MKM Engineers, Inc.

Remedial Action Work Plan

DRAFT

REMEDIAL ACTION WORK PLAN

WINKLEPECK BURNING GROUNDS RAVENNA ARMY AMMUNITION PLANT RAVENNA, OHIO

MARC Contract No. W912QR-04-D-0040
Delivery Order #003

Submitted to

U.S. Army Corps of Engineers
600 Dr. Martin Luther King Place, Room 821
Louisville, KY 40202-2230

Submitted by

MKM Engineers, Inc.
4153 Bluebonnet Drive
Stafford, Texas 77477-3909

July 11, 2008

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DISCLAIMER: This document is prepared for the United States Army Corps of Engineers (USACE), Louisville District by MKM Engineers, Inc. (MKM). Some of the information in this document has not been given final approval by the Ohio Environmental Protection Agency (OHIO EPA). The opinions, findings, and conclusions expressed are those of MKM and not necessarily those of OHIO EPA and USACE.

Prepared / Approved by: _____ Date: _____
Tom Hope
Environmental Scientist

Reviewed / Approved by: _____ Date: _____
Kathleen Anthony
Project Manager

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ACRONYMS AND ABBREVIATIONS

AAP	Army Ammunition Plant
AEDB-R	Army Environmental Database-Restoration Module
ACM	asbestos containing material
AHA	Activity Hazard Analysis
AIHA	American Industrial Hygiene Association
AOC	area of concern
APP	Accident prevention Plan
ASTM	American Society of Testing and Materials
bgs	below ground surface
BMP	best management practice
BRAC-D	Base Realignment and Closure Division
CEHNC	U.S. Army Corps of Engineers Center of Excellence Huntsville Corps
CELRL	U.S. Army Corps of Engineers, Louisville District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	certified industrial hygienist
CLIN	contract line item number
CO	contracting officer
COC	contaminant of concern
COR	contracting officer's representative

ACRONYMS AND ABBREVIATIONS (Continued)

CQAP	contractor quality assurance plan
CQC	contractor quality control
CQM	construction quality management
DDESB	Department of Defense Explosives Safety Board
DFFO	Directors Final Findings and Orders
DGPS	Differential Global Positioning System
DNT	Dinitrotoluene
DoD	Department of Defense
DOT	Department of Transportation
E+S	erosion and sediment
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERIS	Environmental Restoration Information System
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FSP	Field Sampling Plan
FWSAP	Facility-Wide Sampling and Analysis Plan
GOCO	government-owned contractor-operated
GPS	Global Positioning System
HARC	historical, archeological, and cultural

ACRONYMS AND ABBREVIATIONS (Continued)

HASP	Health and Safety Plan
H+S	health and safety
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosive
HTRW	Hazardous, Toxic, and Radioactive Waste
ID/IQ	Indefinite Delivery/Indefinite Quantity
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
LCG	Louisville Chemistry Guidelines
LCG	Louisville Chemistry Guideline
LL	load line
MARC	Multiple Award Remediation Contract
MD	munitions debris
MEC	munitions and explosives of concern
MGFD	munitions with the greatest fragmentation distance
mg/kg	milligram(s) per kilogram
MI	multi-increment
MKM	MKM Engineers, Inc.
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MSD	minimum separation distance
NEW	net explosive weight

ACRONYMS AND ABBREVIATIONS (Continued)

NGB	National Guard Bureau
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NVLAP	National Voluntary Laboratory Accreditation Program
OAC	Ohio Administrative Code
OHARNG	Ohio Army National Guard
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon
PBC	Performance-Based Contract
PLM	polarized light microscopy
POC	point of contact
PPE	personal protective equipment
PWS	Performance Work Statement
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QC	Quality Control
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation

ACRONYMS AND ABBREVIATIONS (Continued)

ROD	Record of Decision
RTC	response to comments
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SOP	standard operating procedure
SSHO	Site Safety and Health Officer
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	semi-volatile organics
SWPPP	Storm Water Pollution Prevention Plan
TCLP	toxicity characteristic leaching procedure
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USP&FO	United States Property and Fiscal Officer
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
WBG	Winklepeck Burning Grounds

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared under the Performance-Based Contract (PBC) for the United States Army Corps of Engineers (USACE) Louisville District's Multiple Award Remediation Contract (MARC) Indefinite Delivery/Indefinite Quantity (ID/IQ) Contract Number W912QR-04-D-0040 for the Winklepeck Burning Grounds (WBG) at Ravenna Army Ammunition Plant (RVAAP).

1.1 Purpose and Scope

MKM has been tasked under the MARC Contract Line Item Number (CLIN) 3 and Contract Modification Number 2 to execute the cleanup of contaminated areas, at WBG Pads 61/61A, 67, and 70 to an acceptable level of risk at RVAAP in accordance with the selected remedy as presented in the *Record of Decision for Soil and Dry Sediment at the Winklepeck Burning Grounds* (SAIC, 2008).

In support of Ravenna Training and Logistics Site (RTLS) preparation, Ohio Army National Guard (OHARNG) has constructed a Mark 19 Grenade Machinegun Range at WBG. To facilitate construction of the Range, munitions and explosives of concern (MEC) and contaminated soil were removed under a Department of Defense Explosives Safety Board (DDESB) approved *Explosive Safety Submission for the Munitions and Explosives of Concern Survey and Munitions Response at Winklepeck Burning Grounds* (MKM, 2004) and associated project work plans (MKM, 2005a, 2005b). The Phase II MEC Clearance and Munitions Response was conducted from March through August 2005 to ensure surface MEC and site related chemicals of concern were removed from the areas of WBG needed for construction. Final grading, seeding, mulching, and road repair were completed in August 2005. These actions were completed under an accelerated schedule to meet the military mission requirements.

At the conclusion of the Phase II MEC removal actions, confirmation sampling indicated that areas of soil contamination greater than cleanup goals remained in portions of the soil at Pads 61/61A and 67. Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and semivolatile organics (SVOCs) were identified at concentrations greater than levels that are considered safe for range construction workers and range maintenance personnel. In addition, transient and friable asbestos was observed at Pad 70. If the asbestos becomes airborne, it could pose a hazard to the health and safety of the range personnel (SAIC, 2008).

The purpose of the remedial action at Pads 61/61A, 67, and 70 is to implement the selected remedy to addresses soil at WBG that contains contamination above risk-based cleanup goals based on the intended use as a Mark 19 Grenade Machinegun Range. The

remedial action described in this document focuses on the removal of additional soil and transient and friable asbestos to protect future range maintenance personnel. The remedial action objective (RAO) is to prevent exposure of the National Guard Range Maintenance Soldier to contaminants in soil exceeding risk-based cleanup levels extending to a maximum depth of four feet below ground surface (bgs) (SAIC, 2008).

1.2 Site Description and Background

1.2.1 Facility Setting and Status

When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by the OHARNG over a two-year period (2002 and 2003), and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres have been transferred to the National Guard Bureau (NGB) and subsequently licensed to the OHARNG for use as a military training site known as the Ravenna Training and Logistics Site (RTLS). The current RVAAP consists of 1,280 acres scattered throughout the RTLS.

The RTLS is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the City of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the City of Newton Falls. The RVAAP portions of the property are located solely within Portage County. The RTLS/RVAAP property is approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide, bounded by State Route 5, the Michael J. Kirwin Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. The RTLS is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, the RTLS did not exist and the entire 21,683-acre parcel was a government-owned contractor-operated (GOCO) industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP. References to the RVAAP in this document are considered to include the historical extent of RVAAP unless otherwise stated. A regional map indicating the location of the RVAAP is presented as Figure 1. A site map showing the layout of the RVAAP is presented as Figure 2.

Production at the facility began in December 1941, with the primary missions of depot storage and ammunition loading. The installation was divided into two separate units – the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance

Depot's primary mission was depot storage of munitions and components, while the mission of the Ravenna Ordnance Plant was loading and packing major caliber artillery ammunition and the assembly of munitions initiating components that included fuzes, boosters, and percussion elements. In August 1943, the installation was redesignated the Ravenna Ordnance Center and again, in November 1945, as the Ravenna Arsenal. The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization and normal maintenance of equipment, along with storage of ammunition and components.

The plant was reactivated during the Korean Conflict to load and pack major caliber shells and components. All production ended in August 1957; and in October 1957, the installation was again placed in a standby condition. In October 1960 the ammonium nitrate line was renovated for demilitarization operations, which involved melting explosives out of bomb casings for subsequent recycling. These operations commenced in January 1961. In July 1961, the plant was again deactivated. In November 1961, the installation was divided into the Ravenna Ordnance Plant and an industrial section, with the entire installation designated as the RVAAP.

In May 1968, RVAAP began loading, assembling, and packing munitions on three load lines (LLs) and two component lines in support of the Southeast Asia conflict. These facilities were deactivated in August 1972. The demilitarization of M71A1 90-milimeter (mm) projectiles extended from June 1973 until March 1974. Demilitarization of various munitions was conducted from October 1982 through 1992.

Until 1993, RVAAP maintained the capability to load, assemble, and pack military ammunition. As part of the RVAAP mission, the inactive facilities were maintained in a standby status by keeping equipment in a condition to permit resumption of production within prescribed limitations. In September 1993, the RVAAP was placed in inactive caretaker status, and subsequently changed to modified caretaker status. The LLs and associated real estate were determined to be excess by the Army.

Until 1999, the RVAAP was a 21,683-acre installation. A total of 20,403 acres of the former 21,683 acre RVAAP was transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio for use by OHARNG as a military training site. The current RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the RTLS. The RVAAP and RTLS are co-located on contiguous parcels of property. The RTLS perimeter fence encloses both installations.

1.2.2 Site Information

WBG, designated as area of concern (AOC) # RVAAP-05, encompasses approximately 200 acres in the central portion of RVAAP (Figure 2). Historical operations at WBG

included destruction of explosives from various types of munitions by open burning. In some instances, black powder and explosives were laid out along roads and burned. Burning is also known to have occurred along Road D. Prior to 1980, materials destroyed by burning included bulk explosives and explosives-contaminated burnable wastes (e.g., paper and cloth), propellants, black powder, sludge, sawdust from LLs, and domestic wastes. Small amounts of laboratory chemicals were burned during production periods. Metallic munitions fragments were allowed to remain on site after burning, as were possible residual explosives. Waste oils (hydraulic oil from machines and lubrication oil from vehicles) were burned in the northeast corner of WBG until 1973.

Prior to 1980, burning was carried out in four earth-bermed burn pits, on gravel-covered or bare soil burn pads, and sometimes on the roads. Although the exact number of burning pads within the AOC is not conclusively known, 70 known or suspected burning pads have been identified from historical drawings and aerial photographs.

After 1980, open burning was conducted in metal, refractory-lined trays within a 1-acre Resource Conservation and Recovery Act (RCRA)-permitted area at Burning Pad #37. Ash residues were drummed and stored in Building 1601, also a RCRA-permitted facility, on the west side of WBG pending proper disposition. The burn trays were decontaminated and removed from Burning Pad #37 in 1998 and closed under RCRA. Building 1601, a storage building, was also closed under RCRA. A former deactivation furnace located at Burning Pad #45 was transferred to CERCLA under the Ohio EPA Director's Final Findings and Orders (Ohio EPA, 2004).

WBG was identified as an AOC at RVAAP in the Preliminary Assessment (USACE, 1996). It was the subject of a Phase I Remedial Investigation (RI) (SAIC, 1998), a Phase II RI (SAIC, 2001a), and a Phase III RI (SAIC, 2005a). A Focused Feasibility Study (FFS) was completed in 2005 (SAIC, 2005b).

As part of the RTLS, OHARNG is constructing a Mark 19 Grenade Machinegun Range at WBG. Initial plans and design for range construction revealed that MEC was present in the areas needed for the project. To protect range maintenance workers, soils contaminated with MEC and chemical contaminants needed removal. The target cleanup goals for chemical contaminants were developed in the FFS. During MEC removal actions, soil containing chemical contamination was removed consistent with the preferred CERCLA alternative. MEC and some associated contaminated soils were removed under an approved DDESB Explosive Safety Submittal (ESS) and associated project work plans (MKM, 2005a, 2005b). Final grading, seeding, mulching, and road repair were completed in August 2005. These actions were completed under an accelerated schedule to meet the military mission requirements (Army, 2006).

At the conclusion of MEC removal actions, confirmation sampling indicated that additional soil contamination above risk-based cleanup goals (those levels that are considered safe for range maintenance personnel) remained on site at Pad 67 and Pads 61/61A. Transite, or friable asbestos, has also been observed on site at Pad 70 and will require removal according to the Record of Decision (ROD) for Winklepeck Burning Grounds (SAIC, 2008).

1.3 Nature and Extent of Contamination

1.3.1 WBG Pad 67

Concurrent MEC removal and environmental remediation were performed at Pad 67 during the MKM 2005 Phase II MEC clearance and munitions response operations at WBG. Remediation at the Pad 67 area included excavation of two sample points (WBG-105 and WBG-70) located adjacent to Pad 67 where RDX exceeded the established WBG cleanup goal of 617 mg/kg. Given their close proximity, the excavations at each sample point overlapped and were combined into one excavation 13.5 feet long by 13.5 feet wide by one foot deep. Concentrations of RDX in confirmation soil samples collected following the removal operation were less than the established cleanup goal for the excavation floor samples; however, the RDX concentrations were greater than the established cleanup goal in the sidewall samples as shown below in Tables 1-1 and 1-2. For additional information regarding the excavation and sampling operations at WBG Pad 67, refer to Section 3.0 of the MKM December 2005 final report for the Phase II MEC clearance and munitions response at WBG (MKM, 2005c).

TABLE 1-1
Excavation Floor and Sidewall Confirmation Sample Results for RDX

Site	Sample #	RDX Concentration (mg/kg)
WBG Pad 67 Floor	WBGcs-071-105M-FLR-SO	150
	WBGcs-071-105M-FLR-QA	270
WBG Pad 67 Sidewall	WBGcs-071-105M-SDW-SO	1,200
	WBGcs-071-105M-STP-SO	2,600

Notes:
WBG RDX Cleanup Goal = 617 mg/kg
Samples collected on 21 April 2005 and analyzed by Method 8330
mg/kg = milligrams per kilogram
FLR = Floor Sample
SDW = Sidewall Sample

1.3.2 WBG Pad 61/61A

Environmental contamination (primarily miscellaneous debris with lesser amounts of asphalt roofing shingles and transite) and MEC were found at and near Pad 61 during MEC removal activities for the proposed Mark 19 Range at the WBG. A MEC removal was conducted in areas where targets for the range are to be constructed. The 400-meter target array crosses Pad 61. Additionally, Pad 61 lies along Lane 1 of the proposed firing range. To provide adequate line of sight to downrange targets, the Mark 19 design calls for excavation along firing Lane 1 at Pad 61 and the bermed areas adjacent to it. Additionally, a portion of Pad 61 at Remedial Investigation sample point WBG-217 requires removal of previously documented surface soil contaminated with SVOCs.

Upon discovery of the debris at Pad 61, a series of test pits were excavated within the berms to estimate the nature and extent of this material. Generally, the debris has an in-place cover of 12 to 18 inches of clay, although some areas have little or no cover. It is not known whether this cover material is contaminated. A clear delineation of debris and clay was observed, with little or no apparent intrusion of contamination into the underlying clay soils. Environmental testing of the soils surrounding the debris indicates elevated levels of SVOCs in those materials. Results of the two sets of analyses of these materials are provided as Table 1-3. Vertical extents of the test pits were compared with the surface topography, and the contamination appears to be confined to a continuous berm located on the west, south, and east sides of Pad 61.

Table 1-2
WBG Pad 61/61A Sample Results (mg/kg)

Analyte	WBG Cleanup Goal	WBG-PD61-Cont1m-SO	WBG-PD61-Cont2m-SO
RDX	617	2	0.57 J
Benzo(a)anthracene	75	100	260
Benzo(a)pyrene	8	86	230
Benzo(b)fluoranthene	75	100 H	270
Dibenzo(a,h)anthracene	8	15 H	46 H
Indeno(1,2,3-cd)pyrene	75	42 H	120

Notes:
Samples collected on 26 April 2005
Explosives analyzed by Method 8330
SVOCs analyzed by Method 8270C
mg/kg – milligrams per kilogram
J = Result is < the reporting limit but > or = the method detection limit
H = Batch QC is greater than the reporting limit or had a negative instrument reading lower than the absolute value of the reporting limit
WBG-PD61-Cont1M-SO collected from the berm at Pad 61
WBG-PD61-Cont2M-SO collected from Pad 61A east of berm

1.3.3 WBG Pad 70

Transite or friable asbestos is present at Pad 70 that needs to be removed according to the ROD for WBG (SAIC, 2008). The current surface elevation of Pad 70 is approximately 999 feet. MKM will remove all existing transite and friable asbestos from the surface and subsurface within the footprint of Pad 70. Once the surface transite and friable asbestos on the surface are removed, the contractor will deepen the excavation until there is no visible transite or friable asbestos present. This removal will be accomplished utilizing the same procedures performed at Pads 61 and 61A, including sifting for UXO and segregation of materials from separate pads.

1.4 Selected Remedy

The selected remedy addresses the remaining soil at WBG that contains contamination above risk-based cleanup goals based on the intended use as a Mark 19 Grenade Machinegun Range. The selected remedy is consistent with past MEC and soil removal, and focuses on additional soil removal to protect range construction workers and future range maintenance personnel. The RAO is to prevent exposure to soils contaminated above cleanup goals. The U. S. Army intends to transfer the remaining portion of the WBG to OHARNG following the removal of contaminated soil from the target array construction area and removal of MEC if found during the soil removal project.

This project involves the removal and disposal of up to 4,500 cubic yards, (6,682 tons) of contaminated soil/solid waste from Pads 61/61A, 67, and 70 at WBG. An option for the removal of an additional 2,000 cubic yards (2,970 tons) of contaminated soil/solid waste may be exercised if necessary.

After the removal is complete, land use controls will be implemented to prevent unacceptable exposure to residual contamination or MEC remaining at WBG. Land use controls are discussed in the following Section.

1.5 Land Use Controls

The objective of the remedial action is to remove the primary sources of contamination and to remove a large part of the secondary sources of contamination in impacted soils and groundwater via soil excavation. However, residual contamination will remain in the soil at WBG (there are no wet sediments at the WBG AOC). The groundwater remedial action will be addressed as a separate operable unit.

The Army will implement land use controls (LUCs) to prevent unacceptable exposure through inhalation, incidental ingestion, and dermal contact with MEC and contaminants at WBG. The LUCs for the WBG AOC are summarized as follows.

1. Maintain the RTLS perimeter fence.
2. Restrict future land use to small arms weapons ranges.
3. Limit activities to target practice; maintenance of targets and associated
    - lifting mechanisms; range maintenance, compatible natural resource
    - management activities, and other activities that are consistent with the Range
    - Maintenance Soldier exposure scenario.
4. Prohibit digging or excavation at the WBG AOC outside of any UXO/MEC/DMM-cleared areas.

A detailed description of the LUC remedial design is included in Attachment 1.

2.0 PROJECT TEAM

MKM maintains a small, focused program staff dedicated to RVAAP project operations. Additionally, MKM maintains numerous technical resource groups from which the Project Manager draws technical resources for project execution. This section identifies key members of the project staff and their respective roles in the project. The responsibilities listed below, for each of the key MKM personnel, are directly related to the activities discussed in this RAWP.

This project will be executed under the technical direction of the MKM Project Manager, who reports directly to the Program Manager.

Program Manager – Donald Brenneman, the Program Manager, will serve as the point of contact (POC) for the USACE on all program issues, as well as task order-specific issues as they may arise. Mr. Brenneman will also ensure that contractual obligations are fulfilled.

Project Manager – As the Project Manager, Kathleen Anthony will be responsible for interactions with USACE Louisville District and will provide support with regulatory negotiations. Additionally, Ms. Anthony will conduct a monthly review of project costs, schedule, and general progress. Ms. Anthony will be responsible for the planning, execution and completion of the task order.

Health and Safety (H&S) Officer – The H&S Officer is Drew Bryson, a Certified Industrial Hygienist (CIH). Mr. Bryson will conduct periodic site inspections to ensure compliance with the Facility Wide Safety and Health Plan (SAIC, 2001b) and will be responsible for assigning the onsite Site Safety and Health Officer (SSHO) to perform day-to-day oversight of the remediation activities.

Field Superintendent – Brian Stockwell will manage field work, be responsible for execution of the field activities, and hold responsibility for implementation of the Health and Safety Plan (HASP) for MKM and its subcontractors. Mr. Stockwell has extensive experience with excavation and disposal, storm water management, and military site remediation.

Unexploded Ordnance (UXO)/MEC Site Manager – Steve Racich will supervise UXO operations, including geophysical, UXO sweeps, demolition' and UXO/MEC-related data management. Mr. Racich has 20 years of military explosive ordnance disposal (EOD) experience and over 14 years of commercial MEC experience. Mr. Racich is a Master EOD Technician and a Naval Master Instructor.

Asbestos Supervisor – Josh Strazewski will supervise asbestos-related operations. Mr. Strazewski's responsibilities will include asbestos notifications, coordination and management of asbestos containing material (ACM) removal operations, asbestos worker training certification, visual inspection and certification for asbestos clearance, and asbestos-related documentation and reporting.

Subcontractors - MKM plans to perform the majority of work for this project with our own in-house specialized equipment. MKM will hire subcontractors to execute portions of the project. Tasks to be subcontracted may include non-hazardous and hazardous waste disposal, site survey work, and laboratory analysis. MKM will select of subcontractors based on qualifications for the task required.

3.0 DESCRIPTION OF ACTIVITIES

This section details construction tasks that will be performed during the cleanup at each of the WBG Pads. These tasks are grouped into ten items:

- Premobilization
- Mobilization and Site Preparation
- Excavation
- Soil and MEC Separation Process
- Establishment of Demolition Area
- Demolition Activities
- Post-Demolition Operations
- Inspection and Certification of munitions debris (MD)
- Disposition of MD
- Explosive Management Plan
- Explosive Sifting Plan
- Confirmation and Waste Characterization Sampling
- Material Handling and Transport
- MEC Demolition and Disposal
- Decontamination
- Site Restoration
- Weekly/Monthly Reports
- Final Report

The activities will be performed in accordance with the aforementioned referenced documents and the WBG ROD (SAIC, 2008) to ensure specific environmental protection requirements are met during construction activities.

3.1 Remobilization

Before mobilizing to the site, MKM will acquire the required permits, plan and coordinate traffic routes, perform a preconstruction survey, identify any remaining utilities, and conduct a preconstruction meeting with the RVAAP team members.

3.1.1 Required Permits/Clearances

The MKM Field Superintendent or designee will verify that all applicable permits, notifications, and approvals have been obtained before mobilization. Special attention will be given to ensure activities to be performed near environmentally sensitive areas will be coordinated with the RVAAP Facility Manager and the Ohio EPA in accordance with federal, state and local regulations. At a minimum, MKM will be required to comply with the requirements of the Ohio EPA Authorization for Storm Water Discharges Associated with Construction Activity under the National Pollution Discharge Elimination System (NPDES) per the Ohio Administrative Code (OAC) Rule 3745-38-06; the Ohio EPA Notification of Demolition and Renovation (processed and enforced through the Akron Regional Air Quality Management District) as required for asbestos removal operations; and the Ohio EPA MEC Demolition Notification, as part of the permit requirements for the proposed remedial action activities. No other permits have been identified as required for the execution of work under this scope of work.

3.1.2 Traffic Coordination and Routing

MKM will establish transportation routes for incoming and outgoing vehicles and heavy equipment to minimize the impact on the RVAAP and surrounding community. The proposed truck routes will reflect the shortest egress from the WBG to the primary roadway (State Route 5) wherever possible. Haul routes will not be positioned to require removal of mature vegetation or encroachment on wetland areas. Additional waste load-out activities are discussed in further detail in Section 3.6.

3.1.3 Preconstruction Survey

Once the notifications and community relations requirements are in place, a preconstruction survey will be performed to document initial conditions at the WBG. Photographs of the preconstruction site conditions will be collected as part of the pre construction survey.

3.1.4 Utility Clearances

Before undertaking intrusive subsurface activities, the designated on site personnel will review available subsurface geophysics details and mark out and identify any subsurface

utilities for clearance in accordance with MKM Standard Operating Procedures (SOPs). All infrastructure organizations or utility-related agencies that may have utilities in the vicinity of each area will also be contacted.

3.1.5 Emergency Response General Notifications

At least one week prior to the initiation of the stockpile removal operations at WBG, MKM will contact all local emergency services to verify the availability of requisite services and to confirm the means used to summon the services. General notifications will be made to key project personnel at this time as well. This includes the following contacts:

- RVAAP Security Dispatcher (Post 1) – (330) 358-2017
- Ravenna City Fire Department – (330) 296-5783
- Ravenna Police Department – (330) 297-6486
- RVAAP Caretaker Contractor (PIKA International, Inc.) – (330) 358-3005
- Hospital – Robinson Memorial Hospital – (330) 297-0811
- Police – Portage County Sheriff Office – (330) 296-5100
- Police – Trumbull County Sheriff Office – (330) 675-2508
- Ohio State Patrol – (330) 297-1441
- William O'Donnell – BRAC-D Project Manager (703) 601-1570
- Mark Patterson – RVAAP Facility Manager (330) 358-7311
- Chris Williams – Akron Regional Air Quality Management District – (330) 375-2480
- Ohio EPA – Eileen Mohr – (330) 963-1221
- OHARNG – (614) 336-6790
- Kathryn Elgin - RTLS – (614) 336-6136
- USACE – Tom Chanda – (502) 315-6868

3.1.6 Preconstruction Meeting

Before beginning activities at RVAAP, MKM will conduct a preconstruction meeting that will include members of USACE, Ohio EPA, RVAAP, OHARNG, and the MKM project

team. The preconstruction meeting will communicate client and contractual expectations to the project team, establish internal expectations, define and communicate all project requirements, and ensure that the project/team members understand their individual roles and responsibilities. The preconstruction meeting will be coordinated and conducted by the MKM Project Manager, and a preconstruction meeting agenda will be provided to the applicable parties in advance of the scheduled meeting. Following this kick off meeting, MKM will participate in the RVAAP weekly coordination meetings, which are typically held on Mondays during construction activities. In addition, MKM will coordinate all constructions activities maintain constant communication with OHARNG.

3.2 Mobilization and Site Preparation

After premobilization requirements are completed, equipment and personnel will be mobilized to the RVAAP areas to prepare and organize for WBG remedial activities. During mobilization, communication protocols will be established to insure effective communication between the on site personnel.

All personnel will be trained and have all necessary certifications in accordance with the Facility Wide Safety and Health Plan (SAIC, 2001b). The tasks for mobilization and site preparation include, but are not limited to, the following:

- Prepare and approve site-specific training.
- Verify utility layout as established during the premobilization phase.
- Review the Activity Hazard Analysis (AHA) for the activities to be conducted for that day with site personnel in accordance with the Facility Wide Safety and Health Plan (SAIC, 2001b).
- Inspect and transport construction equipment to the site.
- Prepare parking areas to receive field trailers, heavy equipment, personal vehicles, and miscellaneous materials and supplies.
- Install temporary facilities and set up the multi-increment laboratory.
- Establish traffic control and post construction signs.
- Coordinate site security with Post 1.
- Install erosion and sediment (E&S) control measures.
- Clear and grub in and around the excavation limits, if necessary.

- Set up soil screening and soil stockpile staging area.
- Establish air, industrial hygiene, personnel, and environmental monitoring operations in accordance with the Facility Wide Safety and Health Plan (SAIC, 2001a).

The subsequent paragraphs provide further discussion on several of these items.

3.2.1 Site-Specific Training

As part of the mobilization process, MKM will perform site-specific training for all onsite personnel assigned to this project. The purpose of this training is to ensure that all onsite personnel fully understand the operational procedures and methods to be used by MKM at RVAAP. Individual responsibilities, safety, and environmental concerns associated with operations will also be covered in the training. The PM and the Asbestos Supervisor and 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 RAWP and Accident Prevention Plan (APP) 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 the Contracting Officer's Representative (COR) and/or BRAC-D.
- Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural (HARC) issues.
- Additional Occupational Safety and Health Administration (OSHA) or BRAC-D required training as required by the APP.
- Identification features, hazards, and reporting procedures if ordnance is encountered.

3.2.2 Equipment

All equipment will be inspected as it arrives to ensure it is in proper working condition. 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 their arrival and then checked again before each use. 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 setup and testing, MKM will also install and test its communication equipment, which includes the following:

- Security band radios to maintain communication with RVAAP security personnel;
- Hand-held portable radios used to maintain communications between the office trailer, PM/Asbestos Supervisor, and the field teams; and
- Cellular telephones, to be used as backup communications between the office trailer, Asbestos Supervisor, and the field teams.

3.2.3 Temporary Facilities

To satisfy the requirements of this RAWP and the Facility Wide Safety and Health Plan (SAIC, 2001b), temporary facilities will include, but are not limited to, office trailers, portable control access and dress out sheds, male and female sanitary facilities, hand wash stations, sufficient lighting equipment, traffic control barriers and devices, and water storage facilities. These temporary facilities will placed at locations to be designated by the RVAAP Facility Manager. Temporary power will also be provided to those facilities requiring power to operate. Communications will consist of hand-held radios and cell phones. In addition, MKM will establish the laboratory at a location to be determined by the RVAAP Facility Manager for the preparation of multi-increment samples.

3.2.4 Sign and Barricade Placement

MKM will post signs and erect barricades to effectively communicate safety requirements, identify hazardous areas, and provide traffic directions to key locations at the RVAAP. MKM will place these signs and barricades in visible locations and will update and maintain the sign and barricade placement as necessary.

3.2.4.1 Safety Signs

Safety signage is important to keep constant visual reminders of the work conditions in front of personnel. Safety signs will be placed at the entrances to the hazardous work

areas and will identify the physical hazards of concern and the required personal protective equipment (PPE) and training needed to enter each area.

3.2.4.2 Traffic Control Signs

A traffic control plan for pedestrian and vehicle access to each of the WBG work areas will be developed and will be understood by all responsible parties before the site is occupied. The site-specific traffic control plan will be developed to assure that adequate consideration is given to the safety of motorists, pedestrians, and workers during construction. All traffic control devices used on the project will conform to Department of Transportation (DOT) applicable standards. Signs will be placed along the proposed traffic routes and at each WBG work area for vehicles and heavy equipment entering and exiting to ensure that traffic flows without impedance.

3.2.4.3 Barricading

Before beginning any work that may present potential hazards to individuals, the areas will be inspected to determine the extent of barricading and or type of barricade required. The MKM SSHO must be notified if barricades on roadways may impede the passage of emergency vehicles. A barricade must be placed guarding all access routes to a hazard where a person could:

- Inadvertently enter a hazardous area;
- Be unaware of required safety equipment or permission for entry;
- Be uncertain of the safe distance of observation; or
- Be working on an activity and accidentally enter into the actual hazard.

Barricades must have barricade tags posted around the perimeter that identify the nature of the hazard. The tag will have the name and phone number of the person who erected the barricade along with date. Rigid wood, metal, or plastic barricades must be used whenever there are openings in excess of 18 inches. Battery-powered flashers will be placed in roadways on all sides subject to vehicular traffic. Barricades in dark areas must have visible warning lights. When the hazard no longer exists, the barricading material must be removed and disposed of or stored properly.

3.2.5 Site Security

Once mobilization begins, site security will be established and coordinated with the RVAAP security personnel at Post 1. Site security is intended for the protection of the

general public and site workers, as well as for the security of site equipment and materials.

MKM will mark all work zones with any of the following: high-visibility fence, roping, caution tape, signage, or temporary construction fencing. Appropriate warning signs will be posted throughout the site to enhance pedestrian and driver safety in the work area and to help establish both controlled zones and site hazards.

3.2.6 Erosion and Sediment Control

E&S controls will be installed before beginning activities that have the potential to disturb soils and cause erosion and will be maintained for the duration of the excavation and restoration activities. These control features will be removed only after vegetation is established and disturbed areas are stabilized. Surface water will be collected or diverted away from excavations by grading, berming, silt fence, hay bales, or pumping. E&S control details are further discussed in Section 5.0 of this RAWP.

3.2.7 Designation of Work Zone Boundaries

Prior to initiating excavation activities, MKM will establish the work zone boundaries by the placement of barrier fences and the appropriate signage. Temporary facilities, including vehicle and equipment decontamination and personnel wash stations, will be set up at the exit to each work zone to ensure that contaminated soils are not tracked outside of the established work areas.

The work zones are living boundaries and will be regulated to mitigate the potential for impact on non-contaminated areas, but they will allow authorized personnel the necessary area to conduct remediation activities. The size and configuration of these work zone areas may increase or decrease based upon conditions encountered in the field.

3.2.8 Site Control During MEC Operations

For the purpose of this RAWP, a MEC operation is defined as any activity that involves investigation, inspection, demolition, or handling any MEC or explosive materials. Once a MEC operation commences in an area, only essential personnel involved in the onsite activities will be permitted into the area defined by the minimum separation distance (MSD). MSD restrictions from MEC areas to non-essential personnel will be applied. Access gates to the WBG will remain closed but unlocked during MEC operations. Gates will not be locked in the event emergency evacuation must be undertaken. Personnel requiring access to the area will coordinate their activities and access procedures with the MKM SUXOS or MKM Project Manager.

The munition with the greatest fragmentation distance (MGFD) for the RD/RA operations conducted under this RAWP will be the 40-mm M406 grenade. As stated in the DDESB Fragmentation Database, the MSD for the 40 mm will be the maximum fragment range-horizontal distance of 345 feet. The team separation distance for the site will be 19 feet, which is the K40 distance for the MGFD listed.

3.2.9 MEC Surface Clearance

Prior to mobilizing heavy equipment, setup of equipment at the processing area, and beginning mechanical excavation at Pad 70, Pad 67 and Pad 61/61A, UXO qualified personnel will conduct a Schonstedt-assisted visual surface sweep to remove MEC items that may be visible on the surface. All recovered MEC and suspect items will be documented and stockpiled in a RVAAP storage igloo 1501 located at Open Detonation Area 2 (OD-2) for subsequent demolition and disposal. Items that are fuzed and unsafe to move will be handled according to the procedures detailed in the *Work Plan for the Phase II MEC Clearance and Munitions Response at Winklepeck Burning Grounds* (MKM, 2005a) and the *Munitions and Explosives of Concern Survey and Munitions Response at Winklepeck Burning Grounds, Revision 3, Amendment 2* (MKM, 2008). The Ohio EPA Notification for MEC Demolition and Disposal Operations will be completed prior to initiating site activities. The Ohio EPA notification is included in Appendix E of the ESS Revision 3, Amendment 2 (MKM, 2008).

3.2.10 Processing Area Setup

Based on MKM knowledge of the road conditions, the proximity of the three sites, the time it takes to set up screening and processing equipment, and current and future land use, MKM has decided that a centralized processing area to screen and soils from Pads 61/61A, 67, and Pad 70 will provide USACE with a cost-effective operation that works with the site activities. The soil staging and processing area for this project will be located in same area of WBG that was utilized during the Phase II MEC Clearance and Munitions Response operations (Figure 3). This soil processing area location was selected based on the following criteria:

- Easily accessible to the three sites;
- Area was surfaced cleared for MEC to facilitate processing of excavated soil during previous Phase II MEC Clearance operations;
- Proximity to paved roads;
- Within the exclusion zone; and

- Will not affect weekend activities on the Mark 19 Range.

After the processing area surface is cleared, the equipment will be set up. Each piece of equipment will be inspected upon arrival on the site.

3.2.11 Clearing and Grubbing

MKM will clear and grub only vegetation that impedes or interferes with the safe and effective implementation of the design and requirements of the site work. The removed vegetation will be consolidated at each WBG pad and will be placed at points nearest the excavation where it will not affect the remediation activities.

3.2.12 Water Source

There are no working fire hydrants at the RVAAP so potable water, water for onsite construction use, and decontamination water will need to be brought to the site. Water for onsite construction use may be brought on a daily basis or stored in designated temporary onsite storage tanks. The tanks will be appropriately labeled as "WATER FOR CONSTRUCTION USE ONLY" to prevent mixing with any other liquids that may be generated or stored on site. Water to be used for decontamination purposes will be separated from the water for construction use and must be American Society of Testing and Materials (ASTM) Type I per the requirements of the Facility-Wide Sampling and Analysis Plan (SAIC, 2001c).

3.2.13 Dust Management

Control measures are also necessary to prevent airborne releases of dust during earth moving activities. Of particular concern is contaminated dust that may expose workers and the public. As excavated soils dry, they are prone to wind erosion and dispersion of fine particles. The primary dust control measure is the application of a water spray to exposed soils. Potable water will only be applied in the amount needed to control dust. No runoff or water ponding will be produced during dust suppression activities.

Given to the isolated conditions of the WBG and years of inactivity, it is likely that a water wagon or truck will be utilized. Water will be sprayed as needed on temporary soil piles, excavations, and re-vegetation areas. Only potable water obtained from a public water supply will be used for dust control. A non-toxic surfactant approved for use by the Ohio EPA, USACE, and RVAAP may be applied to control dust as a secondary measure. Dry soils that are to be excavated will be preconditioned with water to keep them moist to a depth of at least six inches. Backfilled areas will be wetted with the water immediately after backfilling. Revegetation of landscape will be completed as soon as practical to retain moisture and to minimize wind erosion. All soils, contaminated, uncontaminated,

and clean backfill, will be covered during storage, wetted as required, and covered during transport to prevent windblown conditions.

Monitoring for dust will also be performed visually. It will be the responsibility of each worker to observe his or her work area for the potential and actual generation of dust. Areas that show potential release of dust will be reported to the MKM Field Superintendent, who will ensure that water will be sprayed on the area to eliminate the potential for dust problems. The area may also be covered to stop dispersal of dust. If necessary, the work area will be reduced or work stopped until the dust can be controlled.

3.3 Excavation

All excavations will follow the procedures in the Phase II Work Plan and the Final Amended ESS, in addition to the procedures described in this section. Although ACM are present within the site soils at pads 61/61A, 67 and 70, the State of Ohio Department of Health does not consider the soil excavation and processing operations described in this RAWP an abatement operation and, therefore, are not required to be performed in accordance with State of Ohio (OAC3745-20) asbestos emission control regulations. However, the applicable OSHA requirements relative to personal protective equipment and exposure monitoring do apply and will be followed. The load out of asbestos contaminated soil for off site disposal however, is considered asbestos abatement operations and as such will be conducted in accordance with Federal (40 Code of Federal Regulations (CFR) Part 61, Subpart M) and State of Ohio (OAC3745-20) asbestos emission control regulations as described in Section 3.13.1.2.

A shielded excavator will be used to excavate debris and soil under the direction of a single UXO technician at pads 61/61A, 67 and 70 as described below in the subsections that follow. The excavator will be armored with blast shielding consisting of 3-inch Plexiglas over all exposed windows. As stated in the DDESB Fragmentation Database, the 40-mm M406 high-explosive (HE) grenade requires 0.88-inch Plexiglas thickness to prevent perforation from unintentional detonation. Therefore, 3-inch Plexiglas shielding is more than adequate to protect the excavator operator from any fragments, 40-mm grenades, or similar small items, which may be encountered during excavation.

Prior to initiating excavation operations at each pad location, a UXO technician will visually inspect for and remove any MEC, which will provide the first line of quality assurance/quality control (QA/QC) in the flow of material through the remediation process. The excavator will load the excavated materials into an off-road dump truck and the dump truck will transport and dump the materials at the soil processing area.

Safe excavation methods such as sloping will be employed in any excavations that exceed a depth greater than 4 feet bgs.

3.3.1 Excavation at Pad 67

As per the scope of work, MKM will extend the existing excavation at Pad 67 to remove the adjacent soils where it has been determined RDX concentrations exceed WBG site cleanup goals. It is anticipated that at total of 18.5 cubic yards of additional soil will be removed to the required depth of one-foot bgs. Upon excavation, all material will be processed as described in Section 3.4 to remove potential MEC items. Once processed, the material will be returned to the Pad 67 area and consolidated with the existing stockpile. To determine the need for any additional excavation, MKM will collect multi-increment (MI) closure samples at a depth of 0 to 0.5 feet from the bottom and sidewalls of the excavation. The concentration of RDX in the sample collected from the floor of the existing excavation was less than the cleanup goal; therefore, no additional floor samples are required. Additionally, an MI sample of the excavated and processed soil will be taken to determine proper disposition. All MI closure samples will be analyzed in the laboratory for RDX under Method 8330. MI sampling will be performed following the procedures implemented during the environmental remediation operations performed at this location during the 2005 Phase II MEC Clearance and Munitions Response operations as described in the Phase II Work Plan (MKM, 2005a).

Upon receipt of analytical results that are below the risk-based cleanup levels - those levels that are considered safe for range maintenance personnel (SAIC, 2008), the completed excavation will be backfilled with approved clean soil from an offsite source, regraded, and seeded using RTLS approved seed mixtures. Storm water runoff controls, including silt fencing and poly sheeting, will be implemented to protect excavated soils, excavation areas/trenches, and storm ditches from silt accumulation and erosion until the site has been restored to match local surroundings.

3.3.2 Excavation at Pads 61/61A

Environmental contamination (primarily miscellaneous debris with lesser amounts of asphalt roofing shingles and transite) and MEC were found at and near Pad 61 during MEC removal activities for the Mark 19 Range at the WBG. A MEC removal was conducted in areas where targets for the range are to be constructed. Additionally, Pad 61 lies along Lane 1 of the proposed firing range. To provide adequate line of sight to downrange targets, the Mark 19 design calls for excavation along firing Lane 1 at Pad 61 and the bermed areas adjacent to it. Additionally, a portion of Pad 61 at Remedial Investigation sample point WBG-217 requires removal of previously documented surface soil contaminated with SVOCs.

Upon discovery of the debris at Pad 61, a series of test pits were excavated within the berms to estimate the nature and extent of this material. A clear delineation of debris and

clay was observed, with little or no apparent intrusion of contamination into the underlying clay soils. Environmental testing of the soils surrounding the debris indicates elevated levels of SVOCs in those materials. Vertical extents of the test pits were compared with the surface topography, and the contamination appears to be confined to a continuous berm located on the west, south, and east sides of Pad 61.

In accordance with the scope of work MKM will remove approximately 400 in place cubic yards (500 cubic yards after excavation because of "fluff" factor) of soil off the top of the bermed area at Pad 61. Additionally, at the completion of the berm excavation, if any transite or friable asbestos is visible on the remaining surface, the excavation will be deepened in 3- to 6-inch lifts until there is no visible transite or friable asbestos on the excavated surface. Upon excavation, all material removed from the top of the bermed area at Pad 61 will be processed, characterized, and disposed of following the procedures described in this RAWP.

To determine the need for additional excavation, MKM will collect MI closure samples from the sidewalls and floor of the Pad 61 excavation. The MI confirmation samples at this location will be analyzed for asbestos, RDX, and SVOCs. MI sampling will be performed following the procedures described in the Phase II Work Plan (MKM, 2005a) with the following exception. To confirm that all ACM was removed, a minimum of 30 soil samples will be collected at random locations to characterize the floor and sidewalls of the excavation. Each random sample will consist of 1 to 2 ounces and be collected no deeper than 3 inches. The 30 samples will be composited to into one MI sample; however, air drying, sifting, and grinding will not be conducted on this sample because of the possible presence of asbestos. The asbestos sample will be forwarded to an off-site laboratory for asbestos analysis using polarized light microscopy (PLM). If asbestos is present in the sample, then excavation will proceed in 3 to 6-inch lifts until no visible transite or friable asbestos is present. Additional samples will be collected from the sidewalls and bottom of the resultant excavation, and excavation will continue until the results of the PLM testing are non-detect.

When PLM analysis indicates that all asbestos has been removed, a MI sample will be collected from the floor and sidewalls of the excavation and prepared following the procedures specified in the Phase II Work Plan (including air drying, sifting, and grinding) and analyzed for RDX by Method 8330 and SVOCs by Method 8270C. If concentrations of RDX and SVOCs are less than cleanup goals, then the excavation will be backfilled as necessary. If concentrations of RDX or SVOCs exceed cleanup goals, then excavation will proceed in 3 to 6-inch lifts until sample concentrations of RDX and SVOCs are less than cleanup goals.

MKM will backfill as necessary to the grade required for future placements of targets associated with the Mark 19 Range. Suitable backfill material will be determined by sampling and analyzing the proposed borrow source material for the RVAAP full suite of constituents, with the approval of Ohio EPA and the USACE.

For Pad 61A, approximately 4,090 cubic yards of material will be excavated, processed, characterized and disposed following the procedures described in Section 3.13. At a minimum, all waste material in the Pad 61A area will be removed such that the line of site for Lane 1 of the Mark 19 Range matches the design requirements. If any transite or friable asbestos is visible on the surface upon completion of the excavation, additional 3 to 6-inch lifts will be excavated until all visible asbestos has been removed. All material removed from Pad 61A will be processed, characterized and disposed of following the procedures described in this RAWP. To determine the need for additional excavation, MKM will collect MI closure samples from the sidewalls and floor of the Pad 61 excavation. The MI confirmation samples at this location will be analyzed for asbestos, RDX, and SVOCs.

To confirm that all ACM was removed, at least 30 soil samples will be collected at random locations to characterize the surface of the excavation. Each random sample will consist of 1 to 2 ounces of soil and will be collected at a depth of less than 3 inches. The 30 samples will be composited to into one MI sample; however, air drying, sifting, and grinding will not be conducted on this sample because of the possible presence of asbestos. The asbestos sample will be forwarded to an off-site laboratory for asbestos analysis using polarized light microscopy (PLM). If asbestos is present in the sample, then excavation will proceed in 3 to 6-inch lifts until no visible transite or friable asbestos is present. Additional samples will be collected and excavation will continue until the results of the PLM testing are non-detect.

When PLM analysis indicates that all asbestos has been removed, MI confirmation samples for SVOCs and RDX will be collected from the bottom of the excavation and sidewall areas for comparison to WBG cleanup goals. MI sampling will be performed following the procedures implemented during the environmental remediation operations performed during the 2005 Phase II MEC Clearance and Munitions Response operations as described in the Phase II Work Plan (MKM 2005a). If concentrations of SVOCs and RDX in the MI samples exceed cleanup goals, then execution of volume options will proceed as needed. If concentrations of SVOCs and RDX in the MI samples are less than cleanup goals, then no additional excavation will be conducted.

MKM will backfill as necessary to the grade required for future placements of targets associated with the Mark 19 Range. Suitable backfill material will be determined by

sampling and analyzing the proposed borrow source material for the RVAAP full suite of constituents, with the approval of Ohio EPA and the USACE.

3.3.3 Excavation of Sample Location WBG-217

As identified in the Focused Feasibility Study for WBG, the soils adjacent to Pad 61 at sample point WBG-217 (collected from the 2 to 4-foot interval) contain concentrations of SVOCs which exceed WBG cleanup goals. Excavation operations were halted at this location during the 2005 Phase II MEC Clearance and Munitions Response operations upon encountering an unexpected amount of environmental contamination (i.e., buried debris and stained soils) which extended beyond the scope of the planned remedial action at this location. For additional information regarding the excavation and sampling operations at WBG Pad 61 refer to Section 3.0 of the MKM December 2005 final report for the Phase II MEC clearance and munitions response at WBG (MKM, 2005c).

The former location of sample WBG-217 will be excavated to remove the soils where SVOC concentrations exceed WBG site cleanup goals. Excavation operations will be conducted following the excavation and remediation procedures described in Phase II Work Plan (MKM, 2005a).

Upon excavation, all material will be processed as described in Section 3.4 to remove potential MEC items. To determine the need for any additional excavation, MKM will collect MI closure samples from the sidewalls and floor of the resultant excavation. If transite is identified at the site, the asbestos samples will be collected and analyzed as described in the previous subsection before proceeding with MI confirmation sampling. Samples collected at this location will be analyzed for SVOCs. MI sampling will be performed following the procedures described in the Phase II Work Plan (MKM, 2005a).

If the analytical results that show that sample concentrations are less than risk-based cleanup levels (those levels that are considered safe for range maintenance personnel) (Army, 2006), then the excavation will be backfilled with approved clean soil from an offsite source, regraded and seeded using RTLS approved seed mixtures. Storm water runoff controls, including silt fencing and poly sheeting, will be implemented to protect excavated soils, excavation areas/trenches, and storm ditches from silt accumulation and erosion until the site has been restored to match local surroundings.

3.3.4 Excavation at Pad 70

Transite or friable asbestos is present at Pad 70, and its removal is required according to the ROD for WBG (SAIC, 2008). MKM will excavate and remove all existing transite and friable asbestos from the surface and subsurface within the footprint of Pad 70. Once the surface transite and friable asbestos on the surface are removed, MKM will deepen the

excavation until there is no visible transite or friable asbestos present. This removal will be accomplished utilizing the same procedures performed at Pads 61 and 61A, including sifting for UXO, segregation of materials from separate pads, and so fourth.

To confirm that all ACM was removed, a MI sample consisting of at least 30 random soil samples will be collected to characterize the surface of the excavation. Each random sample will consist of 1 to 2 ounces of soil and will be collected at a depth of less than 3 inches. The 30 samples will be composited to into one MI sample; however, air drying, sifting, and grinding will not be conducted on this sample because of the possible presence of asbestos. The asbestos sample will be forwarded to an off-site laboratory for asbestos analysis using PLM. If asbestos is present in the sample, then excavation will proceed in 3 to 6-inch lifts until no visible transite or friable asbestos is present. Additional samples will be collected and excavation will continue until the results of the PLM testing are non-detect.

When PLM analysis indicates that all asbestos has been removed, a MI sample will be collected from the surface of the excavation and prepared following the procedures specified in the Phase II Work Plan (including air drying, sifting, and grinding) and analyzed for RDX and SVOCs following proper health and safety measures. Excavation will proceed until the concentrations of RDX and SVOCs are less than cleanup goals.

If PLM testing indicates that no asbestos is present in the soil and residual concentrations of the contaminants listed in Table 4 of the basic PWS are less than their respective cleanup goals, MKM will backfill as necessary to the approximate original grade. Suitable backfill material will be determined by sampling and analyzing the proposed borrow source material for the RVAAP full suite of constituents, with the approval of the material by Ohio EPA and USACE.

3.4 Soil and MEC Separation Process

The soil and MEC separation process will follow the procedures described in the Phase II Work Plan (MKM, 2005a) and the Final Amended ESS (MKM, 2008), in addition to the text below. A schematic of the proposed sifting operations is presented in Figure 4.

MKM will adopt selected components of its proprietary magnetic separation process used during the 2005 WBG Phase II MEC Clearance and Munitions Response operations (MKM, 2005a) to remove MEC and MD from excavated soils. The primary goal of the conveyor separator process is to safely and effectively remove all MEC and MD from the excavated soils from Pads 61/61A, 67, and 70 so that the final piles of soil and other material can be certified as free of explosive hazards and MEC. To enhance safety, personnel manning the conveyor lines will have an emergency cut-off switch located at the conveyor work area. This switch will be used to immediately shut down all conveyors

and metal separators in the event that the conveyor lines need to be evacuated when MEC are found. All conveyor personnel will be made aware of the switch's location. A generalized overview of each element of the process is presented below.

• After the initial sizing and dewatering (using the trommel screen) has been conducted, excavated soils will be fed to a conveyor that will transport the material to a ferrous metal separator. Ferrous items will be magnetically removed from the conveyor using an overhead drum magnet and conveyed off the side of the main conveyor at a 90-degree angle to another conveyor that will then pass through a blast shield and transport the ferrous objects past a series of UXO personnel. These personnel will inspect the ferrous objects on the conveyor and remove those MEC items that contain explosive hazards.

- Material that passes the ferrous magnet will then be transported on the conveyor to a non-ferrous metal separator (also called the eddy current separator) that will remove non-ferrous material from the remaining material. Non-ferrous metal will be conveyed away at a 90-degree angle from the primary conveyor to a stockpile location at the end of the belt. This material will be periodically removed and stockpiled for later inspection and subsequent disposal.

- Materials that pass through the non-ferrous separator will pass through a blast wall and under the metal detector where UXO personnel will remove any metal objects that were not previously captured by the ferrous and non-ferrous separators.

- Effluent materials leaving the metal detector line will be collected by a hardened front-end loader or dozer and moved to a final location where the final steps in this process will be QC checks and inspection for off-site disposal of the sifted soils and off-site recycling of all MD and non-MD scrap separated from the soil.

Prior to transport for off-site disposal, the final resultant stockpile of processed soil will be sampled using MI sampling methodology for waste characterization. MI sampling will be performed following the procedures described in the Phase II Work Plan (MKM, 2005a). The final number of MI samples required for characterization of the stockpile will be determined by consultation with Ohio EPA.

3.5 Established Demolition Area

OD-2 is the established demolition site which will be used for MEC requiring disposal. The maximum fragment range–horizontal for the MGFD (40 mm grenade) during clearance of the operational area is 345 feet. However, rather than use the maximum fragment range–horizontal for the demolition shot and to enhance safety and minimize the effects of fragmentation, demolition operations will be conducted using sandbag mitigation. According to the DDESB Fragmentation Database, the required wall/roof sandbag

thickness is 1 foot with the vertical height being 6 inches above the MEC item, which will result in a MSD of 200 feet for the sandbag throw distance of 25 feet (see Figure 6 of the Final Amended ESS).

3.6 Demolition Activities

The Ohio EPA Notification for MEC Demolition and Disposal Operations (Appendix E of the Amended ESS) will be completed prior to initiating site activities.

Planned detonation of explosives requires more stringent safety distance requirements than those for ordnance in storage. During disposal of MEC, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, and fragmentation. Physical control of the on site disposal operations will be accomplished by blocking access roads to the site at the point of the MSD. Control of the disposal operations must be maintained to ensure no unauthorized access to the site by nonessential personnel. During disposal preparation, all nonessential personnel will be evacuated to locations outside the MSD, and all essential personnel will be evacuated outside the MSD prior to initiation of demolition charges.

The Senior UXO Supervisor (SUXOS) will ensure that all pertinent parties have been notified of an impending demolition shot. Notification contact numbers are contained in Section 3.1.5 of this RAWP. An established demolition site will be located within OD-2 at RVAAP. The MSD for intentional surface detonation will be the maximum fragment range or K328, whichever is greater.

The maximum fragment range for the MGFD 40 mm M406 HE grenade is 345 feet; however, to meet the client and OHIO EPA requirements to reduce noise and prevent possible recontamination of OD-2 with munitions fragments, all demolition shots at will be conducted using sandbag mitigation as described below:

- The OD-2 range limit of 25 pounds net explosive weight (NEW) will not be exceeded for each demolition shot. The NEW includes the explosive weight of the item being destroyed plus the explosive weight of the donor charge.

- All demolition shots will be conducted using sandbag mitigation and will be performed in accordance with "*Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions. HNC-ED-CS-S-98-7, dated August 1998*." According to the DDESB Fragmentation Data Base, 12-inch thickness of sandbags is required for the 40 mm M406 with the resulting MSD being 200 feet.

While preparing MEC for detonation, the UXOSO will ensure that the number of personnel on site is kept to the minimum required to accomplish the disposal mission safely. Authority to initiate demolition operations will rest solely with the SUXOS.

The UXOSO 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. Following the demolition shot, the area will be inspected for kick-out items and to ensure complete disposal of the MEC.

For established demolition ranges, a minimum area of 200 feet in diameter around the demolition pit will be cleared of dry grass, leaves, and other combustible materials.

3.7 Post-Demolition Operations

After successful initiation of the explosive charge, the SUXOS and UXO Team Leader will conduct an inspection of the disposal site and surrounding area to ensure complete destruction of the MEC. After verifying no more detonations will be required, an “all clear” notification will be issued. The UXO Team will collect for disposal all large MEC fragments and other debris, and generally clean and restore the area.

3.8 Inspection and Certification of MD and Scrap Metal

All ferrous and non-ferrous metals removed will be inspected prior to being declared as either MD or scrap metal. All metals will undergo a five-step inspection/certification process described below. 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.

Steps 1 and 2. At least one of the UXO specialists will initially inspect each item and the UXO Team Leader will verify the inspection before each item is initially declared as MD/scrap metal. Therefore, during the processing of metal on the ferrous inspection line or sorting of metal on the non-ferrous stockpile, the initial two QC inspections will be conducted.

Step 3. After the MD and scrap metal are stockpiled, the UXOQCS will sample and inspect at least 10% of all MD/scrap metal items for the presence of explosive hazards. Once the UXOQCS has performed the inspection, the MD and scrap metal will be containerized and sealed

Step 4. The UXOSO will ensure the specific procedures and responsibilities for processing materials presenting a potential explosive hazard (MPPEH) for certification as MD/scrap metal are being followed and that all procedures are being performed safely.

Step 5 The SUXOS will perform random checks to satisfy that the munitions debris is free from explosive hazards necessary to complete Form DD 1348-1A. The SUXOS will ensure that the inspected MD/scrap metal is secured in a closed, labeled, and sealed container. Prior to offering scrap metal for pickup by the recycling contractor, the SUXOS will certify and the USACE OE Safety Specialist will verify that the MD and scrap metal is free of explosive hazards. To do this, the SUXOS and USACE OE Safety Specialist will sign a DD 1348-1A certificate stating: "*This certifies and verifies that the material listed has been 100% inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related materials.*" The RVAAP Facility Manager will then be provided with copies of the DD 1348-1A along with the chain-of-custody and final disposition forms.

3.9 Disposition of Munitions Debris

MD and scrap metal will be disposed of at a recycler where the material will be processed through a smelter prior to resale. MKM will document the transport and transfer of the MD and scrap metal using the chain-of-custody process described above.

3.10 Explosive Management Plan

The procedures in the Phase II Work Plan (MKM, 2005a) and the Final Amended ESS (MKM, 2008) will be followed for explosive management.

3.11 Explosive Sifting Plan

The procedures for explosive sifting are contained in the Final Amended ESS.

3.12 Confirmation and Soil Stockpile Sampling

The WBG RD/RA actions include removal of soils containing MEC and concentrations of contaminants of concern (COCs) that exceed site cleanup goals coupled with removal of soils required to provide adequate line of sight to downrange targets for the Mark 19 Range. As described in Section 3.3 soil will be excavated from Pads 61/61A, 67, and 70. The goal is to remove soil with concentrations of COCs greater than the site-specific cleanup goals. Confirmation soil samples will be collected from the excavation sites at each pad location to confirm lack of asbestos and/or that soils remaining on site have concentrations of COCs below site-specific cleanup goals. Table 3-1 below provides a summary of the calculated WBG cleanup goals for each RD/RA location.

Table 3-1
Summary of WBG Cleanup Goals

COC	WBG Cleanup Goal
	Mg/kg
RDX	617
Benzo(a)anthracene	75
Benzo(a)pyrene	8
Benzo(b)fluoranthene	75
Dibenzo(a,h)anthracene	8
Indeno(1,2,3-cd)pyrene	75

COC – Chemical of Concern
mg/kg – milligrams per kilogram (parts per million)

Waste characterization soil samples will be collected from excavated soils to facilitate off-site disposal. The purpose of this sampling is to demonstrate that any remaining COCs in soils at WBG RD/RA excavation areas do not present a risk to the National Guard Mark 19 Range Maintenance Soldier. All WBG RD/RA sampling activities, including decontamination of sampling equipment, will be conducted in accordance with the previously approved Field Sampling and Analysis Plan (FSP) and Quality Assurance Project Plan (QAPP) Addendum, included in Appendix E of the Phase II Work Plan (MKM, 2005a). Both of these documents are intended to tier under the RVAAP Facility-Wide Sampling and Analysis Plan (FWSAP) (SAIC, 2001c).

Confirmation and Waste Characterization samples will be collected as described in the following sections. Following visual inspection of the excavation area by the field supervisor, a total of four MI soil samples will then be collected within the footprint to ensure all contaminated material has been removed from the site.

Table 3-2
Estimated Number of Confirmatory Samples and Analysis at Each Excavation Site for the Selected Remedy at the Winklepeck Burning Grounds

	Confirmatory Samples[a,b,c]					
Site	**Medium**	**Surface**	**Bottom**	**Sidewalls**	**Total**	**Analytes**
Former Burn Pad 61	Soil	1 (asbestos)	1	1	3	RDX, SVOCs, & Asbestos
Former Burn Pad 61A	Soil	NA	1	1 (one MI sample from all four sidewalls)	2	RDX & SVOCs (Asbestos if transite is present)

Table 3-2 (Continued)
Estimated Number of Confirmatory Samples and Analysis at Each Excavation Site for the Selected Remedy at the Winklepeck Burning Grounds

Site	Confirmatory Samples[a,b]					
	Medium	Surface	Bottom	Sidewalls	Total	Analytes
Sample Point WBG-217	Soil	NA	1	1 (one MI sample from all four sidewalls)	2	RDX, SVOCs & Asbestos
Former Burn Pad 67	Soil	NA	1	1 (one MI sample from all four sidewalls)	2	RDX
Former Burn Pad 70	Soil	1	NA	NA	1	RDX, SVOCs & Asbestos

a Does not include quality control samples.
b Additional sampling will be conducted if testing indicates COCs exceed respective cleanup goals.
COCs = Contaminants of concern.
MI = Multi-incremental
NA = Not Applicable
RDX = Royal demolition explosive (cyclotrimethylene-trinitramine)
SVOC = Semivolatile organic compound.

3.12.1 Confirmation Sampling

All confirmatory soil samples will be collected using the MI soil sampling technique. This sampling technique consists of taking 30 1- to 2-ounce random soil samples for each represented sample. The samples will be collected from sample locations spatially distributed in a stratified random manner to provide lateral coverage over the entire excavated surface. One to 2-ounce random samples will be collected from the excavation at a depth less than 3 inches. MI samples collected for asbestos laboratory testing will not be air dried, sifted, or ground to prevent fibers from becoming airborne. A minimum of 30 random samples will be collected and composited. One sample from this composite will be forwarded to an off-site laboratory for asbestos analysis using PLM. After all ACM is removed from the excavations at Pads 67, 61A, and 70, additional MI field samples will be collected and analyzed for RDX and or SVOCs. These samples will be air dried, sieved, and ground following proper health and safety measures and the procedures listed in the Phase II Work Plan (MKM, 2005a).

The excavation sidewall samples will be composed of 7-8 sample locations per excavation wall (based on the length of the sidewalls) for a total of 30 sampling locations (based on four sidewalls per excavation). All the pad excavation floor samples and/or excavation bottom samples will be composed of 30 sample locations across the excavation floor (based on one floor per excavation). All excavation floor samples will be collected only after the prescribed excavation depth has been achieved. MI soil samples will be collected from the surfaces (0 to 3 inches deep) of the excavation sidewalls and floors.

Following visual inspection of the excavation area by the field supervisor, a total of 8 MI confirmation soil samples will be taken during the WBG RD/RA operations. The WBG MI soil samples will consist of the following:

Pad 67

- One MI sample from the floor of the excavation for RDX analysis; and
- One MI soil sample from the sidewalls of the excavation for RDX analysis.

Pad 61

- One MI sample from the surface of the excavation for asbestos analysis.
- One MI sample from the bottom of the excavation for asbestos, RDX, and SVOCs,
- One MI sample from the sidewalls of the excavation for asbestos, RDX, and SVOCs,

Pad 61A

- One MI sample from the bottom of the excavation for RDX, SVOCs, and asbestos (if transite materials present) analysis; and
- One MI soil sample from the sidewalls of the excavation for RDX, SVOCs, and asbestos (if transite materials present) analysis.

Sample point WBG-217

- One MI sample from the bottom of the excavation for SVOCs and asbestos (if transite materials present) analysis; and
- One MI soil sample from the sidewalls of the excavation for SVOCs and asbestos (if transite materials present) analysis.

Pad 70

- One MI sample from the surface of the excavation for RDX, SVOCs, and asbestos analysis.

Additional excavation and sampling will be conducted as previously described in Sections 3.3.1, 3.3.2, and 3.3.3 if testing indicates COCs exceed respective cleanup goals at the pad excavation sites.

3.12.2 Excavated Soil Stockpile Sampling

As indicated in the preceding sections of this RAWP, excavated soils from the four pad locations will be processed for removal of MEC, stockpiled, and then sampled for subsequent off-site disposal. One MI soil sample will be collected for every 4,000 cubic yards of stockpiled soil for waste characterization purposes. Each stockpile soil sample will be composed of approximately 30 sample locations throughout the stockpile after it has been processed through the conveyor sifting operation and MEC removed. The samples will be taken directly from the accumulated stockpile. The MI samples for each stockpile will be processed in the same manner as the confirmation soil samples described in Section 3.12.3. Following the sifting process and sample collection, the soil stockpiles will be identified and labeled separately until analytical laboratory results determine the stockpile disposition. All MI soil stockpile samples will be analyzed per disposal facility requirements.

3.12.3 Stockpile Footprint Sampling

A total of four MI soil samples will be collected from the stockpile footprint for asbestos analysis. The soil samples will consist of one MI sample from the surface (0-6 inches) of each quadrant of the stockpile footprint. In the event sampling results indicate detectable concentrations of asbestos, additional excavation and sampling will take place within the affected quadrant(s) in 3- to 6-inch lifts until follow-on MI sampling results indicate all asbestos-containing material has been removed.

3.12.4 Sample Handling and Laboratory Analysis

Following the sample preparation activities, all samples containers will be labeled, sealed with a custody seal, and managed under a chain of custody. All samples will be shipped same day via laboratory courier service to Test America in North Canton, Ohio, for analysis of the following parameters:

- RDX by EPA Method 8330; and

- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (hereafter polynuclear aromatic hydrocarbons [PAHs]) by EPA Method 8310.

All asbestos samples will be shipped overnight to an American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory (AMA Analytical Services, Inc. in Lanham, Maryland) for asbestos analysis using PLM.

3.13 Material Handling and Transport

Two primary waste streams will be generated during excavation activities; solid and liquid wastes. Waste characterization will determine whether a waste is hazardous or non-hazardous and will dictate the disposal option and facility where the waste will be disposed.

3.13.1 Solid Waste

Solid wastes to be generated as part of this removal action will at a minimum consist of contaminated soils and dry sediments. All project-generated solid wastes will be disposed of in accordance with local, state, and federal rules, laws, and regulations.

3.13.1.1 Stockpiling at the Site

Excavated soils to be stockpiled will be stored on site temporarily before transporting to an approved disposal facility. It is anticipated that excavated soils to be stockpiled will be dry and will not require potential leaching management following placement in stockpiles. It is MKM's intent to generate one stockpile within the soil processing area. However, if it becomes feasible and site conditions allow; MKM reserves the right to stockpile non ACM soil separate from ACM soils. The stockpile(s) will be located at the end of the conveyor separator system in same general area used during the MKM 2005 Phase II MEC clearance operations. At the end of each day, the stockpile(s) will be covered with a minimum 6-mil polyethylene liner and secured to prevent wind damage to the cover and stockpile.

Storm water controls for the protection of the stockpile areas will be performed in accordance with Section 5.0 of this RAWP. Silt fence or hay bales will be placed around the perimeter of the stockpiles to control storm water run-off or run-on. Any storm water collected in the stockpile areas will be contained and disposed in accordance with local, state, and federal rules, laws, and regulations.

The polyethylene liner on each stockpile will be inspected daily to ensure that it is properly secured and repaired or replaced, if damaged, to maintain integrity of the cover. E&S control measures found to be deficient will be corrected immediately to prevent potential release of stockpiled soil.

3.13.1.2 Load-Out to the Disposal Facility

The processed contaminated soil stockpile will be loaded out for off-site disposal as soon as practical following the RD/RA excavation and sampling operations. Owing to the presence of transite materials within site soils at the WBG RD/RA excavation sites, all the stockpiled soil and debris will most likely be loaded, transported, and disposed of off-site as asbestos-contaminated material (special waste). As such, all stockpile removal operations will be conducted in accordance with Federal (40 Code of Federal Regulations (CFR) Part 61, Subpart M) and State of Ohio (OAC3745-20) asbestos emission control regulations.

All contaminated stockpile removal operations will be performed under supervision of a certified asbestos supervisor. The stockpile will be loaded out using a track-mounted excavator and/or wheel loader. The heavy equipment will be equipped with closed cabs to minimize potential for exposure to contaminated media. During the load-out operations, the excavated material will be adequately wetted to prevent airborne asbestos emissions. Soil will be loaded into trucks in designated areas only with adequate spill control measures, including equipment to catch and contain spillage, and equipment necessary to recover spillage and clean the area. Disposable sheeting will be placed on the ground around trucks to catch any incidental spillage during loading. Personnel and area monitoring will be performed during load-out operations to verify emissions are maintained within acceptable health and safety limits.

Before loading, trucks will be inspected and surveyed for damage and residual contamination by MKM personnel. Decontamination will be conducted if required. Daily vehicle inspections will be performed prior to loading. Inspections will be conducted from the ground only.

During load-out operations, materials will be loaded into the transport vehicle in a uniform manner and distributed over the full length of the vehicle. Once loading is complete, trucks will be inspected from the ground for loose or escaping soil or leaching water before leaving the load-out area. The load will then be covered with a tarp or other suitable covering using an automated pull-over mechanism from within the truck cab or a manual hand-crank. Only authorized personnel will perform the inspection and all truck drivers will be directed to remain in their vehicle until the vehicle has been properly decontaminated and has left the load-out area.

Transport vehicles will have all required labeling and licensing and will be double-lined in accordance with applicable federal, state, and local rules, laws, and regulations. Prior to transport off-site, haul vehicles will be manifested and inspected for proper marking and labeling information. A returned signed copy of each manifest provided by the disposal facility will be retained by the generator and MKM for record keeping purposes.

Federal DOT regulations will be followed during transport activities. The soil will be DOT-classified based on direct sample results or on previously collected data. The DOT labeling requirements will be followed; and all appropriate placards, bill of lading, and letter of approval requirements to transport contaminated soil from the RVAAP will be in place.

3.13.2 Liquid Waste

Liquid waste, at a minimum, will consist of precipitation accumulated in protected areas (excavation and stockpiles) and decontamination fluids. The liquid waste will be collected and pumped directly into labeled, DOT-approved 55-gallon drums or polyethylene tanks. Liquid wastes will be disposed off-site based on the disposal facility waste characterization analytical requirements. Precipitation accumulated in excavations. may be discharged to ground surface only after analytical results are obtained and approval is received from Ohio EPA, USACE, and the RVAAP. Any ground surface discharges are subject to strict state and federal discharge conditions as well as RVAAP specific guidelines. Liquid wastes will be generated and handled in accordance with local, state, and federal regulations.

3.13.3 Waste Disposal

Off-site disposal facilities will be selected based on waste characterization data collected from the applicable waste stream. It is anticipated that the majority of soils containing metals do not exceed toxicity characteristic leaching procedures (TCLP) limits and, therefore, will not require stabilization prior to off-site shipment. If waste characterization results determine soil to be non-hazardous, it may be disposed at a local Subtitle D landfill.

Hazardous waste will be transported off-site to an approved hazardous waste treatment, storage, or disposal facility within 90 days of the accumulation start date on each container or stockpile. Shipments of waste will be coordinated through the RVAAP Environmental Coordinator. All hazardous wastes will be shipped off-site; and records will be maintained in accordance with local, state, and federal regulations.

3.14 Decontamination

Upon completion of the excavation and before beginning restoration activities, decontamination of small tools and equipment will be performed at each controlled area. Decontamination methods to be implemented may range from dry decontamination procedures, which include removal of all loose soil from buckets, tracks, and undercarriage to a wet brush washing and/or steam cleaning, depending on the extent of residual soils on the equipment. Temporary decontamination pads capable of collecting wash water, including overspray, and loose soil will be constructed as needed to avoid cross-contamination of clean areas during decontamination procedures.

3.15 Site Restoration

Backfill and restoration will take place at each excavation area following the receipt of laboratory confirmatory soil sample results indicating that material with concentrations of COCs exceeding the applicable cleanup criteria had been removed. Restoration will consist of backfilling with clean soil from on- or off-site sources that has passed the chemical and physical requirements outlined in the RVAAP facility-wide plans. Site restoration will be performed to return the disturbed areas to prior conditions and will be "replace-in-kind" unless otherwise noted. There are no anticipated changes to site elevation or drainage features.

Revegetation of disturbed areas will be conducted in accordance with the requirements of the RTLS Integrated Natural Resources Management Plan (INRMP). Only native species as identified in the INRMP will be applied. At a minimum, annual rye will be placed to provide a quick temporary cover. The annual rye may be mixed with other more permanent species to provide long-term cover once the annual rye dies off. No non-natives species will be introduced. MKM will coordinate the required seed mixes with the RTLS Environmental Supervisor prior to mobilizing.

3.16 Weekly/Monthly Reports

MKM will prepare and submit electronic copies of the weekly and monthly reports to RVAAP, USACE, BRAC-D, OHIO EPA, and RTLS. These progress reports will document the project activities conducted by MKM in its performance of the project tasks. The monthly reports will be submitted for receipt by the addressee by the 5th of each month.

3.17 Final Report

At the conclusion of all field activities, MKM will submit a Construction Completion Report. This report will include a summary of the daily activities and disposal records. The report

will document in narrative form all soil removal activities and will include copies of all pertinent documents generated, including asbestos 10-day notification, manifests, air monitoring results, weekly reports, monthly reports, sample collection forms, photographs, and confirmation sampling reports.

The final report will be prepared as a preliminary draft, draft, and final with 45-day comment period by OHIO EPA for each including two response to comments (RTC) matrices and a minimum of one RTC meeting conference call.

4.0 CONSTRUCTION SEQUENCE AND SCHEDULE

4.1 Construction Sequence

The proposed sequence of construction activities is presented below. E&S controls will be constructed, stabilized, and determined to be functional before general site disturbance within the tributary area to those controls. The construction sequence for this project will generally commence as follows:

- If required, repair and maintain the WBG site access roads to support off-road dump truck traffic during transport of excavated soils to the soil screening and staging areas.
- Provide erosion control measures, such as silt fencing as required, to prevent soil erosion on roadways edges, roadside ditches, around Pad excavation areas, and the soil screening and staging areas.
- Once control structures are deemed functional, clear and grub pad excavation areas and soil screening and staging areas as needed.
- Mobilize and install the MKM proprietary magnetic separator and soil screening plant at designated process area within WBG.
- Excavate soil at Pads 61/61A, 67, and 70.
- Transport excavated soils to soil screening and staging area.
- Remove water that accumulates in open excavation(s) by pumping and storage in a 55-gallon drums or a temporary water-tight storage tank.
- Maintain dewatering processes and erosion control guidelines throughout work period.
- Transport any MEC item that is found and safe to move to Igloo 1501 for storage.
- If a MEC item is encountered that cannot be positively identified, or must be destroyed in place, the RVAAP Facility Manager will be contacted for summoning appropriate EOD Detachment personnel for assistance, as needed. In addition, Ohio EPA notification procedures will be followed.
- Conduct confirmation sampling and analysis.

- Transport and dispose of contaminated stockpile.
- Perform demolition and disposal of recovered MEC items and follow Ohio EPA notification procedures.
- Once activity has ceased within WBG and OD-2, disturbed areas will be seeded or stabilized by applying an appropriate seed mix, and mulch.
- After final stabilization has been achieved, remaining temporary erosion and sediment pollution control facilities will be removed.
- Prepare and deliver construction completion report

4.2 Schedule

The current project schedule (as of June 2008) anticipates the completion of all field activities within 120 days of site mobilization. MKM anticipates mobilizing experienced UXO and operator personnel familiar with the WBG RD/RA work areas. All field activities will be conducted in a safe and efficient work manner. The crews may be added or reduced based on work load availability or to maintain cost efficiency.

The project schedule is based on an excavation volume of 5,300 cubic yards with a 2,000 cubic yard contingency. The current project schedule takes into account potential hazards, impedances, and COCs previously identified. Changes in any of these conditions have the potential to affect the project schedule.

5.0 STORM WATER POLLUTION PREVENTION

This section specifies the E&S control requirements for MKM to prevent the erosion of soil and sediments and storm water runoff for the remediation activities to be performed at the WBG. This section has been prepared in accordance with the requirements for a Storm Water Pollution Prevention Plan (SWPPP) per Ohio EPA Permit No. OHC000002 and implements best management practices (BMPs) that are the minimum criteria for the overall control of soil and sediment erosion and storm water runoff during construction activities.

5.1 Surface Features and Topography

The WBG is situated approximately in the center of the RVAAP (Figure 2). It is composed of unconsolidated glacial deposits primarily surrounded by woodland. The topography at WBG is characterized by gently undulating contours that decrease in elevation from west to east. Elevations vary from 1,084.9 to 993.2 feet with the highest elevations located at the extreme western end of the WBG near Pads 28 and 43. Additionally, three small intermittent streams cross the site from west to east and flow into Sand Creek.

5.2 Soil Characteristics and Potential Effects

The WBG site consists of glacial materials and developed soils. The glacially deposited parent material for soil profiles developed at WBG contains a high percentage of clay minerals. The presence of these clay-rich soils presents challenges to a mechanical separation operation for MEC issues. The clay soils will adhere to MEC items and potentially require multiple passes through the process to ensure the proper separation. The clay-rich soils will also cause process equipment screen fouling when the soil moisture content approaches concentrations critical to soil adhesion.

Drainage ways at WBG may provide pathways for migration off-site of COCs. These pathways will be identified in advance of any intrusive activities, and preventative measures will be instituted to prevent migration.

5.3 Environmentally Sensitive Areas

The entire RVAAP facility is situated within the Ohio River Basin, with the West Branch of the Mahoning River representing the major surface stream in the area. This stream flows adjacent to the western end of the facility, generally from north to south, before flowing into the Michael J. Kirwan Reservoir, which is located to the south of State Route 5. The West Branch flows out of the reservoir along the southern facility boundary before joining the Mahoning River east of the RVAAP.

The western and northern portions of the RVAAP are characterized by low hills and dendritic surface drainage. The eastern and southern portions are characterized by an undulating to moderately level surface, with less dissection by surface drainage. Numerous wetland areas occur on the facility. Three primary watercourses drain RVAAP: the South Fork of Eagle Creek, Sand Creek, and Hinkley Creek.

Approximately 50 ponds are scattered throughout the installation. Many were built within natural drainage ways to function as settling ponds or basins for process effluent and runoff. Others are natural glacial deposits or result from beaver activity. All water bodies at the RVAAP support an abundance of aquatic vegetation. None of the ponds within the installation are used as water supply sources.

5.4 Control Methods

In general, erosion control will be accomplished by controlling runoff and then stabilizing soil. There are three basic methods that will be used to control soil movement at the site: runoff control, soil stabilization, and sediment control. Controlling erosion will be the first line of defense and will be implemented using runoff controls and soil stabilization. Sediment control may be necessary for larger disturbed areas at the WBG where it is harder or impractical to control erosion or where sediment particles are relatively large.

5.4.1 Runoff Control

Runoff controls are necessary to prevent storm water or other overland flow sources at disturbed areas from entering or leaving a work area and to control the occurrence of gully, channel, and stream erosion. To mitigate runoff, at each work location MKM will identify potential overland drainage routes. Runoff controls will primarily consist of diversion structures and interception to enclosed drainage areas. Secondary controls may include conveyance to existing waterways and construction of stabilization outlets. The implementation of these methods will depend on the location of the work and the potential for the release of contaminants; they require prior approval by Ohio EPA, USACE, and the RVAAP.

Runoff that occurs in work areas will be collected by diversion structures that are directed to enclosed drainage systems and pumped into 55-gallon drums or temporary storage tanks. The collected runoff will be analyzed for disposal options. If analytical results are acceptable, MKM will discharge the collected runoff to ground surface following approval by Ohio EPA, USACE, and the RVAAP in accordance with local, state, and federal regulations and RVAAP-specific discharge parameters.

Diversion structures consisting of temporary earthen dikes and/or drainage swales will be formed upgradient of construction areas where the volume of overland flow is such that it

is necessary to divert flow around disturbed portions of the WBG. As a BMP, earthwork and other construction operations will be conducted in a manner to prevent muddy water, eroded materials, and other undesirable constituents of project construction waters being discharged through storm water runoff.

5.4.2 Soil Stabilization

Soil stabilization will be performed at disturbed areas to control potential erosion of soils caused by rain, sheet flow, and rills. The purpose of soil stabilization is to protect surface areas and strengthen subsurface areas to minimize or prevent soil erosion. Soil stabilization methods will primarily consist of vegetative soil cover, non-vegetative cover, and structural cover. The preferred method of soil stabilization is the placement of vegetative cover; however, non-vegetative and/or structural erosion control practices may be necessary when disturbed areas cannot be promptly stabilized with vegetation.

Vegetative soil cover will include the placement of temporary or permanent seed or the protection of existing vegetation from construction activities. The type of seeding required for the various areas will be coordinated with RVAAP environmental supervisor. For non-vegetative cover, MKM will place mulch in unprotected areas. Structural soil stabilization options will include land grading to provide erosion and runoff control.

Disturbed portions of each work area where the remediation activities have temporarily ceased will be stabilized with temporary seed or mulch no later than 14 days after the last construction activity in the area unless activities are to recommence within 21 days. Permanent stabilization will occur at all remaining disturbed areas within 14 days of cessation of construction activities. All permanent vegetative cover will be placed with consideration of establishment requirements, adaptability to site conditions, aesthetics and natural resource values, maintenance requirements, and in accordance with the RVAAP environmental supervisor.

5.4.3 Sediment Control

Sediment control is necessary for the protection of areas downgradient of construction areas and off-site locations. The purpose of sediment control is to retain sediments that are generated as a result of soil erosion and storm water runoff. The primary method of sediment control to be implemented by MKM is sediment barriers consisting of silt fence, hay bale dikes, or both to be used solely or in conjunction with one another.

To the greatest extent practicable, all soil-disturbing activities at WBG will be minimized and will proceed in a manner to reduce erosion and sedimentation. All earthwork, grading, movement of equipment, and other operations likely to cause siltation and tracking of sediments will be planned and performed in a sequence as to avoid or reduce

pollution in adjacent waters. Clearing and grubbing activities will be performed in a way that minimizes erosion and sedimentation.

To protect nearby waterways and environmentally sensitive areas, silt fencing will be installed along the downgradient perimeter at all work areas. Silt fences may be constructed using filter fabric that will be staked to provide a barrier to transport silts, fines, and debris yet provides passage of runoff. Selection and type of grade of fabric will be made to allow adequate passage of water. Stakes used to construct silt fences will be of wood with squared, butt ends and tapered driving points. Filter fabric will be stapled or tied with jute twine to stakes. All filter fences will be removed after their function has been fulfilled.

5.5 Operation and Maintenance of Control Methods

Erosion and sediment control measures will be monitored on a daily basis during all phases of construction to prevent soil migration. Corrective action will be taken if the operability of a control device is in question.

Daily inspections will be performed in active work areas to ensure proper performance of run-on and runoff controls. A minimum of weekly and as-needed inspections will be made of inactive, non-vegetated, disturbed areas to ensure that the berms and sediment fences are functioning properly. Inspections will be made after each rainfall and on a daily basis during extensive periods of rainfall.

Corrective measures will be required if inspections reveal excessive silt accumulation in storm water conveyances or along silt fences. Silt accumulation in erosion control structures will be removed. Silt fences will be inspected, and any damaged silt fence will be repaired or replaced.

Sediment that is collected in the systems and removed will be transported to soil stockpile areas and disposed as necessary. Paved streets along the WBG haul route will be maintained as required to remove any mud, dirt, rock, or other materials originating from the work areas.

5.6 Erosion and Sediment Control Management

MKM will manage onsite E&S control activities in an effort to reduce the need for maintenance of structural controls, regrading of severely eroded areas, and reconstruction of failed controls. In conjunction with the implementation of the aforementioned E&S control methods, MKM management activities will include the following:

- Physically mark the limits of land disturbance at the site with tape, signs, or orange construction fence so that workers can see areas to be protected.
- Divert offsite runoff from highly erodible soils and steep slopes to stable areas.
- Clear only what is required for immediate construction activity.
- Initiate stabilization measures no later than 14 days after construction activity if a particular area has temporarily or permanently ceased, unless activity will resume less than 21 days after activity has ceased.
- Provide and maintain stabilized entrances for construction vehicles to reduce dust emissions and soil and sediment tracking.
- Plant permanent seeding at optimal times of year (March through May and September through October). Type of seeding and seeding requirements will be coordinated with the RTLS Environmental Supervisor.
- Remove temporary sediment trapping devices only after permanent stabilization has been established on all contributory drainage areas.
- Make sure that all contractors and subcontractors understand these E&S requirements.
- Designate responsibility of the E&S requirements to one individual (to be named prior to onsite mobilization).
- Establish and maintain an E&S inspection schedule that documents the completion of identified repairs and maintenance items.

6.0 ENVIRONMENTAL PROTECTION

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 RAWP. Environmental protection will be as stated in the following subsections.

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

6.1 Preservation and Recovery of Historical, Archaeological, and Cultural Resources

Known existing historical, archaeological, and cultural resources within MKM's work area will be designated by BRAC-D, and precautions will be taken by MKM to preserve all such resources as they existed at the time they were pointed out to MKM. MKM will install all protection for these resources and will be responsible for their preservation during this contract. If during stockpile removal activities MKM observes unusual items that might have historical, archaeological, or cultural value, such items will be protected in place and reported immediately to BRAC-D.

6.2 Protection of Natural Resources

Before beginning any stockpile removal activities, MKM will identify all land resources to be preserved within the work area. MKM will not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without special permission from BRAC-D and RTLS.

6.2.1 Work Area Limits

Before beginning any excavation activities, MKM will indicate areas where no work is to be performed under this contract. Any monuments and markers will be protected before site operations commence. MKM will convey to its personnel the purpose of marking and protection of all necessary objects.

6.2.2 Protection of Landscape

Trees, shrubs, vines, grasses, landforms, and other landscape features to be preserved will be clearly identified. Except in work areas, trees or shrubs will not be removed, cut,

defaced, injured, or destroyed without the permission of RTLS. Any areas accessed for the purpose of transporting or transferring materials will be protected.

6.3 Protection of Air Resources

MKM will keep stockpile removal activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment processes, and work operated or performed by MKM will be in strict accordance with all federal emission and performance laws and standards. Ambient Air Quality Standards set by the United States Environmental Protection Agency (USEPA) will be maintained for all site operations specified in this RAWP. Special management techniques as set out below will be implemented to control air pollution caused by construction activities, included in the contract.

6.3.1 Particulate Control

Dust particles and particulates from stockpile removal activities will be controlled by wetting the stockpile with clean potable water as needed during the removal effort and replacing the liner cover at the end of each day until the stockpile is completely removed. Water will only be applied as needed, without producing runoff or ponded water.

6.3.2 Odors, Hydrocarbons, Carbon Monoxide, and Oxides of Nitrogen and Sulfur

Hydrocarbons, carbon monoxide, oxides of nitrogen, and sulfur emissions are associated with heavy equipment used at the site. These emissions will be controlled through proper vehicle maintenance, use of emissions reduction devices and other measures. in accordance with federal, state, and local rules, laws and regulations.

6.3.3 Monitoring of Air Quality

Monitoring of air quality for stockpile removal activities will be the responsibility of MKM in accordance with 29 CFR 1910 as detailed in the APP prepared for this project.

6.4 Protection from Sound Intrusions

MKM will keep stockpile removal activities under surveillance and control to minimize damage to the environment by noise.

6.5 Storm Water Pollution Prevention

Storm water pollution prevention is discussed in Section 5.0 of this report.

7.0 CONSTRUCTION QUALITY CONTROL

Construction quality control will be implemented for all activities described in this plan. The construction QC program inspection and testing processes will monitor the overall quality of work, and project controls will be instituted to assure correction of deficiencies identified during the inspections and testing. Project scheduling will be calculated to assure proper sequence and performance of work activities.

Changes to the QC program must be approved by the Ohio EPA, USACE, and RVAAP prior to implementation. MKM will also require contractual approval from USACE before implementing any changes in the QC program.

8.0 REFERENCES

MKM, 2004. Explosive Safety Submission for the Munitions and Explosives of Concern Survey and Munitions Response at Winklepeck Burning Grounds. Final. August, Revision 3.

MKM, 2005a. *Work Plan for Phase II MEC Clearance and Munitions Response at Winklepeck Burning Grounds.* Final. March.

MKM, 2005b. *MEC Clearance and Munitions Response for Winklepeck Burning Grounds at the RVAAP.* Addendum. March.

MKM, 2005c. *Report for the Phase II MEC Clearance and Munitions Response at Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant.* Final. December.

MKM, 2008. Munitions and Explosives of Concern Survey and Munitions Response at Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio. Revision 3, Amendment 2. Draft Final. April.

Ohio EPA, 2004*. Director's Final Findings and Orders.* June.

SAIC, 1998. *Phase I Remedial Investigation Report for Phase I Remedial investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant.* Final. February.

SAIC, 2001a. *Phase II Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant.* Final. April.

SAIC, 2001b*. Facility Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plan.* Final. March.

SAIC, 2001c. *Facility Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant.* Final. March.

SAIC, 2005a. *Phase III Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant.* March.

SAIC, 2005b*. Focused Feasibility Study for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant.* March.

SAIC, 2008. *Record of Decision for Soil and Dry Sediment at the Winklepeck Burning Grounds*. October.

United States Department of the Army (Army), 2006. *Performance Work Statement*. July.

USACE, 1996. *Facility-wide Preliminary Assessment (PA) for the 34 Ravenna Army Ammunition Plant.*

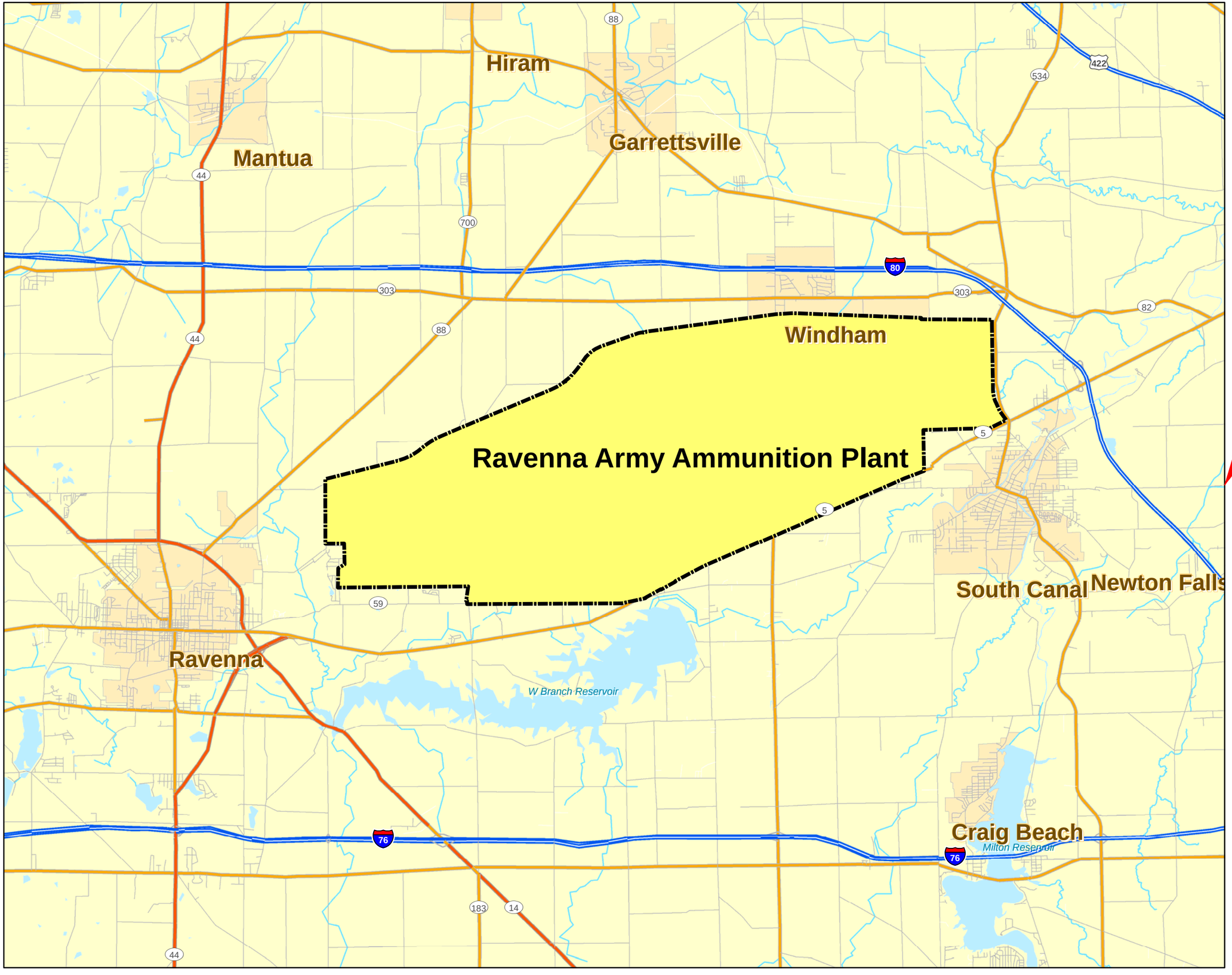
USACE, 2003. *RVAAP Facility Wide Ecological Risk Work Plan. Final*. April.

USACE, 2004. *Multi Increment Sampling Guidance.* Draft. February.

USACE, 2005a. *Contract Drawings for Mark 19 Range Winklepeck Burning Grounds, Ravenna Training and Logistics Site (RTLS), drawings Cover sheet, C-1, C-2, C-4, C-12C, C-6 and C-19*. February.

USACE, 2005b. *RVAAP's Facility Wide Human Health Risk Assessor Manual.* December.

1 Figures



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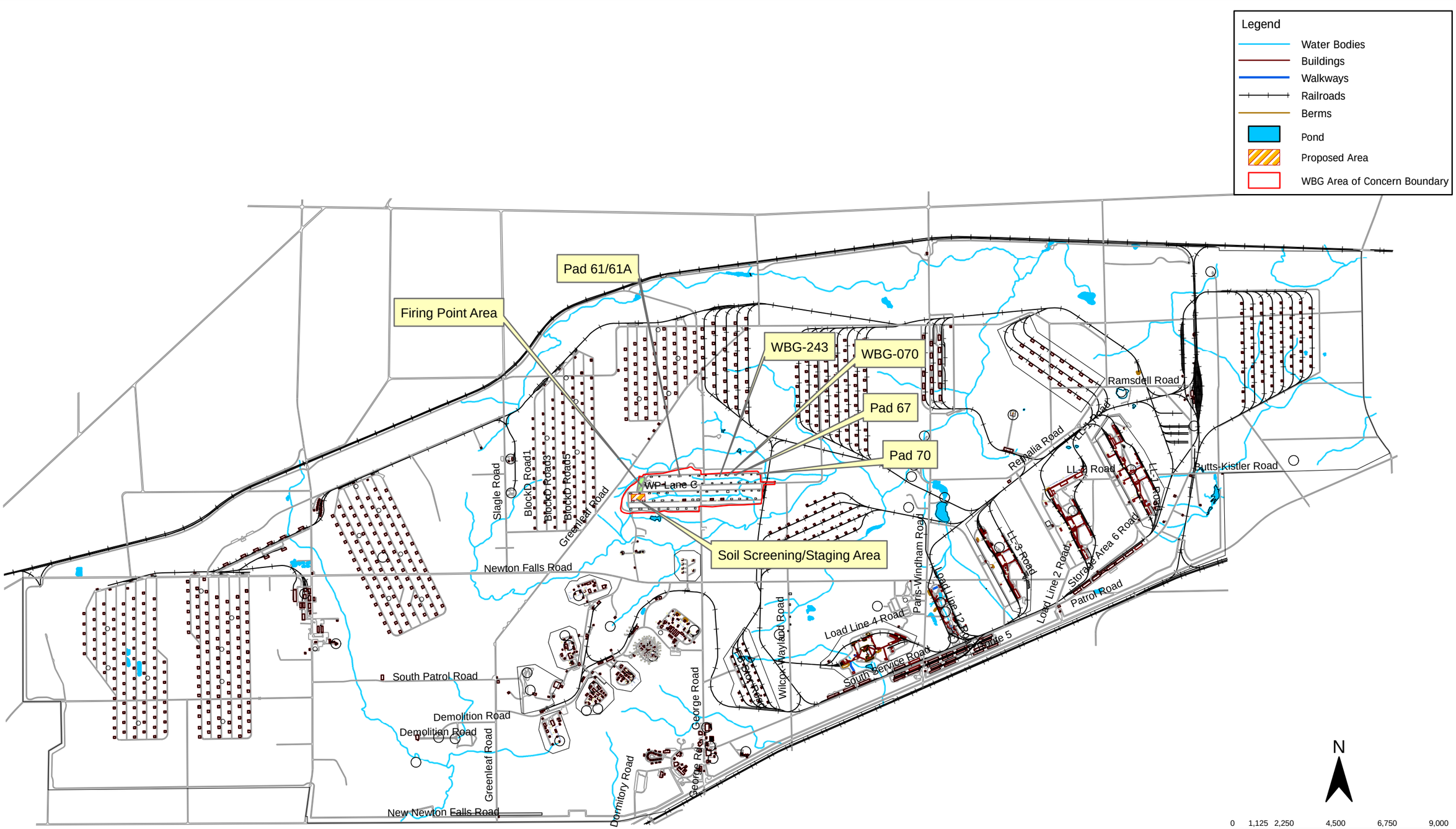
0 0.45 0.9 1.8 2.7 3.6 Miles

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

FIGURE 1 - Site Location Map

Drawn On: 5/5/2008 Drawn By: QX



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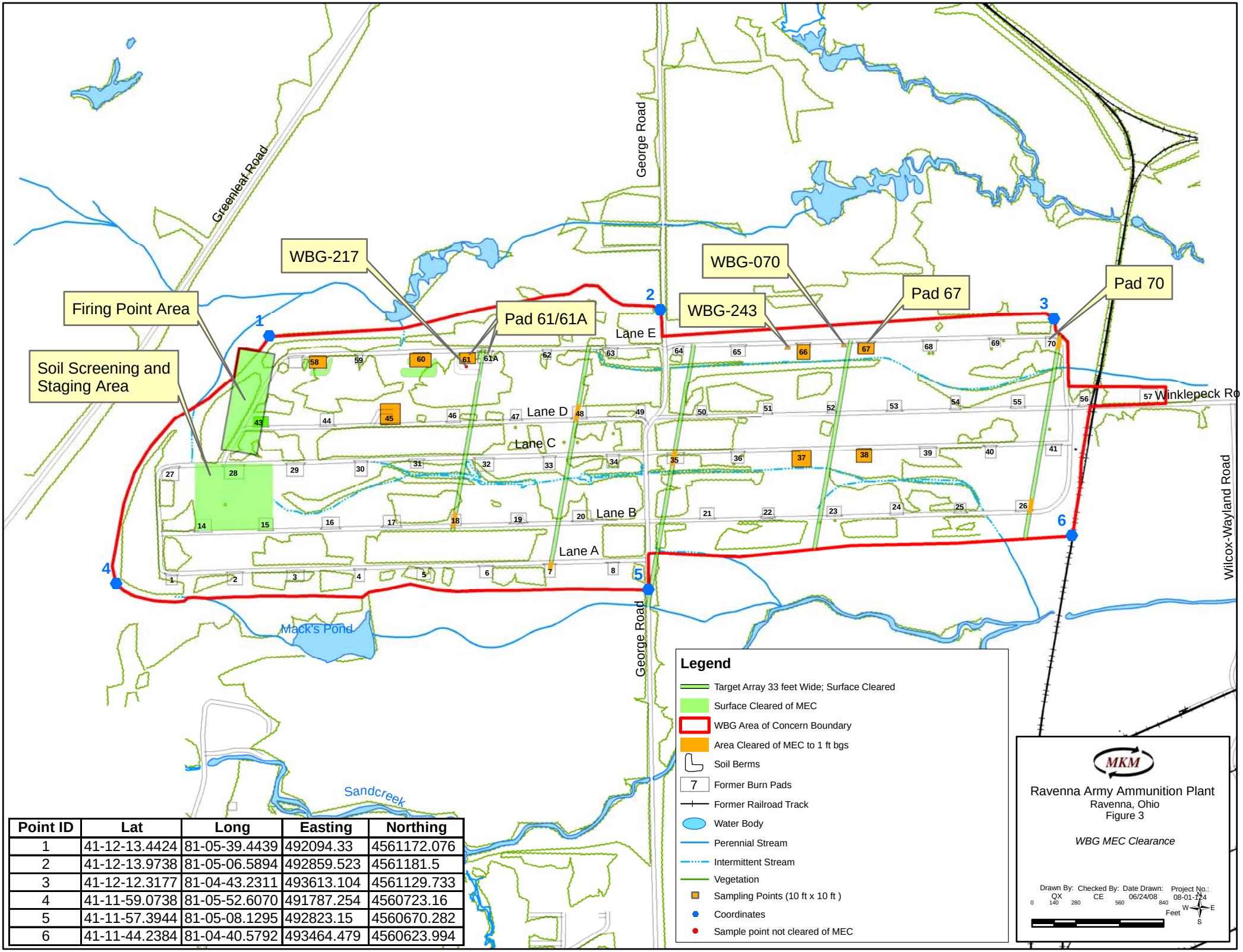
4153 Bluebonnett Drive
Stafford, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

FIGURE 2 WBG Site Map

Drawn On: 5/2/2008 Drawn By: QX



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3	41-12-12.3177	81-04-43.2311	493613.104	4561129.733
4	41-11-59.0738	81-05-52.6070	491787.254	4560723.16
5	41-11-57.3944	81-05-08.1295	492823.15	4560670.282
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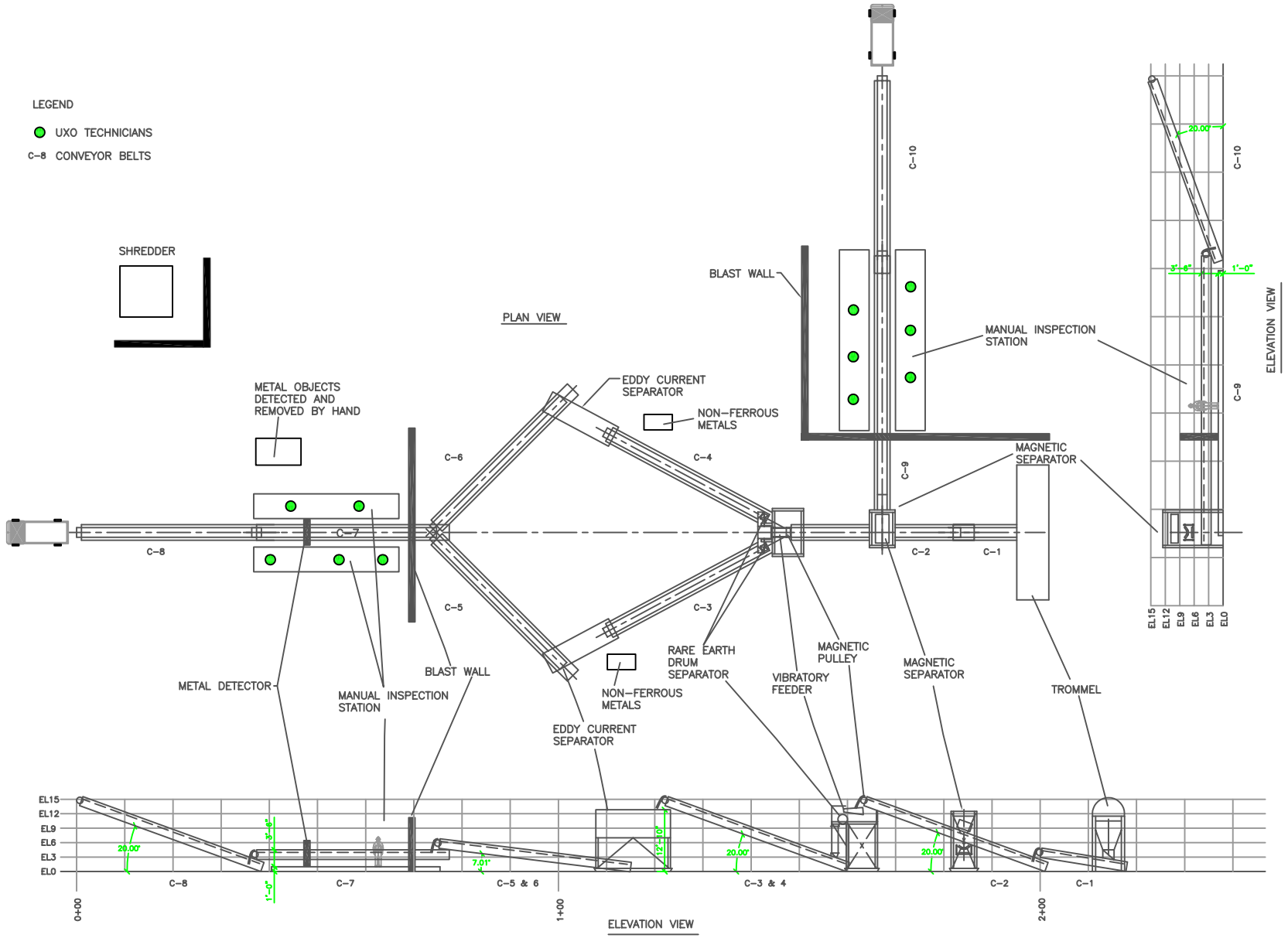

MKM ENGINEERS, INC.			
PROJECT NO.:	04-09-0020	DRAWING NO.:	04-09-0020-E
DATE DRAWN:	10/13/2004	SCALE:	AS SHOWN
DRAWN BY:	MDD	APPROVED BY:	MAL

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FIGURE 4 – SCHEMATIC OF PROPOSED SIFTING OPERATIONS

MEC SURVEY AND MR AT WBG
RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

Attachment 1

WBG Land Use Control Remedial Design

6/06/2008 revised **draft** of Winklepeck Burning Grounds Area of Concern RD Following Ohio EPA Comments

LAND USE CONTROL (LUC) REMEDIAL DESIGN (RD)
WINKLEPECK BURNING GROUNDS (WBG)
RAVENNA ARMY AMMNUNITION PLANT (RVAAP), OHIO

1.0 BACKGROUND

The RVAAP is located in northeastern Ohio within east-central Portage County and southwestern Trumbull County, approximately 1.6 km (1 mile) northwest of the town of Newton Falls and 4.8 km (3 miles) east-northeast of the city of Ravenna (Figure 1). As of February 2006, the Army has laterally transferred a total of 20,403 acres of the former 21,683-acre RVAAP to the United States Property and Fiscal Officer (USP&FO) for Ohio for use as an Ohio Army National Guard training site. The Ohio Army National Guard manages the training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the Ravenna Training and Logistics Site (RTLS). RVAAP's remaining parcels of land are located completely within the RTLS. RTLS did not exist when RVAAP was operational, and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility.

RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading; it was placed on standby status in 1950. Production activities were resumed between 1954 and 1957 and 1968 to 1972. Demilitarization activities, including disassembly of munitions and explosives melt-out and recovery, continued until 1992. The only activities still being carried out at RVAAP are environmental restoration, ordnance clearance and infrequent demolition of any unexploded ordnance, building decontamination and demolition, and training.

RTLS is used for training and related activities, including field operations and bivouac training, convoy training, equipment maintenance, and storage of heavy equipment. Approximately 1,280 acres of property remain under the control of RVAAP; this acreage includes Areas Of Concern (AOCs) and active mission areas. As AOCs are remediated, transfer of the remaining acreage will occur for the purposes of the RTLS mission. Future uses of the land at RVAAP include mounted and dismounted maneuver training areas, development of ranges, as well as the construction of additional field support and cantonment facilities to support future training.

The WBG AOC. The WBG site is located in the center of RVAAP and consists of approximately 200 acres that were historically used for melting explosives out of heavy artillery projectiles using open burning. Before 1980, burning was conducted on platforms (pads) of soil or slag bordered by earthen berms. A total of approximately 70 pads were used for burning. After 1980, burning was conducted only in a 1-acre area at Burning Pad 37 in metal, refractory-lined trays. The burn trays were removed from Pad 37 in 1998, and the site was closed under the Resource Conservation and Recovery Act of 1976 (RCRA).

WBG was the subject of a Phase I Remedial Investigation (RI) (USACE 1998), a Phase II RI (USACE 2001), an Ecological Field Effects Study (USACE 2003), and a Phase III RI (USACE 2004). The purpose of the investigations was to confirm whether contamination was present at the site, to determine the nature and extent of chemicals of potential concern (COPCs) and to evaluate chemical risks and hazards to human and ecological receptors. A munitions clearance was also conducted at the WBG AOC in 2005; reference Phase II MEC Clearance and Munitions Response at Winklepeck Burning Grounds, December 2005.

The Army intends to laterally transfer the WBG AOC to NGB for construction and operation of small arms weapons ranges. Initially, the range will be used for target practice for the Mark 19 Grenade Machinegun, firing non-explosive practice rounds. In advance of site transfer and range construction, the U. S. Army Joint Munitions Command conducted MEC removal in August 2005. The MEC removal action was conducted under a U. S. Department of Defense Explosive Safety Board (DDESB) Explosive Safety Submittal (ESS) and associated project work plans. Lanes 2, 3, and 4 of the Mark 19 range were constructed in 2006 and the range went into operation in 2007. The range is managed by the RTLS and subject to restricted entry and range operational requirements. In the future, other weapons will be fired on the Mark 19 range and additional ranges may be developed within the WBG AOC. All range construction will require review and coordination with the Ohio EPA and possible additional remediation sufficient to facilitate range construction, operations, and maintenance.

An evaluation of alternatives was conducted to select remedies for shallow soil and dry sediment. Dry sediment refers to unconsolidated inorganic and organic material on the surface of the ground that occasionally may be covered with water, usually following a precipitation event. Dry sediments are not covered with water for extended periods and typically dry within seven days. Dry sediments do not function as permanent habitat for aquatic organisms although they may serve as a natural medium for the growth of terrestrial organisms. Dry sediment is essentially soil that due to its location may be covered with water occasionally. The term soil used throughout this LUC RD refers to soil and accumulated dry sediment. The evaluation of the alternatives is documented in the Focused Feasibility Study for the WBG AOC, dated March, 2005. The selected remedy for chemically contaminated soil consists of excavation and disposal of contaminated soil identified at four locations at the WBG AOC. Unexploded ordnance (UXO) and munitions and explosives of concern (MEC) are a concern with any excavation at the WBG AOC; therefore, MEC survey and clearance procedures are incorporated into all excavation activities at the WBG AOC. The selected alternative includes the following:

• clearing of vegetation;
• excavation of contaminated soil by layers to a depth of 0.3 to 1.2 m (1 to 4 ft);
• screening (sifting) of the excavated soil for metal debris (UXO and potential MEC)

- disposal of contaminated soil (above remedial goals) at an approved off-site facility;
- backfill of the excavations using clean fill material, See Facility Wide Sampling and Analysis Plan for Environmental Investigations at the RVAAP, March

2001;

- implementation of land use controls (LUCs) (i.e., security procedures, fencing, warning signs, restricted access, etc.) at the AOC; and
- conducting 5-year reviews of the performance of the selected remedy as described in the ROD.

In addition, the selected alternative includes inspection and maintenance of the RVAAP/RTLS perimeter fence.

1.1 PURPOSE

The purpose of this LUC RD is to outline a process for the implementation and maintenance of LUCs as part of the remedial action at WBG. This LUC RD provides LUC performance objectives, the LUCs to be used, and the LUC implementation actions relevant to WBG.

1.2 EXPOSURE ASSUMPTIONS AND ANTICIPATED LAND USES

This baseline human health risk assessment (HHRA) summary documents the potential health risks to humans resulting from exposure to contamination within WBG at RVAAP if no remedial action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. Section 7.0 of the ROD summarizes the results of the baseline risk assessment for WBG presented in the FFS for WBG at RVAAP. The soil COCs for WBG are: Royal Demolition Explosive (RDX); benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; and indeno(1,2,3-cd)pyrene.

The weapons range supports the RTLS mission. Initially, the Mark 19 target practice grenade will be fired on this range. The Mark 19 target practice grenade is not a high explosive round and carries a small bursting charge to allow a visual determination of the impact point. The range has four fixed firing points, located to the west of Pads 43 and 58 (Figure 2) oriented to fire eastward. The Mark 19 fires 40-mm target practice grenades into a series of five target array bands located 400, 600, 800, 1,100, and 1,500 m east of the firing points. The firing point area, situated at the west end of the range, encompasses an area 200 m long by 70 m deep. The target array bands are 10 m wide. The limit of the range or dispersion area is 2,095 m (6,874 ft). Targets are a combination of computerized pop up silhouette-type targets and hard targets. Hard targets are fixed, inoperable, obsolete armored vehicles and tanks. The engines, as well as all petroleum products and lubricants, have been removed from these vehicles. The computerized pop-up targets are remotely operated and display a specific silhouette for a programmed time for target acquisition and engagement.

The current and future land use for WBG is for various small arms weapons ranges, including the existing Mark 19 Range. The most-exposed potential human receptor for this land use is a Range Maintenance Soldier.

1.3 SUMMARY OF RISKS NECESSITATING LAND USE CONTROLS

Surface soil and subsurface soil remedial actions have been implemented at portions of the WBG. The objectives of the soil actions were to remove the primary sources of contamination and to remove a large part of the secondary sources of contamination in impacted soils and groundwater via soil excavation. However, based on post-remedial action sampling results, residual contamination still remains in the soil at WBG. Also, the groundwater remedial action will be addressed as a separate operable unit. There are no wet sediments at the WBG AOC.

People who might be at risk from exposure to contaminated soil at or below the ground surface include RTLS workers or trainees. If future activities require excavation, workers may be exposed to contaminants by inhalation, as well as through incidental ingestion and dermal contact. Contaminated soils may be found as close as four (4) feet below the ground surface (BGS).

The human health Remedial Action Objective (RAO) is protection of the Range Maintenance Soldier from contaminants in soil extending to a maximum depth of three (3) feet BGS. The numeric criteria developed to meet this RAO are risk-based cleanup goals. These cleanup goals were calculated for the Range Maintenance Soldier using the methodology presented in RAGS Part B (EPA 1991) and incorporating site-specific exposure assumptions applicable to WBG. The cleanup goals for the COCs are presented in the ROD, Section 8.0, Table 2.

2.0 LAND USE CONTROL OBJECTIVES

The Army will implement LUCs to achieve the performance objectives listed below for the WBG AOC. Figure 2 depicts the LUC boundaries for the WBG AOC.

1. Maintain the RTLS perimeter fence.
2. Restrict future land use to small arms weapons ranges.
3. Limit activities to target practice; maintenance of targetry and associated lifting mechanisms; range maintenance, compatible natural resource management activities, and other activities that are consistent with the Range Maintenance Soldier exposure scenario.
4. Prohibit digging or excavation at the WBG AOC outside of any UXO/MEC/DMM-cleared areas.

3.0 LAND USE CONTROLS

This section provides a description of the LUCs, the logic for their selection, and implementation actions. The Army or its representatives are responsible for implementation, inspection, periodic reporting, and enforcement of the LUCs for the WBG AOC. As a condition of property transfer or lease, the Army may require the transferee or lessee, with approval from the Ohio EPA, to assume responsibility for various implementation actions as indicated below. Third party LUC responsibility will be incorporated into pertinent contractual and property documentation, such as a purchase agreement, deed, lease, and an Ohio Environmental Covenant. Although the Army may transfer primary responsibility for various implementation actions to a third party, the

Army shall remain ultimately responsible for remedy integrity. This means that the Army remains responsible for addressing violations of LUCs. Should any LUC be violated, the Army will ensure that appropriate actions are taken as soon as practicable to terminate the offending land use and may initiate legal action to either compel action by a third party(ies) and/or to recover the Army's costs for remedying any discovered LUC violation(s).

3.1 LAND RESTRICTIONS

RVAAP/RTLS. Land use of the WBG AOC shall be limited by the maintenance of the existing RTLS perimeter fence, which shall be a 6-foot chain-link fence topped with a v-shaped bracket slanting inward and outward with a three-strand barbed wire bracket.

WBG AOC. Land use shall be limited to use of the WBG AOC as a small arms range (including the existing Mark 19 Grenade Machinegun Range), and activities on the WBG AOC shall be limited to the following activities: target practice; maintenance of targetry and associated lifting mechanisms; range maintenance (including but not limited to such activities as removal of target practice rounds from the ground surface within the impact area, clearing of target practice rounds from the surface of the range area, road and culvert repair, routine ditch maintenance, and vegetation management [mowing, brush and weed cutting, controlled burning, and herbicide application]); and compatible natural resources management activities (including but not limited to such activities as flora and fauna surveys, timber management to include timber stand improvement and forest products harvesting, soil stabilization and erosion control, invasive/non-native species control, nuisance wildlife control, drainage maintenance, wetland delineations, grassland management, and scientific research). Duration of exposure shall be based upon the established National Guard Range Maintenance Soldier exposure scenario cited at 85 days per year at 6 hours per day for a maximum of 25 years (RVAAP Facility-Wide Human Health Risk Assessor Manual with Amendment 1 – USACE 2005). All activities must be in compliance with range safety regulations, established digging restrictions, and established exposure limits. In accordance with current Department of the Army regulations, the small arms range will be marked with signage, facing outward, to warn personnel that the area is a live fire range. All other uses of the WBG AOC are prohibited and the Army will cause appropriate notice to be posted.

3.2 DISTURBANCE RESTRICTIONS

All digging or excavation on the WBG AOC outside of the UXO/MEC-cleared areas, within the Mark 19 Grenade Machinegun Range, as delineated within this RD Figure 2, is prohibited, subject to the following exceptions:

a. Routine maintenance of the roads, ditches and culverts.
b. Ground surface repairs by authorized range personnel in support of authorized range activities
c. Digging along target array areas by authorized range personnel, to a depth of 1 foot BGS [see Figure 2].

4.0 IMPLEMENTATION ACTIONS

The Army shall perform the following implementation actions to ensure that the LUC objectives are met:

- Prepare GIS data and a map indicating the location and dimensions of the AOC and the known extent of soil contamination with LUC location. Signage and/or fence will be placed in locations that do not conflict with the range impact area to identify the areas of known soil contamination.

- Incorporate environmental overlay and appropriate notice procedures into the Property Management Plan (PMP).

- Through the PMP, prohibit all digging or excavation activities, except for: routine maintenance of roads, ditches, and culverts; ground surface repairs by authorized range personnel in support of range activities; and, digging along target array areas by authorized range personnel to a depth of 1 foot BGS.

- Through the PMP, maintain the RTLS perimeter fence; and restrict land use of the WBG AOC to use as a small arms weapons range.

If additional LUC-related Remedial Design documents are identified or prepared for proposed inclusion in the WBG AOC Remedial Design, the Army shall, upon review and approval by Ohio EPA, incorporate those documents as appropriate into the Property Management Plan, and provide copies to Ohio EPA.

5.0 MODIFICATION OR TERMINATION OF LUCS

LUCs concerning disturbance of soil on the WBG AOC outside of UXO/MEC-cleared areas are expected to remain in place indefinitely. LUCs concerning restriction to training range use are expected to remain in place indefinitely, unless further action is taken to reduce the concentrations of hazardous substances in soil to levels that allow for unlimited use and unrestricted exposure.

The Army shall not, without Ohio EPA approval, make a modification to any LUC. The Army shall not, without Ohio EPA approval, make a land use change inconsistent with the WBG ROD or this LUC RD. Likewise, the Army shall seek prior Ohio EPA approval before commencing actions that may impact remedy integrity.

The Army shall not, without Ohio EPA approval, terminate a LUC. The decision to terminate LUCs will be documented consistent with the National Oil and Hazardous Substances Pollution Contingency Plan process for post-ROD changes.

6.0 MONITORING AND REPORTING

Periodic monitoring of LUCs in the form of site inspections will be conducted by the Army to confirm whether the LUCs remain effective and meet LUC objectives for

continued remedy protectiveness. Site inspections will be conducted as necessary but, not less than once per quarter. Monitoring results will be reported in an annual LUC monitoring report, with changes in monitoring frequency to be coordinated with and approved by Ohio EPA. The Army will provide (via mail) each report to Ohio EPA.

The annual LUC monitoring report will evaluate the status and effectiveness of LUCs with a description of how any LUC deficiencies or inconsistent uses were addressed. The annual LUC monitoring reports will be used in the preparation of the CERCLA 121(c) Five-Year Review. As part of the LUC monitoring report, a written certification will be submitted stating whether or not the LUCs remain in place and are effective.

7.0 CERCLA 121(C) FIVE-YEAR REVIEWS

As part of the CERCLA Section 121(c) 5-Year remedy review process, the Army shall prepare a report evaluating the continued effectiveness of the remedy, including effectiveness of the LUCs and an assessment of whether there is a need to modify the LUCs. The Army will verify whether the LUCs continue to be properly documented and maintained. Each remedy review will evaluate whether conditions have changed due to contaminant attenuation, migration or other factors such as land use. If risk levels have changed since initial LUC implementation, LUC modification will be considered, which may include a change in monitoring frequency.

8.0 LUC ENFORCEMENT

If the Army discovers any land use that is inconsistent with the LUC objectives or the LUCs or that impairs the effectiveness of the remedial actions at the WBG AOC, the Army will notify Ohio EPA in writing as soon as practicable but no later than ten (10) days after discovery and include a written description of the inconsistent land use. Within ten (10) days after such notification, the Army will provide Ohio EPA with information regarding what efforts or measures have or will be taken to address the inconsistent land use.

The Army will work with Ohio EPA and if applicable, transferees/ lessees of the WBG AOC or any portion thereof, to take appropriate action to enforce the LUCs or maintain remedy integrity. The Army may take immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment. Any

breach of the LUCs will be reported to the appropriate civil authorities. Potential response measures include informal resolution with the owner or violator, and the institution of judicial action under State property law or CERCLA.

9.0 LEASES AND PROPERTY TRANSFERS

No later than sixty (60) days prior to leasing or transferring any portion of the WBG AOC to another agency, person, or entity (including federal to federal transfers), the Army shall provide written notice to Ohio EPA of such intended lease or transfer. The notice shall identify the proposed lessee or transferee and describe any additional mechanism(s) to be used for future LUC responsibilities after lease or transfer[1].

As a condition of a lease, the Army will require that equivalent LUCs will be put into the terms and conditions of the lease. The lease will prohibit the lessee from modification or termination of any restrictions/ LUCs without prior Army concurrence and Ohio EPA approval.

As a condition of a transfer to another federal entity, the Army will require that equivalent LUCs will be put into the terms and conditions of the transfer document. The transfer document will prohibit the transferee and subsequent owners or users from modification or termination of the LUCs without prior Army concurrence and Ohio EPA approval. The Army will consult with Ohio EPA for input on the deed or transfer document language.

Furthermore, the transferee or lessee will be responsible for ensuring compliance with the LUCs. However, the Army remains responsible for implementing, maintaining and monitoring the remedial actions (including LUCs) before and after property lease or transfer.

In addition, concurrent with the lease or transfer of the WBG AOC or any portion thereof from the Army, information regarding the LUCs will be communicated in writing to the

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1 In accordance with current DOD and DA policy, a Finding of Suitability to Transfer (FOST) that describes the LUCs and includes the land use restriction language, for subsequent use in the deed or lease, will be provided to USEPA, the state and the public for their review and comment on the specific wording for property transfer, sale, or lease documents. The FOST also serves as the basis for deed inclusion of the CERCLA 120(h)(3) notice, covenant and reservation of access.

lessees or transferees and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property. Should a problem with LUC implementation, maintenance, monitoring, reporting or enforcement arise at a transferred or leased property, the Army will work together with the transferee or lessee, and subsequent property owner(s) and user(s), as well as Ohio EPA and appropriate local government representatives, to resolve any LUC problems and to ensure expedient solutions.

If the Army intends to convey ownership of the WBG AOC or any portion thereof to a non-federal entity, the Army will require that, following review and approval by Ohio EPA, the transferee execute and record an environmental covenant, in accordance with and pursuant to Ohio Revised Code §§ 5301.80 to 5301.92 that establishes the LUCs as enforceable activity and use limitations under state law.

If the Army becomes aware of an action that interferes with or violates an Environmental Covenant, it will take action to resolve the matter in accordance with the enforcement procedures set forth in the Environmental Covenant. The Army will notify Ohio EPA within three (3) days of becoming aware of the violation. If the matter is not resolved, the Army will notify Ohio EPA of the results of its resolution efforts (e.g., any corrective action) or proposal to resolve the matter within ten (10) days of discovery of the violation.

10.0 RESPONSIBILITIES OF SUBSEQUENT OWNERS/ LESSEES

In the event of property transfer or lease, the Army may require the transferee or lessee and subsequent property owner(s) and user(s) to assume certain responsibilities for LUC implementation actions described above, including maintenance, inspection, reporting and enforcement, with the involvement of the appropriate state and/or local government representatives. The responsibilities assumed by transferee(s) and subsequent owner(s) and user(s) shall be clearly documented in the appropriate transfer/ lease documentation. The Army will continue to: (1) conduct all CERCLA 121(c) reviews; (2) notify the appropriate state and/or local government representatives of any known LUC deficiencies or violations; (3) reserve the right to access the property to conduct any necessary response; (4) reserve the authority to change, modify or terminate LUCs and any related deed or lease provisions, with Ohio EPA approval; and, (5) remain responsible for remedy integrity. To the extent permitted by law, a transfer deed shall require the LUCs imposed as part of a CERCLA remedy to run with the land and bind all property owners and users to enforcement by the Army.

The transferee or lessee, as well as subsequent property owner(s) and user(s), will be responsible for promptly notifying the Army, Ohio EPA, and local government representatives, of any deficiencies or violations of LUCs and what efforts or measures have or will be taken to address the deficiency within a reasonable time. Any violations of federal, state or local law will be reported to the appropriate law enforcement authorities. If the transferee or lessee wants to (1) conduct additional remediation, (2) change land use inconsistent with a deed or lease restriction, or (3) modify or terminate a LUC, the transferee or lessee must first obtain written approval from the Army and Ohio EPA and the property owner.