure 5, Appendix B). Once there, it will be allowed to burn itself out before personnel approach it to inspect and (if needed) conduct further demolition operations on the item.

2.4.5.2 Non-Ferrous Metals Separation Process

As shown in Figure 3 (Appendix B), materials passing through the ferrous metal separator will continue along the main conveyor into a non-ferrous metal separation process. The non-ferrous metal separator(s) will remove non-ferrous metals, which will fall onto a stockpile at the separator discharge(s). Based upon information from previous MEC removal actions, it is assumed that non-ferrous materials will not represent a significant amount of recovered MEC/MD, nor will they present a significant potential detonation hazard. However, personnel working near the non-ferrous stockpile(s) while the conveyor is running will be located either inside shielded EMM or behind an approved blast shield.

During the sorting of the materials removed by the electro-magnet described in Section 2.4.3, UXO personnel will sort the non-ferrous materials and remove any MEC. Depending on the volume of non-ferrous materials recovered, this sorting may be performed manually at the stockpile location, or the stockpiled materials may be transported by a shielded front end loader to the inspection conveyor on the ferrous metals inspection line for processing. A team separation distance of at least 200 feet will apply to the sorting process, and all other essential personnel will either be located at least 200 feet from the sorting operation, behind appropriate blast shielding, or inside shielded EMM. Items with known or potential explosive hazards that are safe to move will be transported daily to a storage magazine located east of the site (Figure 5, Appendix B). MEC stockpiled in the magazine will be managed as described in Section 2.4.6.

In the event that an MEC item that is not safe to move is identified on the non-ferrous stockpile(s), all operations will be halted. All personnel on-site will either evacuate outside the MSD (Figure 5, Appendix B), or will relocate behind

appropriate blast shielding. After all personnel are adequately protected, a UXO technician behind a blast protection device will activate the conveyor remotely, allowing the MEC item to roll off the end of the conveyor. A shielded front-end loader will then be used to remove the item from the pile and transport it to the demolition area (Figure 6, Appendix B). If it is an explosively configured item, it will be disposed of before the end of the day. After the item has been moved to the demolition area, site operations may resume.

2.4.5.3 Final Inspection Process

As shown in Figure 3 (Appendix B), materials (e.g., soil, rocks, and small metal fragments) passing through the non-ferrous metal separation process will continue along the conveyor, through a blast shield and into a final inspection area. The final inspection area will consist of a metal detector over the conveyor and will be manned by UXO personnel. The detector will be calibrated to detect the smallest MEC items anticipated. If the detector sounds, the UXO personnel will manually remove detected MEC/MD. This MEC/MD will be placed in containers located in the immediate area, and taken (as needed) to the shredding operation.

Materials (e.g., soil and rocks) reaching the end of the main conveyor will be collected and transported to a stockpile area by a shielded front end loader. These materials may be further processed using a shielded front end loader equipped with a Rotar attachment to homogenize the materials and prepare them for treatment (as necessary). Rocks and stones will be stockpiled separately from homogenized soils. As discussed in Section 2.4.1, these rocks will be presumed to be uncontaminated and will be disposed of on-site. Any materials found to contain significant quantities of metal fragments will be returned to the trommel screen feed hopper for re-processing.

2.4.6 Recovered MEC Management

All recovered MEC that is safe to move will be collected and stored in one of two existing storage magazines located at the site (Figure 5, Appendix B). Stockpiled MEC will be disposed of by detonation on a weekly basis, or as needed to maintain storage at less than 100 pounds (lbs) Net Explosive Weight (NEW). Procedures for MEC disposal operations are provided in Sections 2.6, 3.0, and 4.0. After recovered MEC items have been treated and no longer contain energetic materials, they will be considered MD and transported to the shredding operation.

2.4.7 Inspection of MD and Non-MD

Regardless of the process used to separate them from the Oversize Stockpile, all ferrous and non-ferrous metals removed will be inspected prior to being declared as being either MD or non-MD scrap. All metals will undergo a five-step inspection/certification process. The first three steps are described in this section; the final two steps are described in Section 2.4.9. Steps 1 and 2 will take place on an inspection conveyor for ferrous metals, and during the sorting of the non-ferrous stockpile for non-ferrous metals. Step 3 will take place after the metals have been stockpiled for shredding.

- Step 1 and 2. At least one of the five UXO Specialists will initially inspect each item and the UXO Team Leader will verify the inspection before each item is initially declared as MD/non-MD scrap and stockpiled for shredding. Therefore, during the processing of metal on the ferrous inspection line or sorting of metal on the non-ferrous stockpile, the initial two quality control inspections will be conducted.
- Step 3. After the MD and non-MD scrap are stockpiled for shredding, the UXOQCS will sample and inspect at least 10% of all MD items for the presence of explosive hazards. After the UXOQCS has performed the inspection, the MD and non-MD scrap will be processed through the shredder.

2.4.8 Shredding of Munition Debris

All MD removed from the Oversize Stockpile will be shredded to make it unrecognizable as MD. As shown in Figure 3 (Appendix B), both ferrous and non-ferrous MD and other metal debris will be loaded into a slow speed, high torque, shear-type shredder. The shredding process will reduce the volume of recovered MD.

The shredding process will occur near the end of the project, after the Oversize Stockpile has been excavated and processed, and the only other MEC-related process being conducted is the inspection of the gross ferrous and non-ferrous stockpiles. Because other MEC operations (i.e., ferrous and non-ferrous scrap inspection on the metal inspection line) will be conducted during shredding, the operator of the equipment used to load the shredder will be inside a shielded cab. Additionally, all other personnel within the MSD will be either behind approved blast shielding or inside hardened equipment.

The UXOQCS will inspect ten percent of recovered ferrous and non-ferrous MD prior to shredding. All shredded scrap will be inspected and certified by the MKM UXOQCS or MKM UXOSO, as described in Section 2.4.8. Shredded scrap will be transported to roll-off bins as shown in Figure 3 (Appendix B) to await transport to an off-site recycling facility.

2.4.9 Scrap Inspection Quality Control

The final two steps of the five-step inspection/certification process will take place following shredding.

- Step 4. The UXOSO will perform random checks of shredded MD and non-MD to verify that the scrap is free from any explosive hazards.
- Step 5. Prior to offering scrap metal for pick-up by the recycling contractor, the SUXOS will certify that the shredded MD and non-MD metal is free of explosive hazards. To do this, the SUXOS and the UXOSO will sign a DD 1348-1A certificate or an equivalent form stating "This certifies that the material listed has been 100% properly inspected and to the best of our knowledge and belief, are free of explosive hazards. The BEC will then be provided with copies of the DD 1348-1A (or equivalent) along with the chain of custody and final disposition forms.

2.4.10 Soil Management

As discussed in Section 1.3, the ROD established four basic categories for OBG soils.

- **Category 1** – Total lead concentration < 60 ppm and TCLP lead concentration < 5 ppm; the soil may remain on-site without further action.
- **Category 2** – Total lead concentration ≥ 60 ppm and < 500 ppm, and TCLP lead concentration < 5 ppm; the soil may remain on-site but must be covered with 9 inches of clean fill and vegetated.
- **Category 3** – Total lead concentration ≥ 500 ppm and TCLP lead concentration < 5 ppm; the soil will be disposed of off-site in a RCRA Subtitle D landfill.
- **Category 4** - TCLP lead concentration ≥ 5 ppm; the soil will be treated using solidification/stabilization and then disposed of off-site in a RCRA Subtitle D landfill.

Based on information from the removal actions to date, it is anticipated that the majority of soils generated during the Oversize Stockpile removal operations will be either Category 3 or 4.

To assist in the segregation of sifted soils into stockpiles based on lead concentrations, the sifted soils may be screened for lead using an X-Ray Fluorescence (XRF) instrument or other acceptable field screening method as they are generated. Sifted soils will be stored on-site in stockpiles of approximately 200 CY.

A soil stockpile numbering/identification system will be established in the field to document analytical results and facilitate proper management of each stockpile. A soil stockpile staging area will be established on-site as shown in Figure 3 (Appendix B). One composite sample will be collected from each 200 CY stockpile and sent to an off-site analytical laboratory to be tested for total lead and TCLP lead.

Category 1 soils will be designated for spreading on-site following completion of the Oversize Stockpile removal. Category 2 soils will be designated for spreading on-site or to await loading and transportation to an off-site RCRA Subtitle D landfill (depending on the most cost effective solution). Category 3 soils will be designated to await loading and transportation to an off-site RCRA Subtitle D landfill.

Category 4 soils will be designated for treatment and disposal. Category 4 soils will be treated on-site using a solidification/stabilization process to reduce the toxicity characteristic concentration for lead (TCLP lead concentration < 5 ppm), and then will be stockpiled to await loading and transportation to an off-site RCRA Subtitle D landfill.

Solidification generally involves the addition of a cement or cement-based mixture to the contaminated soil, reducing permeability and surface area. Stabilization involves the addition of chemical reagents to the contaminated soil, which react with contaminants to form less soluble compounds to reduce leachabilty. Common stabilization compounds include phosphates, sulfates, hydroxides, carbonates, and proprietary mixes.

MKM will perform bench-scale treatability testing on sifted Category 4 soils early in the process to determine the most effective treatment method. After a treatment has been selected, MKM will treat stockpiled Category 4 soils. This treatment will be performed on-site by applying the selected treatment method to

each stockpile and then mechanically mixing each pile. After the appropriate reaction/contact time, post-treatment soil samples will be collected and analyzed by an off-site analytical laboratory for TCLP lead analysis to confirm that the performance criterion (TCLP lead concentration < 5 ppm) has been achieved. If the performance criterion has not been achieved, additional treatment will be performed and post-treatment samples will be recollected and reanalyzed.

For the first five treatment batches (i.e., five 200 CY stockpiles), one composite post-treatment sample will be collected from each stockpile. If each of the five composite samples indicates that treatment has been successful (TCLP lead concentration < 5 ppm), the sampling frequency will be reduced to one composite post-treatment sample every fifth treatment batch (i.e., every 1,000 CY treated).

2.5 OVERALL SAFETY PRECAUTIONS AND PRACTICES

MKM will conduct safety and operational briefings daily. Additionally, the SUXOS or UXOSO may hold a safety stand-down to conduct training at any time a deviation or degradation of safety warrants a review. The safety and operational training and briefings will be performed in accordance with the SSHP for this project as summarized below:

1. **Daily Safety Briefing:** Each day, prior to the commencement of work, a safety briefing will be conducted for all essential personnel by the UXOSO or SUXOS. A written record of this meeting will be maintained in the MKM Safety Meeting Attendance Log. The briefing will focus on specific daily hazards, potential hazards and risks that may be encountered, and the safety measures that should be used to eliminate or mitigate those hazards. These briefings will provide personnel with the known or potential task-specific hazards related to the day's operation. The Certificate of Task Hazard Assessment (CTHA) forms presented in the SSHP will be available and used during the safety briefing to inform personnel of the task-related hazards. The CTHA forms will also be used to inform personnel of the personal protective equipment (PPE) and safe work practices that will be used to mitigate the task hazards.
2. **Visitor Safety Brief:** All visitors entering the site must report to the SUXOS and sign the visitor's log. Visitors will be given a safety briefing, as outlined in the SSHP, prior to entering any work area. Visitors will be escorted at all times by a UXO-qualified individual.

3. **Environmental Concerns:** The promotion of environmental sensitivity will be an ongoing part of the daily safety and operational briefs.
4. **UXO Refresher:** All UXO personnel will be given UXO refresher training by the UXOSO or SUXOS on the known MEC to be encountered on site. The refresher will include topics related to explosives that may be encountered on site, including the identification of MEC, the hazards, and the disposal methods.
5. **Additional Training:** The SSHP prepared for this project details additional on-site training.

2.5.1 Compliance with Plans and Procedures

All personnel will adhere strictly to approved plans and established procedures. If 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. Any new course of action or desired change in procedures will be submitted in writing along with justification for approval. Approved written changes will be implemented in a manner that will ensure procedural uniformity and end-product quality.

2.5.2 General Site Practices

All operational activities at SEDA will be performed by essential personnel under the supervision and direction of qualified UXO personnel. Non-essential personnel will be prohibited from performing any activity within the MSD boundaries as shown in Figures 4, 5, and 6 (Appendix B) unless they are accompanied and supervised by a UXO technician. Throughout the entire project, MKM personnel will adhere to the following general practices.

1. **Work Hours:** Operations will be conducted only during daylight hours. MKM intends to work four 10-hour days with an optional schedule of five 8-hour days. However, due to operational needs, MKM may decide to work more than 40 hours in a week. Additionally, a minimum 48-hour rest period will be provided before the start of the next workweek.
2. **Basic MEC Procedures and MKM Standard Operating Procedures:** During all operations with the potential for encountering MEC, MKM personnel will adhere to the general procedures outlined in USACE EP 385-1-95a. This document is attached as Appendix D of this WP.

3. **Site Access:** MKM will control access to all work areas. Access will be limited to only those personnel required to accomplish the specific operations or to those personnel who have a specific purpose and authorization to be on the site. No MEC operations will be conducted when non-UXO or non-essential personnel are inside the defined MSD zone.
4. **Handling of MEC:** Only UXO-qualified personnel will handle MEC items.
5. **Visitor Safety:** All visitors entering the site will report to the MKM project office trailer and sign the visitor's log. All site visitors will receive a safety briefing, as outlined in the SSHP, and visitors will be escorted at all times by UXO personnel when inside the operations area.

2.5.3 Safety and Operational Training and Briefing

MKM will conduct safety and operational training on a daily basis starting with the morning briefing. Daily safety training will typically be conducted by the UXOSO; however, with regards to safety, MKM solicits and welcomes comments and input from all employees. The SUXOS will also conduct operational training sessions and briefings. This training will address team assignments, potential problems and their respective resolutions and productivity status.

2.5.4 Site Control During MEC Operations

Site control is described in Section 2.4.2. For the purpose of this WP, an MEC operation is defined as any activity that involves investigation, inspection, demolition, or handling any MEC or explosive materials. Once an MEC operation commences in an area, only UXO-qualified personnel and other essential personnel involved in the on-site activities will be permitted into the MSD. MSD restrictions from MEC areas to non-essential personnel will be applied during both the clearance of the operations area and oversize sorting operations.

As stated in Section 2.4.2, the MGFD for the clearance of the operational area is the M374 81mm mortar. As stated in Table B-1 of DDESB TP 16, the MSD for the M374 81mm will be the Maximum Fragment Range of 1,233 feet. This MSD is shown in Figure 4 (Appendix B).

As stated in Section 2.4.2, the MGFD for the oversize sorting operations is the 37mm projectile. As stated in Table B-1 of DDESB TP 16, the MSD for the 37mm will be the Maximum Fragment Range of 980 feet. This MSD is shown in Figure 5 in (Appendix B).

The team separation distance for the site will be 200 feet, which is greater than the K50 (0.9 psi overpressure) for the listed MGFD. A team separation distance of at least 200 feet will apply to MEC operations, and all other essential personnel will either be located at least 200 feet from the sorting operation, behind appropriate blast shielding, or inside shielded EMM.

During MEC operations, the MSD will also be the boundary for the EZ.

2.5.5 MEC Identification

The MEC identification process will start when the suspected MEC is located. The UXO technician locating the item will contact the SUXOS and UXOSO immediately. The UXO technician will attempt to identify the item and determine means to remove it. If MKM resources cannot make a positive identification, the SEDA BEC will be notified.

2.5.5.1 Transportation of MEC

MEC items that are identified as safe to move will be collected in containers and moved to the storage magazine until designated for disposal on an as needed basis. The SUXOS in conjunction with the UXOSO, will determine the desirability and safety requirements associated with consolidating multiple MEC items.

2.5.5.2 Safe Holding Area

The need for a safe holding area is not anticipated. If it is later determined that a safe holding area is required for this project, MKM will coordinate with the SEDA BEC to designate, prepare, and secure a temporary holding area.

2.6 MEC DEMOLITION OPERATIONS

Demolition operations for MEC will be performed as needed to maintain a NEW in the MEC storage magazine of less than 100 lbs, and also to ensure that a subsurface demolition limit of 25 lbs NEW is not exceeded for each demolition shot. The limit for surface detonations will be no more than 5 lbs NEW. Demolition operations are covered in detail in the ESS for this project. Planned demolition operations will be carried out in a designated MEC demolition area located as shown in Figure 6 (Appendix B).

If it is determined that MEC needs to be demolished, the SEDA BEC will be contacted for approval to proceed. All demolition operations will be coordinated

by the SUXOS with the UXOSO and will be conducted IAW the procedures outlined in USACE Technical Manual (TM) 60A-1-1-31, EP 385-1-95a, and the MKM Standard Operating Procedure (SOP) for Disposal/Demolition Operations presented in the SSHP. In the event that multiple MEC items are to be consolidated in a single demolition shot, consolidated shots will be conducted IAW U.S. Army Engineering and Support Center, Huntsville, (CEHNC) "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" dated August 1998 (updated March 2000). If needed, this reference will be available on the site.

The MSD for intentional detonations will the Maximum Fragment Range or K328, whichever is greatest. The Maximum Fragment Range for the MGFD (M374 81mm) during clearance of the operational area is 1,233 feet. The Maximum Fragment Range for the Oversize Stockpile MGFD (37mm) is 980 feet. These MSDs are shown in Figure 6 (Appendix B). In the event that a MEC item with a Maximum Fragment Range greater than above must be detonated, a new MSD for intentional detonations will be established using DDESB TP 16 and an ESS amendment with the new MSD will be prepared and submitted for approval.

Prior to commencing demolition operations, access roads to the site(s) will be blocked. The SUXOS will coordinate the blocking of any roads, if required. Avenues of ingress will not be opened without the express permission of the SUXOS/UXODS. A constant state of vigilance will be maintained to prevent intrusion into the MSD.

Additional information pertaining to MEC demolition operations are contained in the Explosives Management Plan (Section 3.0) and Explosives Siting Plan (Section 4.0).

Demolition operations will be conducted IAW the steps outlined below.

2.6.1 Supervision

MEC demolition operations will be performed under the direction of the UXODS designated by the SUXOS. The UXODS will be charged with the responsibility of ensuring that the procedures contained in this WP and the referenced documents are followed. The UXODS will observe the demolition procedures and monitor compliance with the requisite safety measures and, in the event of a noncompliance, the UXODS is vested with the authority to stop or suspend operations. MEC disposal activities are inherently hazardous and require strict adherence to approved safety and operational procedures. Violations of

procedures will typically result in immediate removal from this project and termination of employment or a reprimand, as appropriate.

2.6.2 Site Security and Notification

Site control during demolition operations is described in Section 2.4.2.2. Prior to the start of MEC demolition operations, the SUXOS will verify that an appropriate MSD for the MEC item(s) being disposed has been selected. The SUXOS will ensure that the MSD exclusion zone has been established and that all non-essential personnel and all non-essential personnel are outside the MSD. The SUXOS will also ensure that all contacts have been informed of the impending disposal shot.

2.6.3 Equipment

Standard demolition equipment will be used. Procedures will follow the guidelines dictated by MKM SOPs provided in the SSHP and this WP. For demolition of MEC other than white phosphorus munitions, MKM will utilize jet perforators and non-electric detonators in its shots. Consolidated shots of MEC will be connected using detonating cord. Demolition of white phosphorus munitions will be conducted using buster blocks configured to ensure complete burning of the white phosphorus.

2.6.4 Explosive, Storage, Accountability, and Transportation

MKM will maintain total control of explosives while on site IAW the MKM explosives handling SOPs provided the SSHP.

2.6.5 Disposal Shots

While preparing MEC for detonation, the UXODS will ensure that the number of personnel on-site is kept to the minimum required to safely accomplish the disposal mission. Authority to initiate demolition operations will rest solely with the SUXOS. The SUXOS will be responsible for ensuring all personnel have been accounted for and that the area is secure prior to authorizing the detonation of explosive charges. The SUXOS will ensure that all pertinent parties have been notified of an impending demolition shot.

Prior to priming the demolition shots, the team will perform these actions: 1) direct all personnel not involved in the priming process to evacuate the area and assemble at a designated assembly point and 2) ensure that any necessary roadblocks have been established.

Upon shot completion, the UXOSO, with assistance from the UXODS or SUXOS, will visually inspect the disposal shot. While one of these individuals performs a visual inspection of the disposal site(s), the second one will stand by at a safe distance and be prepared to render assistance in the event of an emergency. Upon completion of this inspection and providing there are no residual hazards, the SUXOS will be informed and will authorize the resumption of site operations of any teams affected by the operation. In the event an additional shot is required, the team will again conduct demolition operations as described above.

2.7 RECORDS

The UXODS will maintain a detailed accounting of activities performed at the site and will include, as a minimum, information pertaining to the following:

- Date and time operations began;
- Team composition and personnel names and positions;
- Date and time operations were completed;
- Any event that impacted the day's operations;
- Quantities of explosives used for demolition operations; and
- Quantities of MEC items along with its identification, condition, disposition and location, and estimated weight recovered by location.

2.8 SITE QUALITY CONTROL

The MKM UXOQCS will ensure that teams are complying with the WP during their operations in the field. Any deviations will be resolved immediately to ensure compliance. Issues that cannot be resolved will be brought to the attention of the SUXOS and the Project Manager. All QC audits will be recorded.

2.9 PUBLIC AFFAIRS AND COMMUNITY RELATIONS

MKM will not make available or publicly disclose any data generated or reviewed under this contract or any subcontract. When approached by any person or entity requesting information about the subject of this or any subcontract, MKM will defer to the BRAC Technical Support Office or the SEDA BEC for response.

2.10 DISSEMINATION OF DATA

Reports and data generated under this contract will become the property of the Government and distribution to any other source by MKM is prohibited unless authorized by the BRAC Technical Support Office.

2.11 FINAL REPORT

At the conclusion of Oversize Stockpile removal operations at SEDA, MKM will submit a final report to the BRAC Technical Support Office for review and comments. Contents of the Final Report will include an executive summary, weekly reports, analytical results, disposal documentation, and other project specific information.

3.0 EXPLOSIVES MANAGEMENT PLAN

3.1 INTRODUCTION

This plan addresses issues associated with the requisition, receipt, storage, transportation, inventory, and use of demolition materials at SEDA. This plan incorporates local, state, and Federal laws and regulations to include Bureau of Alcohol, Tobacco, and Firearms (BATF) Pamphlet ATF P5400-7, which is an excerpt from 27 CFR Part 55; DOD 6055.9-STD Ammunition and Explosives Safety Standards; Department of Transportation (DOT) Regulations; Army Regulations (AR) 190-11; and MKM Policies and Procedures. A copy of the MKM BATF license will be available on-site.

3.2 ACQUISITION

3.2.1 Description and Estimated Quantity of Explosives

MKM will utilize jet perforators along with non-electric detonators for demolition shots to control the operation and reduce the NEW to be used. MKM uses DOT Class 1.4 explosives whenever possible, which are safer to handle, easier and less expensive to ship and store and more readily available. The demolition materials anticipated for use at SEDA are presented in Table 3.

TABLE 3
Demolition Materials for Use at SEDA

Description	Estimated Quantity	DOT Hazard Class and Division	Total Net Explosive Weight	UN NO.
Time Fuse	1,000 ft.	1.4 S	6.8 pounds	UN0131
Detonation Cord, 80 grain	1,000 ft.	1.4 D	13.9 pounds	UN0289
Perforator 29 gram	100 ea.	1.4 S	6.4 pounds	UN0441
Composition, C-4	50 pounds	1.1 D	50 pounds	UN0072
Non-electric Detonators	100 ea.	1.4 B	6.6 pounds	UN0267

3.3 EXPLOSIVE STORAGE MAGAZINE

3.3.1 Magazine Type

All explosives and demolition materials will be stored in one of two existing storage magazines at the site. The storage magazines are located on the east side of the OBG/ODG (see Figure 5, Appendix B).

3.3.2 Quantity-Distance Criteria

An existing storage magazine will be used for the storage of both 1.1 and 1.4 class explosives to be used for demolition operations. All 1.1 and 1.4 explosives stored will be of compatible storage categories. Initiators used for demolition operations will be stored in a separate, segregated area of the magazine as described in the ESS. The NEW for the demolition materials will be a maximum of 100 pounds NEW. The inhabited building distance (DOD 6055.9-STD Table C9.T1) for quantities up to 150 pounds is 500 feet in the front and 250 feet to the side and rear. The public traffic route distances are 300 feet to the front and 150 feet to the side and rear. There are no inhabited buildings or public traffic routes

within these distances. The existing magazines face away from the operations area, and the side and rear distance of 250 feet is protective of site operations.

3.3.3 Lightning Protection

Lightning protection for the storage magazines will be checked and continuity verified prior to use. Any recommended modifications will be discussed and approved through communication with the BRAC Technical Support Office and SEDA BEC.

3.3.4 Magazine Security

The existing storage magazines are sited within the OBG/ODG (see Figure 5, Appendix B). They are earth-covered magazines and access to the OBG/ODG is restricted.

3.3.5 Site Map

See Figure 5 in Appendix B for the location of the existing storage magazines.

3.4 TRANSPORTATION

3.4.1 Procedures for Transporting Explosives

Transportation of explosives will be conducted IAW the MKM Explosives Transport SOP. The roads to be traveled are located within SEDA boundaries and will include both paved and unpaved roads. MKM personnel transporting explosives will use two BATF-approved day boxes for the transport of demolition material. The first box will contain the detonators, and the second will contain the perforators and detonating cord. A predetermined route will be identified and used when transporting explosives.

3.4.2 Requirements for Explosives Transport Vehicle

The vehicle used by MKM to transport explosives will be inspected prior to use each day using the MKM vehicle checklists. The requirements for the vehicle used to transport explosives include the items listed below.

1. Vehicle engine will not be running and wheel chocks will be set when loading/ unloading explosives.

2. Explosives will be transported in a covered pick-up truck whenever possible. When using an open vehicle, explosives will be covered with a flame resistant tarpaulin (except when loading/unloading).
3. The area of the vehicle where the explosives are placed for transportation will have a plastic bed liner, dunnage, or sandbags placed in the area to protect the explosive from contact with the metal bed and fittings.
4. Explosives transport vehicles will have placards, a first aid kit, two 10-pound ABC fire extinguishers, and communications capabilities.
5. Compatibility requirements will be observed.
6. Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions.

3.5 INITIAL RECEIPT AND ISSUING PROCEDURES

Initial receipt of demolition material will be conducted IAW the MKM Explosives Acquisition, Storage, and Accountability SOP, which is provided in the SSHP.

3.5.1 Responsibilities

3.5.1.1 Senior UXO Supervisor (SUXOS)

The SUXOS maintains overall responsibility to process and requisition for the required demolition materials. The SUXOS is also ultimately responsible for maintaining accountability of demolition materials and immediately reporting any losses or discrepancies to the MKM PM, the BRAC Technical Support Office, the SEDA BEC, and the BATF.

3.5.1.2 Individual Responsibilities

All MKM employees are responsible for ensuring the proper and safe handling, use and control of demolition materials. In addition, these personnel are responsible for the return and correct inventory/annotation of the magazine data cards.

3.5.1.3 Authorized Personnel

Only the SUXOS, UXOSO, and UXODS will be permitted to receive and issue explosives.

3.6 INVENTORY

The MKM Explosives Acquisition, Storage, and Accountability SOP lists the procedures to be followed for the inventory, notification of loss/theft, return of unused materials at the end of each day, and disposition of demolition material at the conclusion of the project.

3.6.1 Reconciliation of Discrepancies

In the event there is a discrepancy during the inventory, the item(s) will be recounted a minimum of two additional times. If a discrepancy exists, the MKM PM, the BRAC Technical Support Office, the SEDA BEC, and the BATF will be notified.

3.6.2 Lost, Stolen, or Unauthorized Use

If it is discovered that explosive items have been lost, stolen, or used without proper authorization, the MKM PM, the BRAC Technical Support Office, the SEDA BEC, and the BATF will be notified.

3.6.3 Return of Explosives to Storage

Following each occurrence of a receipt or issue of explosive material, the SUXOS will conduct a joint inventory in conjunction with the UXODS who was issued the explosive and is returning it to storage. Only those items issued/returned will be inventoried.

3.6.4 Forms

All forms associated with the receipt, storage, inventory, and use of demolition material will be kept in the site operations trailer.

4.0 EXPLOSIVES SITING PLAN

4.1 MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) AREAS

As described in Section 2.4.2. and 2.5.4, strict control of MEC operational areas will be applied during all MEC operations being conducted. MSD restrictions from MEC areas to non-essential personnel will be applied during both the clearance of the operations area and oversize sorting operations.

As stated in Section 2.4.2, the MGFD for the clearance of the operational area is the M374 81mm mortar. As stated in Table B-1 of DDESB TP 16, the MSD for the M374 81mm will be the Maximum Fragment Range of 1,233 feet. This MSD is shown in Figure 4 (Appendix B).

As stated in Section 2.4.2, the MGFD for the oversize sorting operations is the 37mm projectile. As stated in Table B-1 of DDESB TP 16, the MSD for the 37mm will be the Maximum Fragment Range of 980 feet. This MSD is shown in Figure 5 (Appendix B).

The team separation distance for the site will be 200 feet, which is greater than the K50 (0.9 psi overpressure) for the listed MGFD. A team separation distance of at least 200 feet will apply to MEC operations, and all other essential personnel will either be located at least 200 feet from the sorting operation, behind appropriate blast shielding, or inside shielded EMM.

4.2 PLANNED OR ESTABLISHED DEMOLITION AREAS

As stated previously, a demolition site will be established on-site to support Oversize Stockpile removal operations. The proposed demolition site is located on the west side of the operations area, as shown in Figure 6 (Appendix B). The MSD for intentional detonations will the Maximum Fragment Range or K328, whichever is greatest. The Maximum Fragment Range for the MGFD (M374 81mm) during clearance of the operational area is 1,233 feet. The Maximum Fragment Range for the Oversize Stockpile MGFD (37mm) is 980 feet. These MSDs are shown in Figure 6 (Appendix B). In the event that a MEC item with a Maximum Fragment Range greater than above must be detonated, a new MSD for intentional detonations will be established using DDESB TP 16 and an ESS amendment with the new MSD will be prepared and submitted for approval.

4.3 FOOTPRINT AREAS

4.3.1 Blow-in-Place

It is anticipated that the only BIP operations that may be needed will be if MEC is located during the initial surface clearance which is identified as unsafe to move. In such situations, the MSD (1,233 feet) for the MGFD (M374 81mm) will be used as the default distance unless there is a potential that the item has a larger MSD. In the event that a MEC item with a Maximum Fragment Range greater than above must be detonated, a new MSD for intentional detonations will be established using DDESB TP 16 and an ESS amendment with the new MSD will be prepared and submitted for approval..

4.3.2 Collection Points

Collection points are those areas used to temporarily accumulate MEC within an area pending transportation to either the approved storage magazine or the planned demolition area. Collection points will be established in each area where ferrous and non-ferrous materials removed from the oversize are inspected to identify MEC items. Because the collection points will be inside the boundary for the MEC area as described in Section 4.1, the same MSD for the removal area will apply to the collection points.

4.3.3 In-Grid Consolidated Shots

No in-grid consolidated shots will be required. If items are safe to move, they will be taken to the ODG and detonated there. The only in-grid shots that may be required will be items to be BIP. However, they will not be consolidated.

4.4 EXPLOSIVE STORAGE MAGAZINES

4.4.1 Magazine Type(s)

All MEC, explosives and demolition materials will be stored in two existing earth-covered magazines at the site (Figure 5, Appendix B).

4.4.2 Magazine Contents

One of the two existing storage magazines will be used for the storage of 1.1 and 1.4 demolition supplies. The magazine will be configured and used as described in the ESS. Initiators used for demolition operations will be stored in a separate, segregated area of the magazine. The other magazine will be used for the

storage of recovered MEC awaiting demolition. Each of the magazines will have a NEW of 100 pounds maximum.

4.4.3 Quantity-Distance Criteria

The inhabited building distance (DOD 6055.9-STD Table C9.T1) for quantities up to 150 pounds are 500 feet in the front and 250 feet to the side and rear. The public traffic route distances are 300 feet to the front and 150 feet to the side and rear. There are no inhabited buildings or public traffic routes within these distances. The existing magazines face away from the operations area, and the side and rear distance of 250 feet is protective of site operations.

4.4.4 Engineering Controls for Public Exposures

No engineering controls are needed since there are no public exposures within the Quantity-Distance for the magazine storage areas.

5.0 WORK, DATA, AND COST MANAGEMENT PLAN

5.1 PROJECT MANAGEMENT APPROACH

The purpose of this Work, Data and Cost Management Plan is to ensure the effective management of allocated funds, manpower, and equipment. This plan describes: the procedures, resources and tools MKM will use to manage the project manpower and equipment resources to ensure effective delivery of the required scope of services. Additional information regarding management of this project is provided in Section 2.2.

5.2 PROJECT SCHEDULE

MKM has developed a proposed Project Schedule for the completion of all tasks presented in this WP. The Project Schedule for Oversize Stockpile removal is shown in Figure 9 (Appendix B).

There may be variations from the proposed schedule that will not require formal approval. Examples include schedule delays as a result of unsafe working conditions (i.e., explosive/safety hazards) or due to inclement weather.

5.3 PROJECT COST CONTROL AND TRACKING

This is a fixed price contract and as such the cost control and tracking required by the government will be minimal. MKM will utilize Microsoft Project or other cost and resource tracking software to ensure that the project costs are maintained within the proposed fixed price. In the event that unexpected and unplanned changes occur that have a significant cost impact, the MKM PM will contact the BRAC Technical Support Office PM to evaluate any potential for changes to the fixed price based upon the cost differential associated with the project change.

5.4 SUBCONTRACTOR COSTS

MKM will control subcontractor costs by using its approved accounting policies, which require acquisition of three quotes for any equipment or services charged to a project. MKM expects subcontractor services required for this project to be limited to analytical laboratories and off-site disposal and recycling facilities, however, MKM will acquire other subcontractors as needed to ensure effective project completion. To secure subcontractor services, MKM will issue a request for proposal containing a SOW for the services needed that corresponds to the

requirements of the JMC/BRAC Technical Support Office. MKM will select a subcontractor source on the basis of best value to the MKM and the Government, and the MKM PM will subsequently review and approve all subcontractor invoices. The MKM PM, in conjunction with the SUXOS, will monitor subcontractor progress to ensure effective completion of the subcontract.

5.5 MANPOWER REQUIREMENTS

MKM will assign the personnel to the project on an as needed basis to ensure that the project is completed within the fixed price budget, on schedule and in a safe, efficient manner. The project management personnel assigned to this project are listed in Section 2.2 of this WP, and those personnel will be responsible for safe, successful project performance. For the performance of on-site operations, the MKM SUXOS will be responsible and will track the manpower requirements for the project. This information will be transmitted and coordinated with the MKM PM.

5.6 RECURRING DELIVERABLES

5.6.1 Weekly Update Reports

MKM will prepare and submit weekly reports to the BRAC Technical Support Office PM. The report will be submitted via facsimile or e-mail no later than the first working day of the week following the week for which the report is prepared. An example report form is included in Appendix F. The weekly report will consist of the following information:

1) General Identifying Information:
   a) Contract number, project location, and ending date of report.
   b) Brief description of project scope and methodology
   c) Name of Contractor's Project Manager, SUXOS, UXOSO, and UXOQCS.
   d) Name of Government Safety Specialist on site (if applicable).

2) Schedule/Progress Data, including progress by task, or sub-task if appropriate, indicating level of completion and including supporting data.

3) Discussion of Issues Relating to Work Progress:
   a) List/status of pertinent correspondence related to the project.
   b) List/status of deliverables and dates submitted.
   c) Discussion of any issue that impacts completion of project on schedule and within budget.

4) Field Information:
   a) Percent of project completed.
   b) Number of soil samples collected during week and to date.
   c) Analytical results received during week and to date.
   d) Amount of lead-contaminated soil treated and/or disposed during week and to date.
   e) Number of live MEC items located during week and to date.
   f) Number of inert MEC items recovered during week and to date.
   g) Number of small arms recovered during week and to date.
   h) Pounds of scrap turned over to salvage/recycling facility during week and to date.
   i) Significant comments relating to type of MEC located, presence of visitors or other contractors, MEC shipments, and demolitions.
   j) A detailed list of MEC located during the week and its disposition and a summary of all MEC recovered to date by ordnance type.
   k) Results of daily safety inspections.
   l) Description of operations planned for the following week.

5) Demolition Materials Accounting:
   a) List of demolition materials received since the project began.
   b) Tabulation of materials used during week.
   c) Balance on hand at the end of the reporting period.

7) Personnel on Site:
   a) List of personnel on site by name, position, and workday.
   b) List of employee absences and associated explanations.
   c) Summary of workers and total number of man-hours expended during week by job category.

8) Exposure Data:
   a) Hours worked in direct support of the contract (by all personnel) during the reported week and cumulative for the project, excluding hours expended on corporate personnel issues, but including hours expended by subcontract personnel in direct support of the contract services.
   b) Number of lost workday accidents during the reported week and cumulative for the project.
   c) Number of lost workdays due to on-the-job accidents during the reported week and cumulative for the project.
   d) Number of property damage accidents (includes vehicles) in which property loss value is $2,000 or more, during the reported week and cumulative for the project.

5.6.2 Daily Progress Reports

MKM will prepare daily progress reports that will be maintained in the MKM project office trailer for compilation of weekly and monthly reports. The daily report will be prepared using a form that provides for the collection of the relevant information for the project specific forms and reports.

6.0 QUALITY CONTROL PLAN

6.1 INTRODUCTION

As a component of the Quality Program (QP), this Quality Control Plan (QCP) provides procedures for controlling and measuring the quality of all work performed during site activities at SEDA. This site specific QCP is designed to provide procedures for:

- Testing and calibrating equipment used to perform work tasks;
- Determining the effectiveness of work performed, including field analytical chemistry;
- Inspecting the maintenance and accuracy of site records; and
- Determining compliance with this plan, and site safety, environmental protection, and technical plans.

6.2 DEFINITIONS

6.2.1 Accuracy

Accuracy is the degree of agreement of a measurement or the average of several measurements with an accepted reference or "true" value; it is a measure of bias in the system.

6.2.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter under the same conditions.

6.2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under normal conditions.

6.2.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Careful choice and use of appropriate methods in the field helps to ensure that samples are representative. This is relatively easy with water or air samples, given that the components of these media are homogeneously dispersed. In contrast, soil and sediment contaminants are unlikely

to be evenly distributed. It is important for the sampler and analyst to exercise good judgment when collecting and analyzing a sample.

6.2.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another.

6.3 QUALITY PROGRAM MANAGEMENT STRUCTURE

The following section describes the structure of the quality management team for MKM's operations at SEDA. Personnel were selected based on previous experience and their familiarity with the MKM QA/QC system.

6.3.1 QC Manager

Mr. Joe Snow is the MKM Operations Manager and QC Manager, and has the overall responsibility for the MKM QP. Mr. Snow reports directly to Khodi Irani, President of MKM. The QC Manager's responsibilities include:

- Preparation of all QC policies and procedures;
- Establishing guidelines to assist in the development of program, project, site and task specific QC policies and procedures;
- Reporting regularly to the President of MKM on the adequacy, status and effectiveness of the QC program;
- Conducting periodic field audits of the programs, projects and sites and submitting a report of findings to the President with courtesy copies to the SUXOS and MKMs PM; and
- Training site QC Specialists in the performance of their duties.

6.3.2 UXO Quality Control Specialist

The MKM UXOQCS has the responsibility and authority to enforce the MKM and site specific QC plans and procedures. His responsibilities include:

- Coordinating with the BRAC Technical Support Office PM to ensure that QC objectives appropriate to the project are set and all personnel are aware of these objectives;
- Coordinating with the MKM QC Manager to ensure that QC procedures are being followed and are appropriate for achieving data validity sufficient to meet QC objectives;

- Conducting periodic QC surveillances of all site activities and recording the findings in the QC Surveillance Report and QC Surveillance Log;
- Conducting inspections of all scrap placed in the roll-offs to ensure there are no explosive components and documenting these inspections on the QC Inspection Report and QC Inspection Log;
- Reporting noncompliance with QC criteria to the SUXOS and MKM's QC Manager and PM. and documenting these non-conformances on the QC Nonconformance/Corrective Action Report and the QC Inspection Log;
- Coordinating with the responsible parties to initiate the proper corrective actions to be taken in the event of a QC deviation and documenting these actions on the Nonconformance / Corrective Action Report and Log; and
- Ensuring that Lessons Learned are documented on the QC Surveillance Report and forwarded to the MKM QC Manager for analysis.

6.3.3 Environmental Team Leader

The MKM Environmental Team Leader's responsibilities include maintaining the integrity and quality of all soil sampling performed as part of the project. The Environmental Team Leader will document all sampling activities (e.g., sample collection, sample chain-of-custody, and sample shipping) IAW established industry and regulatory standards.

6.4 CRITICAL ISSUES/ACTIVITIES

MKM has identified the following issues/activities as being critical to the delivery of a quality product:

- Employee qualifications;
- Employee training;
- Compliance with plans (e.g., safety, MEC operations, environmental, cost management);
- Availability of publications;
- Testing and calibration of equipment;
- Maintenance and accuracy of reports and records; and
- Deliverable accuracy and timeliness.

The following paragraphs describe the QC criteria that MKM will apply to these critical issues/activities and the methods MKM will use to monitor quality on this project.

6.4.1 Employee Qualifications

Prior to the employee's initial assignment or any change in duties/assignment, the QC Manager will physically review the employee's licenses, training records and certificates to ensure that the employee is qualified for the work. The SUXOS will maintain personnel files on each employee. These records will include copies of licenses, training records and certificates of qualifications that support the employee's placement and position. The BRAC Technical Support Office PM will confirm the employee qualifications of BRAC Technical Support Office project personnel.

6.4.2 Training

Employee training is an integral part of producing quality products. MKM conducts site-specific employee training prior to the start of operations and supplements this initial training, as necessary, throughout the remainder of the project. Training is conducted by the UXOSO, SUXOS and UXOQCS, and records of attendance are recorded. At a minimum, MKM personnel receive the following types of training:

- **OSHA**: Current HAZWOPER certification IAW 29 CFR 1910.120(e)(f);
- **Safety**: Review of the SSHP with specific emphasis on the hazards known to exist on site;
- **Equipment Operators Training**: Tailored to the experience level of the operator and objectives of the project;
- **Daily Safety Training**: Tailgate briefings outlining the day's activities, unique hazards and safety precautions, and other operational issues related to the project; and
- **Weekly Safety Meetings**: On the first workday of each week, a topic will be selected and elaborated on at the tailgate briefings.

All site visitors will receive general and site specific training as a portion of their in-briefing.

6.4.3 Publications

MKM has conducted a technical review of the SOW and all pertinent data, and compiled a list of required publications to be available for reference. In addition to this list, MKM will make available, in a timely manner, any additional manuals the SUXOS may require. Prior to the start of operations and periodically throughout the project, the QCS will check to ensure that the required publications are available. Results of this inspection will be recorded and reported. The currently identified publications include:

- MKM Corporate Safety and Health Program;

- OSHA, 29 CFR 1910, Occupational Safety and Health Standards;
- OSHA, 29 CFR 1926, Construction Standards;
- Applicable sections of DOT, 49 CFR parts 100 to 199, Transportation;
- CEHNC EM 385-1-1, Safety and Health Requirements Manual;
- EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations
- DOD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives;
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- AR 385-64, Ammunition and Explosives Safety Standards;
- AR 385-40 w/supplement, Accident Reporting and Records;
- ATF P 5400-7; and
- Material Safety Data Sheets (MSDS) for hazardous substances used on-site.

6.4.4 Equipment Calibration and Tests

Measurement equipment utilized on site (e.g., magnetometers, field chemistry analyzers, monitors, etc.) will be checked for operational reliability and calibration in accordance with the manufacturer's specifications.

MKM has reviewed the equipment requirements of this contract and identified the equipment listed below as requiring daily tests and/or calibration. Calibration/testing of these instruments will be accomplished as follows:

- **Communications Equipment**: Each morning, prior to commencing operations, radios and cellular phones will be checked. Radios will be function-checked to ensure batteries are charged and the radio is operational. Cellular phones will be checked to ensure off-site communications are working. If communications are lost, either between teams and the command post, or to off-site emergency services, work will cease until communications are restored.
- **Magnetometers**: Prior to use, all hand held magnetometers will be checked and/or calibrated against a known metallic anomaly. The purpose of this test/calibration is to ensure that the instruments are operating properly and to appropriately adjust the sensitivity level of the instruments. The UXOQCS will monitor the test and document results in the logs.
- **Monitoring Equipment**: Monitoring equipment specified in the SSHP will be checked and/or calibrated IAW manufacturer's guidance. These checks/calibrations

will be recorded in the UXOSO logs or in the log book of the individual responsible for the use of the monitoring equipment.

All equipment used at SEDA will be dedicated solely to the project until the project is completed. The UXOQCS is specifically responsible for ensuring that equipment is calibrated and checked by the SUXOS or his designee prior to being placed into operation. Records of these checks will be documented on the QC Surveillance Report and logged on the QC Surveillance 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 by the SUXOS or his designee and removed from service. MKM's equipment manager will be notified and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

6.4.5 Maintenance Program

To ensure the continued operation of critical equipment, MKM will implement an on-site maintenance program IAW the following:

- **Preventive Maintenance**: The assigned operator of each piece of equipment will perform scheduled maintenance, and when necessary, unscheduled maintenance to ensure the equipment is maintained in a satisfactory operating condition. Preventive maintenance consists of before, during and after maintenance checks and documentation of these activities, either in the operators log book or in the team leader's field log book.
- **Routine Repair and Adjustment**: Routine repair and adjustment is based on the manufacturers schedule for adjustment, calibration or replacement.
- **Emergency Repair**: Emergency repair includes any unscheduled repair. This type of repair will be conducted using manufacturer required replacement parts to ensure the continued integrity of the equipment.

6.4.6 Included Equipment

Equipment included in the maintenance program will be checked as follows:

- **Magnetometers:** Before-operation checks will include battery insertion, the location of a known anomaly, and calibration conducted as prescribed by the manufacturer. During-operation checks will include frequent checks to ensure the sensitivity setting is on the designated setting. In addition, the operator will check batteries at breaks. After-operation checks will include battery removal and cleaning.
- **Radios/Cellular Phones:** Before-operation checks will include verification of a complete battery charge and a communications check to ensure the unit is

operating properly. During-operation checks will include checks to ensure battery charge remains adequate and a communications check once an hour for the radios and once a day for the cellular phones. After-operation maintenance will include a communications check, cleaning, turning off and placing in battery charger.

- **Vehicles/Earth-Moving Machinery (EMM):** Before-operation checks will include an operator general inspection of the entire unit to include fluid levels, safety equipment operation and tire condition. During-operation will include frequent checks of the dials and gauges and a tire check at breaks. After-operation checks will include topping off of any fluids that are low, a general cleaning and a recheck of all safety related equipment.
- **Specialized Equipment:** Specialized equipment (e.g., shredder, conveyors, and separators) will be checked before, during, and after operations IAW with manufacturer's/vendor's guidance.
- **Monitoring Equipment:** Before-operation checks will include calibration IAW manufacturer's guidance, and, if applicable, battery charge check. During-operation use will include frequent checks to ensure unit is operating properly and battery charge is sufficient. After-operation checks will include a general cleaning, turning off the unit and placing in a battery charger if applicable.

6.4.7 Logs and Records

For all site work, bound log books with consecutively numbered pages will be used by field personnel. The field log books will be used to record the daily activities of the field team, provide sketch maps and locations of UXO/MEC items, and to note any observations which might affect the quality of data. The field log books and site records are utilized to record the following:

- **Daily Journal**: The SUXOS will maintain the daily journal. This journal will provide 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/MEC located, training conducted, visitors, and any additional items deemed appropriate.
- **Field Log Books**: The UXO field personnel will maintain field log books. These log books will be maintained in a neat and legible manner and will provide an historic record of site activities. These log books will include the respective team's daily activities, to include start/stop times.
- **MEC/Explosives Accountability Log**: The SUXOS/UXODS will prepare records for MEC operations. The records will consist of a series of sheets that will be used to record data on MEC items encountered. Each MEC item will be given a unique identifying number to differentiate it from the others. The records will also include a

log of demolition materials used. Example log forms are included in the MKM Explosive Acquisition, Storage, and Accountability SOP provided in the SSHP.

- **Safety Log Book**: The UXOSO will maintain this log. The log will be used to record all safety matters associated with the specific project such as: safety briefings/meetings, including items covered and attendees, safety training, safety audits, near-misses/accidents/incidents, cause and corrective action taken, weather conditions and any other matters encompassing safety.
- **Training Records**: The SUXOS will maintain training records for all essential personnel. These records will contain training certificates, licenses and other qualifying data for an individual's duty position.
- **Quality Control Logs**: The results of all surveillance, inspection and nonconformance / corrective action activities will be recorded on the appropriate report and logged in the appropriate log as required by the QC SOPs. These reports and logs will be kept on site and copies sent to the MKM QC Manager for analysis.
- **Visitors Log Book**: The SUXOS will maintain this log. All personnel that 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 will also be recorded in this log.
- **Photographic Log**: The SUXOS will maintain a photographic log. This log will be used to record all photographs taken to document work and/or site conditions. Photographs will be marked with a unique identifying number relating back to the photographic log, and will be maintained on file until the end of the project.
- **Site Maps**: The SUXOS will maintain a current working map of the operating areas throughout execution of this project. These maps will be used to document UXO/MEC finds, task possession and other pertinent activities and locations.
- **Document Control Log**: The UXOSO/UXOQCS will maintain this log, which will include numbers and the responsible party for all logs and any other documents of importance.

6.4.8 Lessons Learned

Log books and records will be inspected by the UXOSO/UXOQCS on a weekly basis. These inspections will focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections will be documented on the QC Surveillance Report, logged on the QC Surveillance Log and forwarded to the SUXOS and MKM QC Manager. The log keeper's immediate supervisor will review and initial in the log book his concurrence with the log book's entries on a daily basis. The logbooks will be utilized to formulate the final report and will act as an "Official Document" in the event of

any problem area addressed after the completion of the project. All log books will be maintained on file for a period of seven years after project completion.

6.5 ORDNANCE VERIFICATION, ACCOUNTABILITY AND CONTROL

A qualified UXO specialist will positively identify all MEC items located. The specialist will also identify the condition of the item (i.e., misfire, unfired, dud) and associated hazards [high explosives, fragmentation, white phosphorus, ejection, chemical, etc.]. The identification, condition, and associated hazards of all items will be verified by the SUXOS and the UXOSO/UXOQCS. If the item cannot be moved, the UXOSO/UXOQCS, in conjunction with the SUXOS and the BRAC Technical Support Office PM and the SEDA BEC, will determine an appropriate course of action IAW the WP and SSHP, which will then be recorded by the UXOSO/UXOQCS or SUXOS.

6.6 QA/QC AUDITS AND SURVEILLANCE

As part of the MKM QC program for work performed at specific sites, MKM will conduct both internal and external audits and surveillance at SEDA. This is to ensure that all procedures and protocols are being followed and that the resulting data is accurate and defensible. Field audits will concentrate on surface sweep procedures, clearance/removal operations, proper documentation, and checks of resulting data for completeness and accuracy within established QC limits.

6.7 QC INSPECTIONS

As part of the MKM inspection process, the MKM UXOQCS is responsible for scrap certification as described in Section 2.4.7 and 2.4.9. These inspections will be documented on the MKM QC Inspection Report and logged on the QC Inspection Log IAW the MKM QC Inspection SOP provided in the SSHP. A copy of the memo will be attached to each inspection report. The inspection reports and logs will be kept on site and copies forwarded to the MKM QC Manager for analysis.

6.8 PASS/FAIL CRITERIA

The MKM QC Manager will conduct periodic quality audits at SEDA. These audits are designed to ensure quality standards are being met. These standards are based on the approved Work Plan. Data gathered during audits performed at SEDA will be analyzed with the goal of continual process improvement.

These evaluations will provide an effective methodology for ensuring quality control in the field. The following is a summary of these evaluations:

- **Preparatory Evaluation:** This evaluation will be performed prior to beginning each work activity. It will include verification of activity requirements, examination of the

work area, examination of field equipment, calibration of field testing equipment, and verification that field equipment is in proper working order.

- **Initial Evaluation**: This evaluation will review the initial quality of work and a review of control testing for compliance with the work plan requirements.
- **Follow-Up Evaluations**: These evaluations will be performed at appropriate intervals as the work progresses to verify compliance with the work plan requirements. Evaluations will continue until completion of the activity

To facilitate the QA/QC program, MKM will perform a minimum of two site audits during field activities to ensure adherence to project requirements. MKM will focus on MEC issues and overall project quality. MKM will also provide QA/QC activities in support of the soil sampling performed during the field program.

6.9 NON-CONFORMANCE/CORRECTIVE ACTION

Any non-compliance/conformance to contractual requirements will be documented and reported. Non-conformance includes:

- Delivery of items or services by MKM that do not meet the contractual requirements;
- Errors made in following work instructions or improper work instructions;
- Unforeseeable or unplanned circumstances that result in items or services that do not meet quality/contractual/technical requirements;
- Technical modifications to the project by individuals that do not have the responsibility and authority; and
- Errors in craftsmanship and trade skills.

Immediately upon discovery of a Non-Compliance/Conformance item, the UXOQCS will take the following actions:

- Initiate a Non-Conformance/Corrective Action (NC/CA) Report IAW the MKM NC/CA SOP provided in the SSHP;
- Assign a responsible individual and a corrective action due date;
- Issue the NC/CA to the responsible individual and coordinate any corrective actions; and
- Ensure that any corrective actions are appropriate to the non-conformance.

Immediately upon receipt of a NC/CA Report, the SUXOS will take the following actions:

- Identify the impact the non-conformance may have on other project activities;
- Identify and implement the actions required to bring the project/activity back into compliance;
- Verify and document that the corrective action has taken place; and
- Develop procedures to preclude recurrence of the non-conformance. These procedures will be presented to the UXOQCS for concurrence prior to implementation.

If a laboratory procedure or result is found to be in noncompliance, the result will not be considered valid.

6.10 PROJECT CORRESPONDENCE

All written and verbal (telephone) correspondence will be documented and routed to the MKM PM. All written communications from the BRAC Technical Support Office or designee must be addressed to the MKM PM. Incoming written communications will be annotated with the date received. Telephone communications to field personnel must be logged by site personnel into the daily activity logs. Telephone communications with office personnel must be recorded in the daily activity logs. Of critical importance is the documentation of activities that stop work or require a communication to or from the BRAC Technical Support Office.

6.10.1 Contract Correspondence

Correspondence concerning this contract is to be sent to:

MKM Engineers, Inc.
4153 Bluebonnet Drive
Stafford, Texas 77477

6.10.2 Project Manager Address

The MKM PM is Mr. Shahrukh Kanga. Mr. Kanga can be contacted as follows:

Address:

MKM Engineers, Inc.
4153 Bluebonnet Drive
Stafford, Texas 77477

Telephone:

281/277-5100

Facsimile:

281/277-5205

Electronic Mail:

shahrukh.kanga@mkmengineers.com

6.11 PROJECT RECORDS

Project records will be maintained in project files for the contract duration.

7.0 ENVIRONMENTAL PROTECTION PLAN

7.1 INTRODUCTION

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract will be protected during the entire period of this contract. MKM will confine its activities to areas defined by this Work Plan. Environmental protection will be as stated in the following subparagraphs.

MKM is directly responsible for the implementation of this plan. Inspections will be made to assure field personnel's compliance. Following are several specific areas of concern that fall under environmental protection.

7.2 IDENTIFICATION OF AREAS REQUIRING PROTECTION

7.2.1 Endangered/Threatened Species

Currently there are no on-site endangered or threatened species identified and located within the boundaries of the project site. However, if any are identified, MKM will perform all site activities in such a manner as to avoid or minimize adverse effects to any endangered or protected plant/wildlife species and resources discovered on the site. If endangered or threatened species are encountered during site activities, MKM will locate and flag-off the areas and immediately notify and obtain guidance from the SEDA BEC before continuing operations within the flagged area. All MKM site personnel will adhere to the specific guidance received from the SEDA BEC.

7.2.2 Wetlands

As shown in Figure 8 (Appendix B), the ROD identified "low-lying wet areas" at the OBG. These areas will be avoided during site operations.

7.2.3 Cultural and Archaeological Resources

Currently there are no known archaeological or cultural resources within the project site. If during removal activities MKM observes unusual items that might have historical, archaeological, or cultural value, MKM will secure such items in place and immediately notify and obtain guidance from the SEDA BEC before continuing operations within the flagged area. All MKM site personnel will adhere to the specific guidance received from the SEDA BEC.

7.2.4 Water Resources

MKM will keep removal activities under surveillance, management, and control to avoid pollution of surface and ground waters. Special management techniques as set out below will be implemented to control water pollution by site operations.

As shown in Figure 8 (Appendix B), there are numerous existing ground water monitoring wells located at the OBG, and several are located within the site. Special care will be taken to prevent damage to or contamination of existing monitoring wells.

7.3 MITIGATION PROCEDURES

7.3.1 Waste Disposal

Disposal of any materials, waste, effluents, trash, garbage, unsatisfactorily decontaminated materials, oil, grease, chemicals etc., in areas adjacent to streams, rivers, or lakes not authorized for waste disposal will not be permitted. If any waste material is dumped in unauthorized areas, MKM will remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, ground which has been contaminated through the fault or negligence of MKM will be excavated, disposed of as directed by the BRAC Technical Support Office, and replaced with suitable fill material compacted and graded, all at MKM's expense. Disposal of waste, trash, and other materials off the project site will be in accordance with all applicable Federal, State, and local laws.

7.3.1.1 Solid Waste Disposal

Solid wastes will be placed in appropriate containers, which will be emptied regularly. All handling and disposal will be conducted to prevent further contamination and/or contaminant migration. MKM will dispose of all solid waste in compliance with Federal, State, and local requirements for solid waste disposal.

7.3.1.2 Hazardous Waste Disposal

Hazardous waste will be removed from the project site and will be manifested, transported, and disposed of in accordance with applicable Federal, State, and Local rules, laws and regulations.

7.3.1.3 Soil Disposal

As described in Section 2.4.10, Oversize Stockpile removal operations will generate several classifications of lead-contaminated soils requiring disposal.

Category 1 soils (total lead concentration < 60 ppm and TCLP lead concentration < 5 ppm) will be spread on-site. Category 2 soils (total lead concentration ≥60 ppm but < 500 ppm and TCLP lead concentration < 5 ppm) will either be spread on-site and covered by 9 inches of clean fill and vegetated, or will be removed from the project site and will be documented, transported, and disposed of in accordance with applicable Federal, State, and Local rules, laws and regulations.

Category 3 soils (total lead concentration greater than 500 ppm and TCLP lead concentration less than 5 ppm) will be removed from the project site and will be documented, transported, and disposed of in accordance with applicable Federal, State, and Local rules, laws and regulations.

Category 4 soils (TCLP lead concentration greater than 5 ppm) will be treated on-site to reduce leachability, and will be removed from the project site and documented, transported, and disposed of in accordance with applicable Federal, State, and Local rules, laws and regulations.

7.3.2 Dust and Emission Control

MKM will maintain all excavations, embankments, stockpiles, access roads, operational areas, waste areas, and other work areas free from excess dust in quantities constituting a hazard or nuisance. For most excavations and site operations performed by MKM, no dust control measures other than wetting of the soil will be needed. Should unanticipated dust control issues arise, MKM will recommend temporary methods to control dust (e.g., treatment with chemical suppressants) to the BRAC Technical Support Office PM for approval. MKM will control dust as the work proceeds and whenever a dust nuisance or hazard occurs.

Hydrocarbon, carbon monoxide, oxides of nitrogen and sulfur emissions are the emissions associated with heavy equipment used at the site. These emissions will be controlled through proper vehicle maintenance, use of mufflers etc. in accordance with Federal, State, and local rules, laws and regulations.

Monitoring of air quality during removal activities will be the responsibility of MKM in accordance with 29 CFR 1910 as detailed in the SSHP.

7.3.3 Spill Control and Prevention

Special measure will be taken to prevent chemicals, fuels, oils, greases, bituminous materials, sawdust, waste washings, herbicides, insecticides, rubbish or sewage, and other pollutants from entering public waters.

With the exception of the heavy equipment on site, there is very little potential for spillage of large quantities of chemicals. MKM will take all necessary precautions to prevent spills and will implement contingency measures for cleanup should any occur. To minimize the potential for and impact of spillage, MKM will:

- Submit spill response procedures as part of the SSHP to the BRAC Technical Support Office PM for review and approval;
- Use and store minimal quantities of fuels and oils on-site;
- Apply work practice controls to prevent spills during refueling and maintenance of power tools, site vehicles, and equipment;
- Maintain on-site spill response supplies and equipment necessary to contain spilled materials and to remove and contain materials that become contaminated due to spillage; and
- Perform, at a minimum, the following emergency procedures if a spill occurs:
  1. Immediately (within 1 hour), notify the BRAC Technical Support Office PM and the SEDA BEC;
  2. Halt site operations in the area and take immediate measures, using properly protected personnel, to control and contain the spill;
  3. Isolate the hazardous area through flagging, remove or extinguish ignition sources, and evacuate all unnecessary personnel from the area;
  4. If mandated by the nature of the spill, evacuate personnel upwind to the pre-designated assembly area, and post personnel at access routes to prevent unauthorized personnel from entering the area; and
  5. Implement control measures, if needed, to reduce vapors, gases, and/or dust emissions.

7.3.4 Storage Areas and Temporary Facilities

Whenever possible, MKM will locate on-site storage areas in such a manner as to minimally affect site resources. Site storage requirements may include the

use of storage trailers or sheds for equipment storage. All storage locations will be approved by the SEDA BEC prior to their use and will be removed and restored IAW the procedures in Section 7.4.

7.3.5 Access Routes

During site activities, MKM will to the greatest extent possible use existing paved and unpaved roadways to minimize the impact of site operations. Use of such roadways will be especially important when EMM is to be used for stockpile excavation because movement of EMM over soil can damage vegetation and terrain. If new site access routes are required, MKM will establish them so as to minimize their impact on surrounding resources and will return the disturbed areas to their previous condition, if so directed by the SEDA BEC.

7.3.6 Protection and Restoration of Trees and Shrubs

MKM will take all actions necessary to protect and prevent damage to all trees, shrubs, and vegetation not identified for removal. No ropes, cables, or wires will be attached to trees for anchorages. Where, in the opinion of the SEDA BEC, trees may be defaced or otherwise damaged by site equipment or operations, MKM will implement protective measures, including placement of boards, planks, poles or fencing around the tree(s) or shrub(s), as directed by the SEDA BEC.

MKM will report scarring of or damage to any tree not identified for removal to the SEDA BEC and, after receiving written direction, will restore the damaged tree as nearly as possible to its original condition. All scars made on trees that have not been designated for removal will be coated with an approved tree wound dressing, if applicable, as soon as possible.

7.3.7 Control of Water Runon and Runoff

MKM will take all reasonable precautions to prevent run-on from entering areas of the site where it may be exposed to contaminated soils, water, or waste as a result of MKM site activities. If necessary, MKM will construct, monitor, and maintain temporary dikes or diversion ditches to prevent water from entering the site.

MKM will implement appropriate controls, such as placing and securing plastic coverings over roll-off containers or soil stockpiles, to prevent or minimize rainfall from contact with hazardous or other wastes/materials created by MKM. MKM does not expect soil erosion, and therefore sediment control, to present a significant problem during site operations. However, site personnel will prevent

sediment, which may or may not contain environmentally significant contaminant levels, from migrating off site, installing fabric silt fences, diversion dikes, and ditches if needed. All erosion and sediment control measures will be properly maintained throughout the duration of the project, as needed, to minimize erosion potential.

7.4 POST CONSTRUCTION CLEANUP OR OBLITERATION

MKM will obliterate all signs of temporary facilities such as haul roads, work areas, structures, fencing, stakes, or any other signs of construction within the work, storage, and access areas. The areas will be restored to near natural conditions. Any damage to roads, bridges, gates, etc. as determined by the SEDA BEC, will be restored to pre-contract conditions.

APPENDIX A

SCOPE OF WORK

FOR

REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

STATEMENT OF WORK

REMOVAL OF OVERSIZE PILE
AT OPEN BURNING GROUNDS SEAD 23

SENECA ARMY DEPOT, NEW YORK

1.0 **Introduction.** This document provides a statement of work (SOW) for the general site support, separation and clearance of "Dangerous Items" in specified portions of lands located at the Seneca Army Depot Activity (SEDA) facility in Seneca County, Romulus, New York. These "Dangerous Items" consist of ordnance and explosives (OE), suspect unexploded ordnance (UXO), and OE related scrap (ORS).

2.0 **General.** The work required under this SOW falls under the BRAC program.

2.1 Performance Objectives

Ordnance and Explosives are a safety hazard and, if present, constitute a hazard to the public and the environment. The contractor will perform this work in a manner designed to meet the following project objectives:

- Safety – The contractor will execute all work in a manner that ensures the health and safety of the workforce and the public at large. All work will be completed in accordance with (IAW) the SOW, applicable Data Item Descriptions (DIDs), U.S. Army Corps of Engineers (USACE) Safety Manual (EM 385-1-1), 29 CFR1910.120, Site-Specific Work Plan with its integral Site Safety and Health Plan, Engineering Pamphlet (EP) 385-1-95a, Basic Concepts and Considerations for Ordnance and Explosive Operations, and other CEHNC and USACE guidance.
- Environmental Sensitivity – The contractor will execute the project in a manner that minimizes the environmental impact to the site and the environment. The contractor will use all possible caution to avoid actions that could disturb these features.
- Schedule and Budget Performance – The project is a firm fixed price contract and will be executed IAW schedule commitments made by the contractor to BRACO, which they in turn will have made to Seneca Army Depot, New York State Department of Environmental Conservation (NYSDEC) and other stakeholders. The contractor will execute the project in a cost-effective and schedule-certain manner.
- Regulatory Acceptability – The project must meet applicable environmental regulatory requirements and provide assurance that those requirements are being met. The contractor will be responsible for obtaining regulatory approval of all documents and reports as may be necessary.

- Federal Facility Agreement-The contractor shall complete all work in accordance with the Federal Facility Agreement (FFA). This includes but is not limited to monthly reporting requirements and document review and approval requirements.

2.2 Performance Period

Contractor's effort will begin within 15 days after delivery order award. All physical work shall be accomplished within 12 months after the delivery order award. Fieldwork for OE removal, screening and sorting will commence only upon approval of the amended Explosive Safety Submission by Department of Defense Explosive Safety Board (if required). Financial closeout will take place as soon as possible after final administrative acceptance of all work.

2.3 Site Description

2.3.1 Location. Seneca Army Depot Activity (SEDA) is located in Northwestern New York, in the area between Cayuga Lake to the east and Seneca Lake to the west in Seneca County. The city of Romulus, New York borders the eastern side of SEDA.

2.3.2 Site History. The 10,587-acre SEDA facility was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since that date. From its inception in 1941 until 1995, SEDA's primary mission was the receipt, storage, maintenance, and supply of military items, including munitions and equipment. Ordnance stored at SEDA included all classes of ammunition and explosives except chemical ammunition other than smoke.

The Depot's mission changed in early 1995 when the Department of Defense (DOD) recommended closure of the Seneca Army Depot under the BRAC process. This recommendation to close Seneca Army Depot Activity was approved by Congress on September 28, 1995 and the Depot was officially closed in July 2000.

2.4 Area of Concern. The area of concern (AOC) to be cleared under the SOW is an oversize stockpile generated from the clearance of the Open Burning Grounds SEAD-23. The former Open Burning Grounds is located to the south of SEAD-45 (Open Detonation Area) and contains OE, ORS, and dirt and rocks left over from a previous unfinished contract. This material has been screened and sifted at least three times. This pile has been relocated to just south of SEAD-45, and is located on plastic. The soil is contaminated with heavy metals consisting of lead and copper.

The contractor will visit the site independently to characterize and determine the make-up of the oversized pile identified in the above AOC. This will be a firm fixed price task and the Army will not provide additional details regarding the size or make-up of the pile.

3.0 **Task Description**

3.1 TASK 1 – (Firm Fixed Price) Prepare Explosive Safety Submission (ESS). Based on information gathered through site visits, a comprehensive records search, and personnel interviews, the contractor will prepare and submit a written ESS in accordance with the DDESB 6055.9 DOD Standard. The ESS for the current SOW will be developed as an addendum (extension if necessary) to the existing ESS for the clearance of the OB grounds.

3.2 TASK 2 – (Firm Fixed Price) Prepare Work Plan (WP). The contractor will prepare a WP describing all aspects of the site activities associated with the implementation of the scope of work. The WP for the current SOW will be developed as an addendum (extension) to the existing OE Work Plan, addressing project-specific investigation/removal action/construction support requirements.

The WP will be developed IAW DID OE-005-01 and will include the following sub-plans as elements:

- Technical Management Plan (DID OE-005-02)
- Explosives Management Plan (DID OE-005-03)
- Explosives Site Plan (DID OE-005-04)
- Site Safety and Health Plan (DID OE-005-06)
- Work, Data, and Cost Management Plan (DID OE-005-08)
- Quality Control Plan (DID OE-005-11)
- Environmental Protection Plan (DID OE-005-12)

3.3 TASK 3 – (Firm Fixed Price) Mobilization and Site Preparation. The contractor will mobilize personnel and equipment to the site within 2-weeks of Notice-to-Proceed (NTP), and will establish operational areas and temporary facilities. The contractor will complete the following activities during the initial mobilization:

- Meet with local fire protection/prevention organizations to ensure site operations are coordinated and conducted in a manner consistent with their guidelines.
- Make contact with local vendors for accommodations, as well as vendors/ suppliers, for routine purchases to ensure smooth project start up.
- Inspect work areas to identify possible environmental constraints, terrain limitations, and any other interference.
- Set up work zones and safety arcs for sorting/sorting operations, treatment pads/areas for the soil stabilization operations, and accumulated scrap staging areas.

3.4 Task 4 – (Firm Fixed Price) – Excavation and Mechanical Sorting of Oversize Pile (Mt. Molle). The contractor will remove and separate the oversize stockpile containing burn operations residue from the SEAD-23 area. The location of the pile is to the south of SEAD-45 (Open Detonation Area) - shown in the Figure 1. This material was left over from a previous contract.

3.5 TASK 5 – (Firm Fixed Price) Burn Residue Inspection, Certification and Disposal. The contractor will furnish a qualified UXO Quality Control Specialist (UXOQCS) and the necessary personnel and equipment to turn in all recovered inert ordnance items and ORS, to thermally treat the ORS above 1000 degrees F. to a 5X level, to certify the ORS as 5X and free from explosive hazards, and containerize the treated 5X certified ORS for shipment to a smelter/recycling facility. The contractor will 100% visually inspect all recovered items to be disposed of, to ensure removal of live rounds, primers, or explosive material. Items that cannot be visually inspected will be either 100% physically inspected (i.e., using depth gauges, mirrors, or other inspection devices), or vented.

The contractor UXO Safety Officer (UXOSO) will ensure the specific procedures and responsibilities for processing sifted items for certification are being followed and performed safely. The UXOSO will confirm that operations are compliant with the Site Safety and Health Plan (SSHP) and consistent with applicable regulations and guidance and in accordance with the approved WP. The UXOSO will also perform random checks of processed items to ensure items being identified as scrap are safe and free from any explosive hazards.

The contractor SUXOS will independently perform and document a minimum of 10% (100% in some cases), random verification sampling of all items collected from the various teams to ensure no items of a dangerous or explosives nature are identified as scrap metal. The SUXOS will perform these random checks to verify that the item is free from any explosive hazards, necessary for completion of the required documentation. The SUXOS will also ensure that proper shipping documentation (Bill of Lading, DD 1348-1A or equivalent) is completed for all items to be transferred. The documentation will clearly indicate the following for scrap metal:

a) Basic material content (type of metal; e.g., steel, aluminum, brass, or mixed)
b) Estimated weight
c) Unique identification of each of the containers and seals stated as being turned over
d) Location where OE scrap was obtained (SEAD-23)
e) Seal identification, if different from the unique identification of the sealed container
f) The following certification will be entered on each shipping document for turn over of scrap generated from sorting operations and will be certified by the UXOQCS and verified by the SUXOS. *"This certifies that the Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards."* The SUXOS will perform random checks to ensure that the item is free from explosive hazards, necessary to complete the shipping document. The SUXOS will certify all scrap metal as free of explosive hazards or other dangerous material and be responsible for ensuring that inspected materials are secured in a closed, labeled and sealed container.
g) The contractor will provide an *"Inspection, Certification, and Chain of Custody Form"* to BRAC, SEDA and the scrap recycling facility. The following information for each container will be provided; weight of container; location where the item was obtained;

name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. This documentation will be included in the final removal report.

The contractor will release the certified and verified OE scrap to an organization or facility that will:

a) Receive the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chain of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agree with the provided documentation that the sealed containers contained no explosive hazards when received. This shall be signed on company letterhead stating that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic metal content.
b) Send notification and supporting documentation to the contractor that the contents of the sealed containers have been smelted and are now only identifiable by their basic metal content.
c) This document will be incorporated into the final removal report as documentation for supporting the final disposition of the OE scrap metal.

3.6 Task 6 – (Firm Fixed Price) – Onsite Treatment and Offsite Disposal of Earthen Material. After separation operations are performed on the oversize stockpile, the contractor will perform sampling,segregation based on analytical results, onsite treatment and offsite disposal of soils IAW the Record of Decision (ROD) for SEDA-23 dated June 1998. Soils with lead concentrations under 60 parts per million (ppm) will be stockpiled nearby in the OB grounds and can be used as cover for soils with lead concentrations 60 to 500 ppm that the contractor determines can be left on-site.

The ROD includes on-site treatment of soil exceeding the RCRA toxicity limits due to metals. These soils exceeding the TCLP regulatory limits will be treated on site via solidification/stabilization so that the soils will not be a characteristic hazardous waste and can be disposed (landfilled) of as a solid waste IAW the requirements of the Land Disposal Restrictions of RCRA.

3.7 TASK 7 – (Firm Fixed Price) Quality Control The contractor will provide overall project QC and is responsible for the overall quality of the work. The project Work Plan will establish the quality requirements for the project. The contractor will achieve the above objectives by establishing the data quality necessary to ensure defensibility of the final removal report. The contractor will develop and implement a project-specific quality management approach, which will emphasize data quality management. The primary tools that will be used to accomplish quality performance are:

a) Implementation of the contractor's continuous improvement process. A strengthened continuous improvement program is a key result of any contractor's Corporate-wide Quality Assurance (QA) Program. Nonconforming items will be identified, assigned for root cause analysis, and corrective actions developed and documented. The net effect of

the process is a much richer environment for effecting lasting improvement – more opportunities, and less blame.

b) Integration of the data management principles expressed in the project planning process. The contractor's project planning process will relate data needed to meet the project objectives, and in so doing, help establish project-specific Data Quality Objectives (DQOs). The planning process will present the statements through which project-specific DQOs are defined including: satisfaction (or not) of project objectives, satisfaction of data user needs and characteristic of interest (anomaly) identified.

The contractor will define and document project-specific quality requirements in the Work Plan. The Quality Control Plan (QCP) will provide the procedures for controlling and measuring the quality of the removal action performed at SEDA. All quality management activities will be accomplished in accordance with accepted professional and technical standards, as described in the contractor's Corporate Quality Assurance Plan. This ensures that appropriate work procedures will be used, and documentation will be complete. The QCP will describe procedures for:

- Equipment testing, calibration and maintenance
- Record keeping
- Field data management
- UXO identification, management and accountability
- Continuous improvement of procedures and processes
- Compliance with all provisions of the Work Plan.

UXO Quality Control Specialist (UXOQCS). The contractor will achieve the above objectives by assigning a DID OE-025 qualified UXOQCS who will have the overall onsite responsibility and authority to enforce the site-specific QC plans and procedures. The UXOQCS will not be involved in the performance of production tasks. The UXOQCS's specific responsibilities include:

- Coordinating with the BRAC Technical Support Office (TSO) and the BRAC SEDA environmental onsite representative to ensure that QC objectives appropriate to the project are set and all personnel are aware of these objectives;
- Conducting daily QC surveillance and inspection activities for all site activities and recording the results from these inspections in the QC activity log;
- Recommending and implementing actions to be taken in the event of a QC deviation to include stop work authority;
- Reporting non-compliance with QC criteria to the Project Manager and the contractor's Corporate QC Manager; and
- Stop work authority where potential quality issues are significant.

3.8 TASK 8 – (Firm Fixed Price) Project Management The contractor will use a variety of project management techniques to ensure predictable project performance which meets scope, schedule and budget requirements through open and effective communication. The contractor will encourage open communication throughout the project team. Project

meetings will occur on a very frequent, near real-time basis. However, official correspondence and communications related to scope, schedule, budget, and quality will be made through the contractor's Project Manager only. The contractor will perform project management activities necessary to maintain project control, to include but not limited to, the following.

3.8.1 Weekly Status Reports. The contractor will generate a Weekly Status Report for this project, detailing project status, milestones, safety, quality, production, and other information required by DID OE-085. This report will incorporate all telephone conversations/correspondence records as required by DOD OE-055. The reports will be emailed to the BRAC TSO and, depending on the BRAC SEDA Environmental Coordinator onsite requirements, the SEDA Environmental Coordinator.

3.8.2 Monthly Status Report. The contractor will submit a monthly report IAW DID OE-080.

3.8.3 Schedule. The contractor will submit a preliminary project schedule in Microsoft Project as part of the Work Plan. The contractor will update the schedule in accordance with DID OE-085 *Weekly Status Report*. A final schedule shall be submitted a minimum of 5 days before commencing fieldwork.

3.8.4 Public Meetings. The contractor will attend and participate in public meetings. The contractor will be prepared to make presentations and answer questions concerning project activities at SEDA.

3.8.5 Reports/Minutes, Record of Meetings. The contractor will prepare and submit a report/minutes of all meetings attended in accordance with DID OE-045.

3.8.6 Telephone Conversations/Correspondence Records. The contractor will keep a record of each phone conversation and written correspondence concerning this project in accordance with DID OE-055. A copy of this record shall be attached to the Weekly Status Report.

3.9 TASK 9 – (Firm Fixed Price) Prepare a Removal Report The contractor will prepare a final Removal Report due one month from the last day in the field. The contents of the final report include, but are not limited to the following: An Executive Summary of removal activities; soil analytical results; copies of field data records; Quality Assurance (QA); certification that the earthen material remaining on site is free of "Dangerous Items"; certification that the soils treated are stabilized and in compliance with regulations, and summary of the ORS certification and final disposition.

4.0 Schedule of Deliverables

4.1 Deliverables. The Contractor shall provide the indicated deliverables on the following schedule:

Deliverables	Days after NTP
Addendum to ESS	30 days after award
Addendum to Work Plan	30 days after award
Status Reports and Updated Schedule	Weekly basis
Final Removal Report	30 days after field work completed

5.0 Submittals and Correspondence

5.1 Format and Content of Reports. All reports shall contain the following as a minimum, but shall conform to the specific requirements of applicable DIDS. All drawings shall be of engineering quality with sufficient details. The report shall consist of 8-1/2" x 11" sheets of paper. The report covers shall consist of durable binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages.

5.2 Review Comments. The Contractor shall satisfactorily resolve all comments received from the Contracting Officer or the Contracting Officer's Representative and regulatory agencies. The Contractor shall incorporate all applicable comments and provide a written response to each comment no later than 10 days after the Contractor receives the comment.

5.3 Identification of Responsible Personnel. Each submittal shall identify the specific members and title of the subcontractor and Contractor's staff that had significant input into the report.

5.4 Digital Data. All digital data shall conform to the requirements of DID OE-005-14. All final text files and reports generated by the Contractor shall be furnished to the CO in a PC-compatible format. All drawings shall be on reproducible mylars and a PC-compatible digital format.

6.0 Public Affairs

The Contractor shall not publicly disclose any data generated or reviewed under this contract unless authorized by the Contracting Officer (CO). The Contractor shall refer all requests for information concerning the site condition to the BRAC SEAD Project Manager. Reports and data generated under this contract are the property of the Department of Defense and distribution to any other sources by the Contractor, unless authorized by the CO, is prohibited.

7.0 Inspection/Final Acceptance

7.1. The BRAC Technical Support Office and the SEAD Environmental Coordinator (or appointed representative) will monitor contractor performance on this SOW.

7.2. Notification of Inspections and Tests: At least 10 working days prior to the anticipated final inspections and tests required by this SOW, the contractor will notify the BRAC Technical Support Office and the SEAD Environmental Coordinator of the date and items to be inspected/tested.

7.3 Upon project completion, the SEAD Environmental Coordinator will inspect facilities and, if acceptable, notify BRACO in writing that facilities are ready for final acceptance inspection.

7.4 A representative of the BRAC Technical Support Office will perform final acceptance inspection, unless this is delegated in writing, to the SEAD Environmental Coordinator.

7.5. The final acceptance of this project will take place upon receipt by the contractor of written approval from the Contracting Officer.

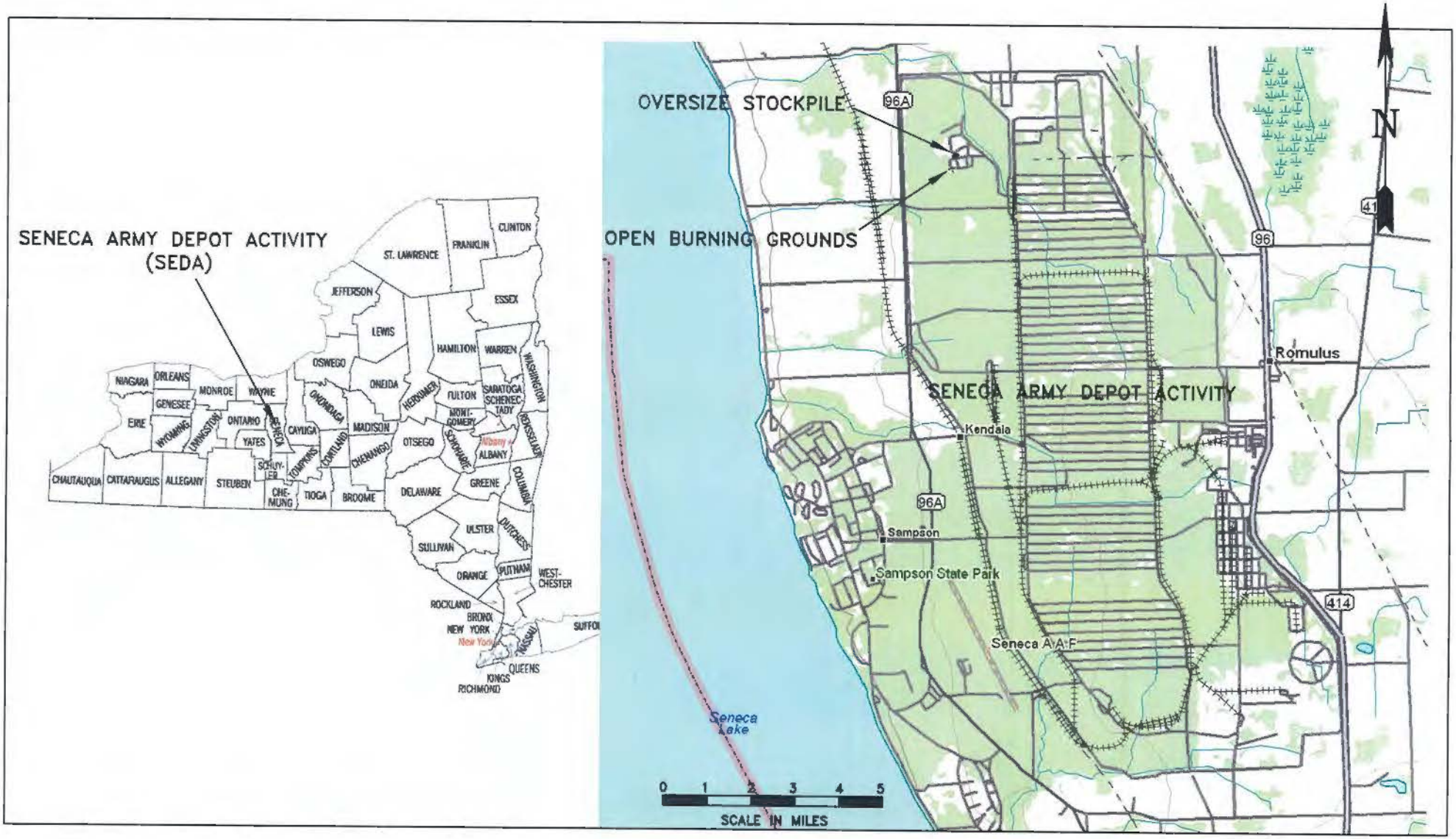
APPENDIX B

SITE MAPS

FOR

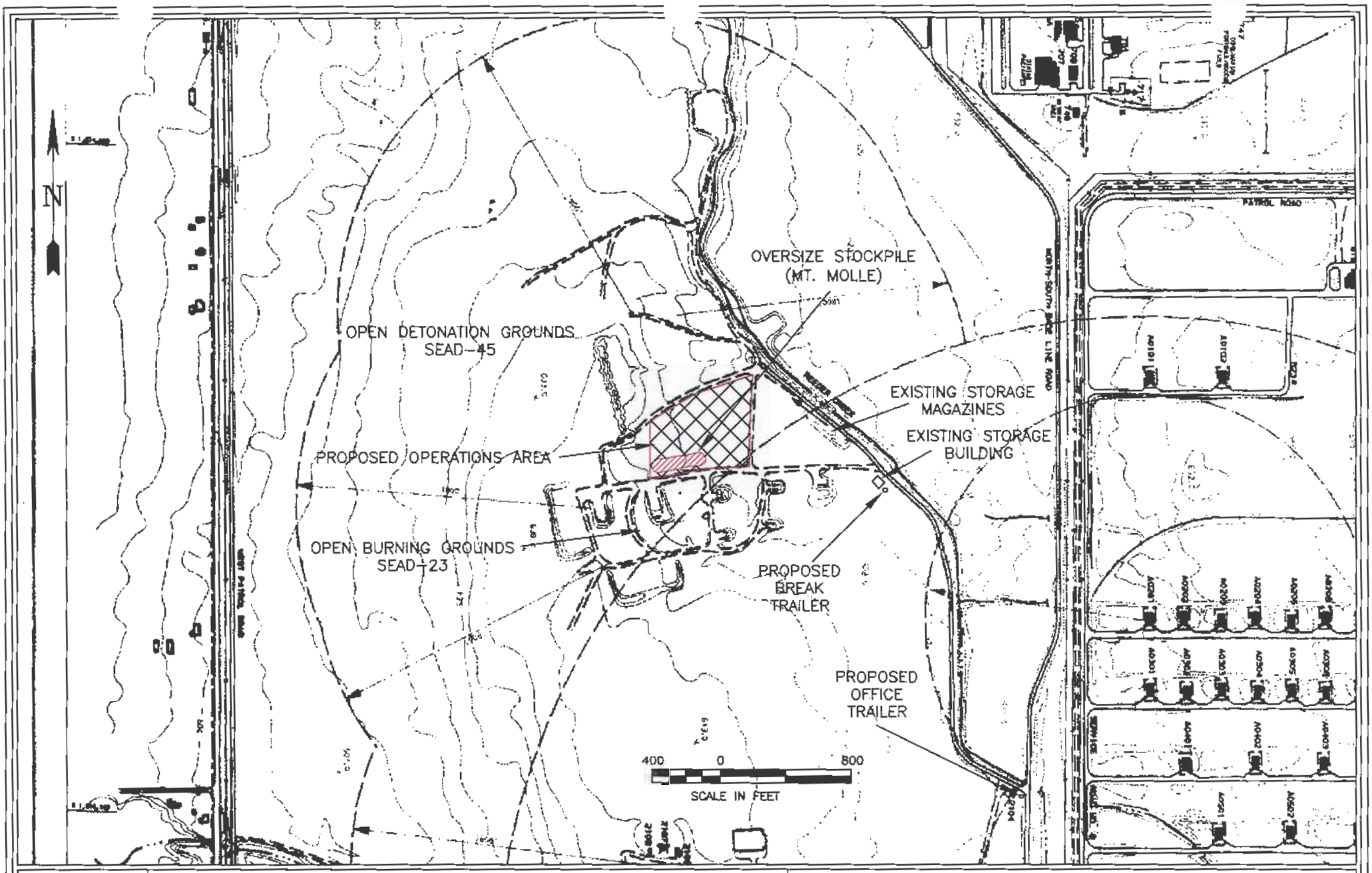
REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK



MKM	MKM ENGINEERS, INC.			FIGURE 1 – REGIONAL MAP SHOWING LOCATION OF SEDA
www.mkmeng.com	PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG1
	DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
	DRAWN BY:	CVJ	APPROVED BY:	SHK

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY

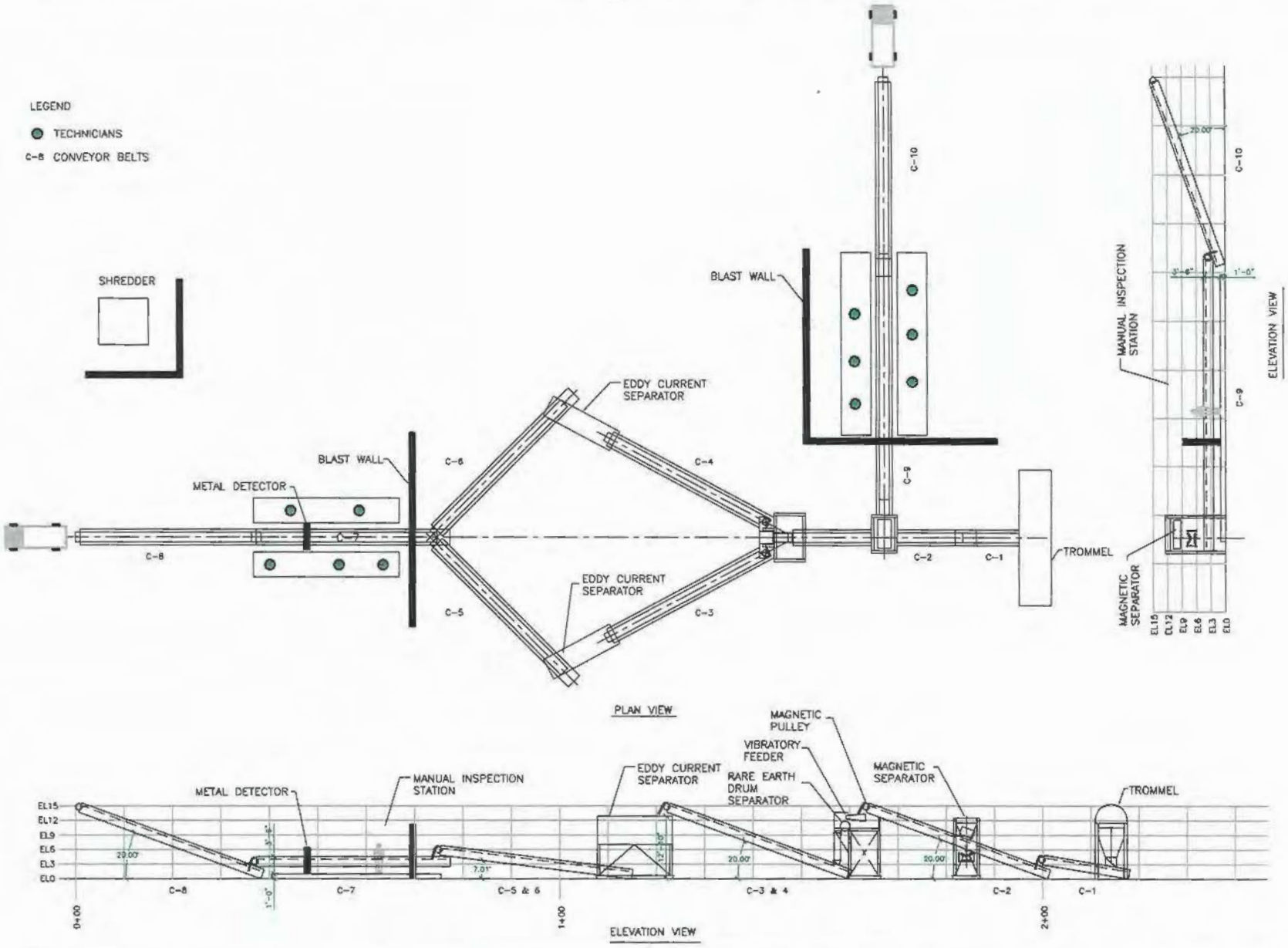


MKM ENGINEERS, INC.			
PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG2
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

www.mkmeng.com

FIGURE 2 – SITE MAP OF OVERSIZE STOCKPILE (MT. MOLLE)

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY



MKM ENGINEERS, INC.			
PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG3
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

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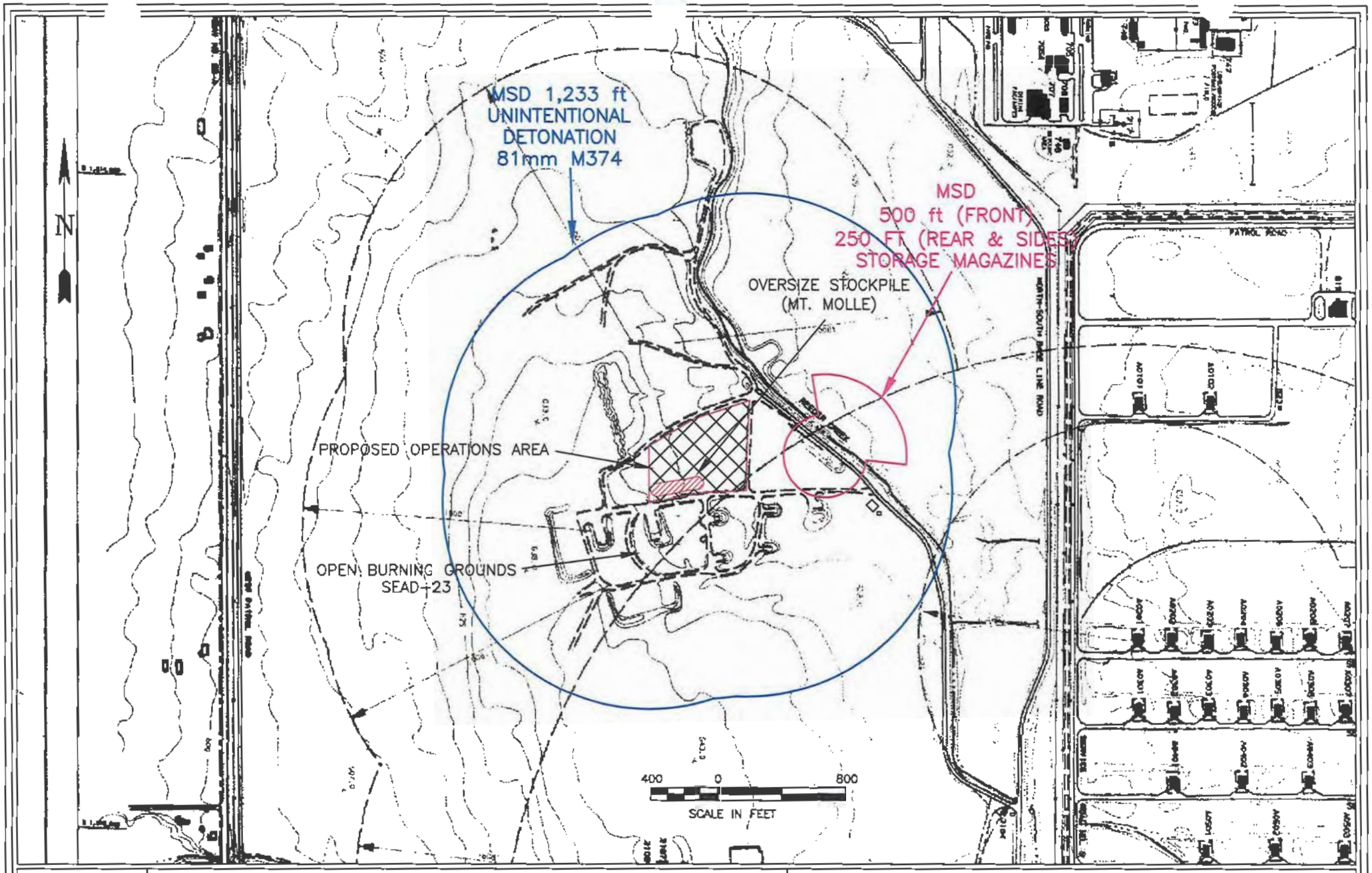
FIGURE 3 – SCHEMATIC OF PROPOSED SORTING OPERATIONS

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY



MKM ENGINEERS, INC.

PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG4
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

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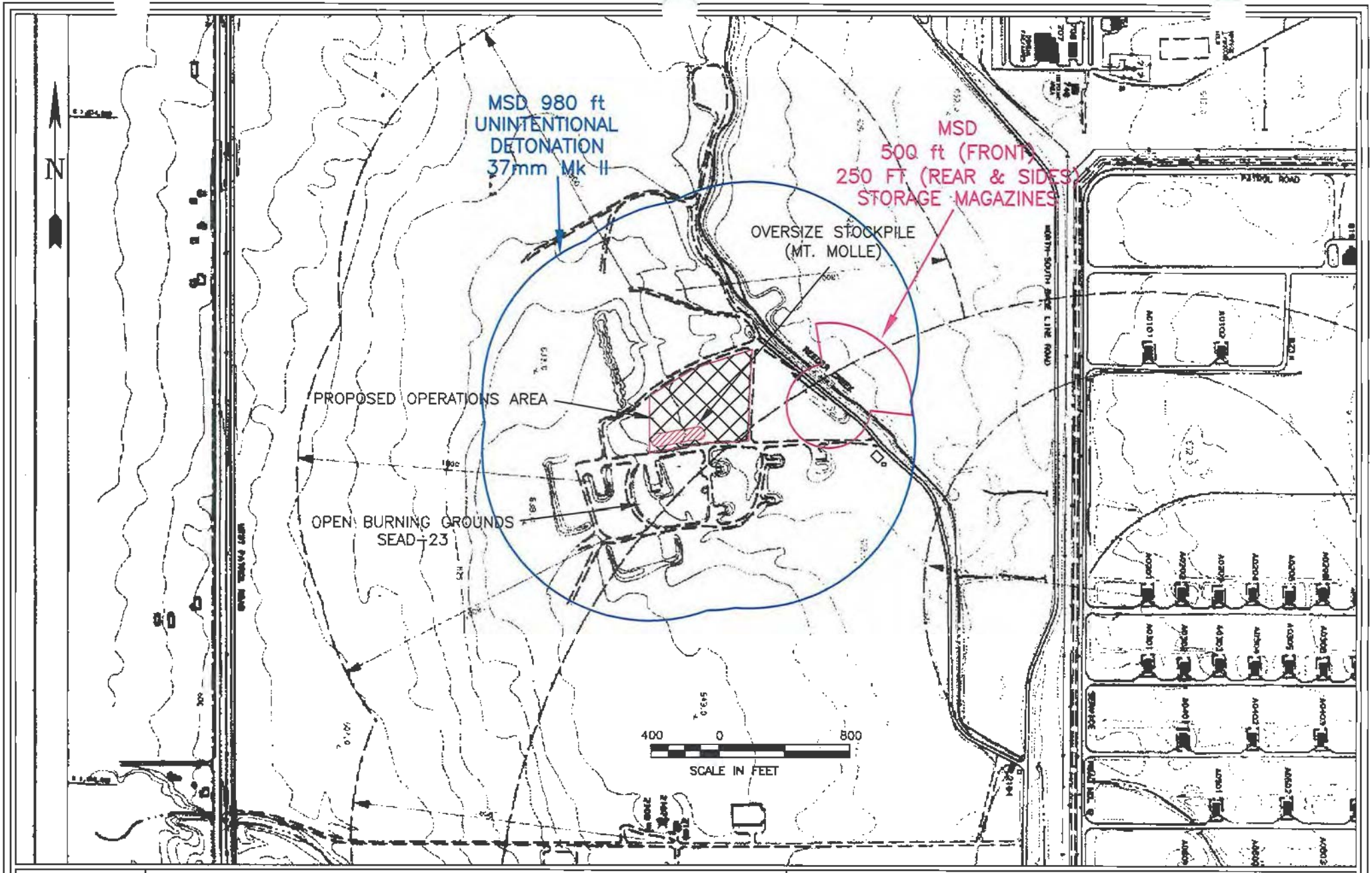
FIGURE 4 – MINIMUM SEPARATION DISTANCE (MSD) FOR INITIAL CLEARANCE OF OPERATIONS AREA

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY



MKM ENGINEERS, INC.

PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG5
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

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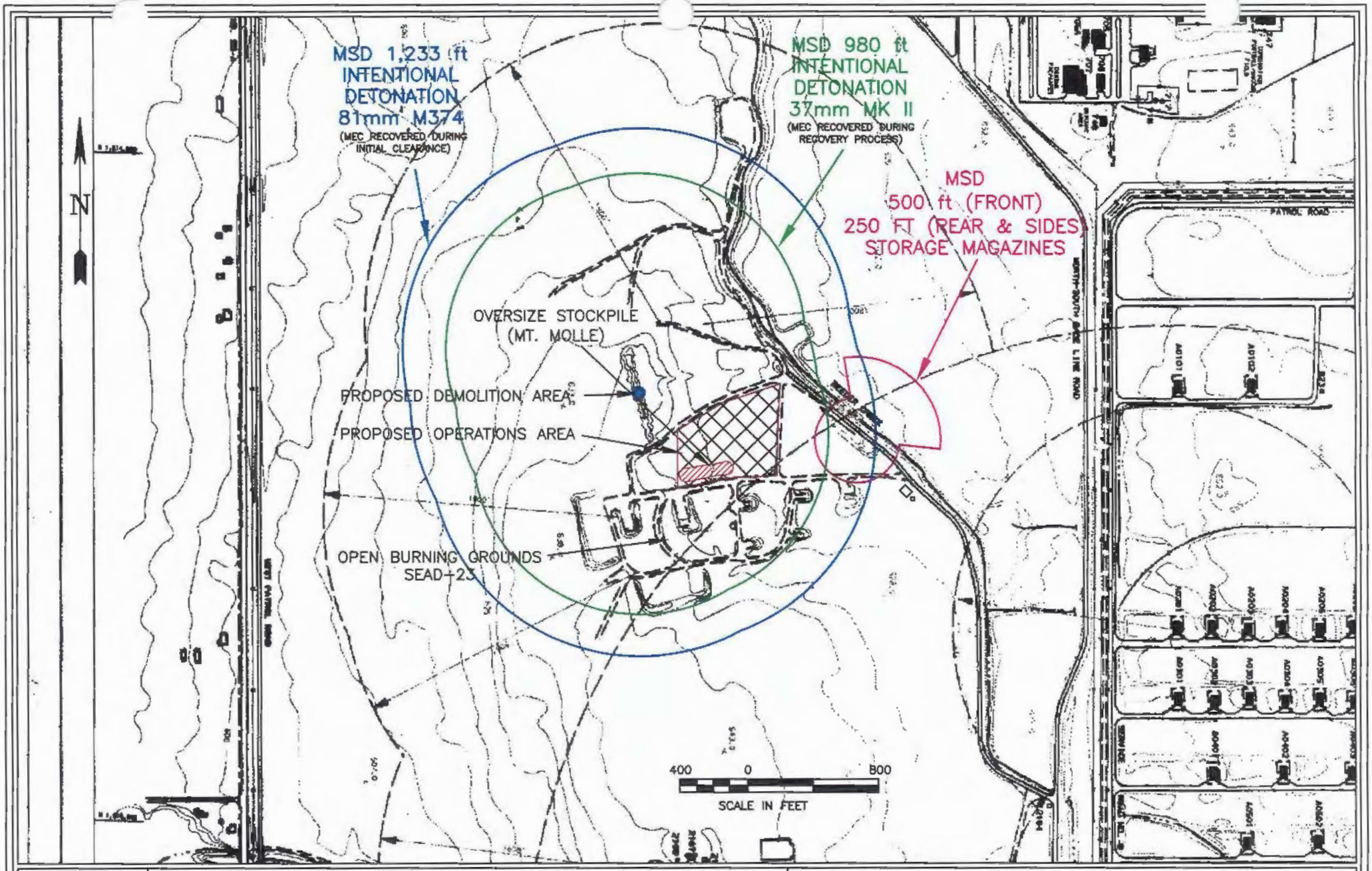
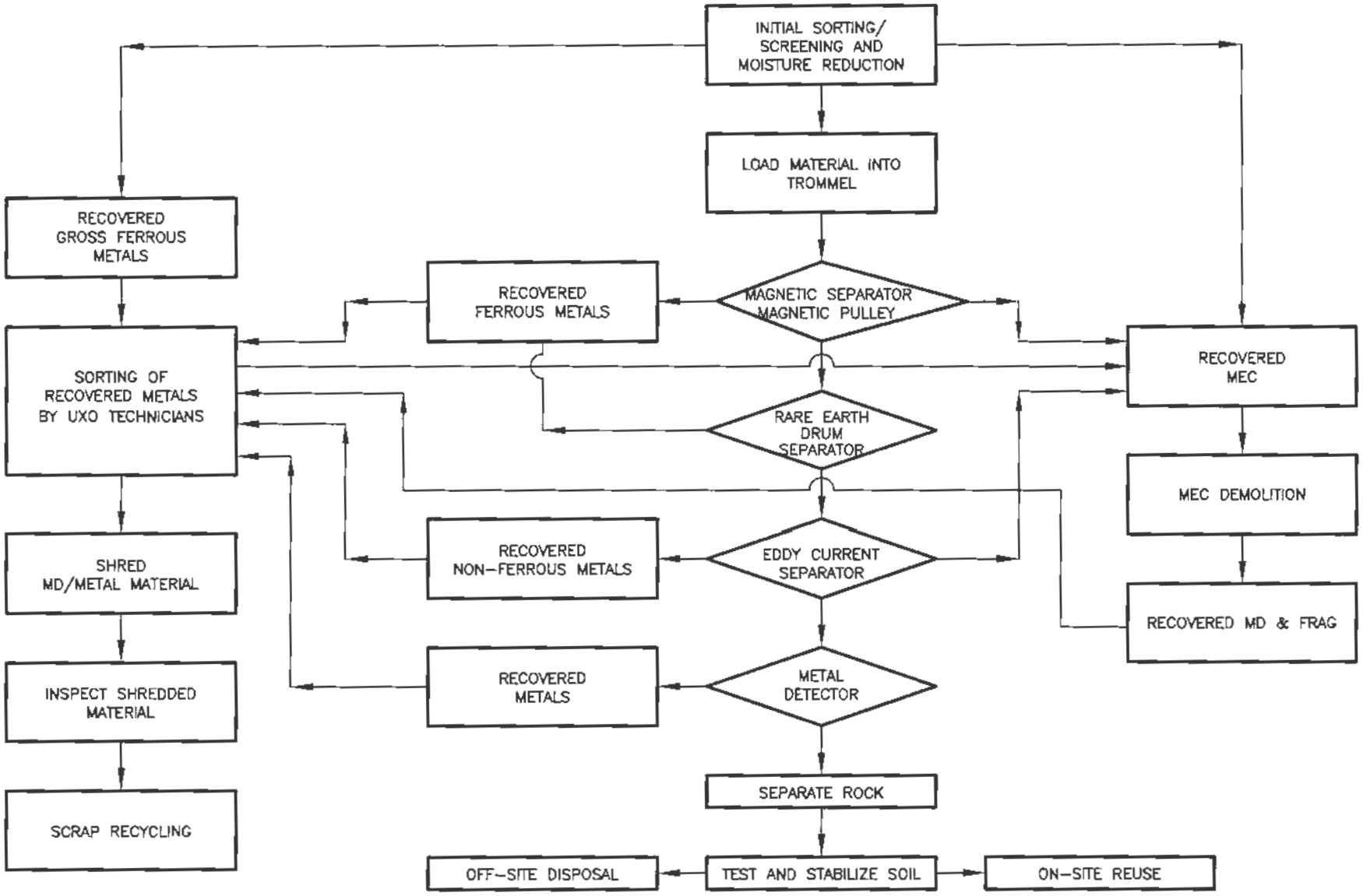
FIGURE 5 – MINIMUM SEPARATION DISTANCE (MSD) FOR THE PROCESSING OF THE OVERSIZE STOCKPILE

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY



MKM	MKM ENGINEERS, INC.			FIGURE 6 – MINIMAL SEPARATION DISTANCE (MSD) FOR THE MEC DEMOLITION
	PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG6
	DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
	DRAWN BY:	CVJ	APPROVED BY:	SHK
www.mkmeng.com				REMOVAL OF OVERSIZE STOCKPILE SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY



MKM ENGINEERS, INC.			
PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG7
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

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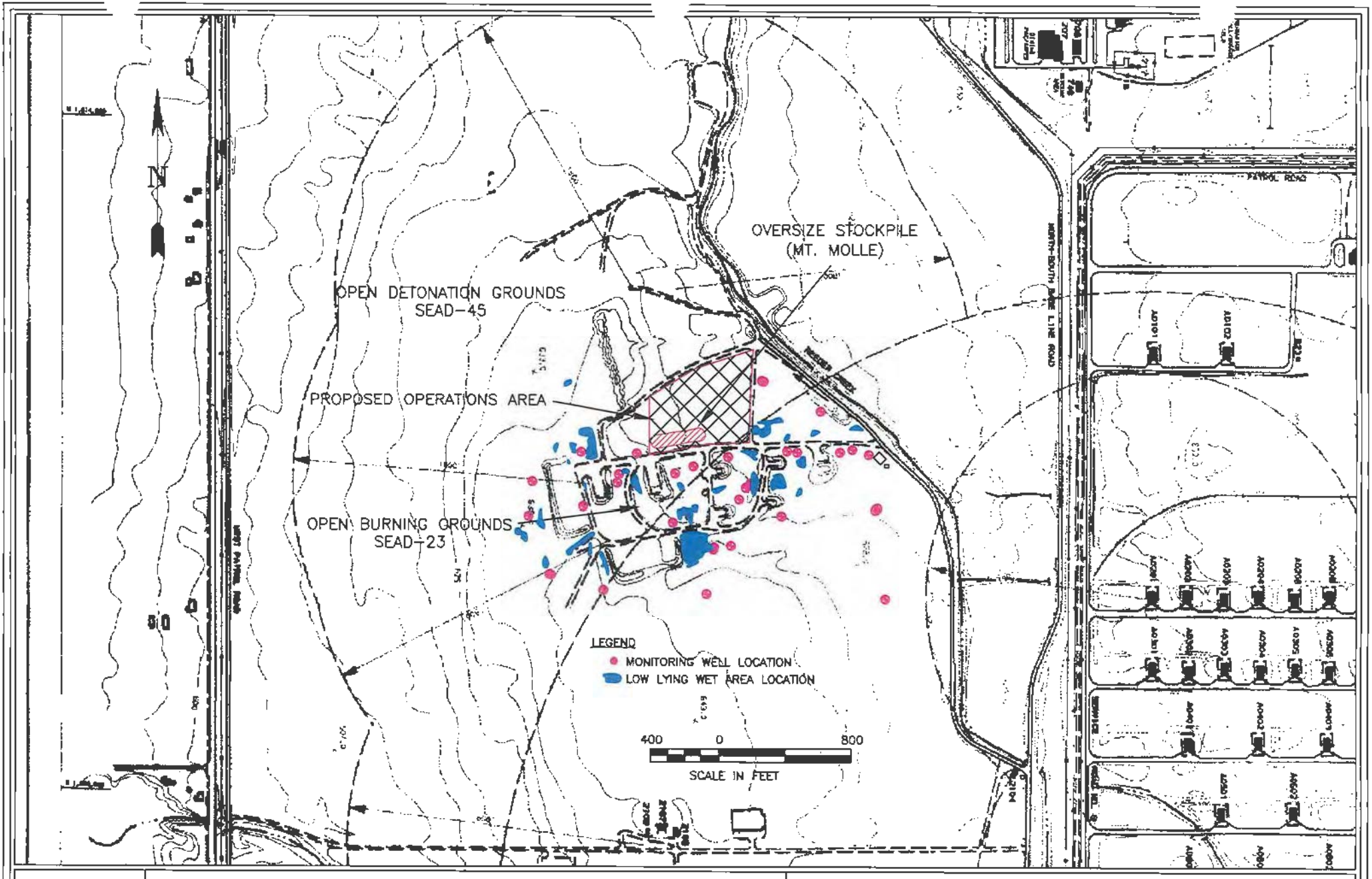
FIGURE 7 – CONCEPTUAL PROCESS FLOW DIAGRAM

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVIY, ROMULUS, NY



MKM ENGINEERS, INC.

PROJECT NO.:	02108	DRAWING NO.:	SEDA_FIG8
DATE DRAWN:	04/02/2004	SCALE:	AS SHOWN
DRAWN BY:	CVJ	APPROVED BY:	SHK

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FIGURE 8 – MONITORING WELLS AND WET AREA LOCATIONS

REMOVAL OF OVERSIZE STOCKPILE
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY

APPENDIX C

LOCAL POINTS OF CONTACT

FOR

REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Service / Contact	Agency / Position	Telephone Number
Land or Air Ambulance	South Seneca Volunteer Ambulance Company	911 (607) 869-5313
Emergency Hospital Care	Geneva General Hospital 196 North Street Geneva, NY 14456	(315) 787-4000
Police	Seneca County Sheriff	911 (607) 869-3721
Fire	Romulus Fire Department	911 (607) 869-5282
Closest Military EOD Unit:	725th Ordnance Company, Ft. Drum, NY	(315) 772-5909 (315) 773-4044 (24-hour)
Steve Absolom	SEDA BRAC Environmental Coordinator	(607) 869-1309
William Ingold	BRAC Technical Support Office Project Manager	(309) 782-1395
Khodi Irani	MKM President	(281) 277-5100 Cellular (281) 794-8917
Paul Ihrke	MKM Program Manager	(281) 277-5100
Shahrukh Kanga	MKM Project Manager	(281) 277-5100 Cellular (281) 734-2923
Joe Snow	MKM Operations Manager	(713) 302-2095
Max Owens	MKM SUXOS	(281) 642-9342
Drew Bryson, CIH	MKM Safety and Health Manager	Office (865) 482-1292 Cellular (281) 546-4862
Tommy Titcomb	MKM UXOSO	(281) 642-9440

APPENDIX D

USACE ENGINEER PAMPHLET EP 385-1-95a

FOR

REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

US Army Corps
of Engineers®

EP 385-1-95a
29 June 2001

SAFETY

BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR ORDNANCE AND EXPLOSIVES OPERATIONS

ENGINEER PAMPHLET

"Approved for public release; distribution is unlimited."

AVAILABILITY

Electronic copies of this and other U.S. Army Corps of Engineers publications are available on the Internet at http://www.usace.army.mil/inet/usace-docs/. This site is the only repository for all official USACE engineer regulations, circulars, manuals, and other documents originating from HQUSACE. Publications are provided in portable document format (PDF).

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

EP 385-1-95a

CESO

Pamphlet
No. 385-1-95a

29 June 2001

Safety
BASIC SAFETY CONCEPTS AND
CONSIDERATIONS FOR ORDNANCE
AND EXPLOSIVES OPERATIONS

1. Purpose. This pamphlet establishes U.S. Army Corps of Engineers (USACE) operating procedures for dealing with ordnance and explosives (OE) items at Formerly Used Defense Sites (FUDS), Base Realignment and Closure, and Installation Restoration projects. There are no absolutely safe procedures for dealing with OE items, merely procedures considered to be least dangerous; therefore, it is essential that a planned and systematic approach to dealing with such items be established.

2. Applicability. This pamphlet applies to all Headquarters, U.S. Army Corps of Engineers elements and all USACE Commands having responsibility for performing OE response activities.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References.

a. 27 CFR 55, Commerce in Explosives.

b. 29 CFR 1926, Subpart P, Excavations.

c. DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards.

d. AR 385-64, U.S. Army Explosives Safety Program.

e. DA Pam 385-64, Ammunition and Explosives Safety Standards.

f. TM 60A-1-1-31, Explosive Ordnance Disposal Procedures: General Information on EOD Disposal Procedures.

g. TB 700-2, Department of Defense Ammunition and Explosives Hazard Classification Procedures.

h. ER 5-1-11, Program and Project Management.

i. ER 1110-1-12, Quality Management.

j. EP 1110-1-17, Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and Explosives Projects.

k. EP 1110-1-18, Ordnance and Explosives Response.

l. EM 385-1-1, Safety and Health Requirements Manual.

m. HNC-ED-CS-S-98-1, Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.

n. HNC-ED-CS-S-98-2, Method for Calculating Ranges to No More Than One Hazardous Fragment per 600 Square Feet, January 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.

o. Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites, U.S. Army Engineering and Support Center, Huntsville, August 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.

p. AFM 91-201, Explosives Safety Standards.

q. NAVSEA OP5, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation, and Shipping.

r. NFPA 780, Standard for the Installation of Lightning Protection Systems.

5. Explanation of Abbreviations and Terms. Abbreviations/acronyms and special terms used in this document are explained in the glossary.

6. Policy. The policy of USACE is to produce products and services that fully meet customers' expectations of quality, timeliness, and cost effectiveness, within the bounds of legal responsibility. An acceptable level of quality does not imply perfection; however, there should be no compromise of functional, health, or safety requirements. Adherence to the principles outlined in ER 5-1-11 and ER 1110-1-12 will contribute to achieving this goal. OE response procedures must be formulated to ensure harmony with the USACE Strategic Vision and should be executed in concert with activities presented in other USACE guidance.

7. Responsibilities. USACE and contractor personnel involved with OE response projects are responsible for safely executing response actions in accordance with (IAW) the approved Site Safety and Health Plan, approved Work Plan, and all applicable laws, regulations, and policies.

8. General Safety Concerns and Procedures.

a. As a general rule, all fuzed unexploded ordnance (UXO) will be detonated in the original position found. This is the safest method to effect final disposition of munitions.

b. OE operations will not be conducted until all applicable plans for the site in question are prepared and approved. These plans will be based upon the concept of limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of OE consistent with safe and efficient operations.

c. Only UXO-qualified personnel will perform OE procedures. As an exception, a UXO Technician I may assist in the performance of OE procedures when under the supervision of a UXO Technician III or a UXO-qualified individual of higher rank than UXO Technician III. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform OE-related procedures when supervised by a UXO Technician III or a UXO-qualified individual of higher rank than 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 or a UXO-qualified individual of higher rank than UXO Technician III.

d. 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 nonstatic-producing clothing.

e. Prior to any action being performed on an ordnance item, all fuzing will be definitively identified. This identification will consist of fuze type by function and condition (armed or unarmed) and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/ sheared, etc.

f. OE operations will be conducted only during daylight hours.

9. OE Safety Precautions.

a. Every effort will be made to identify a suspect OE item. Under no circumstances will any fuzed UXO be moved in an attempt to make a definitive 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 onsite USACE representative will be notified immediately. If there is no onsite USACE representative, the USACE district or the U.S. Army Engineering and Support Center, Huntsville (USAESCH) OE Safety Group will be notified as soon as possible. If research of documentation is required, it will be initiated by USAESCH. Following is additional guidance for the safe handling of OE items:

(1) Projectiles containing base-detonating fuzes are to be considered armed if the round is fired.

(2) Arming wires and popout pins on unarmed fuzes should be secured prior to moving OE items.

(3) Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on OE items. Such actions may arm or activate the items.

(4) Do not attempt to remove any fuze(s) from OE items. Do not dismantle or strip components from any OE items.

(5) UXO personnel are not authorized to render inert any OE items found onsite.

(6) OE items will not be taken from the site as souvenirs/training aids.

(7) Civil War ordnance will be treated in the same manner as any other OE items.

b. Prior to entering areas/ranges contaminated with Improved Conventional Munitions (ICMs) or submunitions, a Department of the Army (DA) waiver must be obtained by the affected installation or for FUDS properties, the executing Corps district. If an ICM or submunition is found at a site not previously known to contain ICMs or submunitions, work will cease. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the OE Mandatory Center of Expertise.

c. Any time suspect chemical warfare materiel 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 FUDS properties, the UXO team will notify the local point of contact (POC) designated in the Work Plan. The local POC will facilitate explosive ordnance disposal (EOD) response, and two personnel will secure the site until the EOD unit'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 if necessary. The EOD unit will notify the Technical Escort Unit (TEU) and secure the area until TEU's arrival. After notifying the local law enforcement agency (when necessary), the local POC will notify the USAESCH OE Safety Group of the actions taken.

(2) On active installations, the UXO team will normally notify the Range Control Officer, the Facility Engineer, post headquarters, or the POC designated in the Work Plan.

d. Avoid inhalation of and skin contact with smoke, fumes, and vapors of explosives and 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 an item's contents, which may have rendered the item more sensitive than in its original state.

f. Do not rely on the color coding of OE items for definitive 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 investigation proves otherwise. PZ fuzing is extremely sensitive. It 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 rear 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. See DA Pam 385-64 for safe separation distances from various sources of EMR.

j. Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally boobytrapped 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 can initiate the fuze.

k. Assume that a practice OE item contains a live charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red or white phosphorus (WP) residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

l. Do not approach a smoking WP munition. Burning WP may detonate the explosive burster charge at any time.

m. Foreign ordnance was shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign ordnance.

10. OE Storage. During OE projects, explosives storage falls into two categories, on Department of Defense (DOD) installations and off DOD installations.

a. On DOD installations, DOD 6055.9-STD and Service requirements (Army – AR 385-64; Navy – NAVSEA OP5; Air Force – AFM 91-201) will be met. For the remainder of this pamphlet, reference to DOD standards (i.e., DOD 6055.9-STD) also implies that Service explosives safety publications will be adhered to. Generally, the installation will have an existing explosives storage facility that meets DOD standards. If not, the contractor will establish a temporary storage facility. The compatibility of explosives defined in chapter 3, DOD 6055.9-STD, will be followed. Recovered OE items awaiting final disposition will not be stored with serviceable explosives. Commercial explosives will be assigned a DOD hazard classification (i.e., 1.1, 1.2, etc.) and storage compatibility grouping by the U.S. Army Technical Center for Explosives Safety prior to being stored on a military installation.

b. Off DOD installations, the contractor will be responsible for establishing a temporary explosives storage facility. This temporary storage facility will meet local, state, 27 CFR 55, AR 385-64, and DOD 6055.9-STD requirements to the greatest extent practicable.

(1) In cases where the facility cannot meet the intermagazine, inhabited building, and public traffic route quantity-distance requirements specified in DA Pam 385-64 and DOD 6055.9-STD, a barricading plan or other engineering controls to protect the public from accidental detonation must be submitted to and approved by the USAESCH Directorate of Engineering.

(2) Magazines must meet the requirements of 27 CFR 55, and each magazine must have a Net Explosive Weight and hazard classification established for the explosives to be stored.

(3) Each magazine must be provided lightning protection IAW DA Pam 385-64. The provisions of NFPA 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

(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 27 CFR 55. However, the contractor is responsible for providing the degree of protection needed to prevent the theft of OE items.

c. A fire plan for either an on- or off-installation explosives storage facility will be prepared and coordinated with the local fire department. Placarding of magazines will be IAW local rules and regulations.

11. OE Transportation, Offsite. In the event that OE items must be transported offsite, the provisions of chapter 15, EP 1110-1-18, will be followed. In addition, USACE contractors are prohibited from transporting UXO offsite for destruction until the provisions of paragraph 1-9, TB 700-2, have been met.

12. OE Transportation, Onsite. The following safety procedures will be followed for the transportation of OE items onsite:

a. Do not transport WP munitions unless they are immersed in water, mud, or wet sand.

b. If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in No. 10 mineral oil or equivalent to minimize the fire and explosion hazards.

c. 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.

d. 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.

e. If a base-ejection projectile must be transported to a disposal facility, the base will be oriented in the vehicle such that it is parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

f. OE items with exposed hazardous fillers, such as High Explosive, 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.

13. Exclusion Zone Operations. On OE project sites, it is the responsibility of the contractor's Unexploded Ordnance Safety Officer (UXOSO) to establish the exclusion zone for each UXO work area.

a. The purpose of the exclusion zone is to protect nonessential personnel from blast overpressure and fragmentation hazards. Calculating exclusion zones with respect to intentional and unintentional detonations is discussed below.

(1) Intentional Detonations. The minimum separation distances specified in DOD 6055.9-STD, chapter 5, paragraph C5.5.4, will be used unless lesser distances have been calculated using HNC-ED-CS-S-98-1.

(2) Unintentional Detonations. If the identity of OE items on a 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 identity of OE items is known, the USAESCH Directorate of Engineering will use HNC-ED-CS-S-98-1 and HNC-ED-CS-S-98-2 to determine the criteria for establishing the exclusion zones.

b. When multiple teams are working onsite, a team separation distance (TSD) will be established. The minimum TSD will be the greater of 200 feet or the K50 (0.9 pounds per square inch) overpressure distance.

c. While OE procedures are being conducted, only personnel essential for the operation will be allowed in the exclusion zone. When nonessential personnel enter the exclusion zone, all OE operations will cease. In addition to this work stoppage, the following actions will be taken:

(1) The individual(s) must receive a safety briefing and sign the visitors log prior to entering the zone.

(2) The individual(s) will be escorted by a UXO-qualified individual.

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 geophysical detection operations, personnel will not wear any metal that would interfere with instrument operations.

14. OE Excavation Operations.

a. Hand excavation is the most reliable method for uncovering an OE item. However, hand excavation exposes personnel to the hazard of detonation . Therefore, only UXO-qualified personnel will be used to perform this task.

b. Earth-moving machinery (EMM) may be used to excavate overburden from suspected OE items. EMM will not be used to excavate within 12 inches of a suspected OE item. Once the EMM is within 12 inches of the suspected OE item, 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 or a UXO-qualified individual of higher rank than UXO Technician III.

(1) If more than one earth-moving machine is to be used onsite, the same minimum separation distances required for multiple work teams apply.

(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 stepdown or offset access method. Under no circumstances will any excavation be made directly over suspected OE items.

15. OE Disposal Operations. All disposal operations will be conducted IAW TM 60A-1-1-31, EP 1110-1-17, and the unnumbered USAESCH publication entitled Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites.

a. As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from DA Pam 385-64 are to be followed:

(1) Premature detonation of electric blasting caps by induced current from radio frequency signals is possible. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

(2) Lightning is a hazard with respect to both electric and nonelectric blasting caps. A direct hit 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 their 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 when an electrical storm approaches to within 10 miles of the site.

(3) Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters to electric power lines be done with a nonelectric system.

b. The only acceptable disposal method is the one stated in the appropriate TM 60 Scries manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

c. If justified by the situation, protective measures to reduce shock, blast over-pressure, and fragmentation will be taken. The USAESCH Directorate of Engineering will assist in any design work and will review for approval all proposed protective measures.

d. Minimum separations distances for personnel during OE disposal will be IAW DOD 6055.9-STD, chapter 5.

e. During open detonation operations, lifting lugs, strong backs, base plates, etc., will be oriented away from personnel locations.

f. Once disposal operations are completed, a thorough search of the immediate area will be conducted with a magnetometer to ensure that a complete disposal was accomplished.

g. Inert ordnance will not be disposed of as scrap until the internal tillers/voids have been exposed and unconfined.

FOR THE COMMANDER:

ROBERT L. DAVIS
Colonel, Corps of Engineers
Chief of Staff

GLOSSARY

Section I
Abbreviations

AFM ..... Air Force Manual

AR ..... Army Regulation

CFR ..... Code of Federal Regulations

DA ..... Department of the Army

DA Pam ..... Department of the Army Pamphlet

DOD ..... Department of Defense

EMM ..... Earth-Moving Machinery

EMR ..... Electromagnetic Radiation

EOD ..... Explosive Ordnance Disposal

FUDS ..... Formerly Used Defense Sites

IAW ..... In Accordance With

ICM ..... Improved Conventional Munition

NAVSEA OP ..... Naval Sea Systems Command Ordnance Pamphlet

NFPA ..... National Fire Protection Association

OE ..... Ordnance and Explosives

POC ..... Point of Contact

PZ ..... Piezoelectric

STD ..... Standard

TB ..... Technical Bulletin

TEU ..... Technical Escort Unit

TSD ..... Team Separation Distance

USACE ..... U.S. Army Corps of Engineers

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

UXO ..... Unexploded Ordnance

UXOSO ..... Unexploded Ordnance Safety Officer

WP ..... White Phosphorus

Section II
Terms

OE Procedures
Procedures which include, but are not limited to, the following actions performed by a UXO-qualified individual:

a. Gaining access to (manual excavation) and identifying subsurface anomalies and assessing the condition of buried OE.

b. Identifying and assessing the condition of surface OE.

c. Recovering and making final disposal of all OE.

OE-Related Procedures
Procedures which include, but are not limited to, the following actions which may be performed by a non-UXO-qualified individual:

a. Locating and marking subsurface anomalies.

b. Locating and marking suspected surface OE.

c. Transporting and storing recovered OE.

d. Utilizing EMM to excavate overburden from suspected OE.

Ordnance and Explosives (OE)
Consists of (1) military munitions that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, or buried, (2) UXO, (3) soil presenting explosion hazards, and (4) buildings with explosives residues that present explosion hazards.

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 operations, installations, personnel, or material and remain unexploded either by malfunction, design, or any other cause.

UXO-Qualified Personnel
Personnel meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18.

APPENDIX E

EQUIPMENT INFORMATION

FOR

REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

ROTAR© ATTACHMENT SPECIFICATIONS

FINAL REPORT

Test Report of Improved Backhoe

July 2003

Prepared by

Institute for Defense Analyses
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Alexandria, VA 22311-1882

for

Humanitarian Demining Research and Development Program
Night Vision and Electronic Sensors Directorate
10221 Burbeck Road, Suite 430
Fort Belvoir, VA 22060

Office of the Assistant Secretary of Defense Special Operations & Low-Intensity Conflict
2500 Defense Pentagon
Washington, DC 20301-2500

FOREWORD

The success of the Improved Backhoe test program was the result of the efforts of a large team of people from several organizations. The Project Engineer, Mr. Mike Collins, not only designed the improvements made to the commercial backhoe, but also directed the manufacturing and installation of all the armor upgrades to the JCB 215S backhoe and to the special equipment installations of the ROTAR® and the SETCO tires. A special debt of gratitude is paid to Mr. John Snellings, the Improved Backhoe operator throughout the test program, who managed to keep his cool even when temperatures inside the cab reached 120 °F+. The Test Engineer was Ms. Sewaphorn (Noy) Rovira from Fibertek, Inc. (now Major Rovira, U.S. Army, as of December 2002) who provided background from previous test programs. Mr. Art Limerick, a member of the Humanitarian Demining staff at the NVESD/CM test site, rendered test support in the field. Mr. Harold Bertrand, Mr. Isaac Chappell, and Ms. Sherryl Zounes of the Institute for Defense Analyses (IDA) provided technical test support and were the authors of this report.

The equipment used on the Improved Backhoe and product information appearing in this report was obtained from the following organizations:

ROTAR International b.v.
Schering 27, 8281 JW Genemuiden
P.O. Box 174, 8280 AD Genemuiden
The Netherlands
Tel: + 31 (0) 38 385 54 71
Fax: + 31 (0) 38 385 54 02
e-mail: www.rotar.nl

SETCO Tire Company,
P.O. Box 809
Idabel, OK 74745
Phone: (580) 286-6531 - Toll Free: 1-877-SETCO-JYD
Fax: (580) 286-6743 - Email: setco@oio.net

Pacific Recycling Attachments, Inc.
P.O. Box 24407
San Francisco, CA 94124-407
(707) 766-9511 Voice; (707) 766-9049 Fax
E-mail: info@pacificrecycling.com

1 INTRODUCTION

1.1 Background

During many humanitarian demining operations, especially those in which extensive use is made of mechanical mine-clearing equipment, the mine-removal process frequently results in moving large amounts of surface soil and dirt from its original location to piles or berms located to the side of the clearing machine and running in a line parallel to the direction of the machine's movement. Clearing machines most apt to form berms are tillers, graders, and bulldozers. Experience has shown that the anti-personnel (AP) mines these machines are intended to destroy, uncover, or remove are frequently physically moved with the dirt and end up buried in the berms. Therefore, a machine that can be used to remove the AP mines [and other unexploded ordnance (UXO)] buried in the untreated berms is needed.

1.2 Objective

The objective of this test program was to evaluate the operational effectiveness of an improved commercial off-the-shelf (COTS) JCB 215S, Series 3, four-wheel steer (4WS) backhoe equipped with a Rotar International b.v. ROTAR©, model HPL 800 S soil sifter mounted on the front of the backhoe (see Figure 1). The Improved Backhoe was tested under conditions approximating those found by humanitarian demining organizations in easy to moderately difficult soil and terrain conditions. The ROTAR© subsystem was tested for its ability to remove mines from berms that were created by plowing or tilling operations and to continue to operate after sustaining an AP-mine-equivalent explosive charge. Vehicle on- and off-road handling was evaluated, and logistic considerations (e.g., spares and fuel/oil consumption) of importance to a user were measured and/or noted. Human factors issues (e.g., operator visibility and comfort under various moving situations) and maintenance issues were also addressed.

2 EQUIPMENT USED

2.1 Improved Backhoe

Starting with a JCB 215S, Series 3, 4WS (also capable of 2 wheel steer (2WS) and crab steer) commercial backhoe, the Modeling and Mechanical Fabrication Shop of the U.S. Army Communications & Electronics Command, Night Vision and Electronic Sensors Directorate (NVESD), Ft. Belvoir, Virginia, made structural modifications to the vehicle to improve its survivability in a hostile, land-mine environment. The modifications included a blast-resistant cab and armored chassis intended to protect the operator and the vehicle from a small-arms fire (up to 12.75 mm) attack and from shrapnel caused by a detonated AP mine under the vehicle or an anti-tank (AT) mine in near proximity to the vehicle. (An AT mine detonated under the improved backhoe would more than likely disable the vehicle and cause injury to the operator.)

Figure 1. Improved Backhoe With HPL 800 S ROTAR©

The changes made to the commercial backhoe were as follows:

- The fiberglass engine cowling[1] was replaced with 12.7 mm (0.5 inch) 6061 aluminum plate. This plating was also installed under the engine and cab area of the body. A 6.35-mm (0.25-in.) T-1 steel blast plate was mounted across the front lifting arms to protect the hydraulic lines from AP and AT mine shrapnel.

- The fiberglass shell of the cab was replaced with 6.35-mm (0.25-in.) T-1 steel. The fore and aft wind screen and side curtains were replaced with 31.75 mm (1.25 in.) of LEXAN©[2]. Exposed vehicle hydraulic lines were hardened to withstand fragmentation damage.

Figure 2 provides a silhouette of the Improved Backhoe. The reader should refer to this figure when as he examines the measurement and weight information in Tables 1 and 2. If the 6-in-1 bucket is also shipped with the Improved Backhoe, an additional 1,830 pounds must be added to the weights in Table 2.

To show the weight impact of providing ballistic survivability along with the soil sifting capability of the ROTAR© soil sifter, Table 3 provides a breakdown of the weight of the Improved Backhoe.

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1 The engine cowling is a covering that houses the engine.

2 LEXAN© is an engineering thermoplastic.

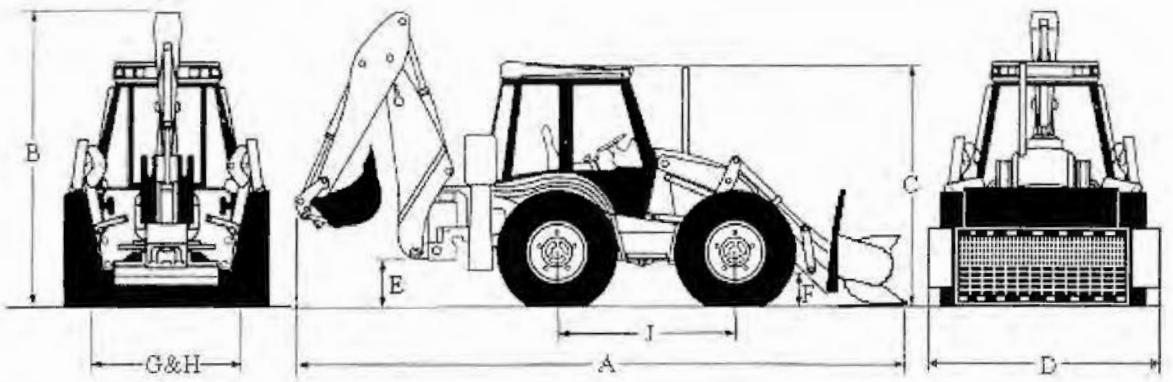

Figure 2. Silhouette of Improved Backhoe

Table 1. Dimensions of Improved Backhoe

	ft-in. (meter)		ft-in. (meter)
A. Transport length	24-6 (7.47)	E. Ground clearance - mainframe	1-1.5 (0.34)
B. Transport height	12-10 (3.91)	F. Ground clearance – front axle	1-5.7 (0.45)
C. Height to top of cab	9-5 (2.87)	G&H. Front/rear wheel track	6-3 (1.91)
D. Overall width with ROTAR©	7-10 (2.30)	J. Wheelbase	7-7 (2.31)

Note for Table 1: *Letters refer to dimensions in Figure 2.*

Table 2. JCB and Improved Backhoe Weights

Backhoe	Weight lb (kg)
JCB 215S-4WS Backhoe	18,765 (with extradig) (8,514)
Improved Backhoe (with ROTAR©)	27,300 (12,387)

2.2 ROTAR© Soil Sifter

The ROTAR© soil sifter, model HPL 800 S (manufactured by ROTAR© International, The Netherlands) used during this test was a COTS unit. The ROTAR© soil sifter comes in several sizes, ranging from light use to very heavy-duty use. Appendix A provides a list of over 600 commercial wheel loaders that will accept a ROTAR© soil sifter.

Table 3. JCB 215S to Improved Backhoe Weight Statement

	Item Weight lb (kg)	Vehicle Cumulative Weight lb (kg)
COTS JCB 215S (4WS)	18,114 (8,219)	18,114 (8,219)
Less cab and engine cowling	685 (310.8)	17,429 (7,908)
Less standard loader bucket	948 (430)	16,481 (7,478)
Less four tires	1,920 (871)	14,561 (6,607)
Plus ROTAR© Soil Sifter	2,855 (1,295)	17,416 (7,902)
Plus four SETCO Tires	6,600 (2,995)	24,016 (10,897)
Plus armored cab, engine cowling, and vehicle blast plate = Improved Backhoe	3,284 (1,490)	27,300 (12,386)

Note for Table 3: *Does not include 1,830 lb (832 kg) for 6-in-1 bucket.*

The ROTAR© model HPL 800 S selected for this test was mounted on the front loader arms of the JCB backhoe using the same attachment points used to mount the standard loader bucket. The NVESD Modeling and Mechanical Fabrication Shop manufactured the interface to mate the ROTAR© to the quick-disconnect mounting points. The ROTAR© barrel is constructed with 20-mm S2-3 steel bars to form a grid of 45-mm squares. Figure 3 is a picture of a COTS ROTAR© mounted to a wheel loader. Table 4 gives the specifications of the HPL 800 S ROTAR© sifter. Appendix B contains the specifications for the ROTAR© used in this test program.

Figure 3. COTS ROTAR© Soil Sifter

Table 4. HPL 800 S ROTAR© Soil Sifter Technical Specifications

ROTAR© Sifter	HPL 800 S
Capacity [1]	800 liters
ROTAR© weight	2,855 lbs (1298 kg)
Total width	93.7 in. (2,380 mm)
Drum width	70.9 in. (1,800 mm)
Bar diameter	0.79 in. (20 mm)
Distance between bars	1.77 in. (45 mm)
Material of frame/drum	S2-3 Steel
Cutting edge	Hardox 500
Drive	Hydromotor Char-lynn Eaton 104-1390
Maximum rotations (drum)	28/min

Note 1 for Table 4: *Working capacity is 2/3 of the drum capacity.*

2.3 SETCO Tires

The standard tires that came with the JCB backhoe were replaced with COTS SETCO solid rubber tires, manufactured by the SETCO Tire Company, Idabel, Oklahoma (see Figure 4). SETCO tires are a commercial product and are adaptable to any wheeled loader. Using SETCO tires (vs. standard tires) added 4,680 pounds (2,123 kg) to the gross vehicle weight of the Improved Backhoe.[3] The SETCO tires will withstand the blast from a 500-gm AP mine, with only slight blast abrasion to the rubber tire and *no* damage/deformation to the metal tire rim.

Figure 4. SETCO Solid Rubber Tire

[3] SETCO tires sized to fit the JCB 215S weigh 1,650 lbs (748 kg) each. Standard tires weigh 480 lbs (218 kg) each.

2.4 Test Targets

All operational berm-cleaning tests of the ROTAR© soil sifter were made using AP mechanical reproduction mines (MRM) manufactured by Amtech Aeronautical Limited, Medicine Hat, Alberta, Canada. MRMs were buried in random patterns on the top and sides of the berms at depths ranging from surface to approximately 400 mm. The MRMs used were PMA-1, PMA-2, PMN, and Type 72A AP mines. Figure 5 shows pictures of the MRMs used during ROTAR© soil sifter operational tests.

PMA-1 PMA-2 PMN Type 72A

Figure 5. AP MRMs Used During ROTAR© Soil Sifter Operational Tests

Six explosive tests were conducted against the ROTAR© soil sifter, using ¼-lb (113.4 gm), ½-lb (226.8 gm), and 1-lb (453.7 gm) blocks of trinitrotoluene (TNT) command-detonated inside the closed ROTAR© barrel. Nine blast tests were conducted against the right front SETCO tire, using eight ½-lb blocks of TNT and a 1-lb block of TNT, all detonated by a small AP mine.[4] One test was conducted against the chassis/cab, using an AT mine containing 22 lbs (10 kg) of explosives was conducted. See paragraph 3.4 for a discussion of these survivability tests.

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3.4 Survivability Tests

Survivability in a mine blast test was conducted in three separate steps. The first was against the ROTAR©, the second was against the SETCO tires, and the third was against the overall vehicle. All survivability testing was done at Test Site 2. All explosive charges were TNT, initiated by either a blasting cap or a small AP mine.

3.4.1 ROTAR© Blast Test

Six blast tests were conducted against the ROTAR©. The sizes of the explosive charges used were ¼-, ½-, and 1-lb blocks of TNT. Two blast tests were conducted for each size explosive: one with the ROTAR© barrel half filled with dirt (in which the explosive was buried) and the other with no dirt in the barrel (the explosive was suspended on the axis of rotation). In all cases, the explosive was remotely detonated. For the 1-lb explosive test, the test in the half-filled barrel resulted in damage to the barrel's steel liner at the midpoint of its

length. Therefore, when the explosive test was conducted without dirt in the barrel, the explosive was suspended on the axis of rotation, at a point one-fourth the length of the barrel from the right side of the barrel. Table 8 presents the results of the explosive test in the ROTAR©. Some of the blast damage to the steel liner caused pieces of the steel liner to be pushed through the mesh of the reinforcing bars of the barrel. The protruding steel liner had to be beaten almost flush with the barrel bars to eliminate interference with the ROTAR© frame. Figure 16 is a picture of the bowing distortion to the ROTAR© barrel from the 1-lb block of TNT in Test 6. Figure 17 shows the damage to the steel liner from this series of tests.

Table 8. Blast Tests on ROTAR©

Test No.	Weight of Explosive	Soil Contents	Damage to ROTAR©	ROTAR© Operable?
1	¼ lb	½ full	No damage.	Yes
2	½ lb	½ full	No damage.	Yes
3	1 lb	½ full	1-11/16" × 5/8" hole in steel barrel liner. Some outward bowing of longitudinal bars.	Yes
4	¼ lb	Empty	5" × 3" hole in steel barrel liner.	Yes
5	½ lb	Empty	13" × 4.5" hole in steel barrel liner.	Yes
6	1 lb	Empty	Pressure-rise tearing of steel barrel liner at juncture with end of barrel. Noticeable bowing of longitudinal barrel bars.	Yes. ROTAR© able to close, lock, and spin.

Figure 16. Blast Distortion (Bowing) to ROTAR©

APPENDIX F

FORMS

FOR

REMOVAL OF OVERSIZE STOCKPILE

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

WEEKLY REPORT

Contract Nos.:	DAAA09-03-C-0046	**Report No.:**	
MKM Project Nos.:	02108	**Date:**	
Project:	Removal of Oversize Stockpile, Seneca Army Depot Activity, Romulus, New York		

Summary of Activities:

Materials Shipped Off-Site

Scrap metal
This week:
Cumulative to-date:

Soil
This week:
Cumulative to-date:

Other
This week:
Cumulative to-date:

Remarks (*include directions received from client's representative or regulators, visitors, compliance notices received, and any other pertinent information*)
Visitors & Regulators on-site.

Health and Safety Performance:

Were there any **lost time accidents** this week? No ☐ Yes ☐
If "yes", refer attached summary of incident or OSHA report.

Schedule for Next Week:

Refer attached **Schedule** for percentage of work completed and projected completion dates.

Site Supervisor:	Safety Officer:	Steve Racich
QA/QC Manager:	SUXOS	Mo Owens

Weekly Photographs