Final Remedial Design Supplement Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds

Former Ravenna Army Ammunition Plant, Camp Ravenna Portage and Trumbull Counties, Ohio

June 30, 2016

Contract No. W912QR-12-D-0004 Delivery Order No. 0003

Prepared for:



U.S. Army Corps of Engineers Louisville District 600 Dr. Martin Luther King, Jr. Place, Room 821 Louisville, Kentucky 40202-2267

Prepared by:



Tetra Tech, Inc. 661 Andersen Drive Pittsburgh, Pennsylvania 15220

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Tetra Tech, Inc., has completed the preparation of this <u>Remedial Design Supplement</u> as part of the <u>Soil Removal Action</u> for <u>RVAAP-05 Winklepeck Burning Grounds</u> at the <u>former Ravenna Army Ammunition Plant (RVAAP)/Camp Ravenna</u>. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of data quality objectives; technical assumptions; methods, procedures, and material to be used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

Suit A-Noff

6/9/2016

Date

Scott Nesbit Project Manager

Richard B. Wine

Rick Wice Independent Technical Review Team Leader <u>6/9/2016</u> Date

FINAL REMEDIAL DESIGN SUPPLEMENT								
Name/Organization	Number of Printed Copies	Number of Electronic Copies						
Mark Leeper, ARNG-ILE-CR	0	1						
Kevin Sedlak, ARNG – Camp Ravenna	0	1						
Katie Tait, OHARNG – Camp Ravenna	1	0						
Nathaniel Peters II, USACE Louisville	2	1						
Greg Moore, USACE Louisville	Transmittal Letter Only							
Pat Ryan, REIMS	Transmittal	Letter Only						
Gail Harris, AR Manager – Camp Ravenna	2	2						
AR = Administrative Record ARNG-ILE-CR = Army National Guard – Installations Logistics Environmental – Cleanup Restoration ARNG – Camp Ravenna = Army National Guard – Camp Ravenna Joint Military Training Center OHARNG – Camp Ravenna = Ohio Army National Guard – Camp Ravenna Joint Military Training Center								

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ACRONYMS AND ABBREVIATIONS

AOC	area of concern
APP	Accident Prevention Plan
BMP	best management practice
Camp Ravenna	Camp Ravenna Joint Military Training Center
COC	contaminant of concern
DOT	Department of Transportation
E&S	erosion and sediment
ESS	Explosive Safety Submission
FFS	Focused Feasibility Study
FS	Feasibility Study
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
РАН	polynuclear aromatic hydrocarbon
RD	Remedial Design
RDS	Remedial Design Supplement
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SSHP	Site Safety and Health Plan
SVOC	semi-volatile organic compound
TCLP	toxicity characteristic leaching procedure
Tt	Tetra Tech, Inc.

- UXO unexploded ordnance
- WBG Winklepeck Burning Grounds
- WMP Waste Management Plan

1.0 INTRODUCTION

This Remedial Design Supplement (RDS) was prepared under the Environmental Restoration Service Contract W912QR-12-D-0004, Delivery Order 0003 for the United States Army Corps of Engineers (USACE) Louisville District. This Delivery Order is to provide Environmental Remediation Services for Camp Ravenna Joint Military Training Center (Camp Ravenna), the former Ravenna Army Ammunition Plant (RVAAP) shown on Figure 1-1.

This RDS for RVAAP-05 Winklepeck Burning Grounds (WBG) combines the deliverables required in the Performance Work Statement into one document;

- · Traffic Plan,
- Site Layout Plan and Preconstruction Surveys,
- Site Safety and Health Plan (SSHP),
- Erosion and Sediment Control Drawings-Plan and Detail,
- · Construction Quality Control Plan (CQCP),
- Waste Management Plan (WMP), and
- · Sampling and Analysis Plan

1.1 PURPOSE AND SCOPE

Tetra Tech, Inc. (Tt) has been tasked to complete a soil removal action for the WBG Area of Concern (AOC) RVAAP-05. The activities are being performed as required by, and will be performed in accordance with, the Comprehensive Environmental Response, Compensation, and Liability Act. The soil removal action will excavate contaminated areas at WBG Pads 38, 61/61A, and 66/67 (see Figure 1-2) to an acceptable level of risk in accordance with the selected remedy as presented in the Final Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds (USACE, 2015) and the final Remedial Design (RD) for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds (USACE, 2015) attached as Appendix A.

The additional soil excavation is required because the original removal action limited the future development of the WBG as a Mark 19 Machine Gun Range. The proposed future use for this AOC is military training. The site is planned to be further developed as a Multi-Purpose Machine Gun Range that will require intrusive activities at various depths over the entire WBG. The Army has determined that future use of the site may also involve full-time employees, thereby requiring that it meet the applicable standards for the Commercial/Industrial Land Use.

1.2 SITE DESCRIPTION AND BACKGROUND

WBG, designated as AOC # RVAAP-05, encompasses approximately 200 acres in the central portion of former RVAAP. Historical operations at WBG included destruction of explosives from various types of munitions by open burning. There are approximately 70 former burn pads located along five east/west oriented gravel or dirt roads. The former burn pads range in appearance from distinct areas of soil and slag that are partially vegetated to non-descript (no visible slag and heavily vegetated).

WBG was the subject of a Phase I Remedial Investigation (RI), a Phase II RI, and a Phase III RI. A Focused Feasibility Study (FFS) was completed in 2005. A removal action for Munitions and Explosives of Concern (MEC) was performed between March and August 2005 in preparation for the proposed future land use as a MK19 Grenade Machine Gun Range, a target practice range for use in firing non-explosive 40 millimeter (mm) practice rounds. The MEC removal action included the removal of soil contaminated with MEC and chemical contaminants and soil containing transite.

At the conclusion of MEC and soil removal actions, confirmation sampling indicated that additional soil contamination above risk-based cleanup goals for Commercial/Industrial Land Use (the proposed Reasonably Anticipated Future Land Use) to allow for the potential of full-time employees on the AOC remained on site at Pads 38, 61/61A, and 66/67. An additional remedial investigation (RI) was conducted to collect additional data to determine the nature and extent of the residual contamination and assess the potential risks to a full-time occupational exposure

receptor. A Remedial Investigation/Feasibility Study (RI/FS) Supplement (USACE, 2014) was prepared and indicated five distinct areas of concern (Pads 38, 61/61A and Pad 66/67) have three chemicals of concern related to Commercial/Industrial Land Use. The RI/FS Supplement also showed that limited additional soil removal in these five areas would allow the site to be used for military training and by full-time workers, with fewer restrictions and Land Use Controls.

1.3 DESCRIPTION OF REMEDIAL ACTIVITIES

This section details construction tasks that will be performed during the cleanup at each of the WBG Pads as designed in the Final Remedial Design (USACE, 2015) attached in Appendix A. These tasks are:

- · Premobilization
- Mobilization, Preconstruction Survey, Utility Clearance, and Site Preparation
- Existing Stockpile and Borrow Material Sampling
- Excavation
- Soil and MEC Separation Process
- · Confirmation and Waste Characterization Sampling
- Material Handling and Transport
- Established Demolition Area, if needed
- · Demolition Activities, if needed
- · Post-Demolition Operations, if needed
- · Inspection and certification of munitions debris (MD) and non-munitions debris, if needed
- Disposition of MD, if needed
- · Decontamination
- · Site Restoration

The activities will be performed in accordance with the Final Remedial Design (USACE, 2015) attached in Appendix A to make sure specific environmental protection requirements are met during construction activities.

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2.0 TRAFFIC PLAN

Tt will post signs and erect barricades to provide traffic directions to key locations at the former RVAAP. These signs will be in visible locations and be updated and maintained as necessary.

Tt will establish transportation routes for incoming and outgoing vehicles and heavy equipment to minimize the impact on the former 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. All traffic control devices used on the project will conform to Department of Transportation (DOT) applicable standards. Figure 2-1 outlines the haul route within former RVAAP.

A traffic control plan for vehicle access to each of the WBG work areas will be understood by all responsible parties before the site is occupied. The plan is to assure that adequate consideration is given to the safety of workers during construction. The proposed traffic routes (Figure 2-2) to each WBG work area will ensure that traffic flows without impedance for vehicles and heavy equipment entering and exiting. The uses of haul routes will be coordinated with the OHARNG to ensure that 40mm grenades are cleared from the WBG roads before use.



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3.0 SITE LAYOUT PLAN AND PRECONSTRUCTION SURVEYS

Operations for the excavation, screening, and disposal of approximately 5,250 cubic yards of nonhazardous soil containing polynuclear aromatic hydrocarbons (PAHs), TNT, and hexahydro-1,3,5trinitro-1,3,5-triazine (RDX) in the WBG will take place in five separate areas. These areas (Pads 61 & 61A, Pad 66, Pad 67, West of Pad 67, and Pad 38) as well as the accompanying wetlands are displayed on Figure 3-1. Haul routes which connect each area being used during the operations are found on Figure 2-2.

3.1 SITE PREPARATION AND EXCAVATION OF PAD AREAS

Each pad will be surveyed for field location by an Ohio Professional Licensed Surveyor using the coordinates in the Final Remedial Design (USACE, 2015) in Appendix A. An underground utility clearance will be conducted at the same time. Following the location of each pad (excavation) area, soil samples will be collected from each of the pad areas. The soil samples will be analyzed at a fixed-based laboratory and the results from the analysis will be used to prepare the waste profile to dispose of the contaminated soil. Sampling and analysis will be in accordance with the Sampling and Analysis Plan in Appendix B and the Waste Management Plan in Appendix F.

Before excavation activities begin, erosion control features will be installed in accordance with the Erosion Control Plan in Section 5. The coordinates, photos from the preconstruction survey of each pad area, and general location of erosion control items are shown on Figures 3-2, 3-3, and 3-4. An armored CAT 325 Excavator will be used to excavate each pad and a Cat 725 haul truck will transport excavated materials to the Soil Screening & Staging Area.

Following excavation and acceptance that the contaminated soil was removed by confirmation samples, each pad will be backfilled with clean soil. Vegetation will be established with seed and mulch in accordance with the Erosion Control Plan from Section 5.

3.2 SOIL SCREENING AND STAGING AREA

An area of approximately 2 to 3 acres in the south-west corner of WBG will be used for the Soil Screening & Staging Area (Figure 3-5). As with the pads, an underground utility clearance is to be conducted and erosion control features are to be installed, including silt fences/filter socks, to control surface run-off. The area will be prepared by light grading and addition of surface barriers. Separate stockpile areas for excavated soil will be established, MEC screening areas, and post-screen soil areas. Equipment includes impact crusher, power screen, conveyor/radial stacker, armored 325 Cat excavator, Cat 720 haul truck, Cat 950 Loader, and water truck. Once the screened contaminated soil is approved for removal, on-highway trucks will be used to transport materials from the Former RVAAP through the Main Gate.



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Pallet Road D West	Ш			REV 0
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	CONTRACT NUMBER	APPROVED BY	APPROVED BY	FIGURE NO. 3-5
Pallet Road C West	SOIL SCREENING AND	STAGING AREA	WINKLEPECK BURNING GROUNDS CAMP RAVENNA	RAVENNA, OHIO
Legend - SF/FS- Silt Fence or Filter Sock Projection: NAD 1983 SPCS Ohio North (Feet).	DRAWN BY DATE J. ENGLISH 02/18/16	CHECKED BY DATE T RII FY DA/16	REVISED BY DATE	SCALE AS NOTED

4.0 SITE SAFETY AND HEALTH PLAN

The Site Safety and Health Plan (SSHP) and Accident Prevention Plan (APP) in Appendix C and the Explosives Safety Submission (ESS) in Appendix D are applicable to the Soil Removal Action that is being conducted by Tt at the WBG. The primary objective of the SSHP and APP is to provide Tt with an effective tool for the anticipation, identification, evaluation, control, and/or elimination of recognized safety and health hazards anticipated. The secondary objective of these documents is to provide Tt with an effective communication medium for providing site personnel task-specific and site-specific hazard information, as well as hazard control information they will use to mitigate or eliminate the risks of exposure to site and task hazards. For those emergencies that may reasonably occur, contingency plans and emergency response procedures are developed and are presented in the SSHP/APP in Appendix C.

Prior to performing site work, site personnel are required to read the SSHP/APP to familiarize themselves with the tasks to be completed. This SSHP/APP is developed to tier under and supplement the Revised 2011 Facility-Wide Health and Safety Plan for the RVAAP, Ravenna, Ohio (SAIC, 2001). Where these two documents conflict, the more stringent of the two shall apply.

The SSHP/APP have been prepared in accordance with:

United States Army Corps of Engineers (USACE). 30 November 2014. Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual.

United States Department of Labor Occupational Safety and Health Administration (OSHA) standards 29 CFR 1910.120 and 1926.65.

USACE Engineering Regulations for Hazardous Toxic and Radiological Waste Sites, EM 385-1-92, Appendix B USACE Baltimore District, Explosive Safety Submission Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action for Winklepeck Burning Grounds (WBG) at the Ravenna Army Ammunition Plant, RVAAP-5, Ravenna, Ohio, April 2016, (provided in Appendix D).

Tetra Tech, Inc. Project Management Plan Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds Camp Ravenna, Ohio, September 2015

Camp Ravenna Joint Military Training Center (CRJMTC) Restoration Contractor Information, March 2014

USACE, 2011c. Facility-wide Safety and Health Plan for Environmental Investigations

Protecting our employees at work sites is our highest priority. Tetra Tech believes that occupational incidents can be prevented and that no incident is treated as an acceptable event when we execute our work. To achieve this, the company's health and safety processes are a vital and integral part of our work. Our goal is zero incidents. This is achievable when safety is integrated fully into operations by management commitment, clearly defining and communicating roles and responsibilities, allocating sufficient resources, establishing systems and processes that integrate health and safety with activities, appropriate training, and employee participation.

5.0 EROSION AND SEDIMENT CONTROL DRAWINGS (PLAN AND DETAIL)

This section specifies the erosion and sedimentation (E&S) control requirements for Tt to prevent the erosion of soil and sediments and storm water runoff for the removal activities to be performed at the WBG. This section has been prepared in accordance with the requirements for a Storm Water Pollution Prevention Plan per Ohio Environmental Protection Agency (Ohio EPA) Permit No. OHC000002, Section 6 of the Final Remedial Design for WBG, 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.

E&S controls will be installed before beginning activities that have the potential to disturb soil 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. Storm water will be collected or diverted away from excavations by grading, berming, silt fence, filter sock, or pumping.

5.1 SURFACE FEATURES AND TOPOGRAPHY

The WBG is situated approximately in the center of the former RVAAP (Figure 1-2). 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.

5.2 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.

5.2.1 <u>Runoff Control</u>

Runoff controls, as indicated in Section 6.4.1 of the RD, 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 Tt 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 ARNG/OHARNG.

With the small size of the work areas and limited time work will be performed, it is not anticipated that runoff of the work areas will be an issue. If runoff occurs in the work areas it 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, Tt will discharge the collected runoff to ground surface following approval by Ohio EPA, USACE, and the ARNG/OHARNG 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 from being discharged through storm water runoff.

5.2.2 <u>Soil Stabilization</u>

Soil stabilization will be performed at disturbed areas to control potential erosion of soil 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 Camp Ravenna Environmental Office and can be found in Table 5-1. For non-vegetative cover, Tt 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. 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 Camp Ravenna Environmental Office. Table 5-1 lists the seeding mixtures to be used in stabilization of the disturbed areas.

5.2.3 <u>Sediment Control</u>

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 sediment that is generated as a result of soil erosion and storm water runoff. The primary method of sediment control to be implemented

by Tt is sediment barriers consisting of silt fence, filter sock, or both to be used solely or in conjunction with one another.

To the greatest extent practicable, soil-disturbing activities at WBG will be minimized and will proceed in a manner to reduce erosion and sedimentation. Earthwork, grading, movement of equipment, and other operations likely to cause siltation and tracking of sediment 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 or filter sock will be installed along the downgradient perimeter at the work areas. Requirements for the sediment control are shown on Figures 5-1 and 5-2.

5.3 OPERATION AND MAINTENANCE OF CONTROL METHODS

E&S control measures will be monitored on a daily basis during construction to prevent soil migration. Corrective action will be taken if the operability of a control device is in question.

Daily visual inspections will be performed in active work areas to make sure proper performance of run-on and runoff controls. A minimum of a weekly or as-needed inspection will be made of inactive, non-vegetated, disturbed areas to make sure 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. A weekly Stormwater Construction Site Inspection Report has been included in the Construction Quality Control Plan (Appendix E).

Corrective measures will be required if inspections reveal excessive silt accumulation in storm water conveyances or along silt fences or filter socks. Silt accumulation in erosion control structures will be removed. Silt fences or filter socks will be inspected, and any damaged silt fence or filter sock 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 mud, dirt, rock, or other materials originating from the work areas.

5.4 EROSION AND SEDIMENT CONTROL MANAGEMENT

Tt 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, Tt 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).
- Remove temporary sediment trapping devices only after permanent stabilization has been established on contributory drainage areas.

- Make sure that subcontractors understand these E&S requirements.
- Designate responsibility of the E&S requirements to one individual, the Tt Field Superintendent.
- Establish and maintain an E&S inspection schedule that documents the completion of identified repairs and maintenance items.

	TABLE 5-1 REVECETATION CUIDANCE								
	NEED	SPECIES AND PROPORTION	APPLICATION						
Temporary Cover for Ongoing Projects	Areas left idle for greater than 21 days, but scheduled for disturbance within the same summer growing season	100% Annual Ryegrass (Lolium multiflorum)	Broadcast at 40 pounds per acre. Drill at 30 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
	Areas left idle for greater than 21 days, but scheduled for disturbance within the same fall growing season	100% Winter rye (Secale cereal)	Broadcast at 112 pounds per acre. Drill at 80 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
	Areas left idle for greater than 21 days, but scheduled for disturbance within the same spring growing season	100% Oats (Aveva sativa)	Broadcast at 80 pounds per acre. Drill at 65 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
	Areas that will remain unfinished indefinitely	40% Nodding Wild Rye (<i>Elymus Canadensis</i>) 40% Virginia wild rye (<i>Elymus virginicus</i>) 15% Partridge Pea (<i>Chamaecrista fasciculate</i>) 5% Black-eyed Susan (<i>Rudbeckia hirta</i>) Add 10 lbs/ac Annual Ryegrass (<i>Lolium multiflorum</i>)/acre	Broadcast at 35 pounds per acre. Drill at 25 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
	Late Season (after 15 September) quick, temporary cover	 23.5% Nodding Wild Rye (<i>Elymus Canadensis</i>) 25% Virginia wild rye (<i>Elymus virginicus</i>) 18.75% Partridge Pea (<i>Chamaecrista fasciculate</i>) 1.5% Black-eyed Susan (<i>Rudbeckia hirta</i>) 31.25% Little Bluestem (<i>Schizachyrium scoparium</i>) Add Annual Ryegrass (<i>Lolium multiflorum</i>)/acre: 20 lbs/ac for broadcast or 15 lbs/ac for drill 	Broadcast at 25 pounds per acre. Drill at 18 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
Permanent Cover for Site Closure	Open Areas	 23.5% Nodding Wild Rye (<i>Elymus Canadensis</i>) 25% Virginia wild rye (<i>Elymus virginicus</i>) 22% Little Bluestem (<i>Schizachyrium scoparium</i>) 18.75% Partridge Pea (<i>Chamaecrista fasciculate</i>) 7.75% Thin-leaved Coneflower (<i>Rudbeckia triloba</i>) 1.5% Brown fox sedge (<i>Carex vulpinoidea</i>) 1.5% Black-eyed Susan (<i>Rudbeckia hirta</i>) Add Annual Ryegrass (<i>Lolium multiflorum</i>)/acre: 20 lbs/ac for broadcast or 15 lbs/ac for drill 	Broadcast at 18 pounds per acre. Drill at 12 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						
	Shaded, Partial Sun, Openings In Woods	 31% Deertongue (<i>Panicum clandestinum</i>) 25% Virginia wild rye (<i>Elymus virginicus</i>) 25% Nodding Wild Rye (<i>Elymus Canadensis</i>) 10% Big Bluestem (<i>Andropogon gerardii</i>) 9% Side-Oats Grama (<i>Bouteloua curtipendula</i>) Add Annual Ryegrass (<i>Lolium multiflorum</i>)/acre: 20 lbs/ac for broadcast or 15 lbs/ac for drill 	Broadcast at 30 pounds per acre. Drill at 20 pounds per acre. Mulch with a minimum of 3 bales of straw per 1000 ft ² Use mulch netting instead of straw on slopes > 6%.						

1 Source: Integrated Natural Resources Management Plan and Approved Grass Seed Mixes, July 29, 2014

Specifications for

Silt Fence



- Silt fence shall be constructed before upslope land disturbance begins.
- All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
- Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
- 4. Silt fence shall be placed on the flattest area available.
- 5. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
- 6. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.
- 7. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
- 8. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.

 Seams between sections of silt fence shall together only at a support post with a mini overlap prior to driving into the ground, (see

Specifications

for

Silt Fence

10. Maintenance—Silt fence shall allow runoff as diffuse flow through the geotextile. If ru tops the silt fence, flows under the fabric of fence ends, or in any other way allows a c flow discharge, one of the following shall t as appropriate: 1) the layout of the silt fence changed, 2) accumulated sediment shall b 3) other practices shall be installed.

Sediment deposits shall be routinely remove deposit reaches approximately one-half of the silt fence.

Silt fences shall be inspected after each ra least daily during a prolonged rainfall. The existing silt fence shall be reviewed daily t proper location and effectiveness. If dama fence shall be repaired immediately.

Criteria for silt fence materials

 Fence post – The length shall be a minimu Wood posts will be 2-by-2-in. nominal dim hardwood of sound quality. They shall be a splits and other visible imperfections, that the posts. The maximum spacing betweer 10 ft. Posts shall be driven a minimum 16 ground, where possible. If not possible, th adequately secured to prevent overturning due to sediment/water loading.

2. Silt fence fabric - See chart below.

Table 6.3.2 Minimum criteria for Silt Fence Fabric (0D0T, 2002)

VALUES	TEST METHOD
120 lbs. (535 N)	ASTM D 4632
50%	ASTM D 4632
50 lbs (220 N)	ASTM D 4833
40 lbs (180 N)	ASTM D 4533
≤ 0.84 mm	ASTM D 4751
1X10-2 sec1	ASTM D 4491
70%	ASTM G 4355
	VALUES 120 lbs. (535 N) 50% 50 lbs (220 N) 40 lbs (180 N) ≤ 0.84 mm 1X10-2 sec1 70%

	CTO NUMBER		DATE		DATE	REV 0
shall be spliced minimum 6-in. I. (see details).	CONTRACT NUMBER		APPROVED BY	Ĩ	APPROVED BY	FIGURE NO. 5-1
unoff to pass only If runoff over- ric or around the a concentrated hall be performed, fence shall be all be removed, or emoved when the If of the height of the rainfall and at The location of hily to ensure its amaged, the silt himum of 32 inches. dimensioned be free of knots, that will weaken ween posts shall be n 16 inches into the e, the posts shall be ning of the fence					CAMP RAVENNA	KAVENNA, OHIO
				14.71		
	DATE	11/06/15	DATE	11/18/15	DATE	E TED
Source: Rainwater and Land Development: Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection, December 2006 (Revised November 2014).	DRAWN BY	J. ENGLISH	СНЕСКЕД ВҮ	T. RILEY	REVISED BY	SCAL AS NOT



- Materials Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".
- Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

INSTALLATION:

- 3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed midslope.
- 4. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

5. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

MAINTENANCE:

- Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.
- Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.
- 8. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.
- Removal Filter socks will be dispersed on site when no longer required in such as way as to facilitate and not obstruct seedings.

Source: Rainwater and Land Development: Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection, December 2006 (Revised November 2014).

DRAWN BY	DATE			CONTRACT NUMBER	CTO N	UMBER
J. ENGLISH	11/06/15				_	_
CHECKED BY	DATE		FILTER SOCK SPECIFICATIONS	APPROVED BY	DATE	
T. RILEY	11/18/15	1.6.1.8.1	WINKLEPECK BURNING GROUNDS (WBG)			
REVISED BY	DATE		CAMP RAVENNA	APPROVED BY	DATE	
			RAVENNA OHIO			
SCAL	E			FIGURE NO.		REV
AS NO	ΓED			5-	2	0

6.0 CONSTRUCTION QUALITY CONTROL PLAN

Construction quality control will be implemented for the 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. The Construction Quality Control Plan describing the specific quality control processes and procedures that will be implemented for this work is provided as Appendix E.

7.0 WASTE MANAGEMENT PLAN

Two primary waste streams will be generated during excavation activities; solid and liquid wastes. Waste characterization will determine whether a waste is hazardous or nonhazardous and will dictate the disposal option and facility where the waste will be disposed. The Waste Management Plan that is applicable to the Soil Removal Action being conducted by Tt at the WBG is provided in Appendix F.

Project-generated solid waste will be disposed of in accordance with local, state, and federal rules, laws, and regulations. The majority of solid waste to be generated as part of this removal action will consist of contaminated soil and dry sediments. It is anticipated that the contaminated soil will be characterized as non-hazardous solid waste. In an effort to minimize waste production, scrap metal will be stored at the staging area, recycled, and documented.

If MEC is encountered it will be handled in accordance with the ESS (Appendix D) prepared by USACE Baltimore District. Tetra Tech will use the procedures identified in the DDESB approved ESS developed by USACE Baltimore District and the RD to conduct the MEC demolition operations. MEC demolition operations will be processed in the Buried Explosion Module at Open Demolition Area #2. The Open Demolition Area #2 munitions response site overlaps the WBG so it is the same munitions response site. A Type II portable magazine will be used in screening production area to hold MEC/MPPEH items discovered during screening operations until disposal is planned. If the item is determined unsafe to move the item will be treated at WBG by using Blow in Place procedures.

MEC/MPPEH will be handled in accordance with the approved ESS. Baltimore USACE will be conducting the MEC demolition operations and the MEC/MPPEH will be managed in accordance with the Open Demolition Area #2 TCRA Work Plan. MPPEH determined to be 100% free of an explosive hazard will be certified as material documented as safe (MDAS). MDAS will also be released to a certified recycler for final disposition and documented
Liquid waste will consist of precipitation accumulated in protected areas (excavation and stockpiles) and decontamination fluids and is expected to be minimal. 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 USACE and the ARNG/OHARNG (forms for ground surface discharge are provided in the Construction Quality Control Plan, Appendix E). Any ground surface discharges are subject to strict state and federal discharge conditions as well as specific guidelines set under the RVAAP restoration program and by the Camp Ravenna Environmental Office. Liquid wastes will be generated and handled in accordance with local, state, and federal regulations.

8.0 SAMPLING AND ANALYSIS PLAN

The project specific Sampling and Analysis Plan in Appendix B is applicable to the Soil Removal Action that is being conducted by Tt at the WBG. The sections below summarize the sampling and analysis requirements.

8.1 EXISTING SOIL STOCKPILE AND OFFSITE BORROW AREA SAMPLING

Soil samples will be collected from the existing soil stockpile and the offsite borrow area that will be used as backfill to restore the areas that are excavated. The scope of the sampling and analysis for the existing stockpile and off-site borrow area samples is to confirm that these materials are considered clean soil from the onsite and offsite sources to restore WBG to its existing conditions.

One sample shall be collected using incremental sampling methodology (ISM) for every 4,000 cubic yards of earth fill (one soil sample will be collected from the existing soil stockpile and one sample will be collected from the offsite borrow area). The analytical results will be screened against a provided list of facility background concentrations. The earth fill will be approved by the OHARNG and, at a minimum, be at or below the facility-wide background concentrations.

8.2 **PROCESSING AND SOIL STOCKPILE AREA SAMPLING**

Soil samples will be collected from the processing and soil stockpile areas before and after the soil removal action. The sampling and analysis of the Processing Area and Stockpile Area will be conducted to confirm the area is clean before the removal action begins and to make sure the contaminated soil has been removed from the site at the end of the removal action.

8.3 WASTE CHARACTERIZATION SAMPLING

Waste characterization soil samples will be collected from the proposed excavation areas to facilitate off-site disposal prior to initiation of the remedial action so that the soil for disposal is

properly managed and disposed at a permitted landfill. Waste Characterization samples will be collected as described in the Sampling and Analysis Plan in Appendix B and the Waste Management Plan in Appendix F following visual inspection of the excavation area by the UXO/MEC Site Manager/Site Safety and Health Officer.

8.4 SOIL CONFIRMATION SAMPLING

The WBG actions include removal of soil containing MEC and concentrations of contaminants of concern (COCs) that exceed site cleanup goals. The goal is to remove soil with concentrations of COCs greater than the Industrial Regional Screening Levels. Confirmation soil samples will be collected from the excavation sites at each pad location to confirm that soil remaining on site have concentrations of COCs below Industrial Regional Screening Levels.

The purpose of this sampling is to demonstrate that the remaining COCs in soil at WBG excavation areas do not present a risk to a full-time worker. WBG sampling activities, including decontamination of sampling equipment, will be conducted in accordance with the Facility-Wide Field Sampling and Analysis Plan and the site specific Sampling and Analysis Plan.

8.5 SAMPLE HANDLING AND LABORATORY ANALYSIS

Following the sample preparation activities, the samples containers will be labeled, sealed, and managed under a chain of custody. Samples will be shipped same day via laboratory courier service to Test America in North Canton, Ohio.

The existing soil stockpile and offsite borrow area samples will be analyzed for:

- Target Compound List Volatile Organic Compounds by EPA Method 8260B, Semivolatile Compounds by EPA Method 8270C, and Pesticides by EPA Method 8081A,
- Target Analyte List of Metals by EPA Method 6010/6020 and 7471,
- Polychlorinated Biphenyls by EPA Method 8082,
- Explosives by EPA Method 8330B,

- Nitro-glycerine, Nitro-guanadine, and Nitrocellulose by EPA Method 8330B, and
- · pH

The processing and stockpile area samples will be analyzed for both parameters below and the confirmation samples will be analyzed of the contaminants of concern for each pad:

- RDX/TNT by EPA Method 8330B;
- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (hereafter PAHs) by EPA Method 8270C or 8310.

The waste disposal characterization samples will be analyzed for contaminants of concern and for parameters required by the disposal facility:

- RDX/TNT by EPA Method 8330B;
- PAHs by EPA Method 8270C or 8310.
- Toxicity Characteristic Leaching Procedure by EPA Method 1311 for
 - Semivolatile Compounds by EPA Method 8270C
 - Metals by EPA Method 6010/6020 and 7471
- Benzene, Toluene, Ethylbenzene, and Xylene by EPA Method 8260B
- · pH and Flashpoint

9.0 REFERENCES

SAIC, 2011. Facility Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plan. . Contract Number W912QR-08-D-008, Delivery Order No. 0016. Final. February.

SAIC, 2011. Facility-Wide Sampling and Analysis Plan for Environmental Investigations, Ravenna Army Ammunition Plant, Ravenna, Ohio. Contract Number W912QR-08-D-008, Delivery Order No. 0016. February.

USACE, 2016. Explosive Safety Submission, Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action for Winklepeck Burning Grounds (WBG) at the Ravenna Army Ammunition Plant, RVAAP-5, Ravenna, Ohio. April.

USACE, 2015. Final Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumball Counties, Ohio, USACE, March.

US Army Corps of Engineers, 2015. Final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds, Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbell Counties, Ohio, August.

United States Department of the Army, 2015. Performance Work Statement. June.

APPENDIX A

FINAL REMEDIAL DESIGN

Final

Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds Former Ravenna Army Ammunition Plant/Camp Ravenna Portage and Trumbull Counties, Ohio

REVISION 0

August 27, 2015

Prepared for: Department of the Army Army National Guard (ARNG-ILE Cleanup) 111 South George Mason Drive Arlington, Virginia 22204-1373

Prepared by: United States Army Corps of Engineers Louisville District 600 Martin Luther King Jr. Place Louisville, Kentucky 40202

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STATEMENT OF INDEPENDENT TECHNICAL REVIEW

U.S. Army Corps of Engineers (USACE) has completed the preparation of this Remedial Design for RVAAP-05 Winklepeck Burning Grounds for former RVAAP/Camp Ravenna. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

8/26/15

Date

Nathaniel Peters, Ph.D., P.E. Study/Design Team Leader

Eric Cheng, P.E. () Independent Technical Review Team Leader

8/21/15

Date

Insert Report Documentation of Ohio EPA Approval of Final Document (Documentation to be provided once approval is issued.)

Final

Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds Former Ravenna Army Ammunition Plant/Camp Ravenna Portage and Trumbull Counties, Ohio

REVISION 0

Prepared for: Department of the Army Army National Guard (ARNG-ILE Cleanup) 111 South George Mason Drive Arlington, Virginia 22204-1373

Prepared by: United States Army Corps of Engineers Louisville District 600 Martin Luther King Jr. Place Louisville, Kentucky 40202

August 27, 2015

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ARNG = Army National Guard

OHARNG = Ohio Army National Guard

Ohio EPA CO = Ohio Environmental Protection Agency, Central Office

Ohio EPA DERR = Ohio Environmental Protection Agency, Division of Environmental Response and Revitalization

REIMS = Ravenna Environmental Information Management System

USACE = United States Army Corps of Engineers

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Figure 2-3. Map of Winklepeck Burning Grounds, Camp Ravenna, Portage and Trumbull Counties, Ohio

ACRONYMS AND ABBREVIATIONS

AOC ARNG ASTM bgs BMP Camp Ravenna CERCLA CERCLIS	Area of Concern Army National Guard American Society for Testing Materials below ground surface Best Management Practice Camp Ravenna Joint Military Training Center Comprehensive Environmental Response, Compensation, and Liability Act Comprehensive Environmental Response, Compensation and Liability Information System						
CFR	Code of Federal Regulations						
COC	Chemical of Concern						
COR	Contracting Officer's Representative						
CQAP	Construction Quality Assurance Plan						
CUG	Cleanup Goal						
ESS	Explosives Safety Submittal						
FS	Feasibility Study						
FSA	Field Staging Area						
FWSAP	Facility-wide Sampling and Analysis Plan						
FWSHP	Facility-wide Safety and Health Plan						
HHRA	Human Health Risk Assessment						
IDW	Investigation-derived Waste						
IRP	Installation Restoration Program						
LUC	Land Use Control						
MC	Munitions Constituents						
MEC	Munitions and Explosives of Concern						
MPPEH	Materials Presenting a Potential Explosive Hazard						
mph	miles per hour						
NCR	Non-conformance Report						
NCP	National Oil and Hazardous Substances Pollution Contingency Plan						
OAC	Ohio Administrative Code						
OHARNG	Ohio Army National Guard						
Ohio EPA	Ohio Environmental Protection Agency						
ORAM	Ohio Rapid Assessment Method						
OSHA	Occupational Safety and Health Administration						
PPE	Personal Protective Equipment						
QAPP	Quality Assurance Project Plan						
QA	Quality Assurance						
QC	Quality Control						
RD	Remedial Design						
ROD	Record of Decision						

RVAAP	Ravenna Army Ammunition Plant
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
USACE	United States Army Corps of Engineers
U.S. Army	United States Department of the Army
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance

1.0 INTRODUCTION

This Remedial Design (RD) describes the implementation process for the selected modified remedy for soil and dry sediment at Winklepeck Burning Grounds (WBG) as stated in the Explanation of Significant Differences (ESD) (USACE, 2014a). The RD was prepared by the United States Army Corps of Engineers, Louisville District (USACE). The ESD presented significant differences to the Final Record of Decision for Soil and Dry Sediment at the RVAAP-05 Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio (SAIC, 2008). The Final Record of Decision (ROD) was signed by the lead agency, the U.S. Army, on August 19, 2008. The Final ROD was signed by the regulatory agency, the Ohio Environmental Protection Agency (Ohio EPA), on August 15, 2008.

The USACE is working under a Project Order with the Army National Guard Directorate (ARNGD) and Army Environmental Command (AEC), as part of the restoration/cleanup program for the former Ravenna Army Ammunition Plant (RVAAP) at the Area of Concern (AOC) known as Winklepeck Burning Grounds, or RVAAP-05. Planning and performance of all elements of this project and document are in accordance with the requirements of the Ohio Environmental Protection Agency (Ohio EPA) Director's Final Findings and Orders (DFFO) for RVAAP, dated June 10, 2004 (Ohio EPA, 2004). The DFFO requires conformance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).

This RD will serve as the Work Plan for the Remedial Action (RA) to be conducted in accordance with the approved ESD. The Contractor who will perform the RA has not yet been selected. The selected Contractor will be required to provide a site-specific Construction Quality Control Plan, with names of key individuals, for Army approval.

1.1 PURPOSE

This RD describes the implementation of proposed post-ROD changes to the remedy at the WBG AOC which are described in the ESD (USACE, 2014a). A Remedial Investigation/Feasibility Study (RI/FS), Record of Decision (ROD), Remedial Design (RD), and Remedial Action Completion Report (RAR) were previously completed for the WBG AOC. These investigations and remedial actions were completed so that the AOC could be used as a Mark 19 Machine Gun Range (MK19 Range). Although remedial actions were completed for WBG, the associated restrictions limited the future development of the AOC. The proposed future use for this AOC is military training. The site is planned to be further developed as a Multi-Purpose Machine Gun (MPMG) Range which will require intrusive activities at various depths over the entire AOC. Additionally, the Army has determined that future use of the site may involve full-time employees, thereby requiring that it meet the applicable standards for the Commercial/Industrial Land Use. An RI/FS Supplement (USACE, 2014b) has been completed showing that the AOC has three Chemicals of Concern (COCs) related to the Commercial/Industrial Land Use. The RI/FS Supplement identified five distinct areas of additional soil removal that are needed to meet the Commercial/Industrial Land Use, so that the site can be used by full-time workers. This RD describes the implementation of the additional soil excavation required and the changes in Land Use Controls (LUCs) at the WBG AOC.

1.2 SCOPE

The scope of this RD is to present a plan to 1) implement the needed additional soil removal and 2) define land use controls (LUCs) that will be implemented after completing the remedial action. Once these remedial action objectives are met, the selected modified remedy will be considered protective of full-time workers, thereby meeting the requirements for Commercial/Industrial Land Use.

1.3 REMEDIAL DESIGN ORGANIZATION

This RD is the work plan for the RA. The work plan is organized as follows:

- Section 2 presents facility and site descriptions, previous remedial activities, and changes to the remedy;
- Section 3 presents project organization and coordination;
- Section 4 outlines activities to achieve the remedial action;
- Section 5 discusses the construction sequence and schedule;
- Section 6 describes storm water pollution prevention;
- Section 7 describes environmental protection;
- Section 8 discusses construction quality control; and
- Section 9 lists references used in this document.

2.1 FACILITY DESCRIPTION

The former RVAAP is located in northeastern Ohio within Portage and Trumbull counties, approximately one (1) mile northwest of the city of Newton Falls and three (3) miles east-northeast of the city of Ravenna (Figure 2-1). The installation is a parcel of property approximately 11 miles long and 3.5 miles wide bounded by State Route 5, the Michael J. Kirwan 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.

As of September 2013, administrative accountability of the entire 21,683-acre former RVAAP has been transferred to the United States Property and Fiscal Officer for Ohio. The installation has been licensed to the Ohio Army National Guard (OHARNG) for use as a military training site known as the Camp Ravenna Joint Military Training Center (Camp Ravenna). Subsequent references in this document to RVAAP, or the former RVAAP, relate to previous activities at the installation as related to former munitions production activities or to activities being conducted under the restoration/cleanup program.

During the former RVAAP's operational years, the entire 21,683-acre property was a government-owned, contractor-operated industrial facility. The RVAAP Installation Restoration Program (IRP) encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP (Figure 2-2). WBG is located in the center of Camp Ravenna and encompasses approximately 200 acres (Figure 2-3). Camp Ravenna is now being used as a military training site.

2.2 WINKLEPECK BURNING GROUNDS DESCRIPTION AND HISTORY

The following sections present the site description and history, and discuss previous remedial activities at WBG.

2.2.1 Site Description

WBG is a rectangular area of approximately 200 acres near the center of the former RVAAP. The topography at WBG is gently undulating with a general elevation decrease from west to east. No perennial streams exist within the AOC and surface water flow within drainage ditches occurs only during storm events. Surface water drainage during storm events generally flows from west to east to southeast across WBG. Storm water run-off ditches ultimately flow into Sand Creek. There are approximately 70 former burn pads located along five east/west oriented gravel or dirt roads. The former burn pads range in appearance from distinct areas of soil and slag that are partially vegetated to non-descript (no visible slag and heavily vegetated).

2.2.2 Site History

Historical operations at WBG included destruction of explosives from various types of munitions by open burning. Historical activities at WBG also included destruction of bulk explosives, propellants, and explosive-contaminated combustible material using open burning. Prior to 1980, materials destroyed by burning included bulk explosives and explosives-contaminated burnable wastes, propellants, black powder, sludge and sawdust from load lines, and domestic wastes. Also, small amounts of laboratory



FIGURE 2-1. Location of Former RVAAP or Camp Ravenna, Portage and Trumbull Counties, Ohio.



Figure 2-2. Map of the Former RVAAP or Camp Ravenna, Portage and Trumbull Counties, Ohio.



FIGURE 2-3. Map of Winklepeck Burning Grounds, Camp Ravenna, Portage and Trumbull, Counties, Ohio.

chemicals were burned during production periods. Metallic munitions fragments were allowed to remain on the site after burning, as were possible residual explosives. Waste oil (hydraulic oil from machines and lubrication oil from vehicles) was burned in the northeast corner of WBG until 1973.

Prior to 1980, burning was carried out on several burn pads, in four burn pits, and sometimes on the roads. The burn pads generally consisted of level areas without berms 20 feet (ft) to 40 ft in width and length, with gravel cover or bare soil. Although the exact number is not known, 70 burn pads have been identified from historical drawings and aerial photographs. The burn pits consisted of areas, with earthen berms on three sides, approximately 50 ft to 75 ft in width and length. The four burn pits are believed to correspond to Pads 58, 59, 60, and 61 (Figure 1-4). Ash from these areas was not collected. Unsalvageable scrap metal was taken to the Landfill North of Winklepeck Burning Grounds, which has been designated RVAAP-19; salvageable metal was taken to a scrap salvage yard and sold as marketable scrap metal (SAIC, 2008).

After 1980, burns were conducted in two metal refractory lined trays set on top of a bed of slag. These trays were located at Pad 37. Ash residues were drummed and stored in Building 1601 until being tested for proper disposal. Burning at this location ceased in the early 1990s and this area was closed under the Resource Conservation and Recovery Act (RCRA) in 1999.

2.2.3 Previous Remedial Activities at WBG

A removal action for Munitions and Explosives of Concern (MEC) was performed between March and August 2005 (MKM Engineers, Inc. (MKM), 2005a, 2005b, 2005c) in preparation for the then future land use as a MK19 Grenade Machine Gun Range, a target practice range for use in firing non-explosive 40mm practice rounds. The MEC removal action was based on the results of the historical environmental investigations (1996 to 2003) and a 2004 MEC density survey. The MEC removal action, completed in August 2005, included the removal of soil contaminated with MEC and chemical contaminants and soil containing transite. Soil containing transite was disposed of off-site as asbestos-containing material (MKM, 2008a). The areas of MEC removal are shown in the Data Quality Objective (DQO) Report (Shaw, 2011). The 2005 action included the following activities:

- Excavation, MEC removal, and approved backfill re-use in 10 ft by 10 ft areas centered on previous soil sampling stations WBG-243, located west of Pad 66, and WBGss-070, located west of Pad 67 to a depth of 1 ft bgs;
- Excavation in 10 ft by 10 ft area centered on previous soil sampling station WBG-217 located south of Pad 61 to a depth of 4 ft bgs (backfill of the excavation and removal of the soil berm associated with Pad 61 were halted pending further environmental investigation);
- Excavation and MEC removal in 13.5 ft by 13.5 ft area surrounding previous soil sampling stations WBGss-401 and WBGss-071, both located at Pad 67, to a depth of 1 ft bgs (excavated soil was staged on site and the excavation was not backfilled pending further environmental investigation);
- Excavation, MEC removal, and approved backfill re-use at Pads 7, 18, 26, 35, 48, and 70 to a depth of 1 ft bgs where a proposed target array overlapped the pad;
- Excavation, MEC removal, and approved backfill re-use at Pads 37, 38, 45, 58, 60, 61, 66, and 67 to a depth of 1 ft bgs;

- Removal of soil berms associated with Pad 58 to a depth of 1 ft bgs and with Pad 60 to ground level and off-site disposal of material;
- Excavation of test pits in the area of Pads 61 and 61A, which were backfilled with their respective excavated soil; and
- Surface clearance of MEC in removal action support areas, the Firing Point Area, select former burn pads, and target arrays as identified in the Phase I MEC density survey (MKM, 2005a).

At the conclusion of the 2005 MEC removal actions, which included remediation of contaminated soil and dry sediment from the target array construction areas, confirmation sampling indicated that additional soil contamination remained on-site. Portions of the soil at Pads 61/61A and 67 were contaminated with hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) or SVOCs at concentrations greater than levels that were considered safe for range maintenance soldiers. In addition, transite and friable asbestos were observed at Pad 70. These areas were all located in the planned firing lane 1 and subsequently were not transferred in 2005 due to this residual contamination. Administrative accountability for approximately 180 of the 200 acres of WBG was transferred to the ARNG/OHARNG for construction of three of the four planned firing lanes (Lanes 2, 3, and 4) of the MK19 Range, which was constructed in 2006.

Additional soil removal began in August 2008 in accordance with the Final Record of Decision for Soil and Dry Sediment at the RVAAP-05 Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio (herein referred to as the ROD) (SAIC, 2008). No surface water or sediment are present on WBG, therefore the selected remedy in the ROD addressed chemical contaminants in soil and dry sediment as the exposure media at the AOC. The objective for remediation presented in the ROD was to prevent exposure of the National Guard Range Maintenance Soldier to contaminants in soil at concentrations greater than risk-based cleanup levels extending to a maximum depth of 4 ft bgs (SAIC, 2008). The COCs and WBG cleanup goals (CUGs) for this removal action were defined in the Final Remedial Action Work Plan, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio, Amendment 1 (MKM, 2008b). The scope of work included soil removal in the areas of Pads 61/61A, 67, and 70. At the completion of work, concentrations of COCs were less than WBG CUGs in confirmatory soil and dry sediment samples (MKM, 2009). The specific activities included the following:

- Excavation and grading of an area including Pads 61 and 61A to achieve design grades for Firing Lane 1 to varied depths of up to 6.5 ft bgs;
- Excavation and grading of soil berms associated with Pad 61 and the area of previous soil sampling station WBG-217 located south of Pad 61 to a depth of 4.5 ft bgs;
- Excavation of a limited area overlapping Pad 61A to a depth of 1 ft below design grade and backfilling with clean soil to design grade;
- Excavation and backfilling of limited area overlapping Pad 67 to a depth of 2 ft bgs; and
- Excavation and grading of soil stockpile overlapping Pad 70 to ground level.

Accountability for Firing Lane 1 was transferred to ARNG/OHARNG on 30 July 2010.

2.3 ANTICIPATED FUTURE LAND USE

The planned future use of the WBG AOC is military training, but Commercial/Industrial Land Use was chosen as the proposed Reasonably Anticipated Future Land Use (RAFLU) to allow for the potential of full-time employees on the AOC.

2.4 ADDITIONAL INVESTIGATION

An RI/FS Supplement (USACE, 2014b) was prepared in general accordance with the Final Work Plan for Additional Evaluation of the RVAAP-05 Winklepeck Burning Grounds, RVAAP/Camp Ravenna (USACE, 2012a). The Work Plan described methods to implement a study to evaluate the use of the WBG for Military Training, using information and data from previously completed studies. The Work Plan identified data gaps and presented a sampling scheme to address those data gaps. During preparation of the RI/FS Supplement Report, the Army determined that the site should be evaluated for the Commercial/Industrial Land Use to allow for the potential of employees to work full time on the site. In order to make the WBG AOC available for full-time workers, risks were evaluated for the Industrial receptor considering the full extent of contamination. The goal of the additional evaluation of risks was to optimize access to soils by reducing limitations based on the presence of chemicals.

During work on the RI/FS Supplement (USACE, 2014b), an evaluation of previously collected data for the AOC was completed to identify additional sampling and analysis required, and this additional sampling was completed. Details of the nature and extent of the residual contamination were used to assess potential risks to the full-time occupational exposure receptor by using the U.S. Environmental Protection Agency's (USEPA's) Industrial Regional Screening Levels (RSLs) (May 2013) at the remediation level (cancer risk 1 x 10^{-5} and/or Hazard Index (HI) of 1.0).

The results of the additional evaluation and risk assessment, in the RI/FS Supplement, indicated that there are three Contaminants of Concern (COCs) for the full-time worker at five distinct areas involving Pad 38, Pad 61/61A, and Pad 66/67. The RI/FS Supplement also showed that limited additional soil removal in these five areas would allow the site to be used for military training by full-time workers, with fewer restrictions or LUCs.

2.5 POST-ROD CHANGES TO THE REMEDY

The Post-ROD changes to the remedy, which are documented in the ESD, consist of additional soil removal and changes to the LUCs. The following subsections provide additional details.

2.5.1 Additional Soil Removal

The total additional soil excavation is estimated to be 5,250 cubic yards. Table 2-1 summarizes the five areas of removal, along with the applicable COCs, depth of removal, area of removal, and estimated volume of removal. Figure 2-2 shows the areas identified for additional soil removal.

2.5.2 Changes to the LUCs

The ESD (USACE, 2014a) and the current facility Property Management Plan (PMP) (USACE, 2012b) documents the previous LUCs. The remedy described in the ESD replaces the previous LUCs with the following two, which are more applicable considering the planned soil removal to achieve commercial/industrial use:

- The AOC cannot be used for Unrestricted (Residential) Land Use unless or until additional evaluation shows that risk levels resulting from residual contamination have been reduced to levels acceptable for Residential Land Use and any residual MEC hazards have been removed and
- Groundwater use or extraction of groundwater located at or underlying the WBG AOC or any portion thereof is prohibited, except for the following:
 - The installation, development, purging, and sampling of new or existing monitoring wells in accordance with the most recent Facility-Wide Sampling and Analysis Plan (FWSAP) as part of the AOC-specific IRP, the Facility-Wide Ground Water Monitoring Program Plan (FGWMPP), or the Facility-Wide Groundwater Remedial Investigation.
 - The modification of existing monitoring wells, if necessary, to allow for construction on the range.
 - The abandonment and replacement of monitoring wells damaged by activities or removed for construction, and abandonment of wells no longer utilized as part of IRP or FGWMPP activities, in accordance with Ohio EPA guidance, the most recent FWSAP, and applicable Ohio Administrative Code requirements.

2.6 REMEDIAL ACTION OBJECTIVE (RAO)

The RAO is to prevent exposure to soils with contaminant concentrations greater than cleanup goals which are based on U.S. EPA Industrial RSLs. This project involves the removal and disposal of approximately 5,250 cubic yards of contaminated soil from Pads 38, 61/61A, and 66/67 at WBG. While MEC removal is not one of the RAOs of this additional soil removal, historical operations have shown that MEC items may still be present at WBG. Therefore, appropriate MEC safety measures will be incorporated into the remedial action, and MEC will be screened from any excavated soil before disposal of the soil. Also, any MEC or scrap metal recovered during the soil separation process will be properly disposed of. After the removal is complete, LUCs will be implemented to prevent unacceptable exposure to residual contamination or groundwater at WBG.

Potential Exposure Area	Proposed Remediation Location	COC	Depth (ft)	Surface Area (acres)	Estimated Volume (yd ³)
Pad 38	Previous removal action area at Pad 38	TNT	2	0.2	645.3
Pad 61/61A	Previous removal action area at Pad 61/61A	PAHs	2	1.2	3,872
Pad 66/67	Previous Pad 66 removal area		2	0.2	645.3
	Sample Station WBG-252 within Pad 67	RDX &	10	0.005	80.7
	Previous removal action west of pad 67 centered on Station WBG-070		2	0.002	6.5
			Totals:	1.6	5,250

Table 2-1 Estimated	Volume of Soil	Removal to	Achieve (Commercial/	Industrial	Land Use
1 auto 2-1. Estimated	volume of Son	Kemoval to			muusunai	Land Use.

Source: RI/FS Supplement (USACE, 2014b)

3.0 PROJECT ORGANIZATION AND COORDINATION

This section presents the project organization and describes the project team coordination. Remedial activities will be overseen by USACE and implemented by the selected Contractor and remedial construction subcontractors. The selected Contractor will be responsible for implementing the RD. Ohio EPA is the regulatory authority for review of this RD and the RA conducted pursuant to the RD. The selected Contractor will be contractually bound by the Army to complete the work in accordance with the approved Final RD and to the satisfaction of the Army and the Ohio EPA. Key personnel responsibilities are summarized in the following sections. The selected Contractor will provide an organization chart with names of key individuals in their site-specific Construction Quality Control Plan (CQCP), which will be a requirement of the RA contract.

3.1 USACE Contracting Officer's Technical Representative

The USACE Contracting Officer's Representative (COR) duties include overseeing the Contractor to ensure work is completed in accordance with this RD. The USACE COR also coordinates responses for any unexpected conditions encountered.

3.2 ARNG Project Manager and OHARNG Restoration Representative

The ARNG Project Manager and the OHARNG Restoration Representative will coordinate and approve access to the site. The ARNG Project Manager also has the authority to review Contractor activities to ensure that activities are conducted safely. The OHARNG Restoration Representative oversees waste management activities for Camp Ravenna and will be responsible for signing waste profiles and manifests. The Camp Ravenna Compliance Manager may act as the alternate for signatures related to waste management.

3.3 Ohio Environmental Protection Agency

The Ohio EPA is the regulatory agency for this project. The Ohio EPA will review project documents and ensure that the RA is completed in accordance with the final approved RD.

3.4 Contractor Project Manager

The Contractor Project Manager will administer the management, implementation, and quality of this RD and RA. The Contractor Project Manager will provide oversight to ensure that all contractual requirements are properly satisfied. This individual will ensure that all project goals and objectives are met in a high-quality, timely manner. The Contractor Project Manager will be responsible for tracking the project schedule and informing the USACE COR of any deviations to the schedule. The Contractor Project Manager will provide the U.S. Army and USACE COR with notifications of project implementation and information regarding any quality assurance (QA) and non-conformance issues for this RA.

3.5 Contractor Field Superintendent

The Contractor Field Superintendent will serve as the Field Operations Manager, as defined in Section 3.7 of the Facility-wide Sampling and Analysis Plan for Environmental Investigations (USACE, 2011a) (herein referred to as the FWSAP). The Contractor Field Superintendent will report to the Contractor Project Manager and will be responsible for project control, implementing remedial activities in accordance with this RD, and managing the technical performance and quality of the remedial action. The Field

Superintendent will be responsible for overseeing subcontractors, adhering to QA/quality control (QC) field procedures and the Site Safety and Health Plan (SSHP), coordinating field activities with Camp Ravenna personnel and the USACE COR, managing any investigation-derived wastes (IDW), documenting field work, and preparing field change orders, if required.

3.6 Contractor Quality Assurance/Quality Control (QA/QC) Officer

The Contractor QA/QC Officer will coordinate with the Contractor Field Superintendent to ensure the requirements of the Construction Quality Control Plan (CQCP) and Facility-wide Quality Assurance Project Plan for Environmental Investigations (USACE, 2011b) (herein referred to as the FWQAPP) are met.

The Contractor QA/QC Officer will ensure that the required submittals are on time and are high quality. The Contractor QA/QC Officer will be responsible for reviewing and approving variances during field activities before work continues and designing and supervising the implementation of audit/surveillance plans. The Contractor QA/QC Officer will be responsible for completing a Non-conformance Report (NCR) that documents when activities do not comply with the approved procedures or specifications within this RD. The Contractor QA/QC Officer will report directly to the Contractor Project Manager and will inform the Contractor Project Manager and the Contractor Field Superintendent of all information and decisions reported.

3.7 Contractor Health and Safety Manager

The Contractor Health and Safety Manager will establish health and safety policies and procedures supporting project and office activities and will conduct periodic site inspections to verify safe work practices and conditions. The Contractor Health and Safety Manager will ensure these policies are, at a minimum, in accordance with the Facility-wide Safety and Health Plan for Environmental Investigations (USACE, 2011c) (herein referred to as the FWSHP), as well as AOC-specific addenda, if applicable. The Contractor Health and Safety Manager will be responsible for assigning the onsite Site Safety and Health Officer (SSHO) and will inform the Contractor Project Manager and the Contractor Field Superintendent of all information and decisions reported. The Contractor Health and Safety Submission (ESS) that covers all work on site related to MEC and Unexploded Ordnance (UXO) and achieves approval of the United States Department of Defense Explosives Safety Board (DDESB).

3.8 Site Safety and Health Officer (SSHO)

The SSHO will be responsible for implementation of and adherence to the SSHP. The SSHO will verify and approve that specified health and safety procedures outlined in the SSHP adequately protect on-site personnel during field activities. The SSHO will ensure that health and safety procedures are modified to meet changing needs, if required. The SSHO will also ensure that all on-site personnel (including visitors) strictly adhere to the SSHP throughout field activities conducted for the duration of the project. The SSHO will report to the Contractor Project Manager and will inform the Field Superintendent of all information and decisions reported. If subcontractors are used for onsite work, each subcontractor shall have a designated SSHO.

3.9 Subcontractor Construction Supervisor

The Subcontractor Construction Supervisor, if a subcontractor is used, will implement specific contracted components of this RD. The Subcontractor Construction Supervisor will be responsible for properly

performing specified remedial activities in accordance with this RD, adhering to QA/QC field procedures and the CQCP, implementing the SSHP, coordinating field personnel activities, and documenting field activities. Each Subcontractor Construction Supervisor will report directly to the Contractor Field Superintendent.

3.10 UXO/MEC Site Manager

The UXO/MEC Site Manager will supervise UXO operations, including geophysical evaluations, UXO sweeps, demolition, and UXO/MEC-related data management. The UXO/MEC Site Manager will be thoroughly versed on the contents of the ESS. The UXO/MEC Site Manager will report to the Contractor Field Superintendent. The UXO/MEC Site Manager may be a Senior UXO Supervisor (SUXOS) or may have a SUXOS that reports to him/her.

4.0 DESCRIPTION OF ACTIVITIES

This section details construction tasks that will be performed during the remedial action at each of the specified areas at WBG. These tasks are grouped into the following items:

- Pre-mobilization,
- Mobilization and Site Preparation,
- Excavation,
- Soil and MEC Separation Process,
- Establishment of Munitions Demolition Area,
- Demolition Activities,
- Post-Demolition Operations,
- Inspection and Certification of Munitions Debris (MD) and Scrap Metal,
- Disposition of MD and Scrap Metal,
- Explosives Management Plan,
- Explosives Sifting Plan,
- Confirmation and Soil Stockpile Sampling,
- Material Handling and Transport,
- Decontamination,
- Site Restoration,
- Weekly/Monthly Reports, and
- Final Report.

The activities will be performed in accordance with the previously referenced documents, such as the FWSAP, FWQAPP, FWSHP, and the CQCP, and the WBG ESD (USACE, 2014) to ensure specific environmental protection requirements are met during construction activities.

4.1 Pre-mobilization

Before mobilizing to the site, the Contractor 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 Camp Ravenna and other Army team members.

4.1.1 Required Permits/Clearances

The Contractor's Field Superintendent or designee will verify that all applicable permits, notifications, and approvals have been obtained before mobilization. The Contractor will communicate with the OHARNG range control to coordinate construction activities and access to the MK19 range gate after verifying the proper communications protocol and points of contact with the ARNG Restoration Project Manager and OHARNG Restoration Representative. At that time, site-specific clearances or coordination may be required.

Since the work is being conducted in accordance with CERCLA, no environmental permits are required. At a minimum, the selected Contractor must comply with the substantive 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. These requirements are discussed in Section 6 of this RD. The selected Contractor must also comply with the Ohio EPA MEC Demolition Notification requirements if demolition of MEC or MEC-related items occurs during the remedial action activities.

4.1.2 Traffic Coordination and Routing

Prior to mobilization, the selected Contractor will prepare a traffic plan for review and approval by Camp Ravenna. This plan will identify proposed haul routes both within and outside WBG. The Contractor will establish transportation routes for incoming and outgoing vehicles and heavy equipment to minimize the impact on Camp Ravenna and the 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 be positioned to avoid removal of mature vegetation or encroachment on wetland areas. The active usage of haul routes will be coordinated with the ARNG Restoration Project Manager, OHARNG Restoration Representative, and the Camp Ravenna Range Control to ensure that 40mm practice grenades are cleared from the roads on the MK19 range before use. Additional waste load-out activities are discussed in further detail in Section 4.13.

4.1.3 Preconstruction Survey

A preconstruction visual survey will be performed to document initial conditions at the WBG. A preconstruction land survey of the existing ground elevation will be conducted at the five locations to be excavated to establish existing grade for site restoration. Photographs of the preconstruction site conditions will be collected as part of the preconstruction survey. The preconstruction survey will include a site walk accompanied by representatives of OHARNG to discuss sensitive areas, equipment staging areas, traffic patterns, coordination with the Mark 19 Range, and any other issues of concern to the OHARNG. This site walk may be conducted in conjunction with the project preconstruction meeting, if OHARNG personnel are available. Prior to mobilization, the selected Contractor will prepare a site layout plan for review and approval by Camp Ravenna. This plan will identify equipment staging areas, stockpile areas, MEC screening areas, and any other areas the Contractor needs to access in order to accomplish the work described in this RD. The plan will also identify any temporary facilities the Contractor intends to install or erect, such as storage units, office trailers, MEC screening equipment, and toilet facilities.

4.1.4 Utility Clearances

Before undertaking intrusive subsurface activities, the Contractor will contact the Camp Ravenna Department of Public Works (DPW) to perform a utility clearance. Additionally, the Contractor will use geophysics instruments to check for the electronic signature of any utilities in the vicinity of the planned

excavations. If any evidence of utilities is observed, hand tools will be used to clear the area to ensure that no utilities are being contacted.

In the event an unmarked utility is discovered during the remedial action, all work will stop immediately and the Camp Ravenna Range Control, USACE COR, and Contractor Project Manager will be notified immediately. Camp Ravenna personnel will determine the disposition of the discovered utility.

Camp Ravenna personnel and the Contractor will collaborate on any necessary actions in order to continue remedial activities. If the discovery of an unmarked utility results in a change to the scope, objectives, or schedule of the remedial action, the Contractor will notify the ARNG and USACE COR for concurrence on proposed revisions and/or corrective actions.

4.1.5 Emergency Response General Notifications

Prior to preparing the SSHP, the Contractor shall obtain a Contractor Packet from Camp Ravenna which contains emergency procedures for contractors. At least one week prior to the initiation of the remedial action operations at WBG, the Contractor will contact all local emergency services to verify the availability of requisite services and to confirm the means used to summon the services, including verification of the following telephone numbers. General notifications will be made to key project personnel at this time as well. This includes the following contacts:

- Camp Ravenna Range Control
- Hospital (Robinson Memorial, Ravenna (330) 297-0811/ (330) 297-2850
- WorkCare Clinic (Robinson Health Center, Streetsboro) (330) 626-3455
- Ravenna City Fire Department (330) 297-5783
- Police Ravenna Police Department (330) 296-6486
- Police Portage County Sheriff Office (North, Windham, OH) (330) 326-2460
- Police Ohio State Highway Patrol (Ravenna Patrol Post) (330) 297-1441
- Ohio Army National Guard Range Control (614) 336-6041
- Camp Ravenna Garrison Commander (614) 336-6560
- Army National Guard Project Manager (Kevin Sedlak) (614) 336-6000 ext. 2053
- OHARNG Restoration Representative (Katie Tait) 614-336-6136
- Vista Sciences (Becky Haney) for submission of site access requests (330) 872-8010
- Ohio EPA Nancy Zikmanis (330) 963-1160

4.1.6 Preconstruction Meeting

Before beginning activities at WBG, the Contractor will conduct a preconstruction meeting that will include members of USACE, Ohio EPA, ARNG, OHARNG, and the Contractor 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 Contractor Project Manager, and a preconstruction meeting agenda will be provided to the applicable parties in advance of the scheduled meeting. In addition, the Contractor will coordinate all construction activities and maintain constant communication with OHARNG representatives.

4.2 Mobilization and Site Preparation

After pre-mobilization requirements are completed, equipment and personnel will be mobilized to the work site in accordance with the approved site layout plan. 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 (USACE, 2011c). 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 pre-mobilization 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.
- Establish traffic control and post construction signs.
- Coordinate site security with OHARNG.
- Install erosion and sediment control measures.
- Clear and grub in and around the excavation limits, if necessary. No tree clearing is anticipated. If tree clearing is necessary, this activity must be closely coordinated with the OHARNG Restoration Representative.
- 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 (USACE, 2011c).

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

4.2.1 Site-Specific Training

As part of the mobilization process, the Contractor shall 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 the Contractor at Camp Ravenna. Individual responsibilities, safety, and environmental concerns associated with operations will also be covered in the training. The PM, Field Superintendent, SSHO, and/or UXO/MEC Site Manager 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;
- Review of tasks necessary to accomplish the RA;
- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations, including review of each Activity Hazard Analysis.
- 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 OHARNG/ARNG.
- Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural issues.
- Additional Occupational Safety and Health Administration (OSHA) or ARNG required training as required by the SSHP.
- Ordnance awareness including identification of features and hazards and reporting procedures in the event ordnance is encountered.
- Onsite speed limits and awareness of potential driving hazards, especially troops using roads and grounds, both on foot and in a variety of motor vehicles.

Documentation of pre-mobilization training will be provided to the USACE COR.

4.2.2 Equipment

All equipment will be inspected as it arrives to ensure it is in proper working condition. Heavy equipment will be inspected for any fluid leaks, including hydraulic fluid, oil, and fuel. Any equipment found damaged or defective will be repaired or returned to the point of origin. A spill kit must be maintained during on-site activities for potential spills. Any equipment and hazardous materials that are brought on site will be removed from the site at the end of the RA. Any hazardous materials will be properly stored on secondary containment and properly labeled. The selected Contractor will maintain an inventory and Safety Data Sheets for any hazardous materials brought on site.

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, Contractor will also install and test its communication equipment, which will include, as a minimum, the following:

- Hand-held portable radios used to maintain communications between the office trailer and the field teams; and
- Cellular telephones, to be used as backup communications between the office trailer and the field teams and for communication with personnel off-site.

4.2.3 Temporary Facilities

To satisfy the requirements of this RD and the Facility Wide Safety and Health Plan (USACE, 2011c), 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 be placed at locations to shown in the approved site layout plan. Temporary power will also be provided to those facilities requiring power to operate. Communications will consist of hand-held radios and cell phones.

4.2.4 Sign and Barricade Placement

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

4.2.4.1 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.

4.2.4.2 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. The selected Contractor will provide the site-specific traffic control plan to USACE and ARNG/OHARNG prior to mobilization to the site. 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 with minimal interference.

4.2.4.3 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 Contractor SSHO must be

notified if barricades on roadways may impede the passage of emergency vehicles, and the SSHO must notify Camp Ravenna range operations. Any barricades which impede roads must be preapproved by Camp Ravenna staff. 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 will be placed around the perimeter of the hazard. Tags that identify the nature of the hazard will be attached to the barricade. 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.

4.2.5 Site Security

Once mobilization begins, site security will be established and coordinated with the Camp Ravenna security and operations personnel. 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.

The Contractor 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.

4.2.6 Erosion and Sediment Control

Erosion and sediment 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. Storm water will be collected or diverted away from excavations by using grading, berming, silt fence, hay bales, or pumping. Erosion and sediment controls will be installed in accordance with the Storm Water Pollution Prevention Plan described in Section 6.0 of this RD.

4.2.7 Designation of Work Zone Boundaries

Prior to initiating excavation activities, the Contractor 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 noncontaminated 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.

4.2.8 Site Control During MEC Operations

For the purpose of this RD, 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 Contractor UXO/MEC Site Manager or Field Superintendent.

Based on MEC removal actions conducted previously (MKM, 2005b, 2005c), the munition with the greatest fragmentation distance (MGFD) for the RD/RA operations conducted under this RD will be the 40-mm M406 grenade. At this time, the MSD for the 40-mm grenade is expected to be the maximum fragment range–horizontal distance of 345 feet, as stated in the DDESB Fragmentation Database. The team separation distance for the site will be 19 feet, which is the K40 distance for the MGFD listed.

4.2.9 MEC Surface Clearance

Prior to the Contractor mobilizing heavy equipment, setup of equipment at the processing area, and beginning mechanical excavation at Pad 38, Pad 61/61A, and Pad 66/67, OHARNG Range Control personnel will conduct a visual sweep of the surface to identify and remove any 40mm practice grenades associated with the Mk19 Range. Then UXO qualified contractor personnel will conduct a Schonstedt-assisted visual surface sweep to remove any other MEC items that may be visible on the surface. Since the areas involved in this RA have had previous removal actions, few MEC items, if any, are expected to remain on the surface. In the event that MEC items that are fuzed and unsafe to move are encountered, they will be handled according to the procedures detailed in the ESS that will be prepared for this work. The ESS will be prepared in accordance with applicable DoD/Army safety regulations and must be approved by the DDESB.

All recovered MEC and suspect items, which are deemed safe to move, will be documented and stored for subsequent demolition and disposal. Storage will occur either in a temporary magazine on WBG or in an earth-covered magazine designated by the OHARNG, if allowed by the approved ESS. The subsequent demolition will be part of this RA and will occur on site at WBG or at Open Demolition Area #2 (ODA2). Onsite storage and demolition must be in accordance with an approved ESS prepared by the USACE Baltimore District. The contractor shall provide a schedule for disposal activities once MEC items are recovered. UXO items cannot be moved from the AOC without approval of the applicable Explosive Ordnance Disposal (EOD) agency or the Baltimore District MMRP Design Center. Procedures for using ODA2 are described in the DFFO and the Camp Ravenna Integrated Contingency Plan (ICP) (OHARNG, 2014). See Section 4.6 of this RD for details.

For information on procedures likely to be contained in the ESS, refer to 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, 2008a). The Ohio EPA Notification for MEC Demolition and Disposal Operations will be completed prior to initiating site activities.

4.2.10 Processing Area Selection and Setup

The Army has determined that a centralized processing area to screen and sift soils from Pads 38, 61/61A, and 66/67 will provide the most cost-effective operation and will work best with site activities and logistics. The most likely area will be the same location that was used for the 2008 removal action (MKM, 2008). Before initiating site activities, the Contractor will work with OHARNG personnel to identify a single processing area. The soil processing location(s) will be selected based on the following criteria:

- Easy access to the three sites;
- Proximity to paved roads;
- Minimal impact to activities on the Mark 19 Range.

After the processing area surface is cleared, the surface soil will be sampled by ISM for the parameters listed in Section 4.12.3, in accordance with procedures in the FWSAP, to establish baseline conditions. The processing area will include the space for soil stockpiling and soil sifting (i.e., MEC separation). After the surface soil is sampled, the equipment will be set up. Each piece of equipment will be inspected upon arrival on the site in accordance with Section 4.2.2.

4.2.11 Clearing and Grubbing

The Contractor 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. Disposition of removed vegetation will be coordinated with the Camp Ravenna Environmental Office.

4.2.12 Water Source

Water to be used for onsite construction and decontamination will 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 construction will meet the standards for potable use. Water to be used for decontamination purposes will be separated from the water for construction use and must be an approved water source in accordance with the requirements of the FWSAP. The FWSAP describes the sampling and analysis protocol and the process for obtaining approval for a water source.

4.2.13 Dust Management

Control measures are required 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. Dust generation activities may occur during clearing and grubbing, excavation, soil loading, soil stockpiling, and transportation. The primary dust control measure is the application of a water spray to exposed soils. Water will only be applied in the amount needed to control dust. No runoff or water ponding will be produced during dust suppression activities. Additionally, vehicle traffic will be kept on improved roads to the extent possible; vehicle traffic will maintain the posted speed limit; and vehicle access within the project boundaries will be, to the extent practicable, kept away from soil that could cause a hazard or nuisance.

A water wagon or truck will be utilized for dust suppression unless the Contractor proposes a more efficient process. 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 Camp Ravenna 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. Re-vegetation of landscape will be completed as soon as practical to retain moisture and to minimize wind erosion. All soils, including contaminated and uncontaminated soil 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 Contractor 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.

4.3 Excavation

A shielded excavator will be used to excavate debris and soil under the direction of a UXO technician at pads 38, 61/61A, and 66/67 as described below in the subsections that follow. The excavator will be armored with appropriate blast shielding over all exposed windows in accordance with the ESS that will be prepared for the site work. Previous studies on site have indicated that the 40-mm M406 high-explosive (HE) grenade is the potential MEC item of greatest concern. The Plexiglas shielding will be sized to exceed requirements for protecting the excavator operator from any fragments, 40-mm grenades, or similar small items, which may be encountered during excavation. These details may vary when the final approved ESS is prepared for this work.

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.

4.3.1 Excavation at Pad 38

A detected level of TNT in the 0 to 1 ft interval must be removed to reduce the Exposure Point Concentration (EPC) of the Potential Exposure Area (PEA) at Pad 38 to below the Industrial Soil RSL remediation level. A removal action was previously completed at Pad 38 involving excavation, MEC removal, and backfill re-use of surface soils to a depth of one (1) ft bgs. This process changed the distribution of surface soils at the pad. Consequently, the exact locations of soils associated with previous discrete surface samples are unknown, but they are still onsite within the footprint of the previous removal action. Therefore, surface soils within the previous removal action area of approximately 0.2 acres in size, which encompasses Pad 38, will be removed. Excavation will be completed to a depth of two (2) ft bgs to capture all surface soil samples located at this pad. The estimated surface area of this removal is 0.2 acres, resulting in an estimated volume of 645.3 cubic yards. The coordinates of the area to be removed are shown in Table 4-1. Upon excavation, all material will be processed as described in Section 4.4 to remove potential MEC items.

One ISM closure sample will be taken at a depth of 0 to 1 ft at the bottom of the excavation to verify that the remediation level has been achieved. The ISM sample will be analyzed for TNT using USEPA SW-846 Method 8330B. The procedures for ISM sampling are described in the FWSAP. The Industrial RSL for TNT (420 mg/kg) is a level considered safe for full-time workers. Upon receipt of analytical results that are less than the Industrial RSL for TNT, the completed excavation will be backfilled with approved clean soil from an approved source outside of Camp Ravenna. Backfill source soil must be sampled and approved in accordance with the FWSAP. The site will then be regraded, and seeded using Camp Ravenna approved seed mixtures. The storm water runoff controls will be implemented to protect excavated soils, excavation areas/trenches, and storm water ditches from silt accumulation and erosion until the site has been restored to match local surroundings.

4.3.2 Excavation at Pads 61/61A

Removal actions were previously conducted at the Pad 61/61A PEA including:

- excavation and grading of an area including Pads 61 and 61A to achieve range design grades to varied depths of up to approximately 6.5 ft bgs,
- excavation and grading of soil berms associated with Pad 61 and the area of previous soil sampling station WBG-217 located south of Pad 61 to a depth of 4.5 ft bgs, and
- excavation of limited area overlapping Pad 61A to a depth of 1 ft below design grade, backfilled with clean soil to design grade.

Confirmation sampling was completed at the conclusion of these removal actions by collecting ISM samples from the base and side walls of the excavations. While detected levels of benzo(a)pyrene in confirmation samples from the excavation bottoms of Pads 61 and 61A did not exceed the established cleanup criteria at that time, they exceed the Industrial Soil RSL remediation level. Also, when the sum of ratios is applied, other detected PAHs contribute more than 10% to the sum which exceeds 1.0 for these samples. Therefore, surface soils within the previous removal action area of approximately 1.2 acres in size, which encompasses Pads 61 and 61A, are proposed for remediation. Excavation will be completed to a depth of two (2) ft bgs to capture all confirmation sample exceedances at these pads. The coordinates of the area to be removed are shown in Table 4-1. The estimated volume of this removal is 3,872 cubic yards. Upon excavation, all material will be processed as described in Section 4.4 to remove potential MEC items.

Four ISM closure samples will be taken at a depth of 0 to 1 ft at the bottom of the excavation to verify that the remedial level for benzo(a)pyrene and other PAHs has been achieved. The ISM samples will be analyzed for PAHs using USEPA SW-846 Method 8270C. The procedures for ISM sampling are described in the FWSAP. The Industrial RSLs for PAHs are at levels considered safe for full-time workers. See Table 4-2. Upon receipt of analytical results that are less than the Industrial RSLs for PAHs, the completed excavation will be backfilled with approved clean soil from an approved source outside of Camp Ravenna. The site will then be regraded, and seeded using Camp Ravenna approved seed mixtures. The storm water runoff controls will be implemented to protect excavated soils, excavation areas/trenches, and storm water ditches from silt accumulation and erosion until the site has been restored to match local surroundings.

Pad 38	Northing	Easting	Pad 66	Northing	Easting
1	562403.06	2359075.70	1	563075.85	2358700.73
2	562405.26	2359173.38	2	563077.27	2358784.19
3	562316.05	2359173.37	3	562979.86	2358785.87
4	562315.66	2359075.66	4	562979.78	2358700.26
Pads 61	Northing	Easting	Pad 67	Northing	Easting
& 61A			1	563051.02	2359028.45
1	563035.10	2356833.23	2	563049.87	2359021.32
2	562984.95	2356833.63	3	563063.90	2359020.78
3	562958.63	2356828.76	4	563064.98	2359036.64
4	562927.88	2356810.86	5	563052.21	2359035.82
5	562913.46	2356665.84			
6	562806.66	2356662.73	West of	Northing	Easting
7	562790.90	2356634.95	Pad 67		
8	562788.15	2356600.06	1	563054.90	2358975.80
9	562820.42	2356569.39	2	563064.90	2358975.80
10	562904.29	2356496.69	3	563064.90	2358985.80
11	562959.11	2356498.81	4	563054.90	2358985.80
12	563033.08	2356513.55			

Table 4-1 Coordinates of Removal Areas

Coordinate System: NAD 83 State Plane Ohio North (Feet)

4.3.3 Excavation at Pads 66/67

Detected levels of TNT and RDX require removal to reduce the Pad 66/67 PEA EPC below the Industrial Soil RSL remediation levels. Levels within the 0 to 2 ft interval at Pad 66 and west of Pad 67, and in the 2 to 10 ft interval at Pad 67 require removal to achieve this. Removal actions were previously completed within the Pads 66/67 PEA including:

- excavation, MEC removal, and backfill re-use of surface soils to a depth of 1 ft bgs at Pads 66 and 67,
- excavation of a limited area within Pad 67 (approximately 30 ft by 30 ft area) to a depth of 2 ft bgs and backfilling with clean soil, and
- excavation, MEC removal, and backfill re-use in a 10 ft by 10 ft area centered on sample station WBG-070 to a depth of 1 ft bgs.

The excavation, MEC removal, and backfill re-use of surface soils changed the distribution of surface soils at the pads, rendering the exact locations of soils associated with previous discrete surface samples as unknowns. However, this means the contaminated soils associated with the discrete samples are still onsite within their respective areas. Therefore, for Pad 66, surface soils within the previous removal action area of approximately 0.2 acres in size are proposed for remediation. Excavation will be completed to a depth of 2 ft bgs to capture all surface soil samples located at this pad, resulting in an estimated volume of 645.3 cubic yards. The coordinates of the area to be removed are shown in Table 4-1. Upon excavation, all material will be processed as described in Section 4.4 to remove potential MEC items.

One ISM closure sample will be taken at a depth of 0 to 1 ft at the bottom of the excavation to verify that the remediation level has been achieved. The ISM sample will be analyzed for TNT and RDX using USEPA SW-846 Method 8330B. The procedures for ISM sampling are described in the FWSAP. The Industrial RSLs for TNT (420 mg/kg) and RDX (240 mg/kg) are considered safe levels for full-time workers.

At Pad 67, the 2 to 10 ft depth interval associated with sample station WBG-252 (see Table 4-1 for coordinates) will be removed in order to reduce detected levels of TNT and RDX. At its base, this excavation may be no wider than a trackhoe bucket, but the Contractor must shore, slope or bench the excavation so that a confirmation sample may be taken at the base of the excavation. The confirmation sample for this location will be an ISM sample and it will be collected from a relatively small area or volume of soil, such as one or two track hoe buckets. Care must be taken to ensure that the material is representative of the base of the excavation. For estimating purposes, the surface area is expected to be about 15 ft by 15 ft, resulting in an excavated volume of less than 80 cubic yards. Upon excavation, all material will be processed as described in Section 4.4 to remove potential MEC items.

At a location west of Pad 67, surface soils within the 10 ft by 10 ft area centered on sample WBG-070 will be removed. See Table 4-1 for coordinates. Excavation will be completed to a depth of 2 ft bgs to capture the depth of the surface soil sample exceedance. Upon excavation, all material will be processed as described in Section 4.4 to remove potential MEC items. One ISM closure sample will be taken at a depth of 0 to 1 ft at the bottom of the excavation to verify that the remediation level has been achieved. The ISM sample will be analyzed for TNT and RDX using USEPA SW-846 Method 8330B.

Upon receipt of analytical results that are less than the Industrial RSLs, the completed excavation will be backfilled with approved clean soil from an approved source outside of Camp Ravenna. The site will then be regraded, and seeded using Camp Ravenna approved seed mixtures. The storm water runoff controls

will be implemented to protect excavated soils, excavation areas/trenches, and storm water ditches from silt accumulation and erosion until the site has been restored to match local surroundings.

4.4 Soil and MEC Separation Process

The soil and MEC separation process will follow the procedures described in this section unless the Contractor obtains Army approval to use a different process. The soil and MEC separation process must be described in detail in the ESS for this RA. The ESS must be approved by the DDESB before the selected Contractor mobilizes to the site.

The Contractor will use a magnetic separation process similar to that used during the 2008 removal action (MKM, 2009) 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 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 trammel 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 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 ISM sampling methodology for waste characterization. ISM sampling will be performed following the procedures described in the FWSAP. Additionally, ISM soil aliquots should be collected throughout the process of placing the soil stockpile to ensure the representative distribution of aliquots from the pile. The final number of ISM samples required for characterization of the stockpile will be determined by consultation with Ohio EPA and the disposal facility.

4.5 Establishment of Munitions Demolition Area

ODA2 is the established demolition site which will be used for MEC requiring disposal. Demolition on site at WBG may occur, if procedures are established by in an approved ESS. Based on previous removal actions, the maximum fragment range-horizontal for the MGFD (40 mm grenade) during clearance of the operational area is 345 feet. However, 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. These details may vary when the final approved ESS is prepared for this work.

4.6 Demolition Activities

During disposal of MEC, safety is the primary concern. This section describes the planned approach for the safe demolition of explosives. Some of the specific details may be changed in accordance with the approved ESS to be prepared for this site. An ESS, which is approved by the DDESB will ensure that procedures being employed are in accordance with the current explosives safety regulations. The Ohio EPA Notification for MEC Demolition and Disposal Operations will be completed prior to initiating site activities.

Planned detonation of explosives requires more stringent safety distance requirements than those for ordnance in storage. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, and fragmentation. Physical control of the onsite 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 4.1.5 of this RD. An established demolition site will be located within ODA2 at RVAAP. Procedures for using ODA2 are described in the DFFO and the Camp Ravenna ICP and are provided at the end of this section.

The maximum fragment range for the MGFD 40 mm M406 HE grenade is 345 feet; however, in order to minimize noise and prevent possible recontamination of ODA2 with munitions fragments, all demolition shots at will be conducted using sandbag mitigation as described below:

- The ODA2 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, August 1998 and HNC-ED-CS-S-98-7, Amendment 1, February 2011." 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.
- 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.

While preparing MEC for detonation, the UXO/MEC Site Manager 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 SUXOS will be responsible for ensuring all personnel have been accounted for and that the area is secure prior to authorizing the detonation of explosive charges. Following the demolition shot, the area will be inspected for kick-out items and to ensure complete disposal of the MEC.

Procedures for using ODA2 are described in the DFFO and the Camp Ravenna ICP and are provided below:

- 1. Notify the Ohio EPA before and after demolition.
- 2. Notify other outside agencies such as emergency contacts, FAA, etc.
- 3. Conduct pre- and post-sampling of the area (soil and surface water).
- 4. Report the net explosives weight of munitions that are blown in place or blown at ODA2 to the Camp Ravenna Environmental Office as these totals count as part of the monthly hazardous waste total for Camp Ravenna (donor charges do not count).
- 5. Perform weekly inspection of the conditionally-exempt storage areas if waste present (there are specific requirements for these inspections).
- 6. Provide inventory of all munitions that are treated and/or stored.
- 7. Provide a written SOP that describes specifics of the operation that is to be reviewed and approved by Camp Ravenna Environmental.
- 8. Keep logs of each demolition shot.

4.7 Post-Demolition Operations

After successful initiation of the explosive charge, the SUXOS and a second UXO Specialist 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. The Contractor will also notify the Ohio EPA and conduct post-demolition sampling in accordance with the Camp Ravenna ICP and the DFFO.

4.8 Inspection/Certification of Materials Presenting a Potential Explosive Hazard (MPPEH)

This section provides the general procedures to be followed for the Army to certify and dispose of MPPEH, Munitions Debris (MD), and scrap metal. The final approved ESS will govern the work. 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 multi-step inspection/certification process described below.

Step 1. Each item on the ferrous metal conveyor will be inspected by at least one of the UXO specialists, and the SUXOS will verify the inspection before each item is initially declared as MD/scrap metal.

Step 2. Each item on the non-ferrous stockpile will be inspected by at least one of the UXO specialists, and the SUXOS will verify the inspection before each item is initially declared as MD/scrap metal.

Step 3. After the MD and scrap metal are stockpiled, a UXO specialist will sample and inspect at least 10% of all MD/scrap metal items for the presence of explosive hazards. If any of the material inspected is found to contain explosives hazards, the load will be rejected, MEC items will be removed for storage and subsequent demolition and disposal, and 100% of the load will be re-inspected. Upon completion of the inspection by the UXO specialist, the SUXOS will perform random checks of the MD and scrap metal, containerize it, seal it and certify it free of explosive hazards.

Step 4. The UXOSO will ensure that MPPEH items are inspected/certified in accordance with the provisions outlined in DoDM 6055.9M and DoDI 4140.62, 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 DD1348-1A. The SUXOS will ensure that the inspected MD/scrap metal is secured in a closed, labeled, and sealed container. Before 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 Camp Ravenna Garrison Commander will then be provided with copies of the DD 1348-1A along with the chain-of-custody and final disposition forms.

4.9 Disposition of Munitions Debris and Scrap Metal

MD and scrap metal will be disposed of by recycling. The Contractor will document the transport and transfer of the MD and scrap metal using proper chain-of-custody procedures.

4.10 Explosives Management Plan

The contractor shall prepare a work plan for explosives management. The work plan will be reviewed and approved by the Baltimore District MMRP Design Center.

4.11 Explosives Sifting Plan

The procedures for explosives sifting will be contained in the contractor's work plan.

4.12 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 USEPA Industrial RSLs. As described in Section 4.3, soil will be excavated from Pads 38, 61/61A, and 66/67. Confirmation soil samples will be collected from each excavation location, as described in Section 4.3, to confirm that soils remaining at WBG RD/RA excavation areas have concentrations of COCs below Industrial RSLs and do not present a risk to a full-time worker at WBG.

Waste characterization soil samples will be collected from excavated soil stockpiles to facilitate off-site disposal, as described in the following sections. After removal of soil stockpiles, the area will be visually inspected by the Contractor's Field Superintendent, and total of four ISM soil samples will be collected within the former stockpile footprint to ensure all contaminated material has been removed from the site. ISM soil samples will also be collected from the processing area (MEC screening area) after the equipment is removed and the surface is cleared of any residual soil resulting from the soil processing.

4.12.1 Confirmation Sampling

The numbers and locations of the confirmation samples are described in Section 4.3. All confirmatory soil samples will be collected using the ISM soil sampling technique. This sampling technique consists of taking at least 30 random soil aliquots 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. The random samples will be collected from the excavation, using a soil probe, at a depth of 0 to 12 inches below the base of the excavation. A minimum of 30 random samples will be collected and composited. These samples will be air dried, sieved, and ground following proper health and safety measures and the procedures listed in the FWSAP.

4.12.2 Excavated Soil Stockpile Sampling

As indicated in the preceding sections of this RD, excavated soils from the excavation areas will be processed for removal of MEC, stockpiled, and then sampled for subsequent off-site disposal. Approximately 1400 cubic yards is to be excavated from areas around Pads 38, 66, and 67. The COCs are TNT (in all three areas) and RDX (Pads 66/67). The soil from these pads will be stockpiled separately from the soil from Pads 61 and 61A, which had PAHs as the COC. The processed and stockpiled soil from Pads 38, 66, and 67 will be tested for hazardous waste characteristics at a rate of approximately one sample per each 70 cubic yards of stockpiled material. Each sample collected to represent a 70 cubic yard portion will be an ISM sample composed of at least 30 soil aliquots. Before collecting characterization samples, the contractor will verify with the laboratory the quantity of soil needed for the required analyses and size each aliquot accordingly.

The soil will be stockpiled, sampled, and analyzed in such a way that parent material represented by each ISM characterization sample can be identified for proper disposal after analysis. This approach will allow for distinguishing between 70-yd lots that are hazardous and non-hazardous, so that each can be properly disposed of. If a 70-yd lot is characterized as hazardous waste, the Army may direct the contractor to divide the pile and collect additional characterization samples in order to potentially reduce the amount of soil that would be disposed of as hazardous waste. The Army may also direct the contractor to increase the sampling frequency, if the analyses consistently approach or exceed regulatory levels for toxicity.

Approximately 3900 cubic yards of soil is to be excavated from around Pads 61 and 61A, where the COCs are PAHs. The processed and stockpiled soil from Pads 61 and 61A will be tested for hazardous waste characteristics at a rate of approximately one sample per each 150 cubic yards of stockpiled material. Each sample collected to represent a 150 cubic yard portion will be an ISM sample composed of at least 60 soil aliquots. Before collecting characterization samples, the contractor will verify with the laboratory the quantity of soil needed for the required analyses and size each aliquot accordingly.

The soil will be stockpiled, sampled, and analyzed in such a way that parent material represented by each ISM characterization sample can be identified for proper disposal after analysis. This approach will allow for distinguishing between 150-yd lots that are hazardous and non-hazardous, so that each can be properly disposed of. If a 150-yd lot is characterized as hazardous waste, the Army may direct the contractor to divide the pile and collect additional characterization samples in order to potentially reduce the amount of soil that would be disposed of as hazardous waste. The Army may also direct the contractor to increase the sampling frequency, if the analyses consistently approach or exceed regulatory levels for toxicity.

The soil to be disposed of is not a listed hazardous waste on the F, K, P, or U lists of specific waste streams from industrial or manufacturing processes or discarded commercial chemical products.

Therefore it will be disposed of as non-hazardous solid waste if it does not exhibit any of the following four characteristics: ignitability, corrosivity, reactivity, or toxicity.

The soil to be disposed of will be tested for toxicity using methods consistent with the Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311). Typically after the leaching procedure is performed the resulting extract is analyzed for specific metals, specific volatile organic compounds (VOCs), specific semi-volatile organic compounds (SVOCs), and specific herbicides and pesticides. Since neither VOCs nor pesticides/herbicides were identified as Chemicals of Concern at Winklepeck Burning Grounds, the TCLP extract will be analyzed only for the TCLP metals and SVOCs, based on generator knowledge of the waste. If the land disposal facility requires additional testing of the TCLP extract, that required testing will be performed.

The soil to be disposed of is not a liquid, a compressed gas, or an oxidizer. The in situ soil to be disposed of contains a maximum of 0.5% by weight of TNT and 0.2% by weight of RDX, based on data collected during the site characterization. The soil also contains no free liquid, such as petroleum-based fuel, that is ignitable. Therefore, there is no evidence that it is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes or, when ignited, it would burn so vigorously and persistently that it would create a hazard. Therefore, the soil to be disposed of will not be tested for ignitability, unless the land disposal facility requires that test. The soil is neither aqueous nor liquid; therefore, by definition it cannot be corrosive. The soil to be disposed of will not be tested for corrosivity, unless the land disposal facility requires that test. The soil to be disposed of does not exhibit any of the eight characteristics of reactivity listed in 40 CFR 261.23. While the soil may contain low levels of explosive compounds, the in situ soil to be disposed of contains a maximum of 0.5% by weight of TNT and 0.2% by weight of RDX, based on data collected during the site characterization. Typically a mixture of explosive compounds and soil is not considered to be an explosive mixture unless the concentration of explosive compounds is 10% or greater by weight. The in situ soil has a concentration of explosives much less than 10%; therefore, the soil to be disposed of will not be tested for reactivity, unless the land disposal facility requires that test.

The waste characterization samples will be taken directly from the accumulated stockpile. In addition to analyses listed above, the samples will be analyzed for any other analyses required by the disposal facility for proper disposal. After processing and sample collection, the soil stockpiles will be identified, labeled, and segregated until analytical laboratory results determine the stockpile disposition.

Analytical results and associated QA/QC information will support an Ohio EPA Tier I data validation. More information concerning this is available in Ohio EPA's Tier I Data Validation Manual available at <u>http://epa.ohio.gov/portals/32/pdf/TierIDVManual.pdf</u>. The contractor will ensure that the laboratory produces a data package that supports the Tier I Data Validation, specifically focusing on requirements in Section 1.1 of the referenced manual.

As requested by the Ohio EPA in an email dated August 19, 2015, specifically for WBG RA, the hazardous waste characterization data and associated QA/QC data will be submitted to Ohio EPA for review and comment prior to disposal. It is anticipated that Ohio EPA will review this information quickly to allow for timely determination of waste characterization and disposal options. The soil materials that are not deemed to be hazardous wastes or UXO will be disposed of at a licensed and permitted solid waste landfill.

Following the removal of the stockpiled materials, confirmation soil samples will be collected from the area where the soils were stockpiled to ensure the area meets the WBG cleanup goals.

4.12.3 Sample Handling and Laboratory Analysis

Following the sample preparation activities, all sample 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 the selected laboratory. Confirmation samples will be analyzed for the following parameters:

- TNT and RDX by EPA SW-846 Method 8330B; 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 SW-846 Method 8270C.

Other samples will be analyzed as described in the applicable sections.

4.13 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.

4.13.1 Solid Waste (Hazardous and Nonhazardous)

Solid wastes to be generated as part of this removal action will at a minimum consist of contaminated soils and dry sediments. Additionally some munitions may be encountered that will be either blown-in-place or transported to ODA2 for treatment. All waste will be appropriately accounted for as soon as possible and prior to conclusion of the project. All waste will be properly managed in accordance with Section 8.0 of the FWSAP, federal and state of Ohio Large-Quantity Hazardous Waste Generator Requirements, Camp Ravenna Waste Management Guidelines, and any other applicable rules, laws, and regulations. Scrap metal will be disposed of offsite using a licensed disposal facility or recycler. Recycling will be used whenever feasible.

The management, transportation, and disposal of all waste streams will be coordinated with the OHARNG Restoration Representative. Any munitions or munitions-related items transported from WBG to ODA2 must be handled as hazardous waste. All transportation paperwork (manifests or shipping papers) and onroad haul truck placards will be prepared by the Contractor Project Manager or Field Superintendent in accordance with federal, state, and local regulatory requirements, and disposal facility requirements. A draft of the transportation paperwork containing "base" information (without quantities and shipping date) will be submitted to the OHARNG Restoration Representative for review and approval a minimum of one week prior to shipment of any material. The Camp Ravenna Compliance Manager is the alternate. The approved transportation paperwork will then be completed as appropriate by the Contractor Field Superintendent in the field during remedial activities. The OHARNG Restoration Representative will sign all waste profiles and waste manifests for the disposal of project wastes, with the Camp Ravenna Compliance Manager as the alternate. The OHARNG Restoration Representative will retain copies of manifests and be responsible for submittal to Ohio EPA and United States Environmental Protection Agency (USEPA) as part of the annual reporting for Camp Ravenna hazardous waste generation and management. Copies of all manifests, shipping documents, and disposal facility approval letters will be incorporated into the RA Completion Report.

Hazardous and nonhazardous solid waste, which is stored on site, awaiting treatment or shipment, will be managed in accordance with the DFFO and applicable waste management regulations. Materials will be

properly stored and labeled. Storage containers and temporary storage areas will be inspected at required intervals in accordance with Camp Ravenna Waste Management Guidelines.

Waste will be transported by licensed waste haulers to ARNG/OHARNG-approved, licensed, off-site disposal facilities. All transportation requirements, including proper labeling, placarding, and weight limits will be followed.

Proper waste minimization procedures will be employed to limit the volume of waste generated. These procedures will include:

- Re-using materials that do not require decontamination, to the extent practicable;
- Minimizing the volume of decontamination fluids;
- Minimizing contact with potentially contaminated materials;
- Minimizing foot and vehicle traffic through potentially contaminated areas; and
- Utilizing good housekeeping practices.

4.13.1.1 Stockpiling at the Site

Excavated soils to be stockpiled will be stored within the WBG AOC temporarily before being transported to an approved disposal facility. It is anticipated that excavated soils to be stockpiled will be dry and will not require management of discharge water following placement in stockpiles. The stockpile(s) will be located at the end of the conveyor separator system in the same area as the approved central processing area, also within the WBG AOC. 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 6.0 of this RD. 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. Erosion and sediment control measures found to be deficient will be corrected immediately to prevent potential release of stockpiled soil.

4.13.1.2 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. The stockpile will be loaded out using a trackmounted excavator and/or wheel loader. The heavy equipment will be equipped with closed cabs to minimize potential for exposure to contaminated media. 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. The Contractor will keep a log (waste tracking sheet) of all waste generated as part of the project. Waste tracking sheets will be turned in to OHARNG/ARNG and included in the RA Completion Report. Personnel monitoring 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 Contractor 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 lined in accordance with applicable federal, state, and local rules, laws, and regulations. Before 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 the Contractor 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 Camp Ravenna will be in place.

4.13.2 Liquid Waste

Liquid wastes will be generated and handled in accordance with local, state, and federal regulations. Liquid waste, at a minimum, will consist of decontamination fluids. The liquid waste will be collected and pumped directly into labeled, DOT-approved 55-gallon drums or polyethylene tanks. Drummed liquid waste will be stored on secondary containment. Liquid wastes will be disposed of off-site based on the disposal facility waste characterization analytical requirements.

Precipitation accumulated in secondary containment areas may be discharged to the ground surface only after a Camp Ravenna rain water release form is obtained. Precipitation accumulated in excavation and stockpile areas may be discharged to ground surface only after analytical results are obtained and approval is received from Ohio EPA, USACE, and Camp Ravenna. Any ground surface discharges are subject to strict state and federal discharge conditions as well as RVAAP specific guidelines. If accumulated precipitation does not meet the requirements for ground surface discharge, it will be handled and disposed of as liquid waste.

4.13.3 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 soils will not exceed toxicity characteristic leaching procedures (TCLP) limits and 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 OHARNG Restoration Representative. All hazardous wastes, except for munitions related items treated onsite, will be shipped off-site; and records will be maintained in accordance with local, state, and federal regulations.

4.14 Decontamination

Upon completion of the excavation and before beginning restoration activities, decontamination of 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 undercarriages 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.

4.15 Site Restoration

Backfill and restoration will take place at each excavation area following the receipt of laboratory confirmation soil sample results indicating that material with concentrations of COCs exceeding the applicable cleanup criteria has been removed. Restoration will consist of backfilling with clean soil from onsite or offsite 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. There are no anticipated changes to site elevation or drainage features associated with this remedial action. Site restoration will include repair of damaged roadways in accordance with contractual requirements.

Revegetation of disturbed areas, including soil stockpile areas and equipment staging areas, will be conducted in accordance with the requirements of the Camp Ravenna Integrated Natural Resources Management Plan (INRMP). Only native species, as identified in the INRMP, will be used. 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-native species will be introduced. The Contractor will coordinate the required seed mixes with the OHARNG Restoration Representative prior to mobilizing.

Site restoration will include removal of sediment and erosion controls and any excess sediment that has been collected. The controls will remain in place until the grass is established with a density of at least 70 percent coverage in all disturbed construction areas, in accordance with Ohio Rainwater and Land Development guidance (Ohio Department of Natural Resources (ODNR), 2006). The site will be inspected weekly until the construction areas achieve at least 70 percent vegetation coverage. Once the construction areas achieve the 70 percent coverage, the erosion and sediment control measures will be removed and disposed of.

4.16 Weekly/Monthly Progress Reports

The Contractor will prepare and submit electronic copies of the weekly and monthly reports to OHARNG (Camp Ravenna), ARNG, USACE, and Ohio EPA. These progress reports will document the project activities conducted by the Contractor in its performance of the project tasks. These reports shall include all inspection activities, including those required for storm water in Section 6.5 of this RD, and spill/release reports and response actions. The monthly reports will be submitted for receipt by the addressee by the fifth of each month.

4.17 Final Report

At the conclusion of all field activities, the Contractor will submit a Remedial Action Completion Report (RACR). 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 manifests, weekly reports, monthly reports, sample collection forms, photographs, and confirmation sampling reports.

The RACR will be prepared as a preliminary draft, draft, and final with 45-day comment period by Ohio EPA for the draft and final reports. The selected Contractor will also prepare responses to Ohio EPA comments on the Draft RACR and facilitate a conference call to discuss the comment responses. If the Ohio EPA has comments on the Final RACR, the selected Contractor will also prepare responses to those comments and a revised Final RACR.

5.0 CONSTRUCTION SEQUENCE AND SCHEDULE

5.1 Construction Sequence

The proposed sequence of construction activities is presented below. Erosion and sediment controls will be constructed, stabilized, and determined to be functional before general site disturbance. 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 and sediment control measures as required, such as silt fencing, to prevent soil erosion on roadways edges, roadside ditches, around 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 magnetic separator and soil screening plant at the designated process area(s) within WBG.
- Excavate soil at Pad 38, Pads 61/61A, and Pads 66/67.
- Transport excavated soils to soil screening and staging area.
- Remove water that accumulates in open excavation(s) by pumping and storage in 55-gallon drums or a temporary water-tight storage tank.
- Maintain dewatering processes and erosion and sediment control practices throughout work period.
- Process excavated soil through MEC screening/soil sifting equipment.
- Transport any MEC item that is found and safe to move to the designated Igloo for storage.
- If a MEC item is encountered that cannot be positively identified, or must be destroyed in place, the OHARNG Restoration Representative, ARNG Project Manager and the Garrison Commander will be contacted for summoning appropriate EOD Detachment personnel for assistance, as needed. Additionally, 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 ODA2, 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 control facilities will be removed.
- Prepare and deliver construction completion report

5.2 Schedule

The selected Contractor will be required to prepare a detailed schedule. The current anticipated project schedule is based on the completion of all field activities within 120 days of completion of site mobilization. The Contractor must mobilize experienced UXO and operator personnel and conduct all field activities in a safe and efficient manner.

The project schedule is based on an excavation volume of 5250 cubic yards. The current anticipated project schedule takes into account potential hazards, impedances, and current COCs. Changes in any of these conditions have the potential to affect the project schedule.

6.0 STORM WATER POLLUTION PREVENTION

This section specifies the erosion and sediment control requirements for the Contractor to prevent the erosion of soil and sediments and to prevent the pollution storm water runoff during the remediation activities to be performed at the WBG. This section has been prepared in general accordance with the requirements for a Storm Water Pollution Prevention Plan (SWPPP) per Ohio EPA Permit No. OHC000004 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. In addition to the narrative contained in this section, the selected Contractor will prepare plan drawings and details showing specific types and locations of erosion and sediment control measures that will be used during the work. Those drawings will be reviewed and approved by the Army prior to work commencing on site. Those drawings together with this section will constitute the SWPPP for this remedial action.

6.1 Surface Features and Topography

The WBG is situated in the center of the former RVAAP (Figure 1-2) and is surrounded by woodland. The topography at WBG is characterized by gently undulating contours that decrease in elevation from west to east. Elevations vary from 993 to 1085 feet, with the highest elevations located at the extreme western end of the WBG near Pads 28 and 43. Surface water drainage during storm events generally flows from west to east to southeast across WBG. Storm water run-off ditches ultimately flow into Sand Creek.

6.2 Soil Characteristics and Potential Effects

The WBG site consists of glacial materials and well-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 proper separation. The clay-rich soils will also cause process equipment screen fouling when the soil moisture content occurs at levels conducive to soil adhesion.

Drainage ways at WBG may provide pathways for off-site migration of COCs contained in soil particles disturbed or eroded as a result of the remedial activities. These pathways will be identified in advance of any intrusive activities, and preventative measures will be instituted to prevent migration. After the contract for the RA is awarded, the Contractor will provide a detailed plan drawing to supplement this RD, showing specific preventative measures and their locations.

6.3 Environmentally Sensitive Areas

Most of the work pursuant to this RD will confined to within the boundaries of the WBG AOC or to existing installation roads outside of the boundaries of the WBG AOC. Limited activities may occur within ODA2 and the C Block Igloos, which may be used for temporary storage. As such, this work will not impact any known environmentally sensitive areas.

6.4 Control Methods

In general, erosion and sediment 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.

6.4.1 Runoff Control

Runoff controls will be used 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 the Contractor will identify potential overland drainage routes. Runoff controls will primarily consist of diversion structures and interception to enclose disturbed drainage areas. Secondary controls may include conveyance to existing waterways and construction of stabilized outlets. The implementation of these methods will depend on the location of the work and the potential for the release of contaminants. The Contractor will select appropriate runoff control measures based on their construction sequence. The selected runoff control measures must be included on the detailed plan drawing that the Contractor will prepare showing erosion and sediment controls.

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, the Contractor will discharge the collected runoff to the ground surface following approval by Ohio EPA, USACE, and OHARNG 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 excavation areas. As a general 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 from being discharged through storm water runoff.

6.4.2 Soil Stabilization

Soil stabilization will be performed at disturbed areas to prevent or minimize erosion of soils caused by rain, sheet flow, and rills. 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 the OHARNG Restoration Representative and ARNG Project Manager. For non-vegetative cover, the Contractor 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 be conducted 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, natural resource values, maintenance requirements, and in accordance with the Camp Ravenna Restoration Project Manager.

6.4.3 Sediment Control

Sediment control, consisting primarily of sediment barriers, will be implemented to protect areas downgradient of construction areas and off-site locations. The purpose of sediment control is to retain sediments, which are generated as a result of soil erosion, on site. The typical types of sediment barriers will be silt fence and straw bale barriers for upland areas and sediment traps for small storm water conveyances.

To the greatest extent practicable, all soil-disturbing activities at WBG will be minimized and will proceed in a manner to prevent erosion and control 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 controls sedimentation.

To protect nearby waterways, silt fencing and/or straw bale barriers will be installed along the downgradient perimeter at all work areas. Where appropriate, straw bale barriers or rock check dams will be used as sediment traps in small storm water conveyances. When used, silt fences will be constructed using filter fabric that will be staked to provide a barrier to 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. Filter fabric must be installed at least 6 inches deep at the bottom of the fence to ensure water cannot flow under the barrier. 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. Straw bale barriers, if used, will be keyed in at least six inches below grade to ensure water cannot flow under the barriers will be removed after their function has been fulfilled and the area will be stabilized.

6.5 Operation and Maintenance of Control Methods

Erosion prevention 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 of 0.5 inches or more within 24 hours 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 and sediment 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 of as necessary. Paved streets along the WBG haul route will be maintained, as needed, by removing any mud, dirt, rock, or other materials originating from the work areas.

6.6 Erosion and Sediment Control Management

The Contractor will manage onsite erosion and sediment 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 erosion prevention and sediment control methods, the Contractor's management activities will include, at a minimum, 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 in 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 Camp Ravenna Restoration Project Manager.
- 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 erosion and sediment control requirements.
- Designate responsibility of the erosion and sediment control requirements to one individual (to be named prior to onsite mobilization).
- Establish and maintain an erosion and sediment control inspection schedule that documents the completion of identified repairs and maintenance items.

6.7 Preventative Maintenance and Good Housekeeping

Preventative maintenance will be performed on equipment to ensure proper operation and to detect potential leaks before they occur. Good housekeeping practices will be maintained at all times during construction activities. All employees will practice due diligence to prevent any damage to the storm water control measures. Containers will be provided at all necessary locations for collecting trash and general construction debris. Fueling activities will be conducted at the staging area away from storm water conveyances.

- Good housekeeping practices are designed to maintain a clean and orderly work environment. Good housekeeping measures will include a minimum of:
- Disposing of and picking up garbage and waste material regularly;
- Inspecting equipment daily and performing material inspections for leaks and/or conditions that could potentially lead to a discharge of a petroleum product, chemical or waste;
- Performing preventative maintenance on equipment to ensure it operates properly and to help detect potential leaks before they occur; and

• Ensuring that spill cleanup procedures outlined in the FWSHP are understood by employees, contractors, and/or subcontractors, and established storage areas are away from streams and water bodies. The storage area will also be away from direct traffic routes to prevent accidental spills.

6.8 Dust Management

Dust management is addressed in Section 4.2.13 of this RD.

7.0 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 remedial action. The Contractor will confine its activities to areas defined by this RD. Environmental protection will be as stated in the following subsections.

The Contractor will be 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.

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

There are no known existing historical, archaeological, or cultural resources within the Contractor's work area. If, during soil excavation or stockpile removal activities, the Contractor observes unusual items that might have historical, archaeological, or cultural value, such items will be protected in place and reported immediately to the OHARNG Restoration Representative and OHARNG Cultural Resources Manager. The Contractor also will follow the Camp Ravenna procedure for inadvertent cultural discoveries.

7.2 Protection of Natural Resources

Before beginning any soil excavation or stockpile removal activities, the Contractor will identify all land resources to be preserved within the work area. The Contractor will not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without permission from the OHARNG Restoration Representative and ARNG Project Manager.

7.2.1 Work Area Limits

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

7.2.2 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 the OHARNG Restoration Representative and ARNG Project Manager. Any areas accessed for the purpose of transporting or transferring materials will be protected.

7.3 Protection of Air Resources

The Contractor will keep soil excavation and stockpile removal activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment processes, and work operated or performed by the Contractor 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 RD. Special management techniques, as set out below, will be implemented to control air pollution caused by construction activities, conducted under this RD.

7.3.1 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.

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

Hydrocarbons, carbon monoxide, oxides of nitrogen, and sulfur emissions are associated with heavy equipment to be 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.

7.3.3 Monitoring of Air Quality

Monitoring of air quality for soil excavation and stockpile removal activities will be the responsibility of the Contractor in accordance with 29 CFR 1910 as detailed in the Site-specific Health and Safety Plan to be prepared for this project.

7.4 Protection from Sound Intrusions

The Contractor will keep soil excavation and stockpile removal activities under surveillance and control to minimize damage to the environment by noise.

7.5 Storm Water Pollution Prevention

Storm water pollution prevention is discussed in Section 6.0 of this RD.

8.0 CONSTRUCTION QUALITY CONTROL

The Contractor will prepare a project-specific Construction Quality Control Plan (CQCP) which will describe the specific QC processes and procedures to be implemented for this work. The CQCP will describe how construction QC will be implemented for all activities described in this plan. The CQCP will describe how the construction QC program inspection and testing processes will monitor the overall quality of work, and how project controls will be instituted to assure correction of deficiencies identified during the inspections and testing. Project scheduling will be developed to assure proper sequence and performance of work activities.

The Contractor CQCP shall address any monitoring, surveillance, and inspection activities described in Section 6, Storm Water Pollution Prevention, and Section 7, Environmental Protection, of this RD. The CQA shall describe the activity, the documentation of the activity, the responsible party, the frequency of the activity, the criteria being checked, the criteria that will trigger corrective action, and the process for implementing corrective action.

The CQCP will be provided for approval by the Army before any construction activities commence. Changes to the CQCP must be approved by the Army prior to implementation, and USACE will require the Contractor to obtain contractual approval from USACE before implementing any changes to the CQCP.

- 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, 2008a. 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.
- MKM, 2008b. Final Remedial Action Work Plan, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio, Amendment 1.
- MKM, 2009. Final Remedial Action Completion Report for RVAAP-05 Winklepeck Burning Grounds Pads 61/61A, 67, and 70. November.
- ODNR, 2006. Rainwater and Land Development, Ohio's Standards for Stormwater Management, Land Development, and Urban Stream Protection. 2006.
- OHARNG, 2014. Camp Ravenna Joint Military Training Center, Integrated Contingency Plan. January.
- Ohio EPA, 2004. Director's Final Findings and Orders. Ravenna Army Ammunition Plant. June.
- 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, 2008. Final Record of Decision for Soil and Dry Sediment at the Winklepeck Burning Grounds. October.
- Shaw, 2011. Final Data Quality Objectives Report for RVAAP-05 Winklepeck Burning Grounds. June.
- USACE 2011a. Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February 2011.
- USACE 2011b. Facility-Wide Quality Assurance Project Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February 2011.
- USACE 2011c. Final Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February 2011.
- USACE, 2012a. Final Work Plan for Additional Evaluation of the RVAAP-05 Winklepeck Burning Grounds, RVAAP/Camp Ravenna.

- USACE, 2012b. Final Property Management Plan for the Designated Areas of Concern and Munitions Response Sites Volume One – Version 1, Ravenna Army Ammunition Plant, Ravenna, Ohio. August.
- USACE, 2014a. Draft Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds, Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbull Counties, Ohio. Revision 0. August.
- USACE, 2014b. Final Remedial Investigation/Feasibility Study Supplement for RVAAP-05 Winklepeck Burning Grounds, Former RVAAP/Camp Ravenna, Portage and Trumbull Counties, Ohio. Revision 0. September.

APPENDIX A: SAMPLE CONSTRUCTION QUALITY CONTROL PLAN (CQCP)

This appendix presents a sample CQCP, showing an example of the typical contents and format. The Contractor will develop their own site-specific and company-specific CQCP. The Contractor's site-specific CQCP must be approved by the Army before work on this RA commences.

The CQCP describes the inspection procedures and documentation required to ensure excavation and restoration activities occur according to the requirements of the RD. Protocols for reporting test results, certifying compliance with construction requirements, correcting construction deficiencies, and documenting such corrections are provided. The CQCP also addresses the review and documentation requirements necessary to comply with the site restoration details contained herein.

A.1 RESPONSIBILITY AND AUTHORITY

A.1.1 Responsibility

The organizational chart presented in Figure A-1 outlines the management structure that will be used to implement remedial activities in accordance with this RD. The functional responsibilities of key personnel were described in Section 3.1. The assignment of personnel to each position was based on the following:

- Qualifications;
- Experience; and
- Training.

The Contractor QA/QC Officer and Contractor Field Superintendent, in coordination with the USACE COR, will ensure the completed remedial activities conform to the RD and any necessary permit conditions. The Contractor Project Manager will verify completion of these activities.

The Contractor Field Superintendent will oversee remediation and site restoration activities. The Contractor Construction Manager or designee will be on site during work activities to ensure that all components of this RD are fulfilled.

A.1.2 Administration and Operation

The QA/QC organization is administered by the Contractor QA/QC Officer in concert with the Contractor Field Superintendent. The Filed Superintendent will be supported by technical staff (engineers, scientists, and technicians) and Subcontractor Construction Manager(s), as necessary.

All vendors supplying materials used for site restoration and storm water control will supply materials from manufacturing facilities with established QC programs.

Results of the manufacturer QC procedures will be submitted to the QA/QC Officer for review, evaluation, and documentation prior to beginning field activities.

A.2 PERSONNEL QUALIFICATIONS

All QA/QC personnel will be properly trained for their job function. The Contractor Field Superintendent is key to the inspection and certification program. The Contractor Field Superintendent will have demonstrated knowledge of specific construction practices relating to earthwork, regulations, observation and testing procedures, and documentation procedures. The Contractor Field Superintendent will also be experienced in performing similar duties on previous jobs in which comparable construction activities took place.

A.3 ACCESS PROTOCOL

A.3.1 Facility Access Protocol

Facility access requests will be made through Vista Sciences Corporation. Vista Sciences Corporation will coordinate facility access approval through OHARNG. All personnel approved to enter Camp Ravenna must provide government-issued identification (e.g., driver's license, passport) at the entrance. Upon entry and exit to Camp Ravenna, each person is required to sign a roster annotating the time of day and the area where they are working or visiting.

All personnel and vehicles must enter Camp Ravenna through the Camp Ravenna Main Gate (8451 State Route 5, Ravenna, OH 44266) and are subject to search and inspection. Weapons, lighters (or similar fire starters), and alcoholic beverages are prohibited within Camp Ravenna; prohibited items may be placed with security personnel while onsite. Security personnel will confiscate prohibited items discovered during inspections.

A.3.2 Construction Area Access Protocol

All supervisors, workers, and site visitors entering the construction area must provide training records specified in the SSHP prior to entering the construction area and/or exclusion zones. Site visitors arriving throughout the day must: 1) undergo a briefing by the Contractor Field Superintendent or SSHO; and 2) provide necessary training records and documentation prior to approaching or entering the exclusion zone. All site visitors must be approved by the Contractor Field Superintendent and SSHO to enter the construction area and/or exclusion zones.

A.3.3 Traffic Rules and Protocol

The Contractor and all subcontractors will comply with all Ohio and Camp Ravenna traffic rules. Speed limits will be maintained as posted around the main entrance area of the facility. The Subcontractor will not exceed the posted speed limits of 35 miles per hour (mph) during daylight hours and 25 mph at night while on all other Camp Ravenna main roads. A speed limit of 10 mph around the project area will be maintained. At no time will the Camp Ravenna main roads be blocked by the Subcontractor during remediation activities. Traffic flow must be maintained on at least half of the roadway width at all times. Prior to starting any activity that will obstruct traffic flow, approval will be obtained from the OHARNG Restoration Representative, Range Control, and the Contractor Field Superintendent.

A.4 DAILY PLANNING BRIEFINGS

At the start of the project, the Contractor and subcontractor field crews will participate in a pre-work briefing on objectives, health and safety, proposed deviations, and project schedule with the Contractor Field Superintendent.

In addition to daily tailgate briefings conducted in accordance with the SSHP, the Contractor and subcontractor field crews will participate in daily planning briefings to determine the plan of action for the work day. This briefing will include, at a minimum, the following:

- A discussion of the planned activities for the work day;
- Planned area of earthwork or excavation;
- MEC awareness;
- Weather considerations;
- Deliveries;
- Transportation schedule;
- Scheduled forecast; and
- Issues which would result in an impact to the project.

A.5 INSPECTION ACTIVITIES

Inspections will be completed to verify acceptability of materials, prevent spills, and assess effectiveness of storm water and dust generation controls. The scope and frequency of each type of inspection is described below.

A.5.1 Spill Control

The Contractor Field Superintendent will conduct daily inspections to verify spill equipment is maintained and no spills have occurred. During execution of the RA, if any visual or olfactory indicators suggest the presence of potentially contaminated soil, the employee will report to the Contractor Field Superintendent. The Contractor will provide all necessary on-site spill equipment (e.g., granulated clay, absorbent blankets, PPE, shovels, containers). All on-site workers will maintain good housekeeping practices (as discussed in Section 6.7 of the RD).

A.5.2 Dust Control

Dust generation activities may occur during remedial activities, material handling, and equipment movement on paved and unpaved roads. The Contractor will minimize dust generation by keeping vehicles on improved roads, limiting speeds to a 10 mph maximum on the access roads, and applying water for dust suppression purposes as required. Water used for dust control will be clean (e.g., obtained from sources with approval of the Contractor Field Superintendent or potable water obtained from an off-site source). The use of additives will not be permitted. Engineering controls will be implemented to minimize the potential for dust generation. The SSHO will conduct daily inspections during representatively normal operating conditions.

A.5.3 Storm Water Pollution Prevention and Environmental Protection

The Contractor CQCP shall address any monitoring, surveillance, and inspection activities described in Sections 6 and 7 of the RD. The CQA shall describe the activity, the documentation of the activity, the

responsible party, the frequency of the activity, the criteria being checked, the criteria that will trigger corrective action, and the process for implementing corrective action.

A.6 SPILL RESPONSE

Spills will be responded to as presented in the FWSHP and Camp Ravenna Integrated Contingency Plan (Spill Plan). In the event of a spill or leak, the employee making the discovery will immediately notify the SSHO and the Contractor Field Superintendent. These spills can include, but are not limited to, releases of fuels, lubricants, and hydraulic fluids.

The Contractor Field Superintendent will ensure the spill is reported to Camp Ravenna Range Control and documented on a Camp Ravenna First Responder Reporting Form (Attachment 1). OHARNG will be responsible to contact the Ohio EPA if the spill exceeds the reportable quantity or if it reaches a surface water body.

A.7 DOCUMENTATION

A.7.1 Field Documentation

This project will include daily inspection and quality summary reports, which will be signed and dated by the Contractor Field Superintendent. These reports will be submitted to the Contractor Project Manager.

The daily reports may include:

- Summary of activities performed at the project site;
- Weather information;

• Inspection activities (e.g., storm water controls, spill-control barriers, equipment staging/fueling areas);

- Departures from the approved RD;
- Problems encountered during field activities;
- Subcontractor submittals; and/or
- Subcontractor certifications (e.g., health and safety records).

Attachment 1 provides spill/release response actions.

A.7.2 Remedial Action Completion Report

Upon completion of remedial activities, a Remedial Action Completion Report will be prepared by the Contractor. The Remedial Action completion Report will document:

• The project was performed in accordance with this RD (i.e., complied with requirements, technical specifications, and other relevant contract documents) and all applicable regulations, including surface water and air regulations;

• Documentation of any approved field variances from this RD (e.g., unforeseen site condition, change in material); and

• Corrective actions and achievement of remedial goals.
ATTACHMENT 1

SPILL/RELEASE RESPONSE ACTIONS (Current version)

FIRST RESPONDER SPILL/RELEASE RESPONSE ACTIONS

Units or contractors performing training or other operations at Camp Ravenna shall be responsible for adhering to the provisions identified in the Camp Ravenna Integrated Contingency Plans (ICP). A copy of the ICP may be obtained from the Camp Ravenna Environmental Supervisor. Following discovery of a spill (any size), the procedures outlined below shall be executed where applicable:

- 1. If necessary, initiate evacuation of the immediate area.
- 2. Notify Camp Ravenna Range Control via two-way radio or by calling <u>(614) 336-6041</u>, and report information contained on the "First Responder Reporting Form" if it is known or can reasonably be determined. This form has been copied on the opposite side of this page. If Range Control cannot be reached, contact a Camp Ravenna OSC (listed below).
- 3. Stop spill flow when possible without undue risk of personal injury.
- 4. If trained, contain the spill using available spill response equipment or techniques.
- 5. Make spill scene OFF LIMITS to unauthorized personnel.
- 6. Restrict all sources of ignition when flammable substances are involved.
- 7. Report to the OSC upon his/her arrival to the scene.
- 8. Turn in a completed copy of the Camp Ravenna First Responder Form to Camp Ravenna Range Control for ALL releases, even ones cleaned up by the reporter.

TELEPHONE NUMBER

When Camp Ravenna Range Control is not available, the Camp Ravenna OSC must to be contacted by the discoverer/first responder following a release if it is in water, at or above a reportable quantity (25 gallons or more of POL), a hazardous or extremely hazardous substance, a hazardous waste, or involves fire, explosion, or is otherwise a major incident.

NAME	JOB TITLE	OFFICE	24 HOUR
Camp Ravenna Range Control	Operations and Training	(614)336-6041	(614) 202-5783
Tim Morgan (Primary OSC)	Environmental Supervisor	(614)336-6568	(330)322-7098
Katie Tait	Environmental Specialist	(614)336-6136	Contact Alternate
CPT Mike Yates	Range Operations	(614)336-6193	(330) 819-5038
MAJ Richard Saphore	Logistics Officer	(614)336-6790	(614) 593-1654
LTC Ed Meade	Garrison Commander	(614)336-6560	(614)307-0493
Joint Forces Command (Alternate POC)	OHARNG Emergency Center	(888)637-9053	(888)637-9053

Off-site (from Camp Ravenna area code 614 phones)

Windham Fire Department9-1-330-326-2222 Portage County Sheriff9-1-330-296-5100 Trumbull County Police, Fire Department and Hazmat.....911 SEE REVERSE FOR FIRST RESPONDER REPORTING FORM

FIRST RESPONDER REPORTING FORM (Print all information)

Collect as much of the information on the top half of this form as possible before making initial notification. Comp top and bottom of the form before turning in to Camp Ravenna.	lete the
Name of individual reporting spill:	
When did the spill occur (Date and Time)?	
Spill Location (Building or area name / number, indoors or out; if vehicle involved, type and bumper number):	
What was spilled?	
Rate at which material is currently spilling	
Extent of spill travel?	
Did the spill reach water (ditch, creek, stream, pond, well head)	
Number of injured personnel and type injuries, if applicable.	
Do you need the Fire Department to respond to protect life, property, and environment?	
Unit: State: Report Date & Time:	
On Scene Coordinator Name and Grade: Phone:	
How did the spill occur (be specific)	
What remedial action was taken?	
Was soil and absorbent material generated? How much?	
What is the location of the soil and absorbents?	
Was the Environmental Office contacted (yes or No, date and time)?	
Who did you talk to in the Environmental Office?	
Was the site cleared by the Env. Office (Yes or No, date and time)?	
Who cleared the site (name and grade, date and time)?	

Initial information is critical. Get as much information as you can, but don't hesitate to make the initial notification if a spill is moving or worsening rapidly!

This form must be completed for all releases and turned-in to Camp Ravenna Range Control within 24 hours.

APPENDIX B

SAMPLING AND ANALYSIS PLAN

FINAL SAMPLING AND ANALYSIS PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS CAMP RAVENNA, OHIO

Contract No. W912QR-12-D-0004 Delivery Order No. 0003



U.S. ARMY CORPS OF ENGINEERS LOUISVILLE DISTRICT 600 Dr. Martin Luther King, Jr. Place, Room 821 Louisville, Kentucky 40202-2267

June 2016

REPORT	Form Approved OMB No. 0704-0188						
The public reporting burden for this collection c gathering and maintaining the data needed, and c information, including suggestions for reducing t 1215 Jefferson Davis Highway, Suite 1204, Arl penalty for failing to comply with a collection of i PLEASE DO NOT RETURN YOUR FO	f information ompleting and he burden, to ngton, VA 2 nformation if i RM TO TH	is estimated to average 1 hour d reviewing the collection of infor Department of Defense, Washin 2202-4302. Respondents shou it does not display a currently val IE ABOVE ADDRESS.	per response, incl mation. Send com ngton Headquarters Id be aware that no lid OMB control nur	uding the tir ments regard Services, Di otwithstandir nber.	me for reviewing instructions, searching existing data sources, ding this burden estimate or any other aspect of this collection of irectorate for Information Operations and Reports (0704-0188), ng any other provision of law, no person shall be subject to any		
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				5C. PRC	JGRAM ELEMENT NUMBER		
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14. ABSTRACT							
15. SUBJECT TERMS							
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			PAGES	19b. TEL	EPHONE NUMBER (Include area code)		

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Tetra Tech, Inc., has completed the preparation of this <u>Sampling and Analysis Plan</u> as part of the <u>Soil Removal Action</u> for <u>RVAAP-05 Winklepeck Burning Grounds</u> at the <u>former Ravenna Army</u> <u>Ammunition Plant (RVAAP)/Camp Ravenna</u>. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of data quality objectives; technical assumptions; methods, procedures, and material to be used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

Sutt A-Nelf

Scott Nesbit Project Manager

Richard B. Wie

Rick Wice Independent Technical Review Team Leader

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FINAL SAMPLING AND ANALYSIS PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS Camp Ravenna, Ohio

Submitted to: USACE Louisville District

Submitted by: Tetra Tech, Inc. 661 Andersen Drive Pittsburgh, Pennsylvania 15220

Multiple Award Remediation Contract Contract No. W912QR-12-D-0004 Delivery Order No. 0003

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PREPARED UNDER THE SUPERVISION OF & APPROVED FOR SUBMITTAL BY:

Suit A-Nelf

SCOTT NESBIT, PE PROJECT MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

STEVEN H. RUFFING, PE PROGRAM MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
FWSAP	Facility-Wide Sampling and Analysis Plan
FWSHP	Facility-Wide Site Health and Safety Plan
ISM	Incremental sampling method
MEC	Munitions and Explosives of Concern
MS/MSD	Matrix spike/matrix spike duplicate
N/A	Not applicable
Ohio EPA	Ohio Environmental Protection Agency
РАН	Polynuclear Aromatic Hydrocarbon
РСВ	Polychlorinated Biphenyl
QA	Quality assurance
QC	Quality control
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SVOCs	Semivolatile organic compounds
TAL	Target Analyte List
TBD	To be determined
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
WBG	Winklepeck Burning Grounds

1.0 PROJECT DESCRIPTION

Soil sampling and analysis will be completed at the Ravenna Army Ammunition Plant (RVAAP)-05 Winklepeck Burning Grounds (WBG) Area of Concern (AOC) for the additional soil removal action related to the Post-Record of Decision changes to the remedy. The additional soil excavation is required because the original removal action limited the future development of the WBG as a Mark 19 Machine Gun Range. The proposed future use for this AOC is military training. The site is planned to be further developed as a Multi-Purpose Machine Gun Range which will require intrusive activities at various depths over the entire WBG. The Army has determined that future use of the site may also involve full-time employees, thereby requiring that it meet the applicable standards for Commercial/Industrial Land Use (USACE, 2015).

The soil sampling and analysis program is described in the Final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds [U.S. Army Corps of Engineers (USACE), 2015]. The results of the confirmation sampling will be evaluated and used to achieve Commercial/Industrial Land Use requirements and revise Land Use Controls at WBG.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The project specific organization and responsibilities are shown in the Construction Quality Control Plan. The key positions for the Sampling and Analysis Plan are shown below.

Project Manager	Scott Nesbit, PE
Project Quality Control (QC) Manager	Rick Wice, PG
Project Health and Safety Manger	James Laffey, CESCO
Laboratory Quality Assurance (QA)/QC Manager	To be determined (TBD)
Laboratory Coordinator	TBD
Field Superintendent	TBD, PE or PG
UXO QC Specialist	TBD
Contractor Field Personnel	Timberline Environmental Services, Inc.

3.0 SCOPE AND OBJECTIVES

The scope and objectives are discussed in the Final Remedial Design (USACE, 2015). The objective of the sampling and analysis is to collect and analyze soil samples for the soil removal action that consist of

- Existing Stockpile and Offsite Borrow Area samples,
- Processing Area and Stockpile Area samples (pre- and post-excavation),
- Waste Disposal Characterization samples, and
- Confirmation samples.

The scope of the sampling and analysis for the existing stockpile and offsite borrow area samples is to confirm that these materials are considered clean soil from the onsite and offsite sources to restore WBS to its existing conditions. The sampling and analysis of the Processing Area and Stockpile Area will be conducted to establish baseline conditions before the removal action begins and to make sure the contaminated soil has been removed from the site at the end of the removal action. The sampling and analysis of the Waste Disposal Characterization samples will be conducted to facilitate off-site disposal of the contaminated soil and meet the requirements of the land disposal facility.

The confirmation samples will be collected from each excavation location to confirm that soil remaining at WBG excavation areas have concentrations of contaminants of concern below Industrial Regional Screening Levels and do not present a risk to a full-time worker at WBG. After results from the confirmation sampling are received and evaluated, with approval of the USACE additional soil excavation may be conducted if the soil sample analytical results are greater than the Industrial Regional Screening Levels. Professional judgment will be used to determine the area and depth of the additional excavation based on the degree of the exceedance.

Table 3-1 presents the proposed sampling and analysis requirements for this soil removal action. Table 3-1 also include the proposed sampling and analysis requirements for the collected excavation and equipment decontamination water that will be generated.

Table 3-1	Proposed	Sampling	and	Analysis
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	Same Para	Dereth of	Name kan a f	Nambana	Analysis						
Sample Type/Location	Sampling Method	Sample	Number of Samples	Number of Replicates	PAHs	TNT/ RDX	TCL/TAL/ Pesticides/PCBs/ Explosives/pH ¹	TCLP SVOCs	TCLP Metals	pH/Flash- point	BTEX
	EPA	Method			8270C /8310	8330B	8260B, 8270C, 8081A, 8082, 6010/6020, 7471, 8330B	1311/ 8270C	1311/ 6010/ 6020 & 7471		8260B
Existing Stockpile & Off	fsite Borrow	Area						-	-		
Existing Stockpile	ISM	N/A	1	0			X				
Offsite Borrow Area	ISM	N/A	1	0			Х				
Processing Area and Sto	ckpile Area						_	-	-		
Before Mobilization	ISM	0 to 1 foot below ground surface	8	12	Х	Х					
After Removal of Contaminated Soil Stockpiles	ISM	0 to 1 foot below ground surface	8	12	Х	Х					
Waste Disposal Charact	erization							-			
TNT/RDX Contaminated Soil (Pads 38, 66, 67, & West of 67)	ISM	0 to 2 feet below ground surface	7	0		Х		Х	Х	Х	Х
PAH Contaminated Soil (Pad 61/61A)	ISM	0 to 2 feet below ground surface	22	0	Х			X	X	Х	Х

					Analysis						
Sample Type/Location	Sampling Method	Depth of Sample	Number of Samples	Replicates	PAHs	TNT/ RDX	TCL/TAL/ Pesticides/PCBs/ Explosives/pH ¹	TCLP SVOCs	TCLP Metals	pH/Flash- point	BTEX
	EPA	Method			8270C /8310	8330B	8260B, 8270C, 8081A, 8082, 6010/6020, 7471, 8330B	1311/ 8270C	1311/ 6010/ 6020 & 7471		8260B
Confirmation	-				-						
Pad 38	ISM	0 to 1 foot	1	0		TNT Only					
Pads 61/61A	ISM	below	4	1^{2}	Х						
Pad 66	ISM	bottom of	1	1^{2}		Х					
Pad 67	ISM	excavation	1	0		X					
West of Pad 67	ISM		1	0		Х					
Collected Excavation &	Equipment	Decontaminat	ion Water		1						
Composite Sample	Grab	Tank/Drum	1	0		In a	accordance with Dispo	osal Facility	Requireme	ents	
 TCL/TAL/Pesticides/PCBs/Explosives/pH – Target Compound List of Volatile Organic Compounds, SVOCs, Pesticides; Target Analyte List of Metals, Polychlorinated Biphenyls, Explosives, Nitro-glycerine, Nitro-guanadine, Nitrocellulose, and pH. Separate replicated ISM samples will be collected using the same methods as the original sample, from a set of random locations. Replicate aliquots collected in separate containers or bowls and placed into separate labeled sample container for transport to the laboratory. These samples will be prepared and analyzed in the same manner as the initial ISM sample Other quality assurance samples include MS/MSD (5% for all analysis) and a QA split sample from Pad 66 analyzed for TNT and RDX by a USACE-designated laboratory. Laboratory turnaround time of 5 days will be requested. 											
ISM – Incremental Sampling Method (see Section 4.1)RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazineN/A – Not ApplicableTCLP - Toxicity Characteristic Leaching ProcedurePAH – Polynuclear Aromatic HydrocarbonSVOC – Semivolatile Organic CompoundsBTEX – Benzene, Toluene, Ethylbenzene, XyleneSVOC – Semivolatile Organic Compounds											

4.0 FIELD ACTIVITIES

Field activities and sampling procedures will be accomplished in general accordance with Section 5.0 of the Facility-Wide Sampling and Analysis Plan for Environmental Investigations (FWSAP). Field instruments (e.g. photoionization detector, flame ionization detector and X-ray fluorescence) will not be used for the measurement of chemical concentrations or biased sample collection during the implementation of this Sampling and Analysis Plan.

4.1 SOIL SAMPLING PROCEDURES

The following sections summarize the soil sampling procedures during the implementation of the field program. Soil samples will be collected using the incremental sampling method (ISM) with the sample locations spatially distributed in a stratified random manner to provide lateral coverage over the entire excavated surface as described in the Final Remedial Design (USACE, 2015) and summarized below.

The ISM consists of taking a minimum of 30 stratified random soil aliquots of similar mass for each represented sample. The samples will be collected from the

- existing stockpile and borrow,
- processing area (pre- and post-excavation),
- waste disposal characterization (composite samples collected according to the Construction Quality Control Plan), and
- excavation area for confirmation samples

For the stratified random sample collection, a grid will be established by field personnel across the sample area and then one random aliquot sample location will be selected in each sub-unit. Sample points will not be pre-located.

The soil aliquots will be collected using a soil probe or hand auger at a depth of 0 to 12 inches below the base of the excavation or from the processing or stockpile areas. Multiple borings using the soil probe may be advanced at each sample location, if necessary, to obtain a sufficient sample volume for the laboratory. A minimum of 30 stratified random soil aliquots for each sample will be collected and composited. These composite sample will be air dried, sieved, and ground following proper health and safety measures and the procedures listed in the FWSAP.

Duplicate QC and QA samples will be collected from the ISM area from the same source that equally represent the soil at a given time and location. The field duplicate samples will be submitted as "blind" to the laboratory and are used to determine whether the field sampling technique is reproducible and as an indicator of sample heterogeneity. Matrix spike/matrix spike duplicate (MS/MSD) samples will be used to verify the accuracy of the laboratory results. The QC sample will be sent to the laboratory under contract with the contractor. The QA split samples will be sent to an U.S. Army QA laboratory for independent analysis and evaluation of analytical results by the contracted laboratory.

4.2 SAMPLE CONTAINERS AND PRESERVATION TECHNIQUES

Sample container and preservation technique requirements in accordance with the laboratory and SW-846 methods are presented below:

- Sample containers will be provided by the laboratory,
- The laboratory will provide the required types and quantities of chemical preservatives, and
- Samples will be stored at 4°C (±2°C) immediately after collection and will be maintained at this temperature until the samples are received at the laboratory.

4.3 SAMPLE PROCESSING

Sample processing will be conducted in the analytical laboratory in accordance with the Facility-Wide Sampling and Analysis Plan for Environmental Investigations (as described on page 5-66). The soil sample will be air dried, sieved, and finely ground (size reduced by using a utensil such that the size of the particles are less than 2 millimeters in diameter or milled). Then, the entire sample will be

thoroughly mixed using an inert, non-contaminating spatula or rod to turn the volume of material over a minimum of three times and spread out on a tray. Appropriately sized representative subsamples will be collected in a systematic random manner from the material.

4.4 FIELD QUALITY CONTROL SAMPLING PROCEDURES

QA/QC samples will be collected during the implementation of this Sampling and Analysis Plan in general accordance with Section 5.6.2.8 of the FWSAP. QC duplicate samples will be collected as indicated in Table 3-1. MS/MSD samples will be collected at a rate of 5% (1 per 20) of the total number of samples. QA split samples will be submitted to a different laboratory than regular and duplicate samples for independent analyses. One QA split sample will be collected during the confirmation sampling activities.

One rinsate blank will be collected for soil sampling equipment per field event. Trip blanks are not included as part of the QA/QC samples in this SAP as no samples will be collected for volatile organic compound analysis. Potable water from the Ravenna water system will be used in the decontamination processes; therefore, no potable water source blanks will be collected during field activities. No field blanks will be collected during field activities as potential contaminant sources unrelated to the specific sources being investigated are not expected to be present in the field.

4.5 DECONTAMINATION PROCEDURES

The construction equipment will be decontaminated in the soil processing and screening area. The decontamination procedure for construction equipment is as follows:

- 1. Remove caked soil material from the exterior of the equipment.
- 2. Steam clean the equipment with potable water from the Ravenna water system and/or use a brush where steam cleaning is not sufficient or available to remove soil material.
- 3. Rinse thoroughly with approved potable water.

- 4. Collect the wash and rinse water and pump it into labeled, DOT-approved 55-gallon drums or polyethylene tanks that are stored in an area with secondary containment. These liquids will be disposed off-site based on the disposal facility waste characterization analytical requirements.
- 5. Allow equipment to air dry as long as possible.

Construction equipment will be decontaminated between the excavation of the PAH and TNT/RDX areas and at the completion of the excavation activities. A final decontamination inspection of equipment leaving RVAAP at the end of field activities will be conducted to make sure proper decontamination has been completed.

Non-dedicated equipment used for soil sampling shall be decontaminated as described in Sections 5.5.2.8 of the FWSAP with the exception that acid and/or solvent rinses will not be included. Ohio Environmental Protection Agency (Ohio EPA) Division of Response and Revitalization issued a procedure update to Field Standard Operating Procedures Section 1.6 Sampling Equipment Decontamination (March 8, 2011) indicating solvents and acids should not be used for equipment decontamination. The decontamination procedure for sampling equipment will be as follows:

- Remove excess soil contamination from the equipment.
- Disassemble the equipment if necessary for proper decontamination.
- Wash the equipment with ASTM Type II or distilled water and non-phosphate detergent. The resultant water/detergent mixture will be containerized for proper offsite disposal.
- Rinse equipment second time with ASTM Type II or distilled water.
- Dry the equipment with a clean cloth or paper towel.
- If the equipment is not be used immediately, wrap in aluminum foil or another protective covering.

Non-dedicated equipment will be decontaminated at the completion of sampling activities at each sampling location.

4.6 SITE SURVEY

Prior to mobilization a preconstruction land survey of the existing ground elevation will be conducted at the five locations to be excavated to establish coordinates for the excavation and the existing grade for site restoration. The preconstruction land survey will be conducted at the same time as the in-situ waste characterization sampling activities. Following excavation activities, land survey of the excavated ground elevation will be conducted at the five locations so the volume of soil removed can be calculated. The locations will be conveyed in Ohio State Plane Coordinates (NAD83). The vertical datum for the elevations will be 1929 National Geodetic Vertical Datum. The coordinates and elevations will be recorded on as-built drawings upon receipt of quality assured survey results and included in the Remedial Action Completion Report.

4.7 MUNITIONS AND EXPLOSIVES OF CONCERN

Munitions and Explosives of Concern (MEC) avoidance protocols will be followed as outlined in the project specific Site Safety and Health Plan and Sections 3.0 and 10.16 of the Facility-Wide Site Health and Safety Plan (FWSHP), (SAIC 2011).

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

5.1 FIELD LOGBOOK

The field logbook or field forms information will follow structures identified in Section 6.1 of the FWSAP and as shown below. Information pertinent to on-site environmental task activities, including field instrument calibration data, will be recorded in field logbooks or field forms. Field forms, which are a project-specific collection of forms, will be bound by a three-ring binder, comb-binding, or equivalent or contained in electronic format (i.e., field sheet on a tablet computer) and will capture specific field data, similarly to a field logbook. The title page of the logbook or field form three-ring binder will be labeled with the following information:

- Title;
- Project name;
- Inventory identification number;
- USACE, Louisville District/other U.S. Army contract number and project delivery order number;
- Start date for field activities; and
- End date for field activities.

Entries will be a compilation of relevant, factual events as they occur. Entries recorded in logbooks can include, but not be limited to, the following information:

- Name and title of author, date, and times of arrival at and departure from the work site;
- Purpose of the drilling, sampling and/or remedial activity;
- Name and contact information of the field manager;
- Names and responsibilities of field crew members;
- Names and titles of any AOC visitors;
- Weather and site conditions;
- Field observations;

- Sample collection or task accomplishment method;
- Amount of materials used or removed;
- Number and volume of sample(s) collected;
- Sample identification number(s);
- Date and time of sample collection, and name of collector;
- Sampling type and methodology, including a distinction between grab and composite samples;
- Sample preservation methods;
- Details of the sampling location, including a sketch map illustrating the sampling location;
- Location, description, and log of photographs;
- References for maps and photographs;
- Types of field equipment and instruments used and the purpose of use, including calibration methods and results;
- Sample documentation information, including
 - Chain of custody record numbers; and
 - Number of shipping containers packaged (including contained COC records) and the shipping method employed (noting applicable tracking numbers).
- Sample distribution and transportation (e.g., name and address of the laboratory and courier);
- Name and address of the U.S. Army QA laboratory for the project and the associated project
- Laboratory Information Management System (LIMS) number, where applicable;
- Information from containers, labels of reagents used, deionized and organic-free water used;
- Decontamination procedures;
- Type, matrix, and containerization method for IDW generated;
- Removal action/investigation-derived waste documentation information, including
 - Types of containers/drums;
 - Contents, type, and approximate volume of waste;
 - Type of contamination and predicted level of contamination based on available information (i.e., generator knowledge);
 - Weekly visual inspection information.
- Summary of daily task (including costs where appropriate) and documentation on any cost or scope or work changes required by field conditions;
- Information regarding sampling changes, scheduling modifications, and change orders;

- Signature and date of personnel responsible for recorded observations; and
- Signature and date of personnel responsible for verifying the QC review of the logbook and/or field form, including but not limited to, accuracy, completeness, legibility, consistency, and clarity.

5.2 PHOTOGRAPHS

Information regarding the documentation of photographs during soil removal action is presented in Section 5.4.2.4.2 of the FWSAP. Representative photographs will be taken during the fieldwork and of significant observations that are made during the field effort. Photographs will be suitable for presentation in a public forum, as well as for documenting the soil removal action. Attempts will be made when taking photographs to document the location to include two or more permanent reference points to facilitate relocating.

5.3 SAMPLE IDENTIFICATION SYSTEM

The sample identification system that will be used to identify samples collected during the implementation of this Sampling and Analysis Plan is outlined in Sections 6.3 and 6.4 of the FWSAP. The sample identification system will consist of the following:

Area Designator and Sample Location Type – Sequential Sample Location (Special Identifier) – Sample Depth – Sample Type

The area designator will be WBG for Winklepeck Burning Grounds

The sample location type will be xx where xx is

- BRW for the existing stockpile material or offsite borrow material,
- SS for surface soil sample in the processing area and stockpile area,
- WS for waste soil sample, or CS for confirmation sample.

The sequential sample location will identify the pad number (P38) or processing area (PA) and numbered consecutively starting with 001. The existing stockpile/offsite borrow material samples or waste soil samples will be numbered consecutively starting with 001.

The special identifier will be M for incremental sampling method.

The sample depth will be the depth in feet below ground surface for the confirmation samples (rounded to nearest whole number) or xxxx for the waste soil samples or existing stockpile/offsite borrow material samples.

The sample type will be SO for soil samples.

Example sample nomenclature for each of the sample location types are as follow:

WBGBRW-001(M)-xxxx-SO – Existing soil stockpile or offsite borrow material sample 1 sampled by ISM as a soil sample

WBGSS-PA001(M)-0001-SO – Process area surface soil sample 1 sampled by ISM from a depth of 0 to 1 foot as a soil sample

WBGWS-001(M)-xxxx-SO – Waste disposal characterization sample 1 sampled by ISM from stockpile lot 1 as a soil sample

WBGCS-P38001(M)-0203-SO – Confirmation sample from Pad 38, sample 1 sampled by ISM from a depth of 2 to 3 feet as a soil sample

Field QA/QC samples will be collected and the sample nomenclature will be as follows

WBGxx-Date-Sequence Number

Where xx is the QC type such as

- FD field duplicate
- MS/MSD matrix spike/matrix spike duplicate.

The date will consist of the two number month, two number day, and two number year (mmddyy).

The sequence number is the QA/QC sample number for the day starting from 001.

5.4 SAMPLE DOCUMENTATION

The sample label, field record, chain of custody, and logbook/field form information will follow structures identified in Section 6.4 of the FWSAP. The information to be recorded on the sample labels affixed to the sample containers/bottles will be as follows:

- Tetra Tech (Tt);
- WBG/Soil Removal;
- Sample identification number;
- Sample type (discrete or composite); and
- Analysis

Chain of custody procedures implemented for the investigations will be in three parts: documenting the handling of each sample from the time of collection, through completion of laboratory analysis, and delivery of final evidence files. The chain of custody form serves as a legal record of sample possession. A unique number printed or entered on the form will identify each chain of custody. This chain of custody will accompany the samples from the WBG to the laboratory and will be returned to the Tetra Tech with the final analytical report.

Sample shipments will be accompanied by the chain of custody record identifying the contents. The original record will accompany the shipment and copies will be retained by the sampler for return to project management and the project file. Bills of lading or airbills will be used as custody documentation during times when the samples are being shipped from the AOC to the laboratory and they will be retained as part of the permanent sample custody documentation. Whenever co-located or split samples are collected for comparison analysis by the U.S. Army QA Laboratory or a government

agency, a separate chain of custody will be prepared for those samples and marked to indicate with whom the samples are being split.

The following information will be recorded on the chain of custody forms:

- Project name;
- Tetra Tech;
- Name of Tetra Tech Project Manager and contact information;
- Sample number (for each sample in shipment);
- Sample station (for each sample in shipment);
- Collection date and time (for each sample in shipment);
- Number of containers for each sample;
- Sample description (i.e., environmental medium);
- Sample type (discrete or composite);
- Analyses required for each sample;
- Sample methods;
- Sample preservation technique(s);
- Chain of custody or shipment number;
- USACE LIMS number (only on COC records for U.S. Army QA sample shipments);
- Shipping address of the laboratory;
- Name of subcontractor laboratory QA/QC manager and contact information;
- Date, time, method of shipment, courier, and airbill number; and
- A space to be signed as custody is transferred between individuals.

Custody seals will be placed on each cooler used for sample transport. Cooler custody seals are signed and dated by the individual responsible for completing the chain of custody form contained within the cooler. The signature and date are written on both the cooler lid and cooler body portions of the seals.

5.5 DOCUMENTATION PROCEDURES

Documentation and tracking of samples and field information will follow the series of steps identified in Section 6.5 of the FWSAP. The tracking procedure is listed below.

- 1. Collect and place the samples into laboratory sample containers.
- 2. Complete the sample container label information.
- 3. Place the sample containers into an ice-filled cooler as specified by the sample method.
- 4. Complete sample documentation information in the field logbook.
- 5. Complete the project and sampling information sections of the chain of custody form(s) for the samples to be transported in a single cooler.
- 6. Complete the airbill for the cooler to be shipped (if necessary).
- 7. Perform a completeness and accuracy check of the chain of custody form(s).
- 8. Complete the sample relinquishment section of the chain of custody form(s) and place the form(s) into the cooler.
- 9. Place the chain of custody seals on the exterior of the cooler.
- 10. Pack and ship the cooler to the laboratory.
- 11. Laboratory receives the cooler, inspects the contents, and records the sample receipt information of the contained chain of custody form(s) and cooler receipt form(s). Each cooler must have a separate cooler receipt form.
- 12. Transmit the original chain of custody form(s) with the final analytical results from the laboratory.

5.6 CORRECTIONS TO DOCUMENTATION

Corrections to documentation will follow guidance established in Section 6.6 of the FWSAP. Original information and data in field logbooks, on sample labels, on chain of custody forms, and on any other project-related documentation are recorded in black waterproof ink and in a completely legible manner. Errors in documentation are corrected by crossing out the error and entering the correct information or data. An error discovered in a document is corrected in the field by the individual responsible for the entry. Erroneous information or data are corrected in a manner that will not obliterate the original entry, and the corrections are initialed and dated by the individual responsible for the entry.

5.7 SUBMITTAL OF INFORMATION

The information including, but not limited to sample numbers, collection date and time, and sample depth will be submitted in electronic format for entry into REIMS.

6.0 SAMPLE PACKAGING AND SHIPPING REQUIREMENTS

Sample packaging and shipping shall follow Chapter 7.0 of the FWSAP. Sample containers must be packaged according to requirements for preservation in transit to the laboratory. Samples requiring cooling are packaged in thermally insulated rigid-body coolers. Packaging and shipping procedures for samples collected at WBG are as follows:

- Identify sample containers with sample labels placed onto each container. Clearly label the samples with waterproof ink.
- Verify that sample containers are the appropriate type and volume and are properly preserved.
- Match sample containers with the information on the chain of custody.
- Clean the exterior of the sample containers, if necessary.
- Make sure the bottles are properly sealed with lids tightened. If unsure about lid integrity, tape bottles, except those containing samples designated for volatile organic analyses, with electrical tape.
- Place the glass sample bottles in bubble wrap sleeves or Styrofoam forms.
- Place each sample bottle into a separate plastic bag that will then be sealed. Squeeze as much air as possible from the sample container bags before sealing.
- Tape the cooler drain plug shut from both the inside and outside before placing the samples into a rigid-body cooler. Line the cooler with a large plastic bag; cushioning packing material is preferred.

- Place the sample containers upright in the shipping coolers inside a large plastic bag along with sufficient ice to maintain a temperature of 4°C ±2°C, which will be placed around, among, below, and on top of the sample containers. Include a temperature blank in each cooler.
- Make sure a trip blank is included in each cooler containing environmental samples for organic analysis, beginning when the samples are placed in the cooler for storage and/or shipment.
- Place additional inert packing material into the cooler, if required, to prevent shifting of the sample containers during transport.
- Place required laboratory paperwork, including the chain of custody form(s), inside a plastic bag and tape it to the inside of the cooler lid.
- To complete the packing process, seal the cooler liner, close the cooler lid, and place two signed/dated custody seals on the cooler one across the front and one across the side.
- Place arrows on each cooler indicating which end is up.
- Seal rigid-body coolers with strapping tape applied directly to the cooler body. Duct tape may be used around the seam of the cooler if shipping via a commercial carrier.
- Complete the airbill, if required for the shipment, and attach it to the top of the shipping box/cooler, which then will be transferred to the courier or commercial carrier for delivery to the laboratory.
- Verify the airbill contains accurate information prior to shipment.
- The coolers containing samples will be shipped overnight to the laboratory by Federal Express or a similar courier.

Container requirements are shown in Table 6-1 below.

Table 6-1 Container Requirements

Analyte Group	Container	Preservative	Holding Time
PAHs/TCL SVOCs/ TCL Pesticides/PCBs	16 oz glass jar with Teflon-lined cap or large mouth jar for full suite or other multiple analyses	Cool, 4°C	14 days (extraction) 40 days (analysis)
Explosives (TNT/RDX)	4 oz glass jar with Teflon-lined lid or large mouth jar for full suite or other multiple analyses	Cool, 4°C	14 days (extraction) 40 days (analysis)
TCL Volatile Organic Compounds/BTEX	8 oz glass jar with Teflon-lined lid	Cool, 4°C	7 days to extraction by the laboratory; 14 days to analysis
TAL Metals	4 oz glass jar with Teflon-lined lid or large mouth jar for full suite or other multiple analyses	Cool, 4°C	180 days (analysis) Hg at 28 days (analysis)
Propellants (nitroguanidine, nitrocellulose, nitroglycerin)	4 oz glass jar with Teflon- lined lid or large mouth jar for full suite or other multiple analyses	Cool, 4°C	14 days (extraction) 40 days (analysis) Nitrocellulose - 28 days
TCLP SVOC	8 oz glass jar with Teflon-lined lid or large mouth jar	Cool, 4°C	14 days to leach preparation; 7 days to analysis
TCLP Metals	8 oz glass jar with Teflon-lined lid or large mouth jar	Cool, 4°C	180 days to extraction except Hg which is 28 days to extraction; 180 days from extraction to analysis except Hg which is 28 days from extraction to analysis
ISM Samples for	One or more 16-oz glass jar with Teflon [®] -lined cap, depending on the number of increments to be	Cool 4ºC	Varies per analyses to be requested
Multiple Analyses	sampled.	C001, 4 C	

PAH - Polynuclear Aromatic Hydrocarbon TCL- Target Compound List SVOCs - Semivolatile organic compounds RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine BTEX – Benzene, Toluene, Ethylbenzene, Xylene PCBs - Polychlorinated Biphenyls TAL – Target Analyte List TCLP - Toxicity Characteristic Leaching Procedure °C - degrees Celcius

g - gram

oz – ounce

Hg - mercury

7.0 CHEMICAL QUALITY CONTROL

The chemical QC program will consist of the requirements as outlined in Section 9.0 of the FWSAP. This will consist of

- Field sampling precision and accuracy assessments will be made by collecting field duplicates and field QC samples in accordance with the procedures described in the FWSAP and at the frequency indicated in this Sampling and Analysis Plan
- Analytical QC procedures specified in the method descriptions; the DoD QSM (DoD 2009); and the USACE, Louisville District's QSM Supplement (USACE 2007). These specifications include the types of QC checks normally required: method blanks, LCSs, MS/MSD, calibration standards, internal standards, surrogate standards, calibration check standards, and laboratory duplicate analysis. Calibration compounds and concentrations to be used and the method of QC acceptance criteria for these parameters have been identified.
- The laboratory will provide analytical results and associated QA/QC information that will support an Ohio EPA Tier I data validation.

8.0 REFERENCES

Science Applications International Corporation (SAIC), 2011. Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February.

Science Applications International Corporation (SAIC), 2011. Final Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. February.

US Army Corps of Engineers (USACE), 2015. Final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds, Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbull Counties, Ohio, August.

US Army Corps of Engineers (USACE), 2015. Final Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP- 05 Winklepeck Burning Grounds Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbull Counties, Ohio, USACE, March.

APPENDIX C

SITE SAFETY AND HEALTH PLAN
FINAL

ACCIDENT PREVENTION PLAN/ SITE SAFETY AND HEALTH PLAN FOR SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS CAMP RAVENNA, OHIO

W912QR-12-D-0004 DELIVERY ORDER #0003



U.S. ARMY CORPS OF ENGINEERS LOUISVILLE DISTRICT 600 Dr. Martin Luther King, Jr. Place Room 821 Louisville, Kentucky 40202-2267

June 2016

Insert Form 298

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Tetra Tech, Inc., has completed the preparation of this <u>Remedial Design Supplement</u> as part of the <u>Soil</u> <u>Removal Action</u> for <u>RVAAP-05</u> Winklepeck Burning Grounds at the <u>former Ravenna Army Ammunition Plant</u> (<u>RVAAP</u>)/Camp Ravenna. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of data quality objectives; technical assumptions; methods, procedures, and material to be used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

Sutt A-Net

6/9/2016

Date

Scott Nesbit Project Manager

James K. Laffey, CESCO Independent Technical Review Team Leader <u>6/9/2016</u> Date

Final Document Distribution List

DOCUMENT DISTRIBUTION

FINAL ACCIDENT PREVESION PLAN/SITE SAFETY AND HEALTH PLAN

Name/Organization	Number of Printed Copies	Number of Electronic Copies
Mark Leeper, ARNG-ILE-CR	0	1
Kevin Sedlak, ARNG – Camp Ravenna	0	1
Katie Tait, OHARNG – Camp Ravenna	1	0
Nathaniel Peters II, USACE Louisville	2	1
Greg Moore, USACE Louisville	Transmittal Letter Only	
Pat Ryan, REIMS	Transmittal Letter Only	
Gail Harris, AR Manager – Camp Ravenna	2	2

AR = Administrative Record

ARNG-ILE-CR = Army National Guard – Installations Logistics Environmental – Cleanup Restoration ARNG – Camp Ravenna = Army National Guard – Camp Ravenna Joint Military Training

OHARNG - Camp Ravenna = Ohio Army National Guard - Camp Ravenna Joint Military Training Center

Final Accident Prevention Plan/Site Safety and Health Plan

For

Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds Camp Ravenna, Ohio

> Submitted to: USACE Louisville District

Submitted by: Tetra Tech, Inc. Foster Plaza 7 661 Andersen Drive Pittsburgh, Pennsylvania 15220

Environmental and Restoration Contract Contract No. W912QR-12-D-0004 Delivery Order #0003

June 2016

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ATTACHMENTS

- I Site-Specific Training Documentation Form and Employee Training/Qualifications/Medical Clearance
- II Excavation Checklists
- III Equipment Inspection
- IV First Responder Reporting Form
- V OSHA Poster

ACRONYMS

§	Section
ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automatic External Defibrillator
AHA	Activity Hazard Analysis
AOC	Area of Concern
APP	Accident Prevention Plan
ARNG	Army National Guard
ARNGD	Army National Guard Directorate
BBP	Blood-borne Pathogen
BG	Background
BLS	Bureau of Labor Statistics
С	Centigrade or Celsius
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COC	Contaminants of Concern
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
CSX	CSX Corporation
DO	Delivery Order
DART	Days Away/Restricted Duty/Transfer
dB	decibels
DEET	N,N-diethyl-meta-toluamide
DO	Delivery Order
DOD	Department of Defense
DOT	Department of Transportation
EM	Engineer Manual
F	Fahrenheit
FSP	Field Sampling Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
H & S	Health and Safety
HBV	Hepatitis B Vaccination

IDW	Investigative Derived Waste
lbs	pounds
MEC	Munitions and explosive of concern
mg/kg	milligrams per kilogram
mg/m ³	milligrams per cubic meter
mm	millimeter
MPPEH	Material Potentially Presenting an Explosive Hazard
NAICS	North American Industry Classification System
NRR	Noise Reduction Rating
OEL	Occupational Exposure Limit
OHARNG	Ohio Army National Guard
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
OPIM	Other Potentially Infectious Materials
PHSM	Project Health and Safety Manager
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
PRCS	Permit Required Confined Space
RAC	Risk Assessment Code
RVAAP	Ravenna Army Ammunition Plant
RCIR	Recordable Case Incident Rate
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TP	Technical Paper
TWA	Time-Weighted Average
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
WBG	Winklepeck Burning Grounds

(770) 365-0049

(412) 921 - 8678

Phone

Phone

1.0 SIGNATURE SHEET

	$\land \land$	
Approved by:		
Steve Ruffing, PE	ALT	(412) 921-8989
Tetra Tech	Signature	Phone
Program Manager and Operating Unit Presid	lent	

STATEMENT OF TECHNICAL REVIEW

Tetra Tech has completed this Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP) for Environmental Remediation Services for Camp Ravenna Joint Military Training Center (Camp Ravenna), the former Ravenna Army Ammunition Plant (RVAAP). Notice is hereby given that an independent technical review, that is appropriate to the level of risk and complexity inherent in the project, has been conducted as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level obtained; and reasonableness of the result, including whether the product meets the customer's needs consistent with law and existing Corps policy. The independent technical review was accomplished by Ralph Brooks former UXO Program Manager and concurred by M. Norman Piper current UXO Program Manager. All comments resulting from the independent technical review have been resolved.

Reviewed by:

M. Norman Piper _____ Tetra Tech UXO Program Manager

Prepared by:

James K. Laffey, CESCO _____ Tetra Tech Project Health and Safety Manager

CERTIFICATION OF INDEPENDENT TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:

There were no significant concerns that had to be addressed. As noted above, all concerns resulting from independent technical review of the project have been fully resolved.

Signature

Scott Nesbit, PE (412) 920-7134 Tetra Tech Phone Project Manager

2.0 BACKGROUND INFORMATION

2.1 CONTRACTOR

Tetra Tech, Inc. (Tetra Tech) and its subcontractor Timberline Environmental Services, Inc. will conduct the field activities identified in this APP/SSHP.

2.2 CONTRACT NUMBER

Tetra Tech will conduct the field activities under United States Army Corps of Engineers (USACE) Louisville District Contract No. W912QR-12-D-0004 Delivery Order #0003.

2.3 **PROJECT NAME**

Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds (WBG)

2.4 **PROJECT DESCRIPTION**

The overall objective of this project is to implement the remedial design (RD) for the WBG, including the additional soil removal and disposal required for planned future development as a Multi-Purpose Machine Gun (MPMG) Range at WBG.

2.5 LOCATION

Camp Ravenna is located in northeastern Ohio within Portage and Trumbull counties, approximately 1.6 kilometer (km) (1 mile) northwest of the City of Newton Falls and 4.8 km (3 miles) east-northeast of the City of Ravenna. The facility is a parcel of property approximately 17.7 km (11 miles) long and 5.6 km (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan 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 installation was formerly known as the RVAAP which was utilized as a load, assemble and pack facility for munitions. Administrative control of the facility (21,683 acres) has been transferred to the U.S. Property and Fiscal Officer for Ohio and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site. The RVAAP Installation Restoration Program, managed by the Army National Guard Directorate (ARNGD) and the OHARNG, encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP. See Figures 1-1 and 1-2 in Section I of the Work Plan.

WBG is a rectangular area of approximately 200 acres near the center of the former RVAAP. The topography at WBG is gently undulating with a general elevation decrease from west to east. No perennial streams exist within the Area of Concern (AOC) and surface water flow within drainage ditches occurs only during storm events. Surface water drainage during storm events generally flows from west to east to southeast across WBG. Storm water run-off ditches ultimately flow into Sand Creek.

2.6 CONTRACTOR ACCIDENT EXPERIENCE

Table 2-1 presents safety statistics for Tetra Tech for the last 3 calendar years compared to the national averages for our industry. This comparison uses data collected by the United States Department of Labor, Bureau of Labor Statistics (BLS) for different types of employers, segregated by North American Industry Classification System (NAICS) codes.

TABLE 2-1

COMPARISON OF TETRA TECH AND 2013 BLS DATA FOR NAICS CODE 541620 (TRIR AND LWDIR CASE RATES)

	NAICS 541620 Professional and Business Services 2013	Tetra Tech 2013	Tetra Tech 2014	Tetra Tech 2015
Total Recordable Incident Rate (TRIR)	1.00	0.69	0.51	0.66
Lost Workday Incident Rate (LWDIR)	0.40	0.15	0.12	0.15

The data comparison illustrates that Tetra Tech's performance compares favorably with the most-recent national averages for the environmental engineering and hazardous waste services industries. Raw data for these statistics can be found in the Occupational Safety and Health Administration (OSHA) Form 300A attached as Figure 2-1.

Tetra Tech Man Hours Worked

2013	24,812,849
2014	23,586,978
2015	22,152,993

Tetra Tech Experience Modification Rates (Policy Year October 1 - September 30):

2013 - 2014	0.80
2014 - 2015	0.83
2015 - 2016	0.77

2.7 PHASES OF WORK REQUIRING ACTIVITY HAZARD ANALYSIS (AHA)

The specific tasks anticipated to be involved with this effort are listed below:

- Site Mobilization/Demobilization
- Site Clearing and Grubbing
- Excavation and Backfilling
- Surface Soil Sampling
- · Mechanical Screening to Separate MEC/MPPEH/Metal from Soil
- MEC/MPPEH Management
- Heavy Equipment Operation
- · Transporting and Disposal of Contaminated Soil and Debris
- Decontamination
- IDW Management

3.0 STATEMENT OF SAFETY AND HEALTH POLICY

Tetra Tech, Inc. is committed to providing and maintaining a healthy and safe work environment for all associates. A strong health and safety (H&S) program protects both individuals and Tetra Tech and ensures the success of both parties. Tetra Tech's program is designed to address the hazards associated with our business and prevent injury and illness in the workplace. Tetra Tech intends to meet its responsibilities for health and safety by committing to the following:

- Complying with applicable federal and state standards, laws and regulations,
- · Designating personnel accountable for implementing H&S programs,
- · Communicating H&S programs and practices throughout the organization,
- Mitigating potential risks through hazard identification and assessment, employee training and safe work practices,
- Allocating sufficient resources to the program,
- · Implementing enforcement and accountability measures, and
- Establishing H&S performance standards that meet or exceed national performance levels.

All management are responsible for ensuring that all aspects of the workplace, including offices and project locations, are safe and that any risks, hazards and safety violations brought to their attention are investigated and corrected promptly.

All associates and subcontractors are responsible for complying with Tetra Tech's H&S policy, programs and standards, and conducting their work safely and without detriment to themselves, other employees or property.

Compliance with this policy is mandatory. Willful violation of this policy will be considered cause for disciplinary action up to and including termination.

Dan L. Batrack Director, Chief Executive Officer and Chief Operating Officer Tetra Tech, Inc.

4.0 RESPONSIBILITIES AND LINES OF AUTHORITY

Tetra Tech, as the employer for staff that will be engaged in performing the work presented in this APP/SSHP, fully recognizes and accepts ultimate responsibility for protecting the safety and health of our employees, and for the implementation of an effective Safety and Occupational Health program. No person shall be required or instructed to work in surroundings or under conditions that are unsafe or dangerous to his or her health. Each employee is responsible for complying with applicable safety and occupational health requirements, wearing prescribed safety and health equipment, reporting unsafe conditions/activities, preventing avoidable accidents, and working in a safe manner.

ALL employees are empowered, authorized, and responsible to STOP WORK at any time when an imminent and uncontrolled safety or health hazard is perceived. Work must be stopped whenever chemical and biological warfare agents, radiological materials, or munitions and explosive of concern (MEC) are discovered. In a Stop Work event (immediately after the involved task has been shut down and the work area has been secured in a safe manner) the employee shall contact the PM and the Project H&S Manager. Through observations and communication, all parties involved shall then develop, communicate, and implement corrective actions necessary and appropriate to modify the task and to resume work.

This section defines responsibility for safety and health for Tetra Tech and subcontractor employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility for onsite health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for onsite activities.

4.1 PROJECT MANAGER- SCOTT NESBIT, PE

The Tetra Tech PM is responsible for the overall direction and implementation of health and safety for this work. The PM coordinates closely with the USACE COR who is responsible to oversee the project implementation, including scoping, data review, and evaluation for the USACE. This includes the responsibility for ensuring that:

- Work is appropriately planned and executed in accordance with contractual, regulatory, and internal requirements
- Adequate resources (including personnel, equipment, and supplies) are assembled, and made available to the Field Superintendent and the Site Safety and Health Officer (SSHO) to safely and effectively accomplish the work.
- Ensure implementation of this APP/SSHP through coordination with the PHSM, as applicable.
- Conduct periodic inspections.
- Participate in the mishap investigations.

- Ensure APP/SSHP has the required approvals before any site work is conducted.
- Ensure that the PHSM is informed of project scope changes that require modifications of this APP/SSHP.
- Assume overall project responsibility for health and safety.
- Ensure that adequate resources are provided to the field staff to carry out their responsibilities as outlined below.

Mr. Nesbit has 28 years of civil and environmental engineering experience in the areas of hazardous, industrial, and solid waste management under the Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and state waste management programs. Mr. Nesbit has performed engineering investigative and design work for remedial designs and feasibility studies. He is knowledgeable of the design and closure of solid and hazardous waste management facilities and the implementation of waste treatment and recovery technologies.

Mr. Nesbit has managed both RCRA and CERCLA projects for government and industrial clients. Projects that have ranged in size to \$8,000,000 have included investigation/assessment, remedial design, and remedial action. Mr. Nesbit has also provided comprehensive oversight, coordination, and management of multi-task remedial investigations and restoration activities.

Mr. Nesbit has conducted hydrological and geotechnical investigations for site development and operation of municipal solid, industrial, and hazardous waste landfills. He also developed soil boring, soil testing, and groundwater monitoring programs in support of landfill development; conducted slope stability analysis; designed and constructed erosion and sedimentation control systems; provided geosynthetic design and construction services; developed closure plans for hazardous waste treatment, storage, and disposal facilities; developed risk assessments for closure of hazardous waste storage facilities; conducted unexploded ordnance investigations; and implemented corrective action plans at RCRA and CERCLA sites. His training experience includes:

- 40-Hour HAZWOPER Training, 29 CFR 1910.120 OSHA, 1987
- 8-Hour Refresher 29 CFR 1910.120 OSHA Refresher, annually, 2014
- 8-Hour Supervisory Training, 29 CFR 1910.120 OSHA, 1988
- 10-Hour OSHA Construction Safety Training, 2009

4.2 PROJECT UXO MANAGER – NORM PIPER

The UXO Manager will work directly with the Project Manager to make sure the munition standards and requirements are in accordance with the Department of Defense, military, and the State of Ohio.

Mr. Piper has over 7 years of Explosive Ordnance Disposal/Unexploded Ordnance (EOD/UXO) experience. His training experience includes:

- · 30-Hour Construction Safety Supervisor Training, (with 29 CFR 1926 OSHA, 2014
- 8-Hour Refresher 29 CFR 1910.120 OSHA Refresher, annually, 2016
- 8-Hour Supervisory Training, 29 CFR 1910.120 OSHA, 2012
- U.S. Army Environmental Command Military Munitions Response Program (MMRP) Training, 2012
- Shipping Hazardous Materials Training, 2015
- National Safety Council CPR; 2014
- National Safety Council First Aid; 2014
- Blood borne Pathogens; 2014
- Unexploded Ordnance Course, Texas A&M, 2009
- · Project Manager Training Level I (2011), CFR 1910.120 OSHA
- Project Manager Training Level II (2014), CFR 1910.120 OSHA

4.3 PROJECT HEALTH AND SAFETY MANAGER – JAMES K. LAFFEY, CESCO

The Project Health and Safety Manager (HSM) is responsible for developing this APP in accordance with applicable OSHA and U.S Army Corps of Engineers EM 385 1-1 regulations. Specific responsibilities include:

- Providing information regarding site contaminants and physical hazards associated with the site
- Establishing decontamination procedures
- Assigning personal protective equipment based on task and potential hazards
- · Determining emergency response procedures and emergency contacts
- · Stipulating training requirements and reviewing training and medical surveillance certificates
- Providing standard work practices to minimize potential injuries and exposures
- Modifying this APP, as necessary

Mr. Laffey has served as health and safety specialist for a wide variety of Environmental Investigation/Remediation Projects for USACE since 1993. He is a Certified Environmental and Safety Compliance Officer (CESCO) #464375803 by the National Registry of Environmental Professionals. His experience involves CERCLA investigations, remedial action projects, and baseline characterization studies (estimated at over 100 different projects). In this capacity, his is responsible for identifying site chemical and physical hazards and developing the site-specific SSHP, providing technical guidance to field personnel to control or minimize site hazards. He is a certified instructor for all the OSHA HAZWOPER training programs including the 40-hour initial training, 8-hour supervisory training, and 8-hour annual refresher training. He is certified by the Federal Emergency Management Agency (FEMA) and the United States Environmental Protection Agency (USEPA) as an Incident Command System Instructor for IS 100 through 400. He has also completed the OSHA 30-hour Construction Safety and Health Training #39-600709094. His training experience includes:

- 40-Hour HAZWOPER Training, 29 CFR 1910.120 OSHA, 1990
- 8-Hour Refresher 29 CFR 1910.120 OSHA Refresher, 1991-2015
- 8-Hour Supervisory Training, 29 CFR 1910.120 OSHA, 1991-2015
- · Shipping Hazardous Materials Training, 2015
- Safety in Excavation Training, 2002
- Blood borne Pathogens, 2015
- · 30-Hour OSHA Construction Safety Training Course, 2010

4.4 FIELD SUPERINTENDENT – TBD

The Field Superintendent is responsible for implementation of the project work plans in accordance with this APP/SSHP, with the assistance of the SSHO. The Field Superintendent manages field activities, executes the RD, and enforces safety procedures as applicable to the RD. Other duties include:

- Ensuring that the proper notifications are made prior to beginning work
- Verifying training and medical clearance of onsite personnel status in relation to site activities
- Selecting, applying, inspecting, and maintaining personal protective equipment
- Implementing Hazard Communication, Respiratory Protection Programs, and other health and safety programs as needed
- Providing site-specific training for onsite personnel
- Investigating mishaps

Insert Bio here.

4.5 UXO/MEC SITE MANAGER/SITE SAFETY AND HEALTH OFFICER (SSHO) - TBD

The UXO/MEC Site Manager will supervise UXO operations and serve as the Site Safety and Health Officer (SSHO). UXO/MEC responsibilities include geophysical evaluations, UXO detector aided surveys, and UXO/MEC-related data management. The UXO/MEC Site Manager will be thoroughly versed on the contents of the ESS. The UXO/MEC Site Manager will report to the Field Superintendent. The UXO/MEC Site Manager may be a Senior UXO Supervisor (SUXOS) or may have a SUXOS that reports to him/her. Duties include:

- Conducting UXO avoidance surveys prior to and during site activities.
- Participating in site specific training sessions.
- Maintaining familiarity with the Tetra Tech UXO SOP.
- · Conducting daily and in progress functional tests on instruments used in the survey
- Performing visual and detector aided survey of excavation area and spoils.
- · Keeping current with pertinent new information and technologies.

As the SSHO the UXO/MEC Site Manager is also responsible for ensuring that corrective measures have been implemented, appropriate internal and Camp Ravenna authorities have been notified, and follow-up reports have been completed. Individual subcontractors are required to cooperate with the SSHO within the parameters of their respective Scope of Work. These duties may include the following:

- · Select, inspect, implement, and maintain personal protective equipment
- · Establish work zones and control points
- · Implements air-monitoring program for onsite activities
- · Verify training and medical status of onsite personnel status in relation to site activities
- Coordinate emergency services
- Provide site specific training for onsite personnel
- Investigate mishaps
- Developing and maintaining current chemical inventories and Safety Data Sheets (SDS) files for hazardous chemicals that will be used/stored at that workplace
- Ensuring that onsite personnel who may use hazardous chemicals have access to and review pertinent SDSs prior to using or dispensing such chemicals
- Ensuring compliance with container labeling requirements
- Providing input to the PHSM regarding the need to modify this APP/SSHP or other health and safety documents as per site-specific requirements

Insert Bio here.

Compliance with the requirements stipulated in this APP/SSHP is monitored by the SSHO and coordinated through the PHSM. The SSHO must be notified of any on-site emergencies and is responsible for ensuring that this appropriate emergency procedures described in this section are followed. His training experience includes:

- · 40-Hour HAZWOPER Training, 29 CFR 1910.120 OSHA, insert date here
- 8-Hour Refresher 29 CFR 1910.120 OSHA Refresher, annually, *insert date here*
- 8-Hour Supervisory Training, 29 CFR 1910.120 OSHA, *insert date here*
- Shipping Hazardous Materials Training, *insert date here*
- · CPR; *insert date here*
- · First Aid; *insert date here*
- Blood borne Pathogens; *insert date here*
- Explosive Ordnance Disposal Course, Indianhead, MD; insert date here

4.6 UXO TECHNICIAN III, II, AND I

The UXO Technician III will have a minimum of 8 years of EOD/UXO experience including prior military EOD and/or commercial UXO experience in munitions response actions and/or range clearance activities. The UXO Technician III may assume the role of UXO Team Leader, may supervise up to six UXO Technicians, and conduct UXO activities as directed by the SUXOS or UXO Program Manager in his/her absence. The UXO Technician III, II, and I will meet the qualifications stated in DDESB TP 18 (DDESB, 2015) and be under the direct supervision of the SUXOS or UXO Manager in his/her absence.

4.7 SITE PERSONNEL - VARIOUS

In addition to the line and staff management functions, each individual performing work under this contract has the responsibility for their own personal health and safety, as well as assisting in assuring the health and safety of their co-workers. This element is also the first one listed in our corporate H&S Policy Statement, which requires that "each employee recognize a *personal* responsibility for their own health and safety and for actions that affect the health and safety of fellow employees." This employee responsibility includes observing specified health and safety requirements and communicating with the designated SSHO on matters such as the effectiveness of specified control measures, identification of new potential hazards, and other related issues. Site Personnel are responsible to:

- Report any unsafe or potentially hazardous conditions to the SSHO.
- · Report injuries, illnesses, spills, fires, and property damage to the SSHO.
- Maintain knowledge of the information, instructions, and emergency actions contained in this APP/SSHP.
- Comply with rules, regulations, and procedures set forth in this APP/SSHP and any revisions that are instituted.

- Initiate the Mishap Report when involved in an mishap mishap/accident if able to do so.
- Inspect the tools and equipment, including PPE, daily prior to use.
- Conduct daily operations check of electronic equipment and annotate in the team logbook.
- Assist the SSHO with implementation and compliance with this APP/SSHP

SUBCONTRACTORS AND SUPPLIERS 4.8

Tetra Tech will employ subcontractors in the performance of work covered by this APP/SSHP. Subcontractor personnel are required to read and comply with the sections of this Tetra Tech APP/SSHP. The subcontractor personnel entering the site must sign the Site-Specific Training Documentation form included in this APP/SSHP and the individual AHAs included in this APP/SSHP.

Tetra Tech directs the subcontractor's supervisor regarding the work and the manner in which tasks are to be performed. Subcontractors are responsible for assigning specific tasks to their employees; ensuring that their employees are properly trained and are in compliance with applicable regulations; and allocating sufficient time, materials, and equipment to safely complete activities in accordance with this APP/SSHP and their individual Environmental H&S plans. Subcontractors will attend the Tetra Tech daily health and safety meeting prior to starting field work.

- Individuals employed by subcontractors/vendors will receive:
 - Site-specific briefing regarding the hazards present on the work site -
 - Required safety activities -
 - Individual roles and responsibilities for safety practices
- While on site subcontractors/vendors will be under the direct supervision of the Field Superintendent.

4.8.1 Identification

The principal subcontractors for various scopes of work during projects conducted under this DO are detailed below:

Subcontractor:	l'imperime Environmental Services, Inc.	
Assignment:	Install soil and sedimentation erosion controls, perform excavation and transportation of non-	
	hazardous soil at WBG to the MEC screening process area, screen soil materials, load out soil for	
	disposal, backfill, and restore the WBG site.	
Address:	22709 Twain Harte Drive, Twain Harte, CA 95383	
Telephone:	(209) 586-1541	
Contact:	Terry Northcutt	

Subcontractor:	Test America
Assignment:	Analytical services
Address:	4101 Shuffel Street NW, North Canton, OH 44720-6900
Telephone:	(330) 497-9396
Project Contact	: TBD

4.8.2 Safety Responsibilities of Subcontractors and Suppliers

Subcontractor personnel must comply with the applicable 29 CFR §1910.120 training and medical surveillance requirements. Subcontractors are responsible for providing PPE needed to protect personnel as specified by their safety and health planning documents and by this APP/SSHP, and are directly responsible for assuring the health and safety of their employees. Subcontractors who have not met OSHA training, medical surveil-lance, and PPE requirements are not permitted to enter areas where exposure to hazardous materials is possible.

This APP/SSHP shall be rigorously enforced during this field effort. Subcontractor personnel who violate this APP/SSHP will be verbally notified upon first violation and the violation will be noted by the SSHO in a field logbook. Upon second violation, the violator will be notified in writing, and the Tetra Tech PM and the violator's supervisors will be notified. A third violation will result in a written notification and the violator's eviction from the site. The written notification will be sent to the Subcontractor, Tetra Tech Contracts Department, and the PHSM.

Enforcement of violations of this APP/SSHP and AHAs is conducted by the Field Superintendent during remedial actions. Tetra Tech will monitor the work practices of its subcontractor workers onsite, and unequivocally enforce all aspects of the AHAs. Subcontractors are responsible for enforcing all health and safety policies applicable to site activities on this project. Disciplinary action will be enforced against the subcontractor manager and personnel for noncompliance violations.

NOTE: Any violations that are deemed to be serious, intentional, or otherwise egregious will be subject to immediate corrective action, up to and including removal from the site.

4.9 CLIENT PROJECT LEVEL PERSONNEL

Personnel on the project level will exercise the primary responsibility for onsite health and safety. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for onsite activities.

4.9.1 USACE Contracting Officer's Technical Representative

The USACE Contracting Officer's Representative (COR) duties include overseeing the Contractor to ensure work is completed in accordance with the Remedial Design. The USACE COR also coordinates responses for any unexpected conditions encountered. USACE Louisville personnel involved are: COR, Nathaniel Peters II, PE, PhD, and Program Manager Gregory F. Moore.

4.9.2 ARNG Project Manager and OHARNG Personnel

The ARNG personnel involved in this task include: Kevin Sedlak, Restoration Project Manager, and Mark Leeper, PG, MBA, ANG Program Manager – RVAAP Restoration. For the OHARNG, Katie Tait is the Restoration Representative.

5.0 TRAINING

Personnel who may be exposed to hazardous conditions and who will participate in site activities are required to meet the training requirements outlined in 29 CFR §1910.120, HAZWOPER. Furthermore, site personnel must satisfy any specialized training requirements that are presented in the AHAs for tasks to be completed on this project. Health and safety-related information will be communicated to employees through meetings, postings, written communications, and reporting of hazards.

5.1 NEW HIRE HEALTH AND SAFETY ORIENTATION

Tetra Tech requires all new employees to attend orientation training which includes a review and sign off on the Employee Handbook. This employee handbook is a general guide to various personnel policies including the H&S Program and employee benefits of Tetra Tech. Each new hire is required to view a video that explains basic safety policies at Tetra Tech. Prior to working in the field on their own they are required to spend a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.

5.2 MANDATORY TRAINING AND CERTIFICATIONS

Tetra Tech personnel qualification and training certification documentation will be obtained by the PM and included in Attachment I and maintained on-site. Mandatory training and certifications applicable to this project include the following:

- 40 hours of introductory hazardous waste site training and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor prior to performing work at Camp Ravenna.
- 8 hours of refresher training within the past 12 months before being cleared for site work. (Field personnel who have had introductory training more than 12 months prior to site work must complete this training again).
- 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site personnel operating in a supervisory capacity.

Documentation of Tetra Tech introductory, supervisory, and refresher training as well as site-specific training, will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

5.2.1 UXO/MEC Site Manager/SSHO

The UXO/MEC Site Manager/SSHO is trained in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP) 18.

5.3 SITE-SPECIFIC SAFETY AND HEALTH TRAINING

The SSHO will provide site-specific training to Tetra Tech employees who will perform work on this project. In addition, a brief meeting will be held at the beginning of each day to discuss operations planned for that day and to review the appropriate AHAs with the planned task participants. Based on field activities, a short meeting may also be held at the end of the day to discuss the operations completed and any problems encountered.

Prior to accessing active work areas of the sites or participating in any intrusive activities, site personnel and visitors will first be required to undergo a site-specific safety and health training session conducted by the SSHO, which will include a review of this APP/SSHP and signing of the Site-Specific Training Documentation form.

Before site activities begin, the Tetra Tech SSHO will present a briefing for site personnel who will participate in onsite activities. The following topics will be addressed during the pre-work briefing:

- · Names of the personnel listed in the organizational chart and designated alternates
- Site history
- Work tasks
- Hazardous chemicals that may be encountered
- Physical hazards that may be encountered
- Ordnance awareness including identification of features and hazards and reporting procedures in the event ordnance is encountered.
- MEC/MPPEH that may be encountered
- · PPE, including types of respiratory and hearing protection to be used for work tasks
- Mandatory training and certification requirements (e.g., HAZWOPER, first aid, etc.)
- · Action levels and situations requiring an upgrade or downgrade of level of protection
- · Site control measures including site communications and control zones
- Decontamination procedures
- · Emergency communication signals and codes, including mishap reporting procedures
- Environmental accident/emergency procedures
- · Personnel exposure and accident emergency procedures
- · Fire and explosion emergency procedures

- Emergency telephone numbers
- · Emergency routes

Any other health and safety-related issues that may arise before site activities begin will be covered during the prework briefing.

5.4 HAZARD COMMUNICATION TRAINING

In accordance with the OSHA Hazard Communication Standard (29 CFR 1920.1200 and 29 CFR 1926.59), copies of SDSs for hazardous chemical materials that are used during site operations or that may be present on site will be available on site from the SSHO. The SSHO will conduct hazard communication (HAZCOM) training in accordance with 29 CFR 1920.1200 and 29 CFR 1926.59, Engineer Manual (EM) 385-1-1 (current version), and the HAZCOM program. Training will include, but is not be limited to, the hazards or potential hazards associated with work activities, and any hazardous chemical materials brought to on the site.

5.5 FIRST AID AND CARDIO PULMONARY RESUSCITATION TRAINING

The SSHO will identify those individuals who have current first aid and cardiopulmonary resuscitation (CPR) training. At a minimum two people including the SSHO will be current in CPR/first aid. The names of all CPR/first aidqualified workers will be posted in the site vehicle and will be reviewed at the start of each work day.

5.6 BLOOD-BORNE PATHOGENS TRAINING

Individuals on site who have first aid and CPR certification and who may provide emergency medical treatment shall have completed training in accordance with the Tetra Tech Blood-borne Pathogens Program and OSHA Blood-borne Pathogen Standard, 29 CFR 1910.1030. The Hepatitis B Vaccine Declination (mandatory) (in the event of accidental needle stick or other exposure to blood during first aid, etc.) will be one of the topics covered in the site orientation training in accordance with 29 CFR 1910.1030.

5.7 HEARING CONSERVATION TRAINING

Hearing conservation training may be conducted as a stand-alone course or may be included in other health and safety training. Hearing Conservation training will include the effects of noise on hearing; the purpose of hearing protectors; the advantages, disadvantages, and attenuation of various types of hearing protection. Instruction on the selection, fitting, use, and care of hearing protectors will also be demonstrated. The purpose of audiometric testing and an explanation of the test procedure.

5.8 TRAINING DOCUMENTATION

Attachment I (Site Specific Training Documentation) documents the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation identifies personnel who, through record review and attendance of the site-specific training, are cleared for participation in site activities. This document shall be maintained at the site to identify and maintain an active list of trained and cleared site personnel.

5.9 PERIODIC SAFETY AND HEALTH TRAINING

Tetra Tech supervisors and employees are required to maintain their training and certifications and participation in the medical surveillance program required for field work. This is accomplished throughout the year by attending classroom sessions, taking on-line instruction, participating in webinars, attending professional conferences and obtaining annual or bi-annual physical examinations. In addition to other corporate training Tetra Tech requires all employees to review and sign off on the Employee Handbook bi-annually which contains the Corporate H&S Program.

5.10 EMERGENCY RESPONSE TRAINING

Tetra Tech personnel who are involved in emergency response activities will be briefed in their roles and responsibilities as part of the initial indoctrination training. The Emergency Response plans are outlined in Section 9.2 of this APP/SSHP.

6.0 SAFETY AND HEALTH INSPECTIONS

The WBG work site will be subject to potential audits by corporate safety staff.

6.1 INDIVIDUALS RESPONSIBLE FOR CONDUCTING SAFETY INSPECTIONS

The Tetra Tech SSHO will conduct safety and health inspections during this field effort to ensure safe work areas and compliance with this APP/SSHP.

6.1.1 Proof of Inspector's Training/Qualifications

The SSHO is certified as a HAZWOPER Supervisor under 29 CFR 1910.120(e)(4).

6.1.2 Inspection Frequency

Daily site safety inspections shall be conducted by the SSHO

6.1.3 Inspection Forms

The SSHO will record any deficiencies in the Field Log Book that is maintained onsite for the site practices.

6.1.4 Deficiency Tracking System and Follow-up Procedures

The items noted during field audits will be communicated to the PHSM who maintains a corrective/preventive action database. Responsibility for resolving each item noted during these audits is assigned and tracked through resolution.

Results from field audits are also regularly communicated throughout Tetra Tech through training and electronic means as a method of continuous program improvement. The Field Superintendent will follow up on deficiencies to ensure that they are resolved.

6.1.5 Competent and Qualified Persons

The competent and qualified persons for this project are documented in the Activity Hazard Analysis in Section 10 of this APP/SSHP. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate or control these hazards and conditions.

The Field Superintendent and the SSHO have many years of field supervision in environmental sampling, and safety and meet the requirements as defined in the definitions of EM 385-1-1 and 29 CFR 1910.120 for knowledge of and experience in environmental sampling, 29 CFR 1926 for excavation, heavy equipment supervision, and OSHA construction safety.

6.1.6 External Inspections/Certifications

The PHSM or a designated representative may conduct an unannounced inspection during this project.

7.0 SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS AND COMPLIANCE

Protection of employee health and safety is a vital and integral part of company operations. Tetra Tech, Inc. (Tetra Tech) has developed this comprehensive corporate H&S Program to provide for the health and safety of its employees and will be implemented by all offices within all Tetra Tech operating units. Tetra Tech's corporate H&S Program and associated procedures apply to all Tetra Tech employees and set forth minimum health and safety requirements for subcontractors.

This corporate H&S Program is made available to all Tetra Tech employees, employee-designated representatives, Occupational Safety and Health Administration (OSHA) personnel, and personnel of other federal, state, or local agencies with appropriate regulatory authority.

7.1 WRITTEN SAFETY GOALS, OBJECTIVES, AND ACCIDENT EXPERIENCE GOALS

The goals of the Tetra Tech corporate H&S Program are as follows:

- To ensure the health and safety of all personnel involved in field, office, and other activities
- · To define the minimum companywide requirements for health and safety
- To support each Tetra Tech operating unit in implementing health and safety programs
- To ensure compliance with all applicable federal, state, and local regulations regarding occupational health and safety

A key component of the health and safety program is the corporate H&S Manual. The manual has been developed in order to:

- Detail Tetra Tech's commitment to health and safety;
- Detail the minimum requirements for corporate and operating unit health and safety programs;
- Serve as an operating manual for Tetra Tech operating units that do not currently have a health and safety program;
- Set forth the minimum health, safety, and emergency response requirements for activities that involve employee exposures or the reasonable possibility for employee exposure to safety or health hazards associated with hazardous waste site operations and any other field projects; and
- Meet the requirements for a written health and safety program of specific federal and state health and safety regulations.

7.2 SAFETY INCENTIVE PROGRAM

Tetra Tech recognizes that the best way to promote safety culture is through each employee – employees who are committed to mishap prevention and willing to share your commitment and knowledge. Tetra Tech's MISSION: SAFETY program recognizes exemplary safety behavior – from small daily acts of safety to unit-wide efforts. Employees can nominate a co-worker or themselves by telling how the nominee has taken positive action in one of these areas:

- · Hazard analysis reducing hazards associated with a task
- · Hazard controls ensuring proper controls were in place and being used, such as personal protective equipment
- Equipment and tools proper tools available and used correctly
- Work environment addressing the work site to improve safety
- Work practices finding better and safer ways to approach our work
- Employee feedback encouraging positive safety behavior

7.3 NONCOMPLIANCE POLICY

All Tetra Tech employees must comply with H&S standards and policies applicable to their job function. Clear and willful violations and disregard, including negligent disregard, of established H&S policies are grounds for disciplinary action up to and including termination. The following roles and responsibilities will be applied in cases where disciplinary action is deemed warranted:

- The project manager, project superintendent, and/or foreman will be responsible to counsel employees under their direct authority and ensure compliance with H&S standards and policies;
- The H&S Representative will provide input to supervisory personnel on the severity of the infraction, taking into account the hazard presented by the infraction, the type and likelihood for serious harm, and the individual's knowledge of the hazardous condition resulting from the infraction;
- The project manager, project superintendent, and/or foreman and Human Resource staff will apply disciplinary action based on the seriousness of the offense.

Generally, the application of the disciplinary program will be specific to the operating unit and is not described in the H&S Program.

7.4 MANAGERIAL/SUPERVISORY ACCOUNTABILITY

In keeping with Tetra Tech's commitment to a goal of zero incidents, management's primary responsibility is to prevent injuries, illnesses, and other undesired events that result or could result in harm to people, or loss/damage to property, production, or the environment. Supervisors and managers will be held accountable for all health and safety issues under their control. A lack of commitment to the company's safety goals, which may be evident by noncompliance with any of the following management responsibilities listed below, will be grounds for disciplinary action. All managers and supervisors shall be responsible for the following:

- Support and participate in H&S goal setting processes;
- Ensure that the Tetra Tech H&S program has been implemented within their area of authority;
- Enforce compliance with the H&S program;
- Inform employees of their health and safety responsibilities and rights;
- · Conduct physical examinations of their work areas to ensure they are free from recognized hazards;
- Provide for H&S training and education of their employees;
- Take prompt action when unsafe acts or conditions are reported or noted;
- · Investigate and report all on-the-job mishaps and request medical treatment if necessary; and
- Assist with action items defined during mishap investigations and hazard assessment activities such as job hazard analysis.

8.0 MISHAP REPORTING AND INVESTIGATION

A mishap is any unplanned, undesired event that occurs during the course of work being performed. The term mishap includes accidents, incidents and near-misses. Mishaps occurring incidentally shall be reported, investigated and analyzed as prescribed below. Tetra Tech and subcontractors are responsible for reporting all recordable mishaps to the USACE PM within 24-hours after notification from the affected employee. No supervisor may decline to accept a report of a mishap from a subordinate. Tetra Tech and subcontractor personnel are required to report:

- Property damage (exceeding \$5,000 is recordable);
- Days Away Injuries;
- Days Away Illnesses;
- Restricted/Transfer Injuries

8.1 IMMEDIATE NOTIFICATION OF MISHAP

Any accident that has, or appears to have, any of the consequences listed below shall be immediately reported to the USACE PM. These accidents shall be investigated in depth in accordance with the EM 385-1-1, Section 01.D, Accident Mishap Reporting and Investigation to identify all causes and to recommend hazard control measures.

- Fatal injury/illness;
- Permanent totally disabling injury/illness;
- Permanent partial disabling injury/illness;
- One (1) or more persons hospitalized as inpatients as a result of a single occurrence;
- \$500,000 or greater accidental property damage;
- Three (3) or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site;
- USACE aircraft destroyed or missing;
- Tetra Tech is responsible for notifying OSHA in accordance with 29 CFR 1904.39 within 8-hours when an employee(s) is fatally injured or 1 or more persons are hospitalized as inpatients as a result of a single occurrence.

In addition to the above, any mishap occurring in any of the following high hazard areas shall be immediately reported to the USACE PM. These mishaps shall be investigated in depth to identify all causes and to recommend hazard control measures.

• Electrical – to include Arc Flash, electrical shock, etc.;
- Uncontrolled Release of Hazardous Energy (includes electrical and non-electrical);
- Load Handling Equipment (LHE) or Rigging;
- · Fall-from-Height (any level other than same surface), and
- Underwater Diving.

Except for rescue and emergency measures, the mishap scene shall not be disturbed until it has been released by the investigating official.

Tetra Tech is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. The Field Supervisor shall assist and cooperate fully with the USACE PM conducting the Government investigation(s) of any mishap. Records of all first aid treatments shall be maintained and submitted to the USACE PM upon request.

- Records shall include, at a minimum, employee's name, job title, date and type of mishap, causes and corrective actions taken (i.e., AHA review, process changes, establishment of controls, personnel qualifications and training, etc.).
- This data shall be reviewed and analyzed for corrective action as appropriate.

8.2 TETRA TECH MISHAP REPORTING PROCEDURES

Following the prescribed mishap reporting procedure is necessary for documenting the information obtained at the time of the mishap.

8.2.1 TOTAL Reporting System

TOTAL is Tetra Tech's online reporting system. Site employees can use TOTAL to directly report health and safety mishaps, notify key personnel, and initiate the process for properly investigating and addressing the causes of mishaps, including near-miss events.

A mishap is considered any unplanned event. It may include several types of near misses, events where no loss was incurred, or that resulted in injuries or illness, property or equipment damage, chemical spills, fires, or damage to motor vehicles. Some examples of mishaps are as follows:

- Work-related injury or illness
- · Suspected hazardous substance exposure over the allowable exposure limit
- Automobile or vehicle-related mishaps

- Significant property or equipment damage
- An unplanned fire or explosion
- An unplanned spill or release (including air releases) to the environment
- · A permit or permit equivalent exceedance
- · Unexpected contact with damage to aboveground or below ground utilities

A near miss is described as an undesired event or workplace condition, which under slightly different circumstances had a reasonable probability of resulting in one of the outcomes described above. Some examples of a near miss are as follows:

- Tools falling from overhead work near workers below
- · Unexpected contact without damage to aboveground or below ground utilities
- · Discovery of an unknown and potentially hazardous material or anomaly

Mishaps involving Tetra Tech personnel or Tetra Tech subcontractors under Tetra Tech's immediate direction shall be reported and investigated.

TOTAL is an intuitive system that guides users through the necessary steps to report a mishap within 24 hours of its occurrence. TOTAL is a tool to better track mishaps, analyze root causes, implement corrective action plans, and share lessons learned. TOTAL is maintained on the secure Tetra Tech Intranet site at https://my.tetratech.com/.

8.2.2 How to Access TOTAL

TOTAL can be accessed through live links posted on the main landing page of My.TetraTech, Toolbox – Report an Event (TOTAL), on the Main Safety Landing Page – Report an Event (TOTAL) and the Mishap Reporting Page – Launch the TOTAL Application.

Note: When accessing the system from outside the Tetra Tech intranet system or when operating in a wireless mode, a VPN connection will be required. The speed of the application may be dependent upon outside factors such as connection speed, signal strength, etc. Enter the system using your network user name and password. The user name should be in the following format - TT\firstname.lastname.

If any Tetra Tech personnel are injured or develop an illness as a result of working onsite, and they are at a remote location where they cannot establish reliable internet connection with TOTAL to report a mishap, then the employee will complete a hard-copy Tetra Tech "Incident Report Form."

Tetra Tech's reporting and investigation program requires that employees report all mishaps as soon as possible, but within 24 hours. An initial report must be completed on TOTAL within that time frame.

The TOTAL reporting forms are included as Figure 8-1. These forms can be used as a reference during the mishap information gathering phase and prior to completing the form on line.

8.3 FIRST AID TREATMENT

Records of all first aid treatments shall be maintained. Records shall include, at a minimum, employee's name job title, date and type of mishap, causes and corrective actions taken. This data shall be reviewed and analyzed by the SSHO for corrective action as appropriate.

9.0 REQUIRED PLANS (PROGRAMS, PROCEDURES)

The follow sections further describe the plans and/or identify the location of the information.

9.1 FATIGUE MANAGEMENT PLAN

Tetra Tech employees frequently perform project services during which mental and physical fatigue may contribute to potential hazards which should be managed in a manner similar to other physical, chemical or biological hazards in accordance with local, state, and federal guidelines. This plan describes the hazards associated with various types of fatigue, and presents guidance for preventing or minimizing the risk of adverse health effects.

The main responsibilities for identifying and managing worker fatigue rests with the Project Manager, Site Safety Coordinator, and individual employees. The PM is responsible to ensure that project work is scheduled in a way that controls worker fatigue, that workers utilize ergonomically-friendly equipment on projects when applicable and feasible and that the PM takes appropriate actions when workers on their project report concerns with tiredness/fatigue. The SSHO is responsible to enforce work/rest schedules set by PM and ensure that the work/rest cycle minimizes the risk of fatigue throughout the project by performing periodic hazard assessments. The SSHO will also monitor workloads, work patterns and shift arrangements to ensure employees are not placed at risk from fatigue. Instruction will also be provided about the risks of fatigue to employees through documented safety tailgate meetings.

Each individual worker is responsible for participating in fatigue management awareness training and using the techniques to manage individual fatigue. Report issues of tiredness or fatigue to the SSHO. Work together to find the appropriate means to address the situation. Ensure that personal use of over-the-counter, prescription drugs and any other products does not affect their ability to safely perform the assigned work.

9.1.1 Causes of Fatigue

There are many contributing factors to tiredness and fatigue and in many cases it is a combination of factors that result in an individual being negatively impacted. Some of the primary causes of fatigue are:

- Lack of or inadequate sleep
- Physical overexertion
- Repetitive motion causing fatigue in a specific muscle group or body part
- Monotonous tasks, including driving, that require sitting or standing in the same position for extended periods of time
- Environmental factors such as heat, cold, excessive noise

- Personal medical conditions
- · Use of over-counter, prescription drugs or other products that can cause drowsiness

9.1.2 Symptoms of Fatigue

Sleep loss of even 1 or 2 hours can significantly degrade alertness and performance, with greater effects for increasing amounts of sleep loss. If a person loses sleep over successive days, this can lead to an accumulated sleep debt. Chronic sleep loss can contribute to health consequences, including obesity, diabetes and high blood pressure. In addition to sleep loss, the other causes for fatigue listed in section 3.1 can result in the following signs and symptoms of fatigue:

- Poor-decision making
- Slowed reaction times
- Reduced attention
- Forgetfulness
- Poor communication
- Fixed gaze
- Apathy
- Lethargy
- Negative mood/irritability
- Nodding off
- Itchy watery eyes
- Need to sit

These symptoms of fatigue may have negative impacts on an individual's productivity, attention to detail, and ability to work safely. Since the majority of mishaps and injuries are the direct result of unsafe or at-risk behaviors as opposed to conditions, and since fatigue is a common human condition, it may have a direct impact on the potential for injury.

9.1.3 Daily Work-Rest Schedules

The Field Supervisor will establish as needed a work-rest schedule based on the level of exertion of the tasks, the PPE utilized, the environmental conditions and other contributing factors. The work-rest schedule will be established on a daily basis by the SSHO during the daily tailgate meeting. Work-rest schedules established will be site-specific and based on all factors contributing to potential fatigue of the workers. In general, the more contributing factors, the longer and more frequent the rest periods should be. Rest areas should be designated to allow the worker to adequately recover both physically and mentally from the work task. If required, staff rotation methods will be established.

9.2 EMERGENCY PLANS

The local emergency response agencies listed in this APP/SSHP are capable of providing the most effective response, and as such, are designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. Tetra Tech and subcontractor personnel will contact Range Control for any emergencies, spills, injuries requiring hospitalization, or accidents. Range Control will dispatch the proper emergency personnel from surrounding communities if needed. The USACE PM/Camp Ravenna POC will be notified if these response agencies are contacted.

9.2.1 Procedures and Tests

In the event of an emergency situation such as fire or explosion, the SSHO will activate an air or vehicle horn for approximately 15 seconds, indicating the initiation of evacuation procedures. The personnel in both restricted and non-restricted areas will evacuate and assemble near the support zone, or other safe area, as identified by the SSHO. Prior to start of work at any project site, the SSHO will identify and mark the location of an evacuation assembly area for that project site. The location should be upwind of the site as determined by the wind direction. For efficient and safe site evacuation and assessment of the emergency situation, the SSHO will have the authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SSHO must establish that access for emergency equipment is provided and that the equipment that may cause combustion has been shut down once the alarm has been sounded. As soon as possible, and while the safety of the personnel is being confirmed, emergency agency notification through Camp Ravenna Range Control will commence. The SSHO will brief site personnel each day as to the location of the evacuation assembly area. The SSHO will prepare a drawing, or map, that diagrams these safe egress routes. The SSHO will use this same map to diagram egress from the evacuation assembly area to the facility gate which is to be used as an exit.

9.2.2 Spill Plans

A spill response kit containing oil/solvent absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies will be maintained in a readily accessible location where fuels, oils, solvents and other environmentally harmful materials are stored on site. Upon notification of a spill, the SSHO, or other designated person, will transport this kit to the spill site for use in the cleanup of the spilled materials.

9.2.2.1 Spill Emergency

For any spill emergency, implement the Camp Ravenna Emergency Spill Notification in accordance with the Camp Ravenna First Responder Form See Attachment IV. Notify Range Control immediately.

9.2.2.2 Personnel Training and Spill Prevention

Personnel will be instructed on the procedures for spill prevention, containment, and collection of hazardous materials in the site-specific training. The SSHO will serve as the Spill Response Coordinator for this operation should the need arise.

9.2.2.3 Spill Control Plan

This section describes the procedures Tetra Tech field crewmembers will employ upon the detection of any spill or leak of potentially contaminated material.

- Take immediate actions to stop the leak or to control the spill.
- Notify the SSHO, Camp Ravenna Range Control and the Camp Ravenna POC immediately.
- Avoid contacting container contents.
- The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for the cleanup.
- Spread the absorbent material in the area of the spill covering completely.
- If necessary, the spill area will be evacuated, isolated, and secured.
- Range Control will be contacted to dispatch the applicable emergency services from Trumbull or Portage County depending on the location of the emergency.
- Follow the procedure and telephone notification on the Camp Ravenna Emergency Contacts provided in Figure 9-1.

The following equipment will be maintained at the staging area for the purpose of supporting this Spill Containment Program.

- · Sand, clean fill, vermiculite, or other noncombustible absorbent (oil-dry)
- Absorbent pads,
- 5-gallon buckets.
- Drums. 55-gallon U.S. Department of Transportation (DOT) 1A1 and/or 1A2

- Shovels, rakes, and brooms
- Polyethylene sheeting

9.2.3 Firefighting Plan

Workers will only fight incipient stage fires. There will be at least one 5- pound ABC fire extinguisher at the work site. Fire extinguishers will also be located in each piece of mobile construction equipment and in the crew pickup trucks. The fire extinguishers are intended to fight only fires that have recently occurred and can be reasonably extinguished immediately. Workers will only attempt to fight a fire that can be reasonably extinguished within 30 seconds to 1 minute. The fire extinguishers are only sufficient to fight small fires. Fire extinguishers will be inspected by the SSHO on a monthly basis (at a minimum). Additionally, fire extinguisher will be red-tagged and taken out of service until such time that it can be serviced. Fire extinguishers will be secured or supported when transported and in storage. At the conclusion of field activities, extinguishers will be handled/shipped/disposed safely in accordance with DOT regulations (that preclude shipping via air carrier). Smoking is allowed only in areas designated by the SSHO.

9.2.4 Posting of Emergency Telephone Numbers

The list of emergency telephone numbers will be maintained at the telephone communications points in the site vehicle. See Figure 9-1.

9.2.5 Man Overboard/Abandon Ship

Not applicable.

9.2.6 Medical Support (Onsite/Offsite)

Tetra Tech will ensure that a minimum of two people have current certifications in CPR/AED, first aid, and bloodborne pathogens. Other than rendering basic CPR and first aid, these employees are not expected to perform emergency medical duties. However, they are authorized to perform emergency rescue or other duties up to the level of their training. Emergency medical assistance will be acquired.

Life-threatening medical emergencies will be handled by the calling (614) 336-6041 or after hours calling 9-1-1. Others will be referred to the UH Portage Medical Center. A map to this facility is provided in Figure 9-2. Tetra Tech personnel are instructed to perform a drive-by of the nearest hospital prior to commencing site activities to ensure that it is accessible and available and that the most efficient routes (primary and alternate) are well mapped. If emergency medical assistance is not required, Tetra Tech personnel may contact WorkCare (occupational medicine provider) as detailed in this APP/SSHP.

9.2.6.1 Medical Data Sheet

Each field team member, including visitors and subcontractors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet (see Figure 9-3). This shall be provided to the SSHO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention. Any pertinent information regarding allergies to medications or other special conditions should be documented. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

9.2.6.2 Substance Abuse Policy

The Tetra Tech Substance Abuse policy prohibits the unlawful manufacture, distribution, dispensation, possession, or use of alcohol, illegal drugs or intoxicants on any Company-owned or leased space, client facility, or work site. Use of these substances, regardless of whether it is determined that such use occurred during the work hours or at a company work location, or whether such use actually affected an employee's ability to perform his or her job, is a violation of this policy.

In order to enforce this policy, the Company may investigate potential violations and require personnel to undergo drug/alcohol screening, including urinalysis, blood tests or other appropriate tests. The Company may also conduct searches of all areas of the Company premises, including, but not limited to work areas, rest rooms, break areas, personal articles, employee's clothes, desks, work stations, lockers, and personal and Company-owned vehicles.

Violation of this policy or any of its provisions may result in disciplinary action up to and including termination of employment. Employees may be subject to discipline up to and including termination for refusing to cooperate with searches or investigations, refusing to submit to screening, or failing to execute consent forms when required by supervisors.

Employees who are convicted of any criminal drug statute for a violation occurring in the workplace are required to notify their Human Resources Representative no later than five days after the conviction. It shall also be the responsibility of each employee who observes or has knowledge of another employee in a condition which impairs the employee to perform his or her job duties or who presents a hazard to the safety and welfare of others to promptly report that fact to his or her immediate supervisor.

9.3 SITE SANITATION/HOUSEKEEPING PLAN

Housekeeping is an important issue at each work site. The work sites shall be kept as clean as possible during task operation, taking into consideration the nature of the work. The SSHO is responsible to ensure that housekeeping occurs on a continuous basis.

Drinking water is provided for each site worker. An adequate supply of cool potable water is provided at the sites for both drinking and personal cleansing.

Portable toilets and washing facilities will be utilized while on site. They will be located near the field trailer.

Heavy duty plastic trash bags will be used to collect waste. Waste receptacles will be provided on site as needed.

9.4 MEDICAL SUPPORT PLAN

Prior to the start of work the communication systems will be tested to ensure proper coverage. Telephone numbers and maps to hospitals, or ambulance pickup sites shall be conspicuously posted, at a minimum, on the safety bulletin board and near the on-site project office telephones and available in site vehicles.

9.4.1 Vector Transmitted Illnesses and Diseases

Ticks and mosquitoes, in this case, are the primary vectors of concern. This insects have been identified in the transmission of diseases including Lyme disease, and West Nile virus (WNV). See Section 9.12 Health Hazard Control.

9.4.1.1 Lyme Disease

Lyme disease is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans through the bite of infected blacklegged ticks. Typical symptoms include fever, headache, fatigue, and a characteristic skin rash called erythema migrans. If left untreated, infection can spread to joints, the heart, and the nervous system. Lyme disease is diagnosed based on symptoms, physical findings (e.g., rash), and the possibility of exposure to infected ticks. Laboratory testing is helpful if used correctly and performed with validated methods. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics. Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat. The ticks that transmit Lyme disease can occasionally transmit other tickborne diseases as well.

Blacklegged ticks are active throughout the year in Ohio. The adults are active in the spring, fall and winter. The nymphs are active in the spring and summer and the larvae are active late summer. The onset of human Lyme disease cases occurs year round in Ohio but peaks in summer following the emergence of nymphs.



9.4.1.2 West Nile Virus

WNV is most commonly transmitted to humans by mosquitoes. You can reduce your risk of being infected with WNV by using insect repellent and wearing protective clothing to prevent mosquito bites. There are no medications to treat or vaccines to prevent WNV infection. Fortunately, most people infected with WNV will have no symptoms. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1% of infected people develop a serious, sometimes fatal, neurologic illness.

9.4.2 WorkCareTM Incident Intervention Program

The WorkCareTM Incident Intervention program is an injury and illness management tool that provides 24/7 immediate telephone access for Tetra Tech employees to access a WorkCareTM occupational medical provider. Their clinical staff of nurses and doctors will intervene on behalf of the Tetra Tech employee after a workplace injury and illness. The goal of the program is to help make sure the employee receives proper care with effective outcomes.

When this service is used within the first hour of a mishap, known as the "golden hour," the clinical team has the ability to guide the proper course of action so that medical evaluation and treatment are rendered appropriately. This early intervention service provides the right care, at the right time, in the proper setting.

At the time of a workplace injury or illness, the Field Supervisor/SSHO calls the WorkCareTM toll free telephone number – (888) 449-7787. The Field Supervisor/SSO then provides information on the type of mishap, possible cause, and the scope of the situation.

The WorkCare[™] clinician will provide:

- An evaluation of the mishap
- Direction on the appropriate course of action
- Consults with the employees treating physician to design a quality care treatment plan

9.4.3 First Aid and Cardiopulmonary Resuscitation (CPR) Availability.

When emergency medical services are not accessible within 5 minutes of a work location, where there are two or more workers, at least two site workers shall be qualified to administer first aid and CPR.

9.5 BLOODBORNE PATHOGEN PLAN

This plan has been developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.1030: the bloodborne pathogens standard.

The OSHA bloodborne pathogens standard requires that the bloodborne pathogens exposure control plan detail the methods of implementation for the various requirements of the standard. The following program elements comply with this requirement. It is currently anticipated that exposure to potentially infectious material will be limited to the site staff who may provide first aid and cardiopulmonary resuscitation (CPR). The identified tasks and controls are documented within the AHAs for each task.

"Universal precautions," as defined by Centers for Disease Control (CDC), are a set of precautions designed to prevent transmission of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other bloodborne pathogens to personnel providing first aid or health care. Under universal precautions, blood and certain body fluids are considered potentially infectious for HIV, HBV and other bloodborne pathogens. Universal precautions must be consistently used whenever contact with blood and body fluid is possible, regardless of their bloodborne infection status. The proactive use of universal precautions shall be implemented during all first aid activities whenever contact with blood or other potentially infectious materials (OPIM) may be reasonably anticipated. Universal precautions should be attained by using engineering controls, work practice controls, and PPE.

9.5.1 Hepatitis B Vaccination

A pre-exposure HBV vaccination is not required for employees who are designated only as first aid providers and those whose primary job assignment is not rendering first aid but administering first aid only as a collateral duty to their routine work assignments; however, the HBV series will be made available to any unvaccinated first aid provider

who has rendered assistance in any situation involving the presence of blood or other potentially infectious materials (OPIM), regardless of whether an actual exposure mishap occurred.

If the employee initially declines the vaccination but decides later to accept, Tetra Tech will provide the vaccination series at that time. If an employee eligible for the vaccination series declines to participate, he or she must sign the "Hepatitis B Vaccine Declination" (Form BBP-1; see Volume III, "Forms").

9.5.2 Post-Exposure Evaluation and Follow-up

A confidential medical evaluation and follow-up, conducted through Tetra Tech's Medical Surveillance Program (DCN 3-2), shall be immediately provided to exposed employees following the report of an exposure mishap. The post-exposure evaluation and follow-up shall include the following:

- Documentation of the exposure route and exposure mishap circumstances;
- Identification and documentation of the source individual (unless identification is not feasible or prohibited by law);
- Collection and testing of blood for HBV and HIV serological status;
- · Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service;
- · Counseling; and
- Evaluation of reported illness.

The source individual's blood shall be tested as soon as feasible after consent is obtained to determine and document HBV and HIV infection status. If the source individual is already known to be infected with HBV or HIV, the blood testing need not take place. The test results shall be made available to the exposed employee, and any applicable laws and regulations regarding disclosure of identity and infection status of the source individual will be complied with. Details of the exposure mishap investigation shall be documented on the Tetra Tech "Post-Exposure Evaluation" (Tetra Tech Form BBP-2 in the Health and Safety Manual). Copies of the completed form shall be forwarded to the PHSM and designated healthcare professional.

9.5.3 Information Provided to the Healthcare Professional

In the event of an exposure mishap, Tetra Tech shall provide the following information to the Tetra Tech corporate medical advisor and the healthcare professional responsible for the employee's HBV vaccination:

- A copy of 29 CFR 1910.1030;
- A description of the exposed employee's duties as they relate to the exposure mishap;

- Documentation of the routes of exposure and exposure mishap circumstances;
- Results of source individual's blood testing, if available;
- · All medical records relevant to the appropriate medical treatment, including vaccination status; and
- A copy of Form BBP-2, "Post-Exposure Evaluation"

9.5.4 Healthcare Professional's Written Opinion

Tetra Tech employees shall receive a copy of the Tetra Tech corporate medical advisor's professional's written opinion within 15 days of the completion of the evaluation. The opinion for HBV shall be limited to whether the vaccination is indicated and if the employee has received such vaccination. The employee will be informed of the results of the examination. During the evaluation, the employee will also be told about any medical conditions that may result from exposure to blood or OPIM and that may require further evaluation or treatment. All other findings or diagnoses shall remain confidential and shall not be included in the corporate medical advisor's written opinion.

9.6 EXPOSURE CONTROL PLAN

The purpose of this exposure control plan is to minimize employee occupational exposure to blood, body fluids, and OPIM..

9.6.1 Engineering and Work Practice Controls

Whenever possible, engineering and work practice controls shall be implemented to eliminate or minimize employee exposures. Such controls may include, but are not limited to, the following:

- Hand-washing supplies should be available at all field project sites. At a minimum, antiseptic hand cleaner with clean paper towels or antiseptic towellettes will be provided.
- Employees shall be instructed to wash hands and skin with soap and water or flush mucous membranes immediately or as soon as feasible after contact with blood or OPIM, and after removal of PPE.
- No eating, drinking, smoking, cosmetics or lip balm application, or handling of contact lenses is allowed in areas with reasonable likelihood of occupational exposure to blood or OPIM.
- In rare cases where employees may come across waste items contaminated with blood or OPIM, care shall be taken to avoid potential contact.
- Any needles or sharp objects shall be placed in a puncture-resistant, labeled, leak proof container. Under no conditions shall needles or contaminated sharp objects be bent, sheared, broken, or recapped.
- All waste created during first aid administration, including PPE, shall be disposed of in a sealable waste bag for disposal. All sanitary napkin and tampon disposal receptacles in restroom facilities shall be lined with plastic bags

that are removed and replaced daily. Because these items do not meet the definition of regulated waste under the bloodborne pathogens standard and pose minimal risk of exposure, they can be disposed of in the sealed plastic bags in regular waste containers.

9.6.2 Personal Protective Equipment

Tetra Tech shall provide occupationally exposed employees with appropriate PPE at no cost. PPE may include the following items:

- Gloves;
- Protective clothing;
- Eye protection such as face shields or masks; and
- Ventilation devices such as mouthpieces, resuscitation bags, or pocket masks.

PPE shall be selected based on the potential exposure to blood or OPIM. PPE is considered appropriate only if it does not permit blood or OPIM to pass through to or reach the employee's work clothes, street clothes, skin, eyes, mouth, or mucous membranes under normal conditions and for the duration of time it will be used. PPE shall be worn during any first aid response involving blood or OPIM.

Disposable gloves and pocket masks will be included in the standard first aid kit required at all field sites and offices. Gloves shall be worn whenever it is reasonably anticipated that employees will have hand contact with blood, nonintact skin, mucous membranes, or OPIM, and when handling or touching contaminated items or surfaces.

Disposable gloves and mouthpieces will not be washed or decontaminated for reuse and must be replaced when they become contaminated, torn, or punctured, or when their ability to function as a barrier is compromised.

9.6.3 Housekeeping

In general, work areas are not expected to be contaminated with blood or OPIM unless in the event of a severe injury. In that case, all surfaces and equipment shall be cleaned and disinfected after contact with blood or OPIM as soon as possible with a diluted bleach solution (concentration ratio 1:10) or other appropriate disinfectant.

If contaminated sharp objects or broken glassware are encountered, these items shall not be picked up by hand. Mechanical means of retrieval (such as use of a broom and dust pan, tongs, or forceps) shall be used. Any reusable bin, pail, can, and similar receptacles that could become contaminated must be inspected and decontaminated with a bleach solution as soon as possible when contamination is visible. Clothing contaminated with blood or OPIM shall be bagged, labeled, and discarded as regulated waste.

9.6.4 Regulated Waste Disposal

The handling, storage, treatment, and disposal of all regulated waste shall be conducted in accordance with all applicable federal, state, and local regulations. Proper handling of regulated waste is essential to prevent unnecessary exposure to blood and OPIM. Regulated waste includes wastes in which blood or OPIM could be released from pouring, dripping, squeezing, or flaking. Regulated waste must be placed in a red biohazard bag labeled "Biohazardous Waste" or with the international symbol and the word "Biohazard." Bags must be tied shut and placed in closable, leak-resistant and labeled containers that can prevent leakage during all handling, storage, transport, shipping, and other activities. If the outside of the container becomes contaminated, it must be placed in a secondary container meeting the same specifications.

Nonregulated waste can be disposed of along with regular waste. This waste must be placed in a leak-proof container, closed tightly, and promptly placed into a garbage receptacle.

9.7 AUTOMATIC EXTERNAL DEFIBRILLATOR (AED) PROGRAM

Not applicable.

9.8 SITE LAYOUT PLAN

Trailers and other temporary structures will be used as a field office or storage, they will be anchored with rods and cables or steel straps with ground anchors such that the system will withstand expected wind conditions. The anchoring system will meet state and local standards for anchoring mobile trailer homes. If a trailer or temporary structure is mobilized it tentatively will be located in the staging area (upon approval of Camp Ravenna). Portable toilet rentals will also be installed in this area in accordance with state and local standards.

9.9 ACCESS/HAUL ROAD PLAN

Not applicable.

9.10 HEARING CONSERVATION PROGRAM

This hearing conservation program has been established by Tetra Tech to protect employees from the harmful effects of noise exposure. This program is designed to comply with the Occupational Safety and Health Administration (OSHA) occupational noise exposure standard in Title 29 of the Code of Federal Regulations (CFR), Part 1910.95, as well as federal, state, and local requirements.

The hearing conservation program elements describe how the criteria specified by the OSHA standard shall be implemented, reviewed and maintained. Program elements include responsibilities, action levels, monitoring, employee notification, audiometric testing, hearing protection, warning signs and information, and training. This hearing conservation program shall be made available upon request to employees and their representatives.

9.10.1 Scope

An action level for noise has been established by OSHA based on an 8-hour, time-weighted average (TWA) of 85 decibels measured on the A-weighted scale (dBA) in the slow response mode. When employees are exposed to sound that exceeds this action level, employers must implement a hearing conservation program. All employees exposed to sound levels exceeding the action level of 85 dBA fall under the scope of this Hearing Conversation Program.

9.10.2 Responsibilities

The PM is responsible for ensuring compliance with hearing conservation controls and protection. The SSHO is responsible for identifying noise control areas or operations and implementing the program on a site-specific basis. The PHSM will assist the PM and SSHO with assessing the need for and implementing hearing conservation program. Employees are responsible for wearing appropriate hearing protection devices and following hearing conservation procedures in noise control areas.

9.10.3 Permissible Exposure Limits

The following table identifies OSHA permissible exposure limits for noise exposures. Whenever possible, administrative or engineering controls will be used to reduce sound levels. If controls are not feasible or fail to reduce sound levels to below 85 dBA, hearing protection will be provided to employees to reduce sound exposures to below the 85 dBA limit. This Tetra Tech hearing conservation program mandates the use of hearing protection for 8-hour, TWA exposures of 85 dBA or greater.

TABLE 9-1	L
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Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
¹ /4 or less	115

PERMISSIBLE NOISE EXPOSURES*

*When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

9.10.4 Monitoring

In most instances, high noise levels at a project site are generated by heavy equipment, such as drill rigs and backhoes, or sources associated with the work site operations such as operating equipment and vehicles. Most common high-noise-level sources have been measured, and instances where hearing protection is required shall be indicated in the activity hazard analysis. When noise exposures at a work site are suspected to equal or exceed an 8-hour, TWA of 85 dBA resulting from noise sources not previously measured, the SSHO will conduct an evaluation to characterize the noise sources and exposure levels.

A portable sound-level meter is recommended for surveying general work areas and for estimating noise exposure when the noise levels are relatively constant. Noise dosimeters are recommended for documenting full-shift noise exposures when noise sources fluctuate, are intermittent, or otherwise difficult to document with the sound-level meter. Monitoring for occupational noise exposure will be conducted for each representative task or job position that the SSHO deems necessary. The PHSM shall assist with sound level monitoring and reporting as necessary.

The noise measurements will be taken in the hearing zone of the affected employee. The hearing zone is an area within a radius not to exceed 12 inches from the ear closest or in most direct proximity to the noise source.

Monitoring equipment must be in factory calibration and will be checked in the field with an appropriate field calibration check standard according to the equipment manufacturer's recommendation before and after each set of measurements. Documentation of test field calibration checks will be kept with the field data collected.

In some cases, such as on short-term projects or projects where noise levels are known, the SSHO may forgo actual noise level measurements and use a simple rule-of-thumb test to determine if noise levels are in excess of 85 dBA. The test requires the SSHO to determine how loud he or she must speak to be heard at arm's length from another person. If the SSHO must raise his or her voice to be heard, average noise levels likely exceed 85 dBA. The SSHO will inform employees exposed at or above an 8-hour, TWA of 85 dBA of the results if monitoring is conducted.

9.10.5 Audiometric Testing

Audiometric testing is conducted for Tetra Tech employees potentially exposed to sounds levels greater than 85 dBA TWA. The audiometric testing program consists of baseline audiograms, annual audiograms, and termination audiograms. Employees are informed of the results of these tests at the time of their examination. Audiometric test results will be retained for Tetra Tech by the corporate medical advisor and will become a part of each employee's permanent medical record. Exposure and audiometric records will be made available to employees upon request.

9.10.6 Hearing Protection

Tetra Tech provides hearing protection to all personnel that may experience noise exposures at or greater than 85 dBA. Hearing protection must provide sufficient attenuation to limit employee noise exposure to an 8-hour, TWA of less than 85 dBA. Hearing protection will be replaced as necessary. The SSHO will supervise the correct use of hearing protection at a work site. Personnel will receive instruction in proper fitting during initial and refresher hearing conservation training classes.

9.10.7 Warning Signs and Information

The SSHO will post "Hearing Protection Required" signs in areas where noise levels have been measured and determined to exceed the 85-dBA, TWA action level. Signs may also be posted in areas where monitoring has not been conducted but noise levels are expected to exceed the 85-dBA, TWA level based on similarity to past activities or on the judgment of the SSHO.

For short-duration projects or where personnel exposure in the high-noise area is limited and controlled, the SSHO may provide verbal notice of the need for hearing protection in place of the signs described above.

9.11 RESPIRATORY PROTECTION PLAN

Not applicable.

9.12 HEALTH HAZARD CONTROL PROGRAM

The primary health hazards associated with this project are physical hazards associated with task to be completed. This APP/SSHP describes mitigation measures to reduce physical hazards and natural hazards (animals, poisonous plants, insects, and snakes).

9.12.1 Natural Hazards

Natural hazards may be encountered on site. Workers should anticipate the increased likelihood of encountering these hazards. Insect stings can cause localized swelling, itching, and minor pain that can be handled by first aid treatment. In sensitized individuals, however, effects can be more serious such as anaphylactic shock, which can lead to severe reactions in the circulatory, respiratory, and central nervous system and, in some cases, even death. The SSHO will identify personnel with a known reaction to bites and stings at the pre job safety orientation meeting. Personnel will not attempt to capture or feed any wild or semi wild animals such as cats, rats, or ground squirrels due to the possibility of a bite or parasitic infestation. Animal and bird droppings often contain mold, fungus, or bacteria that represent a significant respiratory hazard, including lung diseases and allergies. Personnel will not touch visual droppings.

9.12.1.1 Insects

Insects, including bees, wasps, hornets, spiders and ticks, may be present at this site making the chance of a bite or sting very possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition; any individuals who have been bitten or stung by an insect will notify the SSHO. Field personnel who may have insect allergies will provide this information to the SSHO prior to commencing work, and will have allergy medication on site. The following is a list of preventive measures: Apply insect repellent prior to fieldwork and as often as needed throughout the work shift. Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips), and apply the permethrin repellent spray to field clothing. Note: Allow the permethrin to dry before using the treated clothing. Wear proper protective clothing (work boots, socks and pants). When walking in vegetated areas, avoid contact with bushes, tall grass, or brush as much as possible.

Mild insect stings or bites should be treated by applying a baking soda paste or ice wrapped in a wet cloth. Bee stingers should be gently scraped off the skin, working from the side of the stinger. The suction device in commercially available snake bite kits can also be used to remove the stinger. If insect bites become red or inflamed or symptoms such as nausea, dizziness, shortness of breath, etc., appear, medical care will be sought immediately. Immediate

medical care is essential for persons who are allergic to insect bites/stings. If an allergic person receives spider bite or insect bite/sting, seek immediate medical attention and notify Range Control, keep the victim calm, and check vital signs frequently. Rescue breathing should be given, if necessary, to supply oxygen to the victim. Notify Range Control.

9.12.1.2 Spiders

Various spiders may be encountered at the Camp Ravenna; however, two spiders are potentially in the area that are poisonous – the Black Widow and Brown Recluse. The Black Widow spider varies from dark brown to black in color. Its body is 1/4 inch wide and overall size is 1-1/2 inches with legs extended. Only the female is poisonous and can be determined by the red or yellow hourglass marking the underside of the abdomen. The Brown Recluse has a characteristic fiddle-shaped pattern on their head region. The spider is golden brown with the fiddle being dark brown or black. This spider is not hairy and the fiddle pattern is often shiny. They are about 1/4 to 3/4 inch long. The victim will experience the following if a Black Widow or Brown Recluse spider has bitten them:

- The spider's bite will feel like a sharp pinprick or may not even be noticed.
- In 15 minutes or less, the person will feel a dull numbing pain in the bitten area.
- A faint red bite mark appears.
- Black Widow bites in the lower part of the body or legs will cause the victim toot have muscle stiffness or cramps in their abdomen.
 - If the bite is on the upper body or arms, the victim will have muscle stiffness or cramps affecting the shoulders, back, or chest.
 - Additionally, the victim may experience headache, chills, fever, heavy sweating, dizziness, nausea, vomiting, and severe abdominal pain.
- Brown Recluse bite severity may vary.
 - The symptoms may vary from no harm to a very severe reaction.
 - Often there is a systemic reaction within 24-36 hours characterized by restlessness, fever, chills, nausea, weakness, and joint pain.
 - Where the bite occurs there is often tissue death and skin is sloughed off. In some severe cases, a wound may develop that lasts several months.
- First aid procedures for a Black Widow, Wolf Spider and Brown Recluse bites are as follows:
 - Clean the bitten area with soap and water or rubbing alcohol.
 - Do not apply a constricting band because the black widow venom's action is swift; there is little to be gained by trying to slow absorption with a constriction band.
 - To relieve pain, place an ice pack over the bite.
 - Keep the victim quiet and monitor breathing.
 - Seek immediate medical attention and notify Range Control

- If possible, catch the spider to confirm its identity, even if the body is crushed.

9.12.1.3 Snakes

The poisonous snakes found in Ohio are the Copperhead, Timber, and Eastern Massasaugas rattlesnakes. Initial efforts will be directed to avoid, where possible, nesting and territorial areas. Again, it is not anticipated that these reptiles will be encountered the following is provided only for informational purposes.

9.12.1.3.1 Copperhead

Copperhead is also a poisonous pit viper. Its body has broad chestnut-red bands. Most copperheads are about 2 ½ feet long while the largest grow to about 4 feet. The copperhead bites people more often than most rattlesnakes, partly because it is silent and smaller, and is not so quickly noticed. The bite is seldom fatal to adults. This reptile usually eats rodents and other small mammals by killing them with their poison and swallowing them whole. Sometimes the snake eats insects and frogs. The copperhead can be identified by the presence of a pit in front of and below each eye. The snake's nostril is in front of the pit.

9.12.1.3.2 Rattlesnakes

The rattlesnake is a pit viper with a rattle on the end of its tail. The rattle is used to warn enemies to stay away. However, sometimes they give no warning before they bite. The rattlesnake always lifts its tail when it sounds whereas harmless snakes that mimic the rattlesnake move their tail back and forth on top of dry leaves or grass.

Rattlesnakes send out poison through two long hollow fangs, in its upper jaw. The poison forms in a pair of glands behind each eye on the upper jaw. The rattlesnake's fangs are folded back in the mouth when not in use. When an angry rattlesnake strikes, the fangs are erected and the mouth opened wide. Most rattlesnakes eat birds, small mammals, amphibians and reptiles. The larger rattlers rank among the most dangerous of snakes and should be avoided.

The Timber Rattlesnake has a large body and ranges in length of five to six feet. It has a broad triangular head, vertical pupils and heat sensitive pits. The body color may be yellow, gray, dark brown or black, with dark, V-shaped cross bands across the back. The head is usually un-patterned and is covered with many small scales. A distinct rattle on the end of a darkly colored tail produces a buzzing sound when vibrated.

Eastern Massasaugas are small snakes with thick bodies, heart-shaped heads and vertical pupils. The average length of an adult is about 2 feet. Adult massasaugas are gray or light brown with large, light-edged chocolate brown blotches on the back and smaller blotches on the sides. The snake's belly is marbled dark gray or black and there is a narrow,

white stripe on its head. Its tail has several dark brown rings and is tipped by gray-yellow horny rattles. Young snakes have the same markings, but are more vividly colored. The head is a triangular shape and the pupils are vertical.

9.12.1.4 Snake Bite

Should field personnel come in contact with these animals and receive a bite, the following actions are necessary:

- Obtain a detailed description of the snake.
- This and the bite mark will enable medical personnel administering medical aid to provide prompt and correct antidotes, as necessary.
- Immobilize the bite victim to the extent possible.
- Physical exertion will mobilize the toxins (if poisonous varieties) from the bite point systemically through the body.
- Apply a pressure wrap (for extremities), just above and over the bite area.
- With a couple wraps of the pressure wrap in place over the bite area, apply a splint, and continue this application of the pressure wrap.
- The purpose for the splint is to restrict the movement of the extremity, this along with the pressure wrap will aid in restricting the toxins from leaving the site of the bite.
- Seek medical attention immediately and notify Range Control.

9.12.1.5 Poisonous Plants

Various plants which can cause allergic reactions may be encountered during field work. These include poison ivy, poison oak, and poison sumac. Contact with these plants may occur when clearing vegetation for access to work areas, or as a result of movement through these plants. An irritating, allergic reaction can occur after direct contact with the plant or indirect contact through some piece of equipment or clothing article. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next.

Protective measures to control and minimize the effects of this hazard may include, but not be limited to, the following:

- Identify plants for field personnel.
 - Poison Ivy is characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.

- Poison Sumac is characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with auxiliary clusters of white fruit: However, these white fruits and berries may exist only during public stages.
- Poison oak is characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.
- Protective measures may include wearing disposable garments such as Tyvek when clearing brush.
- These may be carefully removed and disposed of along with any oils accumulated from the plants.
- Practice good personal hygiene
 - The oils obtained from the plants will only elicit an allergic response when the person's bare skin layer is contacted.
 - This can be aggravated when skin pores are open (perspiring), or through breaks in the skin such as cuts, nicks, scratches, etc.
 - This can also be accomplished when using excessively hot water for cleaning the skin, which also causes pores to open.
 - Prior to break time, lunchtime, etc. personnel should wash with cool water and soap to remove as much of the oils as possible.

In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to prevent the oils from accessing and penetrating the skin.

9.13 HAZARD COMMUNICATION PROGRAM

Site operations will be compliant with the provisions of the OSHA Hazard Communication 29 CFR 1910.1200(f) Standard. OSHA recently revised its Hazard Communication Standard to align with the United Nations' Global Harmonized System of Classification and Labeling of Chemicals.

9.13.1 Safety Data Sheet (SDS)

Tetra Tech and subcontractor personnel will provide SDSs for chemicals brought onsite. The contents of these documents will be reviewed by the SSHO with the user(s) of the chemical substances prior to any actual use or application of the substances onsite. The SDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.13.2 Chemical Inventory

The SSHO is responsible to develop and maintain an accurate chemical inventory list for the chemicals that will be used and stored at that workplace.

9.13.3 Container Labeling

When a chemical is brought onsite, the SSHO is responsible for its receipt will verify that the container is properly labeled with the following information:

- Name of the chemical substance
- Appropriate hazard warning
- · Name and address of the chemical manufacturer

New OSHA labeling regulations, coming into effect in 2015, will require the following information on labels:

- Name, Address and Telephone Number
- Product Identifier
- Signal Word
- Hazard Statement
- Precautionary Statement(s)
- Pictograms

While these regulations are not currently mandatory some companies have already started to implement these changes.

9.13.4 Training

Any new chemicals brought onsite that may present new hazards may require additional training. The SSHO will ensure that the appropriate training is conducted for the site personnel required to use the chemical.

9.14 PROCESS SAFETY MANAGEMENT PROGRAM

Not applicable.

9.15 LEAD COMPLIANCE PLAN

Not applicable

9.16 ASBESTOS ABATEMENT PLAN

Not applicable

9.17 RADIATION SAFETY PROGRAM

Not applicable

9.18 ABRASIVE BLASTING

Not applicable

9.19 HEAT STRESS MONITORING PLAN

It is necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent heat and cold stress. If such conditions are encountered use the following information on heat and cold stress recognition, prevention and control.

Ambient temperature extremes (hot or cold working environments) may occur during performance of hazardous waste work depending on the project schedule. Work performed when ambient air temperatures are below 50 degrees Fahrenheit (°F) may result in varying levels of cold stress (frost nip, frost bite, and/or hypothermia) depending on environmental factors such as temperature, wind speed, and humidity; physiological factors such as metabolic rate and moisture content of the skin; and other factors such as work load and the protective clothing being worn. Work performed when ambient temperatures exceed 70°F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on factors similar to those presented above for cold stress.

In either case, these conditions can be debilitating and, when extreme, they can be fatal. An understanding of the importance in preventing heat/cold stress, coupled with the worker's awareness of the signs and symptoms of overexposure, can significantly reduce the potential for adverse health effects. If this hazard is present during site operations, each worker will be provided with information necessary to protect themselves, and site management will be instructed to permit frequent breaks in mild temperature rest areas having hot/cold fluids available for consumption. When site personnel are required to wear semi-permeable (Saranex, Tyvek) or impermeable protective clothing to perform their assigned tasks and ambient temperatures are 70°F or higher, biological monitoring may be performed and data compared to the most recent recommendations of the American Conference of Governmental Industrial Hygienists (ACGIH).

9.19.1 Heat Related Disorders

There are four heat related disorders to monitor while performing work onsite.

9.19.1.1 Heat Rash

Also known as prickly heat, this condition affects the skin. It occurs in situations where the skin remains wet most of the time. The sweat ducts become plugged and a skin rash soon appears.

9.19.1.1.1 Signs and Symptoms

- Skin rash will appear on affected areas of the body.
- Tingling or prickling sensation will be felt on the affected areas.

9.19.1.2 Heat Cramps

Heat cramps are muscle pains, usually in the lower extremities, the abdomen, or both, that occur after profuse sweating with accompanying salt depletion. Heat cramps most often afflict people in good physical condition, who overwork in conditions of high temperature and humidity. Untreated, heat cramps may progress to heat exhaustion.

9.19.1.2.1 Signs and Symptoms

- Cramps in the extremities and abdomen that begin suddenly during vigorous activity. Heat cramps can be mild with only slight abdominal cramping and tingling in the extremities, but more commonly intense and incapacitating pain in the abdomen and extremities.
- Respiration rate will increase, decreasing after the pain subsides.
- Pulse rate will increase.
- Skin will be pale and moist.
- Body temperature will be normal.
- Generalized weakness will be noted as the pain subsides.
- Loss of consciousness and airway maintenance are seldom problems with this condition.

Treatment for heat cramps is aimed at eliminating the exposure and restoring the loss of salt and water.

9.19.1.3 Heat Exhaustion

Heat exhaustion is a more severe response to salt and water loss, as well as an initial disturbance in the body's heatregulations system. Like heat cramps, heat exhaustion tends to occur in people working in hot environments. Heat exhaustion may progress to heat stroke. Treatment for heat exhaustion is similar in principle to that for heat cramps. 9.19.1.3.1 Signs and Symptoms

- Heat exhaustion may be accompanied by a headache, fatigue, dizziness, or nausea with occasional abdominal cramping.
- More severe cases of heat exhaustion may result in partial or complete temporary loss of respiration and circulation due to reduced blood flow, resulting in reduced oxygen to the brain .
- Sweating will be profuse.
- Pulse rate will be rapid and weak.
- Respiration rate will be rapid and shallow.
- The skin will be pale and clammy.
- The body temperature will be normal or decreased.
- The person could be irritable and restless.

9.19.1.4 Heat Stroke

Heat stroke is caused by a severe disturbance in the body's heat-regulating system and is a profound emergency: The mortality rate ranges from 25 to 50 percent. It can also occur from having too much exposure to the sun or prolonged confinement in a hot atmosphere. Heat stroke comes on suddenly. As the sweating mechanism fails, the body temperature begins to rise precipitously, reaching $106^{\circ}F$ ($41^{\circ}C$) or higher within 10 to 15 minutes. If the situation is not corrected rapidly, the body cells -- especially the very vulnerable cells in the brain -- are literally cooked, and the central nervous system is irreversibly damaged. The treatment for heat stroke is aimed at maintaining vital functions and causing as rapid a decrease of body temperature as possible.

9.19.1.4.1 Signs and Symptoms

- The person's pulse will be strong and bounding.
- The skin will be hot, dry, and flushed.
- The worker may experience headache, dizziness, and dryness of mouth
- Seizures and coma can occur.
- Loss of consciousness and airway maintenance problems can occur.

9.19.1.5 Controlling Heat Stress

The following control measures are only guidelines for heat related emergencies. Actual training in emergency medical care or basic first aid is recommended. Employees will monitor one another for signs of heat stress. If indications of heat stress occur, the following corrective measures will be performed:

- Inform affected workers of the signs and symptoms of heat stress and encourage co-worker observations.
- Schedule tasks that are physically-demanding in early morning and late afternoon timeframes when heavy loads would be less of an issue.
- Notify the SSHO who may perform biological monitoring to determine the extent of the heat related condition.
- The SSHO may alter the work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- The SSHO may also recommend cooling devices such as vortex tubes or cooling vests be worn beneath protective garments.
- When conditions where heat related disorders may be experienced, the SSHO through site-specific training and safety briefing will inform site personnel of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.
- Provide adequate liquids to replace lost body fluids.
- Personnel must replace water and salt lost from sweating.
- Personnel must be encouraged to drink more than the amount required to satisfy thirst.
- Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Approximately 1 cup of cool water every 20 minutes is recommended.
- Replacement fluids can be commercial mixes such as Gatorade[®].
- Move affected persons into a shaded cool rest area (below 77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- One of the following biological monitoring procedures may be utilized by the SSHO to monitor heat stress concerns.
- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute.
- If the HR is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of rest period stays the same.
- If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.
- The length of the initial work period will be determined by using the table below.

TABLE 9-2

Work-Rest Regimen	Work Load					
	Light	Moderate	Heavy			
Continuous	80.0°F	80.0°F	77.0°F			
75% Work - 25% Rest, Each Hour	87.0°F	82.4°F	78.6°F			
50% Work - 50% Rest, Each Hour	88.5°F	85.0°F	82.2°F			
25% Work - 75% Rest, Each Hour	90.0°F	88.0°F	86.0°F			

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

Body temperature shall be measured orally with a digital thermometer with disposable probe covers or an aural/temporal temperature sensor as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99°F. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.7°F at the beginning of the next rest period, the following work cycle shall be further shortened by 33%. OT should be measured at the end of the rest period to make sure that it has dropped below 99°F. At no time shall work begin with the oral temperature above 99°F.

NOTE: External temperatures in excess of those stated above shall be regarded as inclement weather.

9.19.1.5.1 Temperature Extremes – Heat Stress Indication

Temperature extremes are considered inclement weather. Steps should be taken to the extent possible protect site personnel from the effects of heat stress and the sun. Control measures include:

- Watch for signs of heat stress/exhaustion, see Table 9-3.
- Provide fluid replacement.
- Provide adequate number of breaks within a cooler environment.

Care should be exercised when working outdoors due to harmful effects of the sun. To reduce the potential for sunburn and melanoma use the following measures:

- Wear a hat that shades the face, neck, and ears.
- Apply sunscreen with a SPF of 15 or higher liberally on any exposed skin at least 15 minutes before going outside, then at least every two hours, more if you are sweating a lot.

- Plan/provide suitable equipment to offer shade to avoid the midday sun since the sun's ultraviolet rays are most intense between 10 AM and 4 PM and can damage your skin even on hazy days. Portable canopies over the sample station are an example of this.
- Wear wrap-around sunglasses to protect the eyes and delicate skin around them.

TABLE 9-3

HEAT STRAIN SYMPTOMS

Stop work if any worker demonstrates any of the following:

Heart Rate	Sustained (several minutes) heart rate minus worker's age > than 180 beats per minute (bpm) measured at any time.
Body Core Temperature	> 101.3°F (38.5° C)
Recovery Heart Rate	> 110 bpm (measured 1 minute after peak work effort)
Other symptoms	Sudden and sever fatigue, nausea, dizziness, or headache

Individuals may be at greater risk of heat stress when:

- Profuse sweating is sustained over hours
- Weight loss over a shift is > 1.5% of beginning body weight
- 24-hour urinary sodium excretion is less than 50 nmoles

9.19.1.5.2 First Aid for Heat Stroke

Take the following steps to treat a worker with heat stroke:

- · Call Emergency Dispatch Center and notify SSHO and Field Superintendent.
- Move the affected individual to a cool shaded area.
- Cool the worker using methods such as:
 - Soaking their clothes with water.
 - Spraying, sponging, or showering them with water.
 - Fanning their body.

9.19.1.5.3 First Aid for Heat Exhaustion

Treat victim suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath, or sponge bath.

9.19.1.5.4 First Aid for Heat Cramps

Individuals with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear water, juice or a sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention and notify Range Control if any of the following apply:
 - The person has heart problems.
 - The person is on a low-sodium diet.
 - The cramps do not subside within one hour.

9.19.1.5.5 First Aid for Heat Rash

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

9.20 COLD STRESS MONITORING PLAN

Just as heat can present a problem for on-site personnel during certain activities, so can cold temperatures. Just as the heat related disorders are magnified by environmental conditions and the tasks to be completed, so are the cold related disorders. As above, the focus is on recognizing conditions contributing to cold related disorders and selecting the most appropriate control measure.

The ACGIH cold stress Threshold Limit Values (TLVs) are recommended to protect workers from the severest effects of cold stress (hypothermia) and cold injury and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects. The TLV objective is to prevent the deep body temperature from falling below 36 degrees centigrade (°C) or (96.8°F) and to prevent cold injury to body extremities (deep body temperature is the core temperature of the body determined by conventional methods for rectal temperature measurements). For a single, occasional exposure to a cold environment, a drop in core temperature to no lower than 35°C (95°F) should be permitted. In addition to provisions for total body protection, the TLV objective is to protect all parts of the body with emphasis on hands, feet, and head from cold injury.

Fatal exposures to cold among workers have almost always resulted from accidental exposures involving failure to escape from low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body. The clinical presentations of victims of hypothermia are shown in Table 9-4. Workers should be protected from exposure to cold so that the deep core temperature does not fall below 36°C (96.8°F); lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences.

TABLE 9-4

PROGRESSIVE CLINICAL PRESENTATIONS OF HYPOTHERMIA*

Core Temperature		Olladad Chang				
degrees C	degrees F	Cinical Signs				
37.6	99.6	"Normal" rectal temperature				
37	98.6	"Normal" oral temperature				
36	96.8	Metabolic rate increases in an attempt to compensate for heat loss				
35	95.0	Maximum shivering				
34	93.2	Victim conscious and responsive, with normal blood pressure				
33	91.4	Severe hypothermia below this temperature				
32	89.6	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated				
31	87.8	but react to light; shivering ceases				
30	86.0	Progressive loss of consciousness; muscular rigidity increases; pulse and blood pressure difficult to obtain; respiratory rate decreases				
29	84.2	pressure united to obtain, respiratory rate decreases				
28	82.4	Ventricular fibrillation possible with myocardial irritability				
27	80.6	Voluntary motion ceases; pupils nonreactive to light; deep tendon and superficial reflexes absent				
26	78.8	Victim seldom conscious				
25	77.0	Ventricular fibrillation may occur spontaneously				
24	75.2	Pulmonary edema				
22	71.6	Maximum right of vantaioular fibrillation				
21	69.8	Maximum risk of ventricular indrination				
20	68.0	Cardiac standstill				
18	64.4	Lowest accidental hypothermia victim to recover				
17	62.6	Isoelectric electroencephalogram				
9	48.2	Lowest artificially cooled hypothermia patient to recover				

* Presentations approximately related to core temperature. Reprinted from the American Family Physician, published by the American Academy of Family Physicians.

9.20.1 Signs and Symptoms

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering occurs when the body temperature has fallen to 35°C (95°F). This must be taken as a sign of danger and exposure to cold should be immediately terminated when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

9.20.2 Control Measures

Since prolonged exposure to cold air or to immersion in cold water, at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided.

• Adequate insulating dry clothing to maintain core temperatures above 36°C (96.8°F) must be provided to workers if work is performed in air temperatures below 4°C (40°F).

- Wind chill cooling rate and the cooling power of air are critical factors. [Wind chill cooling rate is defined as heat loss from a body expressed in watts per meter squared which is a function of the air temperature and wind velocity upon the exposed body.]
- The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- An equivalent chill temperature chart relating the actual dry bulb air temperature and the wind velocity is presented in Table 9-5.
- The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep body core temperature.
- Unless there are unusual or extenuating circumstances, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia.
- Older workers or workers with circulatory problems require special precautionary protection against cold injury.
 - The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions which should be considered.
 - The precautionary actions to be taken will depend upon the physical condition of the worker and should be determined with the advice of a physician with knowledge of the cold stress factors and the medical condition of the worker.
- Acclimatization With exposure the body does undergo changes that will permit it to adjust to the cold weather better.
- Dehydration Water and salt loss magnifies conditions associated with hypothermia. Warm, sweet nonalcoholic fluids should be employed for fluid replacement. Soup, non-caffeinated drinks including decaffeinated teas, coffees, etc. are suitable for this purpose.
- Diet A balanced diet can provide the body with the necessary nutrients to aid in combating cold stress.
 Restrictive diets avoiding salts, carbohydrates, etc. may rob you of certain elements that you need. Caffeine and alcoholic drinks may increase the effects of a cold environment through the loss of water and salts.
- Engineering Controls such as wind shields/barriers may be used to control the potential effects of cold stress.
- Administrative controls such as worker rotation; work/warm regimens; required fluid intake; scheduling the work for warmer weather; assigning more workers to the task to complete it quicker.

TABLE 9-5

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE (under calm conditions)*

	Actual Temperature Reading (
Estimated Wind Speed	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
(in mpn)	Equivalent Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40	LITTLE DANGER				INCREASING DANGER			GREAT DANGER				
mph have little additional	In $<$ hr with dry skin.			Danger from freezing of Flesh may freeze within 30 second			n 30 seconds	-				
effect)	Maximum danger of			exposed flesh within one								
	false sense of security			minute.								

Trench foot and immersion foot may occur at any point on this chart.
- Overall physical condition should always be considered when combating cold stress.
 - Older persons and those on certain medications (blood pressure control) are vulnerable to cold environment and cold stress disorders.
- Environmental monitoring results will tell you if the conditions are such that cold related disorders can occur.
 - Biological monitoring will provide real time information as to the progression of the cold related disorders within your field crew.

9.20.3 Monitoring

- Core temperature
 - Ensure that it does not drop below 96.8°F
- Weight Loss
 - Monitoring weight loss may be indicative of water and salt loss through dehydration.
 - >2% changes in body weight are indicative of water loss.
- Visual observation of signs and symptoms of overexposure.

9.20.4 Special Conditions - Evaluation and Control

For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent chill temperature of -32° C (-25.6° F). Superficial or deep local tissue freezing will occur only at temperatures below -1° C (30.2° F) regardless of wind speed.

At air temperatures of 2°C (35.6°F) or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

TLVs recommended for properly clothed workers for periods of work at temperatures below freezing are shown in Table 9-6.

Special protection of the hands is required to maintain manual dexterity for the prevention of accidents:

- If fine work is to be performed with bare hands for more than 10-20 minutes in an environment below 16°C (60.8°F), special provisions should be established for keeping the workers' hands warm.
- For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized.

Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below -1° C (30.2°F).

- If the air temperature falls below 16°C (60.8°F) for sedentary, 4°C (39.2°F) for light, -7°C (19.4°F) for moderate work and fine manual dexterity is not required, then gloves should be used by the workers.
- To prevent contact frostbite, the workers should wear anti-contact gloves.
- When cold surfaces below -7°C (19.4°F) are within reach, a warning should be given to each worker by the supervisor to prevent inadvertent contact by bare skin.
- If the air temperature is -17.5° C (0°F) or less, the hands should be protected by mittens.
- Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.
- Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). The workers should wear cold protective clothing appropriate for the level of cold and physical activity:
- If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water.
- With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted.
- The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layers of sweat.
- If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating.
- If clothing is wet, the employee should change into dry clothes before entering the cold area.
- The workers should change socks and any removable felt insoles at regular daily intervals or use vapor barrier boots.
- The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
- If exposed areas of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should be supplied in auxiliary heated versions.

TABLE 9-6

THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT*

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
℃ (approx)	°F (approx)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26°to -28°	-15° to -19°	(Norm	1	(Norm	1	75 min	2	55 min	3	40 min	4
		Breaks)		Breaks)							
-29° to -31°	-20° to -24°	(Norm	1	75 min	2	55 min	3	40 min	4	30 min	5
		Breaks)									
-32° to -34°	-25°to -29°	75 min	2	55 min	3	40 min	4	30 min	30 min 5 Non-emergency we		gency work
-35° to -37°	-30°to -34°	55 min	3	40 min	2	30 min	5	Non-emerg	Non-emergency work should cease		d cease
-38° to -39°	-35° to -39°	40 min	4	30 min	1	Non-emergency work		should cease			
-40° to -42°	-40°to -44°	30 min	5	Non-emer	gency work	should cease					
-43° & below	-45°& below	Non-emerg should	ency work cease	shoul	d cease						

NOTES:

1. Schedule applies to moderate to heavy work activity with warm-up breaks of 10 minutes in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at '35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).

2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.

3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: (1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 W/M²; (2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m². In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges, since windy conditions rarely prevail at extremely low temperatures.

4. TLVs apply only for workers in dry clothing.

* Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

• If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

9.20.5 Work - Warming Regimen

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below -7°C (19.4°F), heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The workers should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation or a change of dry work clothing provided. A change of dry work clothing should be provided as necessary to prevent workers from returning to work with wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effects.

For work practices at or below -12°C (10.4°F) ECT, the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods should be taken in heated shelters and opportunity for changing into dry clothing should be provided.
- New employees should not be required to work full time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized.
- Unprotected metal chair seats should not be used.
- The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures.
- The training program should include as a minimum instruction in:
 - Proper rewarming procedures and appropriate first aid treatment.
 - Proper clothing practices.
 - Proper eating and drinking habits.
 - Recognition of impending frostbite.

- Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
- Safe work practices.

Note: This information has been adopted from the 2010-1011 "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Indices" by the American Conference of Governmental Industrial Hygienists (ACGIH).

As conditions may vary, it will be at the discretion of the Field Operations Leader and the Site Safety Officer to temporarily suspend or terminate activities as conditions dictate. All site activities will be terminated in the advent of electrical storms, tornadoes, and other hazardous weather conditions.

9.21 INDOOR AIR QUALITY MANAGEMENT PLAN

Not applicable.

9.22 MOLD REMEDIATION PLAN

Not applicable.

9.23 CHROMIUM (VI) EXPOSURE EVALUATION

Not applicable.

9.24 CRYSTALLINE SILICA EVALUATION

Not applicable.

9.25 LIGHTING PLAN FOR NIGHT OPERATIONS

Not applicable.

9.26 TRAFFIC CONTROL PLAN

A detailed traffic management plan has been developed. See Section II of the Work Plan.

9.27 FIRE PREVENTION PLAN

Combustible materials will be protected from heat, flames, and sparks by moving or covering them. Flammable liquids will be kept in closed containers. Safety containers will be used, when required. The site workers have training on the use of portable fire extinguishers. Each site vehicle has at least a 5-lb ABC fire extinguisher.

9.27.1 Re-Fueling

Any fuel stored onsite must meet Tetra Tech and Camp Ravenna safety requirements for fuel storage. Only portable, UL-approved, metallic flammable liquid storage containers will be used to store fuel at the project site (Type II preferred). Fuel storage containers will be labeled properly (i.e., Flammable and Diesel/Gasoline). Fuel stored on-site will be dual contained tanks that provide secondary containment of at least 110%. It will be located outside of the 100-year floodplain and a minimum of 50 feet from other storage areas and heat sources. A properly rated fire extinguisher will be located adjacent to the fuel storage facility. The tank and containment will be inspected regularly, in accordance with the Spill Prevention Control and Countermeasures (SPCC) plan, to verify that it is in good condition and that rainwater is emptied from the containment area. SDSs for onsite fuels will be made available to all site personnel. When refueling, personnel will place a drip pan or spill pads underneath the pump to catch any overflow. Vehicle fueling if equipment fill valves are higher than 4 foot an elevated platform with fall protection will be required for refueling.

9.28 WILD LAND FIRE MANAGEMENT PLAN

Not applicable.

9.29 ARC FLASH HAZARD ANALYSIS

Not applicable.

9.30 ASSURED EQUIPMENT GROUNDING CONTROL PROGRAM (AEGCP)

The grounding procedures below shall apply as appropriate to all project sites.

- All electrical tools and equipment must be approved, double-insulated, and properly grounded or used with ground-fault circuit interrupters.
- For 15- and 20-ampere receptacle outlets on single-phase, 120-volt circuits that are not part of the permanent wiring of the building or structure, either ground-fault circuit interrupters or an approved equipment grounding conductor program will be used.

- Moving equipment that is used near overhead power lines shall be equipped with grounding chains. An equipment grounding conductor program will include the following:
- Each cord set, attachment cap, plug, and receptacle of cord sets, and any equipment connected by a cord and plug, except cord sets and receptacles that are fixed and not exposed to damage, will be inspected before each day's use for external defects and possible internal damage.
- Tests will be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.
- Grounding conductors will be tested for continuity.
- Each receptacle and attachment cap or plug will be tested for correct attachment of the equipment grounding conductor.

9.31 HAZARDOUS ENERGY CONTROL PROGRAM AND PROCEDURES

This Control of Hazardous Energy program establishes minimum requirements for the lockout and tagout of energyisolating devices whenever maintenance or servicing is performed on machines or equipment. This procedure will be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out and tagged out before employees perform any servicing or maintenance during which the unexpected energization or startup of the machine or equipment or release of stored energy could cause injury. This procedure was developed in accordance with the requirements of Title 29 of the *Code of Federal Regulations* (CFR), Part 1910.147, the "Control of Hazardous Energy (Lockout/Tagout)."

9.31.1 Applicability

This applies to all affected workers, including those who are authorized to perform service or maintenance activities on equipment that could result in injury from equipment startup or energization or employees who may be affected due to work assignments in proximity or relation to such activities. Only trained, authorized employees, permitted to perform maintenance or repair on machines and equipment, may perform lockout and tagout procedures in accordance with this program. Untrained and unauthorized personnel must not perform any activity that may expose them to hazards or energized equipment. Upon observing a machine or piece of equipment that is locked out and tagged out to perform servicing or maintenance, an employee shall not attempt to start, energize, or use that machine or equipment. Violation of this rule may result in immediate termination. The following situations are exempt from the requirements of this program:

- Cord- and plug-connected electrical equipment under sole control of the employee performing the service or maintenance
- Installation of power by a utilities service

If a subcontractor has an existing lockout/tagout procedure, the SSHO shall inform the sub-contractor or site personnel of Tetra Tech procedures and request access to their respective procedures.

9.31.2 Responsibilities

The PM shall ensure and enforce necessary lockout and tag out procedures and understand the hazards of energy isolations and:

- Coordinate all lockout and tagout activities (including shutdown, release of stored energy and re-energizing) on their projects;
- Confirm that affected and authorized employees have received adequate training on lockout and tagout procedures;
- Verify that specific permits (hot work, confined space, etc.) are not required;
- Review all permits that are required; and
- Ensure that either a Tetra Tech or client-specific isolation control register is being completed during the duration of the lockout and tagout activity.

This responsibility may be delegated to the SSHO who is designated as the authorized employee shall:

- Receive approval from the project manager to perform lockout and tagout procedures on the equipment to be serviced or maintained;
- Lockout and tagout the equipment using designated locks which have only key, which is kept with them at all times;
- Confirm that the equipment is properly isolated before servicing or maintenance work begins;
- Removes the lock and restores the energy to the equipment following energy restoration procedures; and
- Notifies affected employees that the energy-isolating device has been removed.

9.31.3 Energy Control Procedures

Whenever feasible, equipment should be locked out. Only when lockout is physically not feasible may tagout be the sole means of energy control.

9.31.3.1 Isolation Control Register

Information regarding the lockout and tagout procedures should be documented on the Tetra Tech or client-specific isolation control register. The isolation control register should be updated during the duration of the lockout and tagout activity.

9.31.3.2 Lockout or Tagout Sequence

The following sequence of activities must be followed for proper lockout or tagout:

- The authorized employee shall notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. The notification can be provided verbally, or else a written notice of intent to lockout for service or maintenance can be posted.
- The authorized employee (conducting the servicing or maintenance) shall refer to all available reference materials and information sources to identify the type and magnitude of energy that powers the machine or equipment, shall understand the hazards of the energy, and shall know methods to control the energy.
- If the machine or equipment is currently operating, it must be shut down by the normal stopping procedure (such as depressing the stop button, opening the switch, closing the valve, or another method).
- The energy-isolating device(s) should be deactivated so that the machine or equipment is isolated from the energy source(s).
- The energy-isolating device(s) should then be locked out with assigned individual lock(s). Each lock must be accompanied by a "DANGER, DO NOT OPERATE" tag explaining why the equipment is locked out of service. Tags should contain complete information, such as name of servicing or maintenance employee, complete date, and reason for the tag. Tags must be written legibly. Each authorized employee who has locked out the equipment will retain the lock key in his or her possession as long as the lock is installed.
- **Note:** Installing locks on ordinary stop-start stations is not considered a satisfactory electrical lockout. Lockout must occur at a circuit breaker, disconnect switch, block, or any similar device to block or isolate energy.
- Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure) must be dissipated or restrained by methods such as grounding, repositioning, blocking, or bleeding down, as appropriate.
- The authorized employee should ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, and then by verifying the isolation of the equipment by operating the "on" switch or other normal operating control(s) or by testing to make certain that the equipment will not operate.
- **Caution:** Operating controls should be returned to a neutral or "off" position after isolation of the equipment is verified.

• The machine or equipment is now locked out.

Each employee working on the equipment must be satisfied that it is safe for him or her to proceed with the work. Only the employee who has placed the lock can remove it, even if that person leaves the area with the lock or tag left on the equipment.

9.31.3.3 Shift Changes

When it is necessary to maintain the status of a locked out machine or device past the end of a shift when the lockout was initially installed, the following procedures shall be adhered to:

- The incoming authorized employee(s) shall place their lock(s) on the lockout point and complete a new tag.
- The outgoing authorized employee(s) shall remove their lock(s) after the new lock(s) are applied.
- If there is only one shift at the site, the initial lock(s) may be left in place until the following day or until the equipment is released from lockout and tagout.
- The new shift supervisor indicates the change of responsibility on the isolation control register.

9.31.3.4 Restoration of Equipment to Service

When the servicing or maintenance job is completed and the machine or equipment is ready to return to normal operating conditions, the following steps shall be taken in the order listed:

- 1. The project manager should approve the reenergizing of the equipment.
- 2. The machine or equipment and the area around the machine or equipment should be checked to ensure that nonessential items have been removed and that machine or equipment components are operationally intact.
- 3. The work area should be checked to ensure that all employees have been safely positioned or removed from the area.
- 4. The controls should be in a neutral or "off" position.
- 5. The lockout or tagout devices should be removed by the authorized employee(s) and the machine or equipment re-energized.

Affected employees should be notified that the servicing or maintenance is completed and the machine or equipment is ready for use.

Note: Some forms of blocking may require re-energization of the machine before the blocking can be safely removed.

9.31.3.5 Temporary Removal of Lockout and Tagout Devices

When the lockout and tagout devices must be removed temporarily and the equipment re-energized to conduct testing, steps 1-4 described above will be followed. When testing is complete control measures must be reapplied before continuing with servicing or maintenance. The employee conducting the maintenance or testing task and signing the lockout/tagout tag should perform this procedure. The tag provides documentation that this procedure has been verified by the SSC or client supervisor.

9.32 STANDARD PRE-LIFT PLAN – LOAD HANDLING EQUIPMENT

Not applicable.

9.33 CRITICAL LIFT PLAN

Not applicable.

9.34 NAVAL ARCHITECTURAL ANALYSIS

Not applicable.

9.35 FLOAT PLANT INSPECTION AND CERTIFICATION

Not applicable.

9.36 SEVERE WEATHER PLAN FOR MARINE ACTIVITIES

Not applicable.

9.37 EMERGENCY PLAN FOR MARINE ACTIVITIES

Not applicable.

9.38 MAN OVERBOARD/ABANDONSHIP PROCEDURES

Not applicable.

9.39 FLOAT PLAN FOR LAUNCHES, MOTORBOATS, AND SKIFFS

Not applicable.

9.40 FALL PROTECTION AND PREVENTION PLAN

It is not anticipated at this time for any work that would require a Fall Protection and Prevention Plan. However, the Field Supervisor is responsible for ensuring that work areas are evaluated for the presence of slip, trip, stumble and fall hazards prior to the start of work. If it is determined that site-specific fall protection practices are needed then they should be identified and detailed in an AHA prior to the beginning of work. The SSHO is responsible for ensuring that on-site work is performed in accordance with the AHA. Site specific fall protection procedures must be developed by an employee trained and qualified as a "competent person" in accordance with OSHA standard 29 CFR 1926 Subpart M. Anchor points and lifelines must be designed and approved by a trained "Qualified Person." The PHSM shall assist with the implementation of the Fall Protection and Prevention Plan.

During elevated work, the precautions below must be taken.

- Fall hazards should be identified at work sites with the potential for elevated work. Once an elevated fall hazard has been recognized, an appropriate control measure must be selected. Priority should be given to elimination of the fall hazard over the use of fall protection equipment.
- Approved safety harnesses and shock-absorbing lanyards or self-retracting lifelines (SRLs) shall be worn by employees whose work exposes them to falls of greater than six (6) feet.
- Workers must be protected from falls of less than 4 feet when working over machinery or equipment that would pose an additional hazard if the employee were to fall.
- Anchorage points for lanyards or SRLs should be located at a level no lower than the employee's waist to limit the free fall distance to a maximum of 4 feet and to not allow the employee to contact the next lower work level, where practical.
- All fall protection devices should be used only in accordance with manufacturer's recommendations.
- All fall protection devices shall be inspected daily before use.
- Any lifeline, harness, or lanyard actually subjected to in-service loading (a fall) should be immediately removed from service and not used again for employee fall protection.
- Anchor points and lanyards capable of supporting a minimum force of 5,400 pounds should be used.
- Employees who are required to wear fall protection must be trained in the use of the equipment, as well as in fall protection work practices.

9.41 DEMOLITION/RENOVATION PLAN

Not applicable.

9.42 ROPE ACCESS WORK PLAN

Not applicable.

9.43 EXCAVATION/TRENCHING PLAN

This program provides the requirements for activities involving excavations in accordance with 29 CFR 1926, Subpart P - Excavations.

9.43.1 Competent Person

Prior to the start of any excavation work the PM shall designate a competent person to fulfill the requirements of this procedure. The competent person(s) shall be responsible for:

- Day-to-day oversight of open excavations and trenches
- Conducting soil classifications
- Selection of protective systems
- · Conducting daily inspections of open excavations and trenches; and
- Providing the PM with all required documentation on a daily basis.

9.43.2 General Requirements

The following section provides general requirements governing activities in and around excavation and trenches, as well as the requirements for the selection and use of protective systems.

- Surfaces surrounding open trenches and excavations shall have all surface hazards removed.
- All utilities shall be located and cleared prior to initiating digging.
 - Public or facility utility groups shall be utilized where possible for this purpose.
 - In the absence of either, the Field Superintendent shall specify the procedures to be used to clear utilities in consultation with the project manager.
 - When the excavation is open, utilities shall be supported and protected from damage.
 - Clearance and support methods shall be documented on the daily inspection checklist.
- No person may enter a trench or work at the foot of the face of an excavation until a qualified, competent person
 has inspected the excavation and determined whether sloping or shoring is required to protect against cave-in or
 subsidence and this Appropriate protection has subsequently been installed.

- Trenches and excavations must be assessed by a qualified, competent person, even in the absence of working personnel, whenever heavy equipment will be operating nearby in order to ensure that the trench or excavation will support the weight of the equipment without subsistence or causing the accidental overturning of machinery.
- Access to trenching areas must be controlled and limited to authorized personnel.
 - Prior to entering a trench or excavation, workers must notify the Field Superintendent, SSHO, and nearby equipment operators whose activities could affect the trench or excavation.
- Trenches and excavations must be inspected regularly (daily at a minimum) to ensure that changes in temperature, precipitation, shallow groundwater, overburden, nearby building weight, vibration, or nearby equipment operation have not caused weakening of the sides, faces, and floors and to ensure that personnel protection is being maintained.
- Where structural ramps are used for egress they shall be installed in accordance with 29 CFR 1926.651(c)(1).
- Stairways, ladders, or ramps shall be provided as means of egress in all trenches 4 feet or more in depth.
 - Travel distance shall be no more than 25 feet between means of exit.
- Ladders if used must be secured from shifting, and must extend at least 3 feet above the top of the trench or excavation.
- Where necessary to prevent falls, crosswalks or walkways will be constructed. Structural ramps, walkway, and cross walks must be designed by a qualified competent person.
- Employees exposed to vehicular traffic shall wear traffic vests.
- No employee shall be permitted under loads being lifted or under loads being unloaded from vehicles.
- When vehicles and machinery are operating adjacent to excavations, warning systems such as barricades, hand or mechanical signals, or stop logs shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling on employees.
- Excavated and loose materials should be kept at least 3 feet from the edge of excavations, but at a minimum 2 feet from the edge of the excavation in accordance with OSHA requirements.
- Walkways or bridges with standard railing shall be provided at points employees are to cross over excavations or trenches.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.
- When subsidence or tension cracks are apparent anywhere in an excavation, all work should be stopped until the problem is corrected.
- The competent person must inspect trenches or excavations after any precipitation event to ensure integrity has been maintained.
- If trenches or excavations are near walkways or roadways, guards or warning barriers must be placed to alert pedestrians and drivers of the presence of the trench or excavation.
- If possible, trenches or excavations should be covered or filled in when unattended.

- Otherwise, strong barriers must be placed around the trench or excavation and lighting must be provided at night if the trench or excavation is near a walkway or roadway.

9.43.3 **Protection from Water Hazards**

When water has collected or is collected in excavations and trenches the following requirements shall be applied.

- Employees shall not work in excavations in which water has, or is, accumulating without the use of additional protection such as special support systems or water removal.
- Water removal shall be monitored by a competent person.
- Barriers such as ditches and dikes shall be used to divert runoff from excavations and trenches.
- Trenches shall be re-inspected prior to re-entry after water accumulation due to heavy rainfall or seepage.

9.43.4 Stability of Adjacent Structures

When excavating or trenching near an adjacent structure the following practices shall be implemented.

- Support systems such as shoring, bracing, or underpinning shall be provided where the stability of buildings, walls, or other structures is endangered by excavation.
- Excavation bases or footings of foundations shall be prohibited unless support systems are used, the excavation is in stable rock, a professional engineer (PE) has determined the structure is sufficiently removed from the site as to not pose a hazard, or a PE determines that the excavation shall not pose a hazard to employees due to the structure.
- Support systems shall be used when it is necessary to undermine sidewalks, pavements, and appurtenant structures.
- Surcharge load sources and adjacent encumbrances shall be listed with their evaluation date on the daily inspection checklist.

9.43.5 Daily Inspections

Inspections shall be performed daily on all excavations, adjacent areas, and protective systems before personnel enter the trench. The checklist provided in Attachment II or equivalent shall be used.

9.43.6 Soil Classification

To perform soil classification, the competent person shall use a thumb test, pocket penetrometer, or shear vane to determine the unconfined compressive strength of the soils being excavated. In soils with properties that change (i.e.,

one soil type mixed with another within a given area) several tests may be necessary. When different soil types are present the overall classification shall be that of the type with the lowest unconfined compressive strength. Classifications shall result in a soil rating of Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR 1926.652, Appendix A. Soil classifications shall be listed on the daily inspection checklist. The soils analysis checklist provided in Attachment II or equivalent shall be used for soil classifications.

9.43.7 Sloping and Benching

All sloping and benching shall be done in accordance with 29 CFR 1926.652, Appendix B. Selection of the sloping method and evaluation of surface surcharge loads shall be made by a competent person familiar with the requirements contained therein. Sloping and benching methods and specifications shall be listed on the daily inspection checklist.

9.43.8 Protective Systems

Protective systems are required on all excavations over 5 feet in depth or in excavations less than 5 feet when examination of the ground by a competent person reveals conditions that may result in cave-ins.

Selection and installation of protective systems shall be done in accordance with 29 CFR 1926.652, Appendices C & D, or manufacturers data for shoring and shielding systems. Selection of a protective system shall be made based upon soil classification and job requirements by a competent person. Protective systems and specifications shall be listed on the daily inspection checklist in Attachment II.

9.43.9 Dust Management

Control measures are required to prevent airborne releases of dust during earth moving activities. Of particular concern is contaminated dust that may expose workers and the public. Excavated soils are prone to wind erosion and dispersion of fine particles. Dust generation activities may occur during clearing and grubbing, excavation, soil loading, soil stockpiling, and transportation. The primary dust control measure is the application of a water spray to exposed soils and covering the soil stockpiles with 6-mil polyethylene (see Final Remedial Design). Water will only be applied in the amount needed to control dust. No runoff or water ponding will be produced during dust suppression activities. Additionally, vehicle traffic will be kept on improved roads to the extent possible; vehicle traffic will maintain the posted speed limit; and vehicle access within the project boundaries will be, to the extent practicable, kept away from soil that could cause a hazard or nuisance.

9.43.10 Training

Competent persons shall have an adequate combination of experience and training to classify soil types and select protective systems as outlined in 29 CFR 1926.652. Training and experience pertaining to qualification as a competent person shall be documented and include the following:

- · General safety practices related to working in or near open excavations;
- Inspection requirements and techniques;
- · Classification of soils in accordance with 29 CFR 1926.652, Appendix A; and
- Uses, limitations, and specifications of protective systems in accordance with 29 CFR 1926.652.
- Training records shall be maintained on site.

9.44 FIRE PREVENTION AND PROTECTION PLAN FOR UNDERGROUND CONSTRUCTION

Not applicable.

9.45 COMPRESSED AIR WORK PLAN FOR UNDERGROUND CONSTRUCTION

Not applicable.

9.46 FORMWORK AND SHORING ERECTION AND REMOVAL PLAN

Not applicable.

9.47 PRECAST CONCRETE PLAN

Not applicable.

9.48 LIFT SLAB PLANS

Not applicable.

9.49 MASONRY BRACING PLAN

Not applicable.

9.50 STEEL ERECTION PLAN

Not applicable.

9.51 EXPLOSIVES SAFETY SITE PLAN (ESSP)

See DDESB approved ESS

9.52 BLASTING PLAN

Not applicable.

9.53 DIVE OPERATIONS PLAN

Not applicable.

9.54 SAFE PRACTICES MANUAL FOR DIVING ACTIVITIES

Not applicable.

9.55 EMERGENCY PLAN FOR DIVING

Not applicable.

9.56 TREE FELLING/MAINTENANCE PROGRAM

Not applicable.

9.57 AIRCRAFT/AIRFIELD CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

Not applicable.

9.58 AIRCRAFT/AIRFIELD SAFETY PLAN COMPLIANCE DOCUMENT (SPCD)

Not applicable.

9.59 SITE SAFETY AND HEALTH PLAN FOR HTRW WORK

This SSHP establish policies and procedures to protect workers and the public from the potential hazards posed during field operations at Camp Ravenna. It was developed using historical site background information regarding known or

suspected chemical contaminants, information obtained on previous site visits, and knowledge of potential physical hazards that may be associated with the proposed work at the site.

This SSHP will be modified, as necessary, if new information becomes available, and changes will be made with this approval of the Tetra Tech SSHO and the PHSM. Requests for modifications to the SSHP should be directed to the SSHO. The SSHO will notify the PHSM, who will then notify affected personnel of the changes.

9.59.1 Site Description and Contamination Characterization

The OHARNG plans to construct a new MPMG Range at Camp Ravenna. The location chosen for the MPMG Range is the current location of the Mark 19 Range at the former WBG. There are approximately 70 former burn pads located along five east/west oriented gravel or dirt roads. The former burn pads range in appearance from distinct areas of soil and slag that are partially vegetated to non-descript (no visible slag and heavily vegetated).

Historical operations at WBG included destruction of explosives from various types of munitions by open burning. Historical activities at WBG also included destruction of bulk explosives, propellants, and explosive-contaminated combustible material using open burning. Prior to 1980, materials destroyed by burning included bulk explosives and explosives-contaminated burnable wastes, propellants, black powder, sludge and sawdust from load lines, and domestic wastes. Also, small amounts of laboratory chemicals were burned during production periods. Metallic munitions fragments were allowed to remain on the site after burning, as were possible residual explosives. Waste oil (hydraulic oil from machines and lubrication oil from vehicles) was burned in the northeast corner of WBG until 1973.

Environmental investigations identified additional soil removal is necessary to allow the site to be used by full-time personnel and achieve industrial use. Results of the supplemental investigation indicate that polynuclear aromatic hydrocarbons (PAHs), TNT, and RDX are present within the soil at concentrations which exceed the USEPA's Industrial Regional Screening Levels. A removal action for Munitions and Explosives of Concern (MEC) was performed in 2005 which included remediation of contaminated soil and dry sediment from the target array construction areas, confirmation sampling indicated that additional soil contamination remained on-site.

9.59.2 Hazard/Risk Analysis

The potential hazards associated with the site activities also include chemical, physical and biological hazards. The potential for encountering various hazards will depend on the work being conducted, the location of that work, and the time of year. Specific hazards are discussed below. There are also environmental hazards associated with the physical location of the site (such as vehicular traffic) and weather conditions such as heat, noise, and flora and fauna contact. An AHA has been developed for each planned activity and operation occurring in each major phase of work for the project. Each AHA identifies the sequence of work, specific hazards anticipated, and the control measures to

be implemented to minimize or eliminate each hazard. The AHA is used to augment daily health and safety meetings, and is intended to heighten safety and hazard awareness on the job. A pre-task briefing will be documented, and may be combined with the daily tailgate safety meeting. AHAs are the focal point for safe conduct of work on a project. Since each task is described and evaluated, workers should be better prepared to perform work safely. The SSHO will discuss the risks and precautions associated with each task identified in the Work Plan. Daily tailgate safety meetings are held at the start of each shift. Prior to the day's activity, the safety meeting discusses the potential chemical, physical, and environmental hazards that could be encountered, along with preventive safety measures. During a work day, if there are any changes or new conditions to be addressed, the SSHO will update the AHA and ensure the workers review the amended AHA. Attendance is mandatory for the employees involved in the specific work identified by the AHA.

Amended AHAs must be reviewed by the PHSM. If a change must be implemented immediately and the PHSM cannot be contacted, the SSHO may implement the change and forward a copy of the change to the PHSM as soon as possible, leaving a voicemail phone message for the PHSM. The AHAs for this project are located in Section 10.0 of this APP/SSHP. The SSHO will modify these AHAs as appropriate, add new AHAs for new tasks, and train the employees who perform the tasks on the appropriate AHA. The SSHO will forward any modified or new AHAs to the PHSM for review and approval.

9.59.2.1 Chemical Exposure Potential

There is little potential concern for chemical exposure during excavation sampling if adequate safety precautions are followed. While it is highly unlikely that exposure may occur through inhalation it is possible that very low levels of contamination may be ingestion or absorbed through direct skin contact. The likelihood of worker exposure through these three routes is a considered unlikely, provided that workers follow good personal hygiene and standard good sample collection/sample handling practices, and wear appropriate PPE as specified in this SSHP. Examples on-site practices that are to be observed that will protect workers from exposure via inhalation, ingestion or skin contact include the following:

- Follow the protocol outlined in the Work Plan.
- Avoid hand-to-mouth activities on site (eating, drinking, smoking, etc.)
- · Wash hands upon leaving the work area and prior to performing any hand to mouth activities
- Wear surgeon's-style gloves (nitrile) when handling potentially-contaminated soils.

9.59.2.1.1 MEC Exposure Potential

While MEC/MPPEH removal is not one of the RAOs of this additional soil removal, historical operations have shown that MEC items may still be present at WBG. Therefore, appropriate MEC safety measures will be incorporated into

the remedial action, and MEC/MPPEH will be screened from any excavated soil before disposal of the soil. Also, any MEC/MPPEH or scrap metal recovered during the soil separation process will be properly disposed of in accordance with the DDESB approved ESS. Only UXO qualified personnel per the Department of Defense Explosives Safety Board (DDESB) TP-18 are authorized to handle MEC material. MEC has the potential to kill or cause serious injury if improperly handled. Operations involving MEC are inherently dangerous and require strict adherence to safe practices, safety procedures, and positive control of personnel. Due to the nature of MEC items that may be encountered, all site workers must be vigilant in identifying hazards at the work site and bringing them to the attention of supervisory personnel. As additional hazards are identified, protective measures will be implemented.

9.59.2.1.2 Signs and Symptoms

Routes of exposure are inhalation, ingestion, skin and eye contact. Skin and eye contact are not prevalent routes however dermal contact may lead to inhalation or ingestion through poor work hygiene practices. Signs and symptoms of overexposure may include headaches, dizziness, nausea, hyperactivity, convulsions, seizures, fatigue, and irritability rashes, dry skin and itchy eyes, respiratory problems, joint pain, sore throat, and depression. These effects may be experienced quickly or several hours later. Some can be topically irritating to skin and eyes.

9.59.2.2 Biological Hazards

See Section 9.12.1 of this APP/SSHP.

9.59.3 Staff Organization, Qualifications and Responsibilities

See Section 4.0 of this APP/SSHP.

9.59.4 Training

See Section 6.0 of this APP/SSHP.

9.59.5 Personal Protective Equipment

The levels of personal protection to be used for work tasks at the Camp Ravenna site have been selected based on the nature of the planned work activities and on the known or anticipated hazards; types and concentrations of contaminants that may be encountered onsite; and contaminant properties, toxicity, exposure routes, and matrixes.

PPE is selected by the PHSM when writing the SSHP, and is confirmed through a rigorous review process by the PHSM. To assure proper PPE has been selected, both the physical and chemical hazards present at the job site are taken into account in both developing and reviewing safety-related documents.

The anticipated levels of protection selected for use by field personnel during site activities is the USEPA Level D. If site conditions performed during site activities warrant a higher level of protection, the field personnel will withdraw from the site, immediately notify the Tetra Tech PHSM, and obtain further instructions.

PPE levels can be upgraded or downgraded based on a change in site conditions or investigation findings. When a significant change in site conditions occurs, hazards will be reassessed.

PPE has been selected based on the results of task-specific hazard assessments. Through the completion of employee training (e.g., introductory 40-hour hazardous waste training, annual refresher training, etc.), Tetra Tech employees have been informed of the proper selection, use, and care of PPE items provided to them. After PPE is provided to an employee, the responsibility for using and caring for it appropriately is the responsibility of that employee. The SSHO is responsible for assuring that these responsibilities are fulfilled through daily observations and work area inspections at the sites. The SSHO is also responsible for assuring that appropriate and adequate supplies of PPE are maintained such that they are readily available for issuance/replacement and in a clean and sanitary manner and location. The site personnel will use the procedures presented in the AHAs to obtain optimum performance from PPE.

The levels of personal protection to be used for work tasks have been selected based on the nature of the planned work activities and on the known or anticipated hazards. Specific PPE selected for this project is listed, by task, in the AHAs located in Section10.0 of this APP/SSHP. The PPE minimum is as follows:

- Safety glasses with side shields when there is a possibility of splashing liquids
- Hard hat if near overhead hazards
- Shirt and long pants
- · Water resistant shoe/boots with slip-resistant soles
- Tyvek[®] coverall type suits if a chance of soiling clothing

9.59.6 Medical Surveillance

Personnel performing onsite work that will result in exposure to contaminant-related health and safety hazards shall be enrolled in a medical surveillance program that complies with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65(f). Site personnel will have had a physical examination, conducted by a board certified occupational medicine physician, which meets the requirements of Tetra Tech's medical surveillance program. Certification of medical surveillance program participation is appended to the SSHP. The certification shall include:

• Employee name

- Date of last examination
- Name of examining physician(s).

The required written occupational physician's opinion shall be made available upon request to the USACE Contracting Officers Representative. The medical records shall be maintained in accordance with 29 CFR 1910.1020. Attachment I contains the certification of participation in a medical surveillance program.

9.59.7 Exposure Monitoring/Air Sampling Program

Based on the levels and the type of contamination, air monitoring is not anticipated. The generation of visible dust from intrusive activities or sample handling or the detection of odors/stained soil may require additional monitoring. The SSHO will notify the PHSM immediately if this occurs.

9.59.8 Heat and Cold Stress

See Section 9.18 of this APP/SSHP.

9.59.9 Standard Operating Procedures, Engineering Controls and Work Practices

In addition to the task-specific work practices and restrictions identified in the AHAs found in Section 10.0 of this APP/SSHP, the following general safe work practices are to be followed when conducting work on-site.

- Personnel engaged in onsite activities will practice the "buddy system" to ensure the safety of personnel involved in this operation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists is prohibited.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area.
- The use of waterless hand cleaning products is acceptable if followed by actual hand-washing as soon as practicable upon exiting the site.
- Avoid contact with potentially contaminated substances including puddles, pools, mud, or other such areas.
- Avoid, kneeling on the ground or leaning or sitting on equipment.
- Plan and mark entrance, exit, and emergency evacuation routes.
- Rehearse unfamiliar operations prior to implementation.
- Establish appropriate safety zones including support, contamination reduction, and exclusion zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone). Nonessential vehicles and equipment should remain within the support zone.
- Establish appropriate decontamination procedures for leaving the site.
- · Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the SSHO.
- Observe co-workers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

9.59.9.1 Material Handling Procedures

Handling and storing materials involve many operations including handling drums and moving equipment. Improper handling and storing of materials often result in injuries. Whether moving materials manually or mechanically, know and understand the potential hazards associated with the task at hand and how to control the workplace to minimize danger.

- Hazards include lifting heavy objects, falling objects, improperly stacked materials, and various types of equipment. Potential injuries that can occur when manually moving materials include the following:
- Strains and sprains from lifting loads improperly or from carrying loads that are either too large or too heavy.
- Fractures and bruises caused by being struck by materials or by being caught in pinch points.
- Cuts and bruises caused by falling materials that have been improperly stored or by incorrectly cutting ties or other securing devices.
- Manual lifting is likely to occur during many phases of the project.

Tetra Tech personnel should notify supervisors or designated safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities, such that the Tetra Tech may evaluate safe operational procedures with regard to the required task.

- Proper lifting techniques (use of knees and not back) must be used when lifting any object:
- Plan storage and staging to minimize lifting or carrying distances.
- Use drum dollies/carts with a latching mechanism when handling full/loaded drums.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift especially for heavy (>40 lbs.) or awkward loads.
 - If site personnel are not capable of lifting 40 lbs., seek assistance from a team member to split the load.
- Make sure the path of travel is clear prior to the lift.

9.59.9.2 Drum/Container/Tank Handling

During the execution of the contract, various types and quantities of generated waste materials will be generated and may include, but not be limited to, PPE excess soil, and limited quantities of decontamination fluids. Personnel are permitted to handle and/or sample drums containing known waste sources/materials, but handling or sampling of other drums (unknowns) requires an APP/SSHP revision or amendment approved by the PHSM. The following control measures must be taken when managing drums containing waste sources/materials:

- Minimize transportation of drums or other containers with generated waste materials.
 - However, where this is deemed necessary, appropriate drum dollies, hand trucks or other suitable material handling equipment shall be used to transfer drums of generated waste materials.
- Sample or open only labeled drums or drums known to contain generated waste materials.
- Unknown drums or drums that show evidence of excessive buckling/ bulging, corrosion, vapors, crystallization, unusual discoloration or other abnormalities may only be sampled with:
 - Evaluation of engineering controls,
 - Proper PPE and
 - Use of properly trained personnel familiar with the sampling of unknown drum contents.
- Use caution when sampling bulging or swollen drums.
 - Relieve pressure slowly and step away from the drum as pressure is being released.
- If drums contain, or potentially contain, flammable materials, use non-sparking (i.e., brass) tools to open the drum.
 - Picks, chisels, and firearms may not be used to open drums.
- Reseal bung holes or plugs whenever possible.
- Avoid mixing incompatible drum contents.
- Sample drums without leaning over the drum opening.
- Transfer the content of drums using a method that minimizes contact with material.
- PPE worn to minimize potential dermal to identified contaminants of concern.
- Good personal hygiene practices and procedures must be maintained.

9.59.9.3 Comprehensive AHA of Treatment Technologies

See Section 10.0 of this APP/SSHP.

9.59.10 Site Control Measures

This section outlines the means to delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas.

9.59.10.1 Control Zones

It is anticipated that a three-zone approach will be used during work at this site. This approach will be comprised of an exclusion zone, a contamination reduction zone, and a support zone. It is also anticipated that this approach will control access to site work areas, restricting access by the general public, minimizing the potential for the spread of contaminants, and protecting individuals who are not cleared to enter work areas. Site personnel entering the exclusion zone and contamination reduction corridor will log-in and log-out with the SSHO on a daily basis. This information will be kept in the SSHO project log book.

9.59.10.2 Exclusion Zone

The exclusion zone will be considered those areas of active operations plus an established safety zone depending on the task. The following represent the exclusion zone boundaries for the following identified tasks:

- Excavation area Authorized personnel only
- MEC/MPPEH Investigation area IAW the ESS and Work Plan
- MEC/MPPEH Disposal IAW the ESS and Work Plan
- Processing and Stockpile area Authorized personnel only
- Low pressure decontamination activities 10 feet

All areas where activities are performed that may involve exposure to ordnance should be considered EZs. EZs will be established and taken down as MEC support activities in various areas is conducted and completed. The size and configuration of the EZ will be based on the HFD of the MEC items discovered, allowing adequate space for field members and emergency equipment. The size of the EZ will be determined and checked by the SUXOS. Each EZ established will be clearly delineated using traffic cones, caution tapes or other appropriate markers or barricades.

Exclusion Zones will be established around each MEC/MPPEH investigation area as detailed in the ESS and Work Plan (Mk II Hand Grenade) HFD 62 Feet.

A pre-startup site visit will be conducted to identify proposed subsurface investigation locations, conduct utility clearances, and provide notices concerning scheduled activities.

9.59.10.3 Contamination Reduction Zone

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting exclusion zone activities. This area will be marked using barrier tape, cones, and postings to inform and direct facility personnel.

Decontamination will be conducted at a central location. Equipment potentially contaminated will be bagged and taken to that location for decontamination.

9.59.10.4 Support Zone

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established at areas of the site away from potential exposure to site contaminants during normal working conditions or foreseeable emergencies.

9.59.10.5 Site Visitors

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by Tetra Tech
- Regulatory personnel (i.e., Ohio EPA, OSHA)
- Authorized OHARNG and Authorized ARNG
- Authorized USACE Personnel
- Other authorized visitors

Non-Tetra Tech personnel working on this project are required to gain initial access to the site by coordinating with the Tetra Tech Field Superintendent or designee. Site visitors will be escorted and restricted from approaching any work areas where they could potentially be exposed to hazardous chemicals. If a visitor has authorization from the client and from the Tetra Tech PM to approach our work areas, the SSHO must ensure that the visitor first provides documentation indicating that he/she/they have successfully completed the necessary OSHA introductory training, receive site-specific training from the SSHO and that they have been physically cleared to work on hazardous waste sites.

9.59.10.6 Site Security

Site security will be accomplished using Tetra Tech field personnel. Tetra Tech will retain complete control over active operational areas. The second line of security will take place at the work site referring interested parties to the POC. The POC will serve as a focal point for base personnel, interested parties, and serve as the final line of security and the primary enforcement contact.

9.59.10.7 Communication

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary. External communication will be accomplished by using cell phones. Workers should enter the emergency and important phone numbers from Figure 9-1 into their cell phones prior to beginning work.

9.59.11 Personal Hygiene and Decontamination

This section provides decontamination procedures and guidelines for developing site and activity specific decontamination procedures.

9.59.11.1 Responsibilities

The PHSM shall ensure that decontamination measures are adequately addressed in the Site Specific H&S Plan. The SSHO is responsible for establishing a decontamination area. The SSHO also ensures that adequate decontamination procedures are followed to prevent contamination of individuals or the environment beyond the exclusion zone. The PM will ensure that sufficient information has been provided to the PHSM to prepare adequate decontamination procedures for inclusion in the SSHP.

9.59.11.2 Decontamination

Decontamination involves physically removing contaminants and/or converting them chemically into harmless substances. Decontamination, proper PPE donning procedures, and safety zones minimize the chance of cross-contamination from protective clothing to wearer, equipment to personnel, and one area to another.

The decontamination will consist of a soap/water wash and rinse for outer protective equipment (e.g., boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the drilling operations bordering the support zone.

This decontamination procedure will consist of:

- Equipment drop
- Soap/water wash and rinse of outer gloves and outer boots, as applicable
- Soap/water wash and rinse of the outer splash suit, as applicable
- · Wash hands and face, leave contamination reduction zone

The SSHO will determine the organization and materials used. Factors that are considered include: the extent and type of hazard expected, meteorological conditions, topography, levels of protection selected, and availability of equipment and supplies.

9.59.11.3 Contamination Avoidance

Avoiding contamination is the first and best method for preventing the transfer of contamination to personnel or to non-contaminated areas. Each person involved in site operations must regularly practice the methods, listed below, for contamination reduction.

- Know the limitations of the protective equipment being used.
- Do not sit or lean against anything in a contaminated area.
- Waste containers should be checked for incompatible materials.
- Do not set sampling equipment directly on contaminated areas.
- Use the proper tools to safely conduct the job.

9.59.11.4 Decontamination Guidance

Personnel decontamination will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, splash suits, etc.). This function will take place at an area adjacent to the site activities.

Decontamination procedures will be reviewed with site personnel prior to entering the EZ. Each person will be given precise instructions and be acquainted with the procedure for moving through the decontamination line. Progress through the decontamination line will be deliberate, organized to minimize hazard contamination for personal.

9.59.11.5 Closure of the Decontamination Line

When the decontamination line is no longer needed, it will be closed down by site personnel. The disposable items used during the operation will be double-bagged and contained onsite, or removed to an approved off-site disposal facility. Decontamination and rinse solutions may be discarded onsite if approved by regulatory agencies. If not, they will be removed to an approved disposal facility. Reusable clothing should be dried and prepared for future use. If gross contamination had occurred, additional decontamination or disposal of these items may be required. Cloth items must be bagged and removed from the site for final cleaning or disposal. Wash tubs, pails, containers, etc., must be thoroughly washed, rinsed, and dried before removal from the site.

9.59.12 Heavy Equipment and Sampling Equipment Decontamination

Heavy equipment and sampling equipment will be decontaminated as stated per the requirements in the Sampling and Analysis Plan. SDS for any decontamination solutions (such as Alconox[®], methanol, isopropanol, hexane, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.). The sampling equipment used will require a complete decontamination between locations and prior to removal from the site.

The equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment, such as drill rigs, will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. The site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.

The equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.

The SSHO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. Equipment will only be authorized access or exit with this authorization.

Evaluation will consist of a visual inspection to ensure that visible contamination has been effectively removed.

9.59.13 Emergency Equipment and First Aid

The following emergency equipment will be strategically placed and maintained onsite:

- A first aid kit meeting the requirements of OSHA, EM 385-1-1, Section 03.B.01, and ANSI Z308.1 will be readily available at each work site by having the kit available and ready for use.
 - The location of each first aid kit shall be clearly marked, and kits shall be protected from the weather and maintained clean.
 - The kit must contain all the items listed in Figure 9-4 Requirements for Basic Unit Packages (from Section 3 of the EM 385-1-1 Manual) and include one pocket mouthpiece or CPR barrier and latex gloves.
 - The kit will be inspected weekly and items shall be replaced as they are used.
 - All employees who work where there is a first aid kit shall receive a tool box training on the content and use of the kit supplies.

- Eye wash units (or bottles of disposable eyewash solution) are maintained during sampling activities due to the small quantities of corrosive preservatives and well construction activities due to the caustic nature of the cement/grout products.
 - These units are acceptable due to extremely small quantity of the corrosives.
 - These will be used as adjunct support until access to a fixed unit or the medical provider at UH Portage Medical Center.
 - These units will be maintained in a clean location and inspected each week.
- Fire extinguishers will be maintained onsite and shall be immediately available for use in the event of an emergency. A 5 lb. ABC Dry Chemical Class Fire Extinguisher will be used for general support activities.
- If fuel will be transferred from portable fuel cans, they will be Underwriters Laboratory (UL) approved safety cans properly labeled.
 - If greater than 25 gallons is stored onsite a 5lb. ABC fire extinguisher will be mounted within 50 feet of the fueling location.
- Fire extinguishers will be inspected monthly to ensure:
 - Sufficient charge
 - No physical damage
 - Tamper indicators are in place
 - Inspection tag documents inspection
- Site personnel will be trained in the use of the fire extinguisher as part of site specific training.

9.59.13.1 First Aid

Tetra Tech personnel will perform rescue operations from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid and Cardio Pulmonary Resuscitation (CPR)" level support, and only within the limits of training obtained by site personnel.

Basic First-Aid is considered treatment that can be rendered by a trained first aid provider at the injury location. Medical attention above First-Aid level support will require assistance from the designated emergency response agencies which is obtained by notifying Range Control. At least two Tetra Tech site personnel will be trained to this level while working onsite.

9.59.14 Emergency Response and Contingency Procedures

In the event of an emergency during onsite work, the primary response action by onsite personnel will be to safely evacuate, assemble at an area unaffected by the emergency, and notify Range Control. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that

such transport does not aggravate or further endanger the welfare of the injured/ill person. Site personnel will record any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets which will be filed onsite.

The local emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. The POC will be notified if these response agencies are contacted. Tetra Tech personnel will provide insipient emergency prevention activities such as:

- Initial (e.g., non-structural) fire-fighting support (fire extinguisher) and prevention
- Initial spill control and containment measures and prevention
- Evacuate personnel from emergency situations
- Initial medical support for injury/illness requiring only first-aid level support

9.59.14.1 Pre-Emergency Planning

Based on the nature of the planned activities, emergencies resulting primarily from physical hazards could be encountered. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following:

- Coordinating with the local Emergency Response personnel prior to the commencement of work to ensure that Tetra Tech emergency action activities are compatible with existing emergency response procedures.
- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency.
- Creating and maintaining documents onsite that can be important in the event of an emergency situation, including:
 - A Chemical Inventory of hazardous chemicals onsite
 - MEC/MPPEH Inventory
 - Corresponding SDS.
 - Completed Medical Data Sheets (Figure 9-3) for onsite personnel.
 - A log book identifying personnel onsite each day.
 - Hospital route maps with directions.
 - Emergency Notification phone numbers.
 - Location of nearest Medical Transfer Point to work site.

In the event of an onsite emergency, the SSHO will be responsible for the following tasks:

- Determining that an emergency situation exists, initiating a site evacuation, accounting for onsite personnel at the assembly area, and determining if/when return to work conditions resume.
- With assistance from the SSHO, educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention.
- With assistance from the SSHO, periodically performing practice drills to ensure site workers are familiar with incidental response measures.

9.59.14.2 Personnel and Lines of Authority for Emergency Situations

In the event of an emergency situation the SSHO will serve as the Incident Commander until the local emergency services arrive on site. Other site personnel will provide support and follow direction from the Incident Commander.

9.59.14.3 Criteria and Procedures for Emergency Recognition and Site Evacuation

Emergency situations may be encountered during site activities.

9.59.14.3.1 Emergency Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. Visual observation will also play a role in detecting potential exposure events to chemical hazards. To adequately recognize chemical exposures, site personnel must have an awareness of signs and symptoms of exposure associated with the principle site contaminant of concern (see Sections 9.59.1 Site Description and Contamination Characterization and 9.59.2.1 Chemical Exposure Potential).). Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in this APP/SSHP. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The SSHO will be responsible for performing and documenting surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Site personnel are responsible for reporting perceived hazardous situations.

The above actions will provide early recognition for potential emergency situations, and allow Tetra Tech to instigate necessary control measures. However, if the SSHO determine that control measures are not sufficient to eliminate the hazard, Tetra Tech will withdraw from the site and notify the appropriate response agencies.

9.59.14.3.2 Site Evacuation

An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety or welfare of site workers. Specific examples of conditions that may initiate an evacuation include, but are not limited to the following: severe weather conditions; fire or explosion; and evidence of personnel overexposure to potential site contaminants.

In the event of an emergency requiring evacuation, personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the Tetra Tech SSHO. Safe places of refuge will be identified prior to the commencement of site activities and will be conveyed to personnel as part of the pre-activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the Tetra Tech SSHO or the Emergency Response Team Incident Commander. The SSHO will perform a head count at this location to account for and to confirm the location of site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel. The SSHO will document the names of personnel onsite (on a daily basis) in the site H&S Logbook. This information will be utilized to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

9.59.14.3.3 Emergency Alarm Systems

Tetra Tech personnel will be working in close proximity to each other at Camp Ravenna. As a result, hand signals, two-way radio communications, voice commands, and line of site communication will be sufficient to alert site personnel of an emergency. When project tasks are performed simultaneously on different sites, vehicle horns will be used to communicate emergency situations. If an emergency warranting evacuation occurs, the following procedures are to be initiated:

Initiate the evacuation via radio communications, hand signals, voice commands, line of site communication, or vehicle horns. The following signals shall be utilized when communication via vehicle horn is necessary:

HELP	three short blasts	(•••)		
EVACUATION	three long blasts	()		

- Report to the designated refuge point.
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the SSHO (who will serve as the initial Incident Coordinator) pertinent mishap details.
- Notify Range Control and the USACE COR.

9.59.14.4 Decontamination and Medical Treatment of Injured Personnel

Based on the nature of the planned activities and on the nature and extent of contamination that may be encountered during these activities, the need for any specific personal decontamination activities in an emergency medical situation is highly unlikely. In the unlikely instance that such efforts become necessary, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of the involved personnel. Decontamination will be postponed if the mishap warrants immediate evacuation. As soon as possible and prior to transportation to a medical center the contaminated site worker will be:

- Washed and rinsed
- · Contaminated clothing removed and disposed of as hazardous waste
- First aid treatment rendered

9.59.14.5 Route Maps and Phone Numbers for Emergency Responders

For emergencies contact Range Control by telephone at (614) 336-6041. Notify the USACE COR, Nathaniel Peters II at (502) 315-2624.

The closest hospital is the UH Portage Medical Center in Ravenna, Ohio. The Emergency Department is open 24 hours a day, 365 days a year, and is equipped to treat all illnesses and injuries, whether minor, serious or life threatening. Figure 9-2 is the route map to hospital.

Prior to initiating field activities, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Figure 9-1 provides a list of emergency contacts and telephone numbers. This figure must be posted where it is readily available to site personnel.

9.59.14.6 Criteria for Alerting Local Community Responders

- For non-spill emergencies from 0730-1630, Monday through Friday, contact Range Control.
- For non-spill emergencies outside duty hours, dial 911 and ask for the Ravenna, Ohio emergency dispatch.
- State your emergency and location.
- Outside of duty hours, the Main Gate Guard Shack, also known as Guard Post 1, (330) 358-2017 should be notified so they can assist in the process (open the gate, direct vehicles).
- During duty hours, Range Control will contact this appropriate dispatch for emergency response and help guide units to your location.
- If the patient can be moved, transporting the patient to the nearest Medical Transfer Point, or EMS entrance gate (North Gate or Main Gate) will expedite the medical evacuation process.
- If the patient cannot be moved, post a signal person (time and resource permitting) at the nearest major intersection/road/medical transfer to help guide emergency vehicles.
- Medical Transfer Points are located throughout the installation. These predetermined points assist first responders in locating injured personnel.



Medical Transfer Point Sign

9.60 CONFINED SPACE ENTRY PROCEDURES

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. Therefore, personnel under the provisions of this APP/SSHP are not allowed, under any circumstances, to enter confined spaces. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

9.61 CONFINED SPACE PROGRAM

Not applicable.
10.0 RISK MANAGEMENT PROCESSES

Work conducted in support of this project will be performed using the Activity Hazard Analysis (AHA) process to guide and direct field crews on a task by task basis. It is the SSHO's responsibility to review the AHAs with the task participants as part of a pre-task tailgate briefing session.

Daily safety meetings will be conducted during site work and the task-specific AHA(s) will be reviewed prior to initiating any field activities. This effort will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Use of this APP/SSHP will provide the line of communication for reviewing task-specific hazards and protective measures associated with each operation. This APP/SSHP will be used as the primary reference for selecting levels of protection and control measures.

The SSHO is responsible for making the parties aware of the contents and requirements of this APP/SSHP. Any problems encountered with the protective measures required will be documented and brought to the attention of the SSHO.

As an ongoing quality assurance effort, the SSHO will review operations to ensure the AHAs adequately address potential hazards for the tasks being conducted. Where deficient, they will be corrected and that information shared with the field personnel. Amended AHAs will be forwarded to the PHSM for inclusion in future APP/SSHP s for similar activities. The following AHAs are attached below:

- Site Mobilization/Demobilization
- Site Clearing and Grubbing
- Excavation and Backfilling/Mechanical Soil Screening
- MEC/MPPEH Management
- Surface Soil Sampling
- Heavy Equipment Operation
- · Transporting and Disposal of Contaminated Soil and Debris
- Decontamination
- IDW Management

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:

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Project: Camp Ravenna Site Mobilization/Demobilization Job: Prepared By: J. Laffey, CESCO Reviewed By* (USACE): N. Peters/K. Tait

Recommended Protective Clothing & Equipment:

Personal Protective Equipment Minimum: Safety toe boots, safety glasses.

Optional items: Hardhat, hearing protection.

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
s	Catastrophic	Е	Е	Н	H	Μ
e v	Critical	Е	Н	Н	Μ	L
r i	Marginal	Н	M	Μ	L	L
t y	Negligible	Μ	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC*
Vehicle Operation	1. Unauthorized drivers	 Ensure driver is "authorized" per the Tetra Tech Vehicle Safety Program. Every person operating a motor vehicle shall possess, at all times while operating such vehicle, a license/permit valid for the equipment being operated. Operators must also comply with State and local vehicle and traffic regulations. 	18.A	L
	2. Vehicle/equipment failure	 Prior to use, walk around your vehicle make sure you have adequate tire pressure, no lights are broken, etc. Examine gauges to ensure operational fluids are at desired levels. Carry a First-Aid Kit and a Fire Extinguisher in each site vehicle to provide emergency assistance/control should a situation arise. Vehicles not meeting safe operating conditions shall be immediately removed from service, its use prohibited until unsafe conditions have been corrected, and re-inspected before being placed in service again. 	18.A.03-04	L
	3. Distracted driving	 Preset radio stations, secure wires for auxiliary IPod or similar devices so this is not attempted while driving. The driver will not use a cell phone while the vehicle is in motion. Set address for GPS or similar devices so this does not have to occur while driving. Do not eat, play with the radio or engage in any activities that would distract you from your primary task of driving. If a call is received, let it go to voice mail or pull over and answer it. 	18.C	L

Μ

Date Prepared: 11-16-2015

Project: Camp Ravenna Job: Site Mobilization/Demobilization

ACTIONS TO ELIMINATE OR EM 385-1-1 RAC* JOB STEPS HAZARDS **MINIMIZE HAZARDS** (PARA REF) 4. Speeding 1. Do not speed. 18.C.02 The speed limit on Camp Ravenna 35 MPH (during daylight hours) & 25 MPH 2. (during hours of darkness) on all roads unless otherwise posted and 10 MPH when passing military personnel traveling on foot. Practice defensive driving whenever traveling in a vehicle. Permit adequate room between you and the driver in front of your vehicle. L 4. 5. Use the 4-second rule - The time and distance between you and the vehicle in front of you) for travel speeds in excess of 40 miles per hour (mph) to permit adequate stopping time. 6. Follow posted road signs Exercise extra caution when moving through school, residential, and work zones. 7. 18.C.16 5. Unsecured loads 1. Secure items to prevent movement or loss from the vehicle potentially causing an accident. L 2. Vehicles shall not be loaded in a manner that obscures the driver's view ahead or to either side or which interferes with the safe operation of the vehicle. 6. Vehicle accident 1. If there is an accident the driver is responsible to notify the proper authorities and Appendix secure the scene. B.16.b. 2. Visually examine the area ensure the scene is safe to enter and provide assistance as necessary. Move the vehicle if possible from the travel lanes. 3. Turn on the emergency flashers. 4. 5. Do not step into traffic when exiting the vehicle. Secure the vehicle and valuables. 6. L 7. Place the warning triangle (100-feet behind your vehicle) and put on your High Visibility Vest. Provide assistance to injured persons as training permits and as necessary. 8. 9. Contact the Field Superintendent and the SSHO. 10. Be respectful to the local authorities. 11. Never attempt to argue who's fault 12. Take photos, record locations, get witness names and contact information where and as possible. Assembling equipment and 1. Heavy Equipment Conduct initial site acceptance inspection prior to performing any work at this 18.A.03 1. supplies site. L 2. Use the equipment inspection checklist for drill rigs in Attachment III.

Date Prepared: 11-16-2015

Project: Camp Ravenna

Job:

: Site Mobilization/Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC*
Performing initial/exit inspections of the intended work areas	2. Vehicular traffic when moving large equipment to the support area	 Designate and mark vehicle and equipment staging areas. Inform the site personnel of heavy equipment areas and of their responsibility to stay clear of moving vehicles. In high traffic areas, wear a high-visibility vest, shirt or jacket. 	18.C	L
Arranging for utilities, site access, notifying appropriate Base Contacts Performing equipment inspections of vehicles and equipment arriving/preparing to depart the site Installation of Type II Storage Magazine	 Minor cuts, abrasions or contusions 	 Wear cut-resistant gloves when handling items with sharp or rough edges or when using knives to cut open packages. A cut resistant glove should at least be worn on the non-knife hand. Exercise caution when unpacking boxes. Make sure you can see clearly into the box and do not reach in and contact broken glass (possibly damaged in shipment) or sharp articles. Always cut away from yourself and others. Do not place items to be cut on your hand and/or knee Always use a sharp cutting instrument. Many accidents result from struggling with dull cutting implements. Secure work pieces to be cut. Carry and transport glassware in a hard-sided container, that way if you fall, you will not fall onto broken glass resulting in lacerations. If there is broken glass, place it in a hard-sided container for disposal. Placement in a soft sided container may result in cuts and lacerations, if the bag is penetrated by shards of glass. 	05.A.07	L
	4. Heavy lifting (muscle strains and pulls)	 Practice safe lifting techniques. Use mechanical lifting devices such as a dolly whenever possible Ensure clear path of travel and a clear area where the load will be deposited Have a good grasp on object. Perform "test lift" to gauge ability to safely make the lift without injuring yourself. Keep your back (spine) straight Lift with legs not back. Muscles, tendons, and ligaments are not as flexible in the early morning hours. Stretch before physical taxing activities. Later in the afternoon, the muscles, tendons, and ligaments maybe stressed from fatigue. Take breaks as necessary to avoid injury. 	14.A.01 14.A.04.d	L

Date Prepared: 11-16-2015

Project: Camp Ravenna

Job: Site Mobilization/Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC*
	5. Intermittent high noise levels	 Site personnel are to wear hearing protection if noise levels are such that they must raise their voice in order to communicate with someone who is within arm's reach (approx. 2') of them. SSHO is responsible for determining and designating when hearing protection is required. Hearing protection is to consist of either ear muffs or plugs that have a noise reduction rating (NRR) of at least 25 dB. 	5.C	L
	6. Inclement weather	 The Field Superintendent and/or the SSHO will temporarily suspend outside activities in the event of electrical storms or high winds. It is preferred that supported systems such as lightning detection devices or emergency weather broadcasts are employed. Electrical/Thunderstorms – Where possible employ a lightning detection equipment to warn field personnel of approaching storms. You are <u>not safe</u> anywhere outside. Move quickly and safely to a safe building or vehicle when you first hear thunder, see lightning or observe dark threatening clouds developing overhead. Stay inside until 30 minutes after you hear the last clap of thunder. Do not shelter under trees. 	01.E.01	L
	7. MEC/MPPEH Hazards	 A visual detector aided survey will be performed within all site ingress egress areas prior to non UXO personnel entering the work area. MEC/MPPEH survey and clearance will be conducted by trained UXO Technicians. Non-UXO personnel will be escorted while in the area of concern. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log location information will be recorded with the site GPS. MPPEH will be dual inspected. Items determined MDAS will be segregated and secured in the MDAS container. 	25.A.01 c (13)	М

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: Site Mobilization/Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC*
		 If suspect MEC or MPPEH items not determined MDAS are identified the item will be treated IAW the approved ESS. Any suspect MEC or MPPEH item not determined MDAS discovered during UXO Survey/Mechanical Screening which has been determined to be safe to move, may be moved to a designated holding area until treated in accordance with the approved ESS. MEC determined unsafe to move will be left in place and treated using blow in place procedures IAW the approved ESS. An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation, and the PM will be provided an inventory update on a daily basis. 		
Conducting land survey	1. Slips, trips, and falls	 Watch for tree branches, roots, weeds, limbs and other ground hazards Use caution when working on uneven and wet ground surfaces. Remove/identify trip hazards from the work area, so they may be avoided. Maintain good housekeeping within the work area. Select the best route possible for moving over various terrain types and vegetation. 		L
	2. Foot injuries	 Work boots with a rugged lug is recommended to minimize slips, trip, and falls. Lace up boots providing a substantial ankle support is recommended for movement over various terrain. Steel toed boots are not required for this task. 	05.E	L
	3. Irritating plants	 Recognize Poison Ivy, Poison Oak, Poison Sumac and other irritating plants which cause an allergic reaction s. Avoidance is the best method of prevention. Wear protective clothing that maybe thrown away when the task is complete. Wear barrier creams or PPE, prior to entry into heavy brush. Wash with cool water and soap or an over the counter solutions to remove these oils from the skin. Wash contaminated clothes separate from other clothes. 	06.E.03	L
	4. Insects	 Insect populations can vary from ants, bees, spiders, ticks, and mosquitoes, etc. These hazards are affected by the season in which the work is being conducted. Use commercially available insect repellant applied liberally to skin and clothing per the manufacturers requirements. Wear light colored clothing to assist in locating crawling insects on your body. Apply insect repellent containing at least 10% DEET. 	06.E.01	L

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: Site Mobilization/Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC*
		6. Tape pants legs to boots to control insect access into clothing.		
	7. Inclement weather	 To detect electrical/thunderstorms use a lightning detection equipment to warn field personnel of approaching storms. Electrical/Thunderstorms – Where possible employ a lightning detection equipment to warn field personnel of approaching storms. You are <i>not safe</i> anywhere outside. Move quickly and safely to a safe building or vehicle when you first hear thunder, see lightning or observe dark threatening clouds developing overhead. Stay inside until 30 minutes after you hear the last clap of thunder. Do <i>not</i> shelter under trees. The survey team leader shall assess heavy rains/ storms and determine whether work will continue. 	01.E.01	L

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (dollies, hand	Review of AHA during pre-task tailgate safety briefing with	Visual inspection prior to use by user.
carts, hand knives, etc.)	the intended task participants. Competent or Qualified	
	Person(s): Field Superintendent and SSHO.	
Personal Protective	PPE training in proper use, care, storage, and limitations. It	Initial PPE inspection performed by SSHO. Ongoing (prior to each use)
Equipment Minimum:	is anticipated that this has been covered in employees' 40	inspections responsibilities of PPE users.
Safety toe boots, safety	hour HAZWOPER training, which is to be verified by the	
glasses. Optional items:	SSHO through initial training documentation and review	
Hardhat, hearing protection.	prior to permitting personnel to participate in any onsite	
HTRW: None anticipated for	activities, and will be confirmed by visual observations of	
this task.	worker activities.	

Date Prepared: 11-16-2015

Project:Camp Ravenna**Job:**Site Mobilization/Demobilization

I have read and understand this AHA:

Name (Printed)	Signature	Date

Date Prepared: 11-16-2015

Project:

Site Clearing and Grubbing Job:

Reviewed By* (USACE): N. Peters/K. Tait Prepared By: J. Laffey, CESCO

Recommended Protective Clothing & Equipment:

Camp Ravenna

Steel toe boots, hard hats, and safety impact eye protection, work gloves, work clothes, hearing protection during chainsaw use.

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
S	Catastrophic	Е	Е	Н	Н	Μ
e v	Critical	Е	н	Н	Μ	L
r i	Marginal	Н	Μ	Μ	L	L
t y	Negligible	Μ	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
Site Preparation	1. MEC/MPPEH Hazards	 A visual detector aided survey will be performed within all site ingress egress areas prior to non UXO personnel entering the work area. MEC/MPPEH survey and clearance will be conducted by trained UXO Technicians. Non- UXO personnel will be escorted while in the area of concern. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. All mechanical excavation activities will be performed IAW the approved planning documents. Equipment will meet shielding requirements as All manual intrusive investigations will be performed using proper manual UXO excavation techniques. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log location information will be recorded with the site GPS. MPPEH will be dual inspected. Items determined MDAS are identified the item will be managed IAW the approved ESS 	25.A.01 c. (13)	М

Risk Assessment Code (RAC)*:

Date Prepared: 11-16-2015

Camp Ravenna Site Clearing and Grubbing **Project:** Job: EM 385-1-1 **ACTIONS TO ELIMINATE OR JOB STEPS** HAZARDS RAC (PARA REF) MINIMIZE HAZARDS Any suspect MEC or MPPEH item not determined MDAS discovered during UXO Survey/Mechanical Screening which has been determined to be safe to move, may be moved to a designated holding area until managed IAW the approved ESS. MEC determined unsafe to move will be left in place and treated using blow in place procedures in accordance with the approved ESS. -An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation, and the PM will be provided an inventory update on a daily basis. 1. Power equipment will be inspected prior to use in accordance with operating instructions. 2. Cuts, sprains and 13.A.02 2. Equipment must be operated by knowledgeable field personnel. strains 3. Prior to the start of clearing and grubbing, the equipment to be used will be inspected using the Equipment Inspection Checklist for Hand and Power Tools provided in Attachment III. 4. Only manufacturer approved parts may be used in repair of site equipment. 5. Only personnel directly supporting the clearance activity will remain in the area, others will stay at least 50-100 feet away from the point of operation. 6. Site personnel will be instructed in the location and operation of the emergency shut off devices. L 7. Secure all loose clothing articles to avoid possible entanglement. 8. If hand tools (brush hooks, machetes, etc.) are used to clear brush and small trees the following precautions should be followed: Inspect handles, are they in good condition (no cracks, splinters, loose heads/cutting apparatus?? Check cutting tools edges, all blades should be sharp without nicks or gouges in the blade. All hand tools (brush hooks, machetes, etc.) should be kept in a sheath when not in use. A 10-foot perimeter will be established around areas where brush clearing is being _ conducted. 1. All gasoline-powered equipment will be grounded and bonded. 3. Fire 09.A Follow manufacturer's instructions for refueling 2. Equipment must be shut off during refueling. 3. Smoking only permitted in designated areas. 4. L 5. Fuel containers will be stored further than 10 feet of the motor. Fuel will be stored in UL approved safety containers with contents clearly labeled. 6. 7. Portable fire extinguisher(s) must be maintained onsite.

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: Site Clearing and Grubbing

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
	4. Insect/animal bites	 Tape up joint between the bottoms of pants legs and top of work boot with duct tape. Apply insect repellants containing at least 10% DEET. Follow manufacturer's label instructions for proper application and re-application. Perform close body inspections at the end of each day to detect/remove any insects. If walking through high grass or brush areas avoid approaching or disturbing potential nesting areas. 	06.E1	L
	5. Inclement weather	 If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the SSHO will suspend outside activities. Electrical/Thunderstorms – Where possible employ a lightning detection equipment to warn field personnel of approaching storms. You are not safe anywhere outside. Move quickly and safely to a safe building or vehicle when you first hear thunder, see lightning or observe dark threatening clouds developing overhead. Stay inside until 30 minutes after you hear the last clap of thunder. Do not shelter under trees. If no additional lightning and/or thunder is noted within this 30 minutes, work may resume at the SSHO direction. Personnel will be directed to seek suitable shelter that will provide adequate protection from the elements. Lightning threat detection will be coordinated within Camp Ravenna POC existing systems. 	01.E.01	L
	6. Strains/sprains from heavy or improper lifting	 Practice safe lifting techniques. Use mechanical lifting devices such as a dolly whenever possible Ensure a clear path of travel and good grasp on objects Lift with legs not back, and obtain help when needed to lift large, bulky, or heavy items). 	14.A	L
	7. Slip/trip/fall hazards	 Implement and maintain good housekeeping practices throughout work areas. Preview walking/working areas and maintain them to identify and avoid possible slipping/tripping hazards. Preview work locations for unstable/uneven terrain. 	14.D	L
	8. Chemical exposure	1. As direct contact will be minimal given the nature of the work, it is unlikely that exposure will occur.	06.A.01	L
Chain Saw	Cuts, amputation, burns.	 Inspect the chainsaw prior to each use. Ensure the blade is adjusted and sharp, and all parts are lubricated per the manufacturer's instruction. Test the safety devices initially and then periodically. Wear hearing protection. When starting the chainsaw, place it on a firm surface. Place your foot in the hand guard at the rear of the saw, grip the top handle, pull the start cord with the free hand. 	31.E.07	М

Date Prepared: 11-16-2015

Camp Ravenna Site Clearing and Grubbing **Project:** Job: EM 385-1-1 **ACTIONS TO ELIMINATE OR JOB STEPS** HAZARDS RAC MINIMIZE HAZARDS (PARA REF) Never attempt to start the saw free hand, or by placing it on your knee. 6. Never cut with tip of the chain saw blade. 7. Carefully plan the cut. Know where the tree will fall. Establish an escape route when cutting trees greater than 2 inches. Check for insects and nests in hollowed out trunks and tree tops. Never stand between falling trees, branches, equipment or other trees. When cutting a limb, cut from the opposite side of the trunk, so the trunk will act as a shield to protect the worker. Be attentive as to how the trunk may move when removing limbs, keep out of the pathway of falling limbs or branches. 8. Never cut above your head. 9. Only cut wood with a chain saw. 10. Wear the recommended safety equipment (see below) 11. Monitor the condition of the saw during use. Make adjustments, as necessary. 12. Keep the work area free from clutter to avoid potential slip, trip, and fall hazards. 1. Caught by the chipper Wood Chipping 1. Safety devices and controls, such as emergency shut-off devices, are tested and verified to be 31.D.03 feed mechanism functioning properly before the chipper is used. 2. Workers are trained in safe work procedures, including operating wood chipper safety devices and safety controls. _ These procedures should be based on the manufacturer's recommendations for each machine. 3. At least two workers are in close contact with each other when operating the chipper. 4. Workers wear close-fitting clothing, gloves without cuffs, trousers without cuffs and skidresistant foot wear. - Clothing should be kept tucked in. Μ 5. Worker's hands and feet remain outside the in-feed hopper. 6. Workers feed brush and limbs into the in-feed hopper butt end first. 7. Workers feeding material are positioned at the side of the machine to allow quick operation of the emergency shut-off device and minimize risk of entanglement in branches. -Because of differences among machines, the manufacturer's operating manual should be consulted for guidance. Safe feeding of some disc-type chippers requires the worker to be on the right side. Workers walk away once the feed mechanism has grabbed the material. 8. Workers lay short material on top of longer material that is feeding or use a longer branch to 9. push it through the in-feed hopper.

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job:	Site Clearing and Grubbing
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JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		 Workers load small raked-up material such as twigs and leaves directly into the chip truck or in trash cans or bags instead of feeding it into the chipper. Workers keep the area around the wood chipper free of tripping hazards. Workers wear hard hats, eve protection, and hearing protection. 		
	2. Struck by flying hoods covering chipper discs or drums	 Wood chippers are inspected each working day before startup for defects such as broken or missing hood latches and pins or cracked and worn hinges. Broken, damaged, or missing machine components should be repaired or replaced before the machine is placed in service. The hood covering the chipper knives is completely closed and latched according to manufacturer's recommendations before starting the machine. Before processing material (unless manufacturer recommends otherwise), the machine is run at the lowest possible speed to detect for noise that might indicate broken or loose machine parts. If unusual noise is detected, the machine should be shut down immediately and evaluated by a competent person. If necessary, the machine should be repaired before being placed in service. The internal machine parts have come to a complete stop before the hood covering the chipper disc or drum is opened. 	31.E.03	М
Skid Steer Loader Operation	Slips, trips, falls	 Only qualified drivers to operate machine. Always use the hand rail and steps when mounting the machine. Only mount unit when the arms are lowered or restrained. Never use the control levers as hand holds when climbing on or off. 	18.A	М
	Crushed or caught by the machine or its parts during operation	 Follow manufacturer's instructions Only operate the loader from the operator's compartment. Controls should be in neutral or park position and parking brake set before starting. Stay seated when operating the loader controls. Work with the seat belt fastened and the restraint bar in place. Start the engine from the operator's seat only. Run through a complete check of all equipment controls. Check lighting systems and safety devices such as headlights, horn, wheel lugs tight, etc., Keep arms, legs, and head inside the cab while operating the loader. Load, unload, and turn on level ground when possible. Operate on stable surfaces only. Do not travel across slopes. Travel straight up or down, with the heavy end of the machine pointed uphill. Keep bystanders away from the work area. Never disable safety devices. 	18.B	М

Date Prepared: 11-16-2015

Project: C	amp Ravenna Job:	Site Clearing and Grubbing	
JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		13. Must be equipped with rollover protective structures (ROPS)	
	Crushed or caught by the	1. Park the machine on level ground, if possible.	18.G.10-24
	machine or its parts	- If parking on a grade,	
	during shutdown	- Position the loader so that it is at a right angle to the slope	
		- Follow the shutdown procedure then block the wheels.	
		2. Place the controls in neutral or the park position.	
		3. Set the parking brake.	
		4. Always lower the bucket to the ground.	
		5. Idle the engine for gradual cooling, at least 30 seconds before stopping engine.	
		6. Remove the key to prevent unauthorized starting and movement.	
Brush Hog Operat	ion Struck by, cuts, trapped	1. Clear the work area of objects (rocks, wire, fencing, bottles etc.) which might be picked up and thrown.	31.D.03
		2. Always keep clear of front discharge area when operating Brush Hog.	
		3. Keep everyone 75 feet away while machine is in operation.	
		4. Only operate the cutter with front deflector chains in place.	
		5. Keep hands and feet clear of mower blades	
		6. Disengage power to the Brush Hog and stop the engine before leaving the operators cab.	
		7. Never place hands or feet under the Brush Hog or near any moving parts when unit is running.	
		8. Shut the Brush Hog down and the loader engine off before performing any inspection or maintenance to the cutter	
		9. Never operate the Brush Hog with the cover removed.	
		10. Never leave the Brush Hog unattended in a raised position.	
		11. The loader and Brush Hog should be stopped and inspected for damage after striking a	
		foreign object and the damage should be repaired before restarting and continuing cutting.	
		12. Cut only in daylight or good artificial light.	
		13. Keep all nuts, bolts and screws tight and be sure the equipment is in safe working condition.	
		14. Check the blades mounting bolts for proper tightness at frequent intervals.	
		15. Use caution when walking on Brush Hog deck which is slick when wet.	
		16. Never drive your skid loader with your Brush Hog raised more than 2 feet.	
	Trapped. crushed	1. Reduce speed on slopes and make turns gradually to prevent tipping or loss of control.	31.D.03
		 Exercise cauton when changing unection on stopes. 2 Stay alert for drop off or holes in the terrain 	
		2. Stay alert for diop-on of notes in the terrain. 3. When working under the Brush Hog always securely block it up	
		J. When working under the Drush Hog always securely block it up.	
		is locked onto your loader.	
		- The Brush Hog weighs 1000 lbs.	

RAC

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Date Prepared: 11-16-2015

Project: Camp Ravenna Job:

Site Clearing and Grubbing

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Personal Protective Equipment: Minimum:	PPE inspection	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been
Steel toe boots, hard hats, and safety impact eye	performed by the	covered in employees' 40-hour HAZWOPER training, which is to be verified by the SSHO
protection, work gloves, work clothes, hearing	SSHO. Ongoing (prior	through initial training documentation and reviewed prior to permitting personnel to
protection during chainsaw use.	to each use) inspections	participate in site activities, and will be confirmed by visual observations of worker
Optional items: Chipper, Chainsaw Chaps and	are the responsibility of	activities.
Loggers helmet with full face shield (when operating	PPE users.	
chainsaws and handheld brush cutters) high visibility	Competent or	
vests when near active traffic areas.	Qualified Person(s):	
HTRW: PAH and constituents of explosives	Field Superintendent	
	and SSHO.	

I have read and understand this AHA:

Name (Printed)	Signature	Date

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:

Prepared By: J. Laffey, CESCO

Project:

Job: Soil Sampling

Reviewed By* (USACE): N. Peters/K. Tait

]	Recommended Protective Clothing & Equipment:
	Nitrile surgeon's type gloves, sefety toe boots, sefety glasses

Camp Ravenna

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
s	Catastrophic	Е	Е	Н	Н	Μ
e v r i t y	Critical	Е	н	Н	М	L
	Marginal	Н	Μ	Μ	L	L
	Negligible	Μ	L	L	L	L

JOB STEPS		HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
Surface Soil Sampling Preparation	1.	Minor cuts abrasions handling equipment and tools	1. Wear cut-resistant gloves when operating hand auger or handling items with sharp or rough edges.	05.A.07	L
	2.	Slips, Trips, Falls	 Clear intended work areas and walking paths of roots, weeds, limbs and other ground hazards. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. Ensure that work boots have adequately-aggressive sole design. Use caution when working on uneven and wet ground. 	14.A	L
	3.	Insect bites and contact with poisonous plants.	 Shake out boots before donning. Use insect repellants. Products containing DEET should be applied to exposed skin. Products containing Permethrin should be applied to clothing only. Follow manufacturer's recommendations. Tape up pants leg to work boot joints with duct tape and wear light-colored clothing to better see and remove any insects. Look down when walking through heavy brush or tall grass. 	06.E.01	L

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Soil Sampling

Date Prepared: 11-16-2015

Project: Camp Ravenna Job:

EM 385-1-1 **ACTIONS TO ELIMINATE OR** JOB STEPS HAZARDS (PARA RAC **MINIMIZE HAZARDS** REF) 8. Avoid potential nesting areas (brush, deadfall, etc.) where insects or snakes may be present. . 9. Perform close body inspections at least daily upon leaving the site. 06.E.03 4. Poison plants 1. Poison ivy, poison oak, and poison sumac are anticipated to be abundant. 2. The best protective measures is to avoid contact. Wear long pants and long shirt sleeves in areas where these plants exist. 3. 4. Know the plants. 5. If not possible to avoid then wear protective clothing that maybe thrown away when the L task is complete. 6. Wear barrier creams or PPE, prior to entry into heavy brush. 7. Wash with cool water and soap or an over the counter solutions to remove these oils from the skin. 8. Wash your contaminated clothes separate from your other clothes. 5. Snake bites 1. Snake chaps should be worn in heavy vegetation, along rocky out cropping, in and around 06.E.02 debris piles and areas or in areas of reported sightings. 2. Never pick up a snake. L 3. Prepare for emergencies – If snakes are prevalent in the area prepare to take action in the event of a snake bite. 6. Inclement weather 1. Due to the obvious hazards associated during inclement weather, soil sampling activities 01.E.01 L may be temporarily suspended. 7. MEC/MPPEH Hazards 1. All sampling activities will be performed using anomaly avoidance. 2. MEC/MPPEH visual detector aided survey will be conducted by trained UXO Technicians. Non-UXO personnel will be escorted while in the area of concern. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. Μ 3. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: Shoreline ProtectionThe UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log location information will be recorded with the site GPS.

Date Prepared: 11-16-2015

Project: Camp Ravenna

Job: Soil Sampling

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		 MPPEH will be dual inspected. Items determined MDAS will be segregated and secured in the MDAS container. If suspect MEC or MPPEH items not determined MDAS are identified the item will be managed in accordance with the approved ESS. Any suspect MEC or MPPEH item not determined MDAS discovered during UXO Survey/Mechanical Screening which has been determined to be safe to move, may be moved to a designated holding area until managed IAW the approved ESS. MEC determined unsafe to move will be left in place and treated using blow in place procedures IAW the approved ESS. An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation, and the PM will be provided an inventory update on a daily basis. 		
Preparation and handling sample bottles	 Burn or corrosion from acid spills 	 Wear surgeon's style gloves and safety glasses when handling potentially-contaminated media and samples. Avoid contact with potentially-contaminated media to the extent possible. Follow good decontamination and practice good personal hygiene (hands and face washing) when exiting work area. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). Exposure via dermal contact and ingestion represent some limited concern during this task. 	06.B.02	L
Sample collection using hand auger	 Muscle strains, tendon or ligament sprains, back or other soft- tissue injuries 	 Operating a hand auger can be physically demanding depending on the conditions of the soil, the auger tools, and the physical capabilities of the operator. Only personnel who are confident that they can physically perform this activity without injury should operate a hand auger. 	13.A.02	L
	2. Contact with utilities	 Inspect for buried and overhead utilities in the vicinity of the augering location. Verify the location of utility lines in accordance with Tetra Tech SOP Utility Location and Excavation. 	25.A.01.c(12)	М
	3. Bruises, abrasions, cuts, foot or eye injuries	 Ensure that the hand auger tool is properly maintained. Avoid injury by stopping if strong resistance is encountered (such as if impassable rocky conditions are encountered). Secure assistance when needed. Wear appropriate PPE (work gloves, safety toe shoes, and safety impact eye protection) 	13.A.02	L

ACTIVITY HAZARDS ANALYSIS ACTIVITY HAZARDS ANALYSIS

Date Prepared: 11-16-2015

Project: (

Camp Ravenna Job:

Soil Sampling

EQUIPMENT	INSPECTION	TRAINING
Stainless steel hand auger, sample collection tools and containers (jars, spatulas, spoons, etc.) Safety Equipment: Portable eye wash bottle Monitoring Instruments: none	Visual inspection prior to use by user.	Training/experience in proper sample collection, handling and chain of custody requirements.
Personal Protective Equipment: <u>Minimum</u> : nitrile surgeon's type gloves, safety toe boots, safety glasses <u>Optional items</u> : Hardhat, hearing protection. If sampling done concurrently with HSA, observe HSA AHA PPE as well. If contact with contaminants is likely, wear chemical-resistant coveralls (e.g., Tyvek) or aprons and surgeon's nitrile gloves under leather/cotton work gloves. <u>HTRW</u> : VOCs	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.	 OSHA 40 Hazardous Waste Operations and Emergency Response (HAZWOPER) training, plus appropriate 8-hour annual refresher training for the task participants. Supervisors must have completed additional 8 hours of HAZWOPER training. ALSO: Review of AHA during pre-task tailgate safety briefing with the intended task participants. PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees' 40 hour HAZWOPER training, which is to be verified by the SSHO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.

I have read and understand this AHA:

Name (Printed)	Signature	Date

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:

Project: Camp Ravenna

Job: Excavation and Backfilling/Mechanical Soil Screening

Prepared By: J. Laffey, CESCO Reviewed By* (USACE): N. Peters/K. Tait

Recommended Protective Clothing & Equipment:

Hard hats, steel toe boots, sleeved shirt, long pants, safety glasses, high visibility vests

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
s	Catastrophic	Е	Е	H	H	Μ
e v	Critical	Е	н	Н	Μ	L
r i	Marginal	Н	Μ	Μ	L	L
ı t y	Negligible	Μ	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
Transporting Heavy Equipment to the Site	1. Vehicle accident; Damaged over-passes, power lines traffic lights and signs, etc.; roadways, etc.; Load Restrictions; Permit restricted transport routes	 Confirm permitted travel route and access points and times when oversized equipment may be moved. The travel route, loading and off-loading area should be identified. To ensure adequate clearance is maintained along the route (over- passes, traffic lights, power lines, etc.) personnel should drive the route the vehicles will take. Make sure turns and routes provide sufficient clearance to movement the transport truck and trailer with load. Confirm there are no load restrictions along the travel route. 	18.A	L
Positioning and moving excavators and transport trucks.	 Struck by moving vehicles/ caught between 	 Operators/Drivers will submit a copy of their valid driver's license on initial arrival for each vehicle brought on site. Drivers will maintain workers on foot in sight, if you lose sight of someone, Stop! Personnel are not allowed to use a cellular phone while driving a vehicle on-site. Restrict non-essential personnel from operating area. Ensure that excavators and trucks are equipped with audible back-up motion alarms. 	18.G	L

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Date Prepared: 11-16-2015

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		 Spotters or other ground crew are responsible for positioning themselves in view of vehicle operators (stay out of operators' blind spots). DO NOT get in-between trucks or operating equipment. Do not walk behind operating equipment with a restricted view when moving backwards Always leave yourself an escape route. If you activity places you in the area of operating equipment carry a whistle or air horn to alert operators should you find yourself in a compromised position. Wear a high visibility clothing to increase visual recognition. Hard hats and safety glasses, standard work attire are required in the operating area. Structural traffic routes in a single direction where possible. Dump trucks will be equipped with over cab protection. Drivers will remain in the truck during loading or they will move away a distance which is equal to or greater that the length of the boom + 10-feet. When exiting the vehicle drivers must comply with PPE requirements. Equipment operators should NOT swing loads over personnel Personnel on the ground should NOT walk under elevated loads. 		
Heavy Equipment Operation	 Noise Equipment malfunction 	 Evaluate high noise operations to determine if hearing protective devices should be worn. Hearing protection with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs) will be worn during high noise operations. All equipment will have manufacturer's required mufflers. Equipment will be initially inspected to certify safe to use onsite and 	05.C 18.G.25	L
		 Description will be initially inspected to certify such to use onsite and before each days use. Unsafe equipment will be taken out of service, tagged and will not be used until repaired. Only operators trained and experienced with the specific equipment will operate that equipment. 	10.0.25	L
	3. Roll over	 Equipment will have rollover protective structures and seat belts. Operators shall wear seat belts when operating equipment. Do not operate equipment on grades which exceed manufacturer's recommendations. 	18.B.13	L

Date Prepared: 11-16-2015

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
	4. Struck by	 Equipment will have guards, canopies or grills to protect from flying objects. Equipment parked on an incline shall have the wheels chocked or track mechanisms blocked and the parking brake set. Ground personnel will stay clear of all suspended loads. All slings chains and ropes will be rated for the load in which it is expected to lift. Eye contact with operators will be made before approaching equipment. Equipment will not be approached on blind sides. Avoid equipment swing areas. Know hand signals. All equipment will be equipped with backup alarms. The use of headphones for entertainment purposes is prohibited. A 15 foot minimum safe separation distance when boom is fully extended will be maintained between equipment and overhead utility lines. Keep out of the swing radius of heavy equipment. Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times. Ground personnel will not stand directly behind heavy equipment when it is in operation. Do not approach heavy equipment unless eye contact with appropriate hand signals has been made with the operator to cease activity. Equipment operators will confirm that eye contact had been made by stopping operation and clearly showing their hands are off of the 		L
	5. Vehicle Accidents	 Spotters will be used when backing up trucks and heavy equipment. Trucks and heavy equipment will be equipped with back up alarms. Traffic cones and orange traffic vests will be used when working in areas of traffic, construction vehicles and near roadways. Implement traffic controls such as flag persons, warning devices, etc., as necessary. Employees will need to pay attention to operations around and adjacent to their work and continually evaluate the need for traffic control measures. Establish one-way (if possible) traffic routes for loaded and unloaded trucks, so that they can keep the same path while moving dirt. 	Appendix B.16.b	L

Date Prepared: 11-16-2015

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		 6. Site personnel will be informed as to the routes they should use. 7. Pedestrians will only use dedicated sidewalks when in the facility. 8. Personnel will not enter restricted areas without prior authorization. 		
	6. Fire	 Refuel vehicles only in areas designated. Shut off the vehicle engine. Do not smoke. Do not over-fill fuel tanks. When the fuel is liquid propane gas, ground the nozzle of the fuel hose to the vehicle filler pipe with a ground wire. 	09.A	L
	7. Fuel Spills	 Equipment will be shut down before and during fueling operations Spills and absorbent materials will be readily available. Drip pans, polyethylene sheeting or other means will be used for secondary containment. Contain, control and clean up the spill and affected area (soil, water). Manage and dispose of spill material appropriately. Waste materials generated will be contained in a seal-able container appropriate for the size of the spill. Commercial spill kits are available. Employees will be instructed on proper fueling techniques. Fuel nozzles and hose will be secure in holder after use. Fuel caps will be secured after fueling operations. Report spills to Range Control and the USACE COR. 	09.B	L
	8. Unstable soil	 During hauling operations, keep soft areas/ruts filled and graded. Do not allow off-road trucks to continually run over ruts. Off-road trucks should vary their path on the haul roads. Prior to beginning any grading activities in potentially unstable areas, an operator experienced with working on unstable material will run a low ground pressure bulldozer over the entire area to evaluate for signs of unstable areas. 	18.C	L
	9. Adverse weather	 If electrical storms or inclement weather are in the area, as determined through local forecasting or weather alerts issued, the SSHO will suspend outside activities. Electrical/Thunderstorms – Where possible employ a lightning detection equipment to warn field personnel of approaching storms. You are not safe anywhere outside. Move quickly and safely to a safe building or vehicle when you first hear thunder, see lightning or observe dark threatening clouds developing overhead. 	01.E.01	L

Date Prepared: 11-16-2015

Project: Camp Ray	Job: Excavation	n and Backfilling/Mechanical Soil Screening		
JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		 Stay inside until 30 minutes after you hear the last clap of thunder. Do not shelter under trees. 3. If no additional lightning and/or thunder is noted within this 30 minutes, work may resume at the SSHO direction. 4. Personnel will be directed to seek suitable shelter that will provide adequate protection from the elements. 5. Lightning threat detection will be coordinated within Camp Ravenna POC existing systems. 		
Excavation/ Mechanical Soil Screening	1. MEC/MPPEH Hazards	 MEC/MPPEH visual detector aided surveys and will be conducted by trained UXO Technicians. Non-UXO personnel will be escorted while in the area of concern. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. All mechanical excavation/sifting activities will be performed IAW this approved planning documents. Equipment will meet shielding requirements IAW the approved ESS. All manual intrusive investigations will be performed using proper manual UXO excavation techniques. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded with the site GPS. MPPEH will be dual inspected. Items determined MDAS will be segregated and secured in the MDAS container. If suspect MEC or MPPEH items not determined MDAS are identified the item will be managed IAW the approved ESS. Any suspect MEC or MPPEH item not determined MDAS discovered during UXO Survey/Mechanical Screening which has been determined to be safe to move, may be moved to a designated holding area until treated in accordance with the approved ESS. MEC determined unsafe to move will be left in place and treated 	25.A.01.c (13)	М

Page 5 of 7

Date Prepared: 11-16-2015

JOB STEPS	TEPS HAZARDS ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS		EM 385-1-1 (PARA REF)	RAC
		- An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation, and the PM will be provided an inventory update on a daily basis.		
	2. Excavation Hazards and Potential Exposure to Contaminated Soil	 Prior to beginning work, the competent person shall complete a Plant Operations Ground Breaking Permit and Job Planning Checklist for any excavation 4 feet or greater. Do not leave excavations open overnight whenever possible fill them. Install open trench warning devices/barricades. Excavated and loose materials should be kept at least 4 feet from the edge of excavations. The spoils shall be properly slope at a safe angle. If the excavated site is large enough for employees to bodily enter and perform work, and has limited means for entry or exit, and is not designed for continuous employee occupancy, it falls under OSHA confined space regulations. If deemed necessary, use the benching and sloping methods to prevent cave-ins (29 CFR 1926.652, Appendix B). If personnel entry is necessary, stairways, ladders, or ramps shall be provided as means of egress in all trenches 4 feet or more in depth. Travel distance shall be no more than 25 feet between means of exit. Protective systems are required on all excavations over 5 feet in depth or in excavations less than 5 feet when examination of the ground by a competent person reveals conditions that may result in cave-ins (29 CFR 1926.652, Appendics C & D). Excavations will be inspected by a competent person prior to personnel entering the excavation. Continuous air monitoring will be performed in accordance with Section 6.0 if personnel are required to enter the excavation. It is highly unlikely that exposure would occur through inhalation but it is possible that very low levels of contamination may be ingested or absorbed through direct skin contact. Follow good personal hygiene and standard good sample collection/sample handling practices, and wear appropriate PPE. The competent person shall have completed an accredited excavation safety course. 	25.A.01	М

Date Prepared: 11-16-2015

Project: Camp Rave	enna Job: Excavation a	nd Backfilling/Mechanical Soil Screening		
JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
	3. Utility strike	 When operations approach the location of underground utilities, excavation shall progress with caution until the exact location of the utility is determined. Workers shall be protected from the utility and the utility shall be protected from damage or displacement. 	25.A.10	М

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Excavators and transport trucks	SSHO to inspect each vehicle	Heavy equipment operators must demonstrate experience in proper vehicle/equipment
	using Heavy Equipment	DOT licenses
	Inspection Checklist provided	
	in Attachment III.	
Personal Protective Equipment: Minimum: Hard	Initial PPE inspection	PPE training in proper use, care, storage, and limitations.
hats, steel toe boots, sleeved shirt, long pants, safety	performed by SSHO.	
glasses, high visibility vests	Ongoing (prior to each use)	
Optional items: Hearing protection when required	inspections responsibilities of	
and surgeons gloves when sampling	PPE users.	

All persons working within the operation will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:

Project: Camp Ravenna

Job: MEC/MPPEH Management (Treatment, Inspection, Certification, Disposal)

Prepared By: J. Laffey, CESCO Reviewed By* (USACE): N. Peters/K. Tait

Recommended Protective Clothing & Equipment:

Hard hats, steel toe boots, sleeved shirt, long pants, safety glasses.

Optional: Hearing Protection, nitrile gloves, high visibility vest.

E = Extremely High Risk		Probability					
M : L =	= Moderate Risk = Low Risk	Frequent	Likely	Occasional	Seldom	Unlikely	
s	Catastrophic	Е	Е	Н	H	Μ	
e v	Critical	Е	Н	н	Μ	L	
r i	Marginal	Н	Μ	Μ	L	L	
t y	Negligible	Μ	L	L	L	L	

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
This activity includes receipt, storage, transfer and disposal of explosives and explosive components.	1. Explosive handling	 Only UXO Technicians will be permitted to handle and/or transport explosives and detonators. Only UXO technicians will be permitted to load and detonate explosive materials per the DDESB approved ESS. 	25.A.01 c. (13)	М
	2. Initiating explosions	 Segregation - Strict adherence will be practiced with regard to the segregation of initiating devices (cord and detonators) from the explosives during storage and transport. Restrict non-essential personnel from operating area. 	25.A.01 c. (13)	L
	3. Storage Precautions	 The following requirements shall be adhered to when storing explosives Store MEC/MPPEH not determined MDAS in an authorized storage facility (Bunker, Type II Magazine). No donor charges will be stored on site. All donor explosives will be delivered on an as needed basis and will be consumed on the day of receipt. Maintain a running inventory. 	25.A.01 c. (13)	L

Н

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: MEC/MPPEH Management

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
	4. Hazard	 Storage facilities should be kept clear of combustible or flammable storage/debris at least 25 feet surrounding the perimeter. All temporary storage facilities will be properly grounded to provide protection against electrical hazards. Appropriate signage indicating storage content will be placed. Hazard communication will be an integral part of explosive handling 	06.B.01	
	Communication/Emergency action procedures	 to alert transport workers and emergency response personnel of the presence of explosives, extensive hazard communication requirements apply to explosives. These include identifying materials on transport documents, providing specific emergency response information with the transport document and a 24-hour telephone number where more detailed information may be obtained, markings and labels on packaging as well as placarding of the transport units. 2. Each employee is required to be trained on the hazards of materials they handle and their specific responsibilities. Toxicity - Explosives materials, explosives components (additives or adhesives), and materials such as organic solvents used in the explosives processing procedure that can be toxic when inhaled, ingested, or absorbed through the skin. The most frequently reported effect from working with explosives is a skin rash resulting from skin contact with explosives operations. The following general precautions should be used to: Know the health hazard and controls before beginning operations. Read the MSDS. If you have questions ask the SUXOS and/or the UXOSO for clarification. Avoid skin contact; use surgeon's gloves when necessary to avoid direct skin contact and absorption. Cotton coveralls are also recommended. The UXOSO may recommend additional PPE based on site specific conditions. Practice good work/personal hygiene. Wash before eating, drinking, or smoking (hand to mouth activities), or using toilet facilities: end-of-shift showers. 		L

Date Prepared: 11-16-2015

 Project:
 Camp Ravenna
 Job:
 MEC/MPPEH Management

JOB STEPS HAZARDS	ACTIONS TO ELIMINATE OR	EM 385-1-1	RAC
	MINIMIZE HAZARDS	(PARA REF)	
5. MEC/MPPEH Hazards 1. 2. 3. 4. 5.	 MEC/MPPEH visual detector aided surveys and will be conducted by trained UXO Technicians. Non-UXO personnel will be escorted while in the area of concern. Exclusion zone distances will be defined based on those specified in the Work Plan. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. All mechanical excavation/sifting activities will be performed IAW this approved planning documents. Equipment will meet shielding requirements IAW the approved ESS. All manual intrusive investigations will be performed using proper manual UXO excavation techniques. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log location information will be recorded with the site GPS. MPPEH will be dual inspected. Items determined MDAS will be segregated and secured in the MDAS container. If suspect MEC or MPPEH item not determined MDAS are identified the item will be managed IAW the approved ESS. Any suspect MEC or MPPEH item not determined MDAS discovered during UXO Survey/Mechanical Screening which has been determined to be safe to move, may be moved to a designated holding area until treated in accordance with the approved ESS. MEC determined unsafe to move will be left in place and treated using blow in place procedures IAW the approved ESS. An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation, and the PM will be provided an inventory update on a daily basis. UXO treatment- During these activities only trained UXO 	25.A.01 c. (13)	Н

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: MEC/MPPEH Management

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR	EM 385-1-1	RAC
		MINIMIZE HAZARDS	(PARA REF)	MIC
		SUXOS will determine treatment methods. If the item is identified as		
		safe to move it will be documented as such and transported to the	ļ	
		demo area and treated in accordance with the DDESB approved ESS.	ļ	
		If the item is determined unsafe to move the item will be blown in		
		place. The following provisions will apply:	ļ	
		- Target anomalies within the closest proximity will be treated	ļ	
		first (clearing access paths to within the area of concern.	ļ	
		- UXO Technicians will determine the charge size, load the hole,	ļ	
		string detonation cord. An air gap will be maintained between	ļ	
		the cord and slapper blasting control box. These wires shall be	ļ	
		insulated from any and all extraneous electrical discharge as	ļ	
		well as physical damage.	ļ	
		- At this time the UXO Technician may utilize other (Non-UXO)	ļ	
		personnel within cleared pathways to transport sand bags that	ļ	
		will serve as cover during the treatment of fuzed MEC.	ļ	
		- The SUXOS will walk over the area to insure the load and	ļ	
		associated engineering controls (sand bags, soil cover, windows	ļ	
		cover, etc.) are satisfactory.		
		- Once approved the SUXOS will notify the POC of the time of	ļ	
		the planned detonation. The SUXOS will sound a warning signal		
		consisting of	ļ	
		(1) WARNING SIGNAL - a one-minute series of long	ļ	
		audible signals 5 minutes prior to blast signal;		
		(2) BLAST SIGNAL a series of short audible signals	ļ	
		(2) DLAST SIGNAL - a series of short audible signals	ļ	
		\sim UXO Technician will initiate detonation		
		No persons will enter the area until all dusts settle and the UXO	ļ	
		Technician or Technicians perform a detector aided sween The		
		purpose is to insure all of the fuzed MEC has been eliminated as	ļ	
		well as the explosives used in the treatment process		
		(3) ALL CLEAR SIGNAL - a prolonged audible signal		
		following the inspection of blast area.		
		The safety signals shall be given by use of a compressed air		
		whistle, a horn, or equivalent means, and shall be clearly		
		audible at the most distant point in the blast area.	ļ	

Date Prepared: 11-16-2015

Project:

Camp Ravenna Job: MEC/MPPEH Management

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		It should be noted that several MEC items may be treated at the same time.		
	6. Adverse weather	 Equipment will have rollover protective structures and seat belts. Operators shall wear seat belts when operating equipment. Do not operate equipment on grades which exceed manufacturer's recommendations. Equipment will have guards, canopies or grills to protect from flying objects. Equipment parked on an incline shall have the wheels chocked or track mechanisms blocked and the parking brake set. 	01.E.01	L
	 Intermittent high noise levels 	 Site personnel are to wear hearing protection if noise levels are such that they must raise their voice in order to communicate with someone who is within arm's reach (approx. 2') of them. SSHO is responsible for determining and designating when hearing protection is required. Hearing protection is to consist of either ear muffs or plugs that have a noise reduction rating (NRR) of at least 25 dB. 	5.C	L

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Excavators and transport trucks	SSHO to inspect each vehicle prior to permitting site access	UXO technicians will be trained in accordance with DDESB TP-18.
	using Heavy Equipment	
	Inspection Checklist provided	
	in Attachment III.	
Personal Protective Equipment: Minimum: Hard	Initial PPE inspection	PPE training in proper use, care, storage, and limitations.
hats, steel toe boots, sleeved shirt, long pants, safety	performed by SSHO.	
glasses, high visibility vests	Ongoing (prior to each use)	
Optional items: Hearing protection when required	inspections responsibilities of	
and surgeons gloves	PPE users.	

Date Prepared: 11-16-2015

Project: Camp Ravenna Job: MEC/MPPEH Management

All persons working within the operation will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:



Project: Camp Ravenna

Transporting and Disposal of Contaminated Soil and Debris

Prepared By: J. Laffey, CESCO

Reviewed By* (USACE): N. Peters/K. Tait

Recommended Protective Clothing & Equipment:

Hard hats, steel toe boots, sleeved shirt, long pants, safety glasses, high visibility vests

Job:

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		Probability					
		Frequent	Likely	Occasional	Seldom	Unlikely	
s	Catastrophic	Е	Е	Н	Н	Μ	
e v	Critical	Е	Н	Н	Μ	L	
r i	Marginal	Н	Μ	Μ	L	L	
t y	Negligible	Μ	L	L	L	L	

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR	EM 385-1-1	RAC
		MINIMIZE HAZARDS	(PARA REF)	
Depositing soils onto haul	1. Utility strike and/or damage	1. Follow the Tetra Tech Excavation and Trenching Program in	25.A.01	
vehicles.		Attachment II.		
		2. Call before you dig and dig with care.		
Construction of drainage		3. Stay outside of Tolerance Zone boundaries or you must dig by		
channel and revetment wall		hand.		т
		4. Clearance distance from overhead power lines (swing pattern of		L
		boom)		
		- Maintain 20-feet clearance.		
		- Where possible, position the excavator to avoid inadvertent		
		contact during excavation channel construction and loading.		
	2. Over loading vehicles	1. Drivers shall leave the cab while the vehicle is being loaded when	18.C.16	
		they are exposed to danger from suspended loads or overhead		
		loading equipment, unless the cab is adequately protected.		
		2. Vehicles shall not be loaded in a manner that obscures the driver's		т
		view ahead or to either side or which interferes with the safe		L
		operation of the vehicle.		
		3. The load on every vehicle shall be distributed, chocked, tied down,		
		or secured. Loads shall be covered when there is a hazard of		

Transporting and Disposal of Contaminated Soil and Debris

Date Prepared: 11-16-2015

Camp Ravenna

Job:

Project:

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		flying/falling dirt, rock, debris, or material. Tail gates shall not be removed without implementing a positive means to prevent material from falling out of the back of the vehicle.	· · · · · · · · · · · · · · · · · · ·	
	3. Falling objects – From transporting vehicles	 Use the excavator to level the load during placement of the excavated materials in the truck to ensure proper balance of the load while also applying slight compaction. Use the excavator to knock the load down below and compress as necessary below the side boards. When loading soil attempt to mix dry and wet materials. During transport loaded materials will settle resulting in water/fluid collection on top of the load or at and along the Tail Gate. When this condition may be suspected mix with dry materials to absorb any fluids separated from the solids. If the materials cannot be dried enough by mixing, then a dewatering pad will be required. The vehicles will be covered with tarps to control and contain any debris potentially blowing out during transport. During backfilling personnel will be kept away from the offloading area to avoid be struck by materials being placed. 	18.C.16.c	L
	4. Elevated noise levels	 Where provided close the cab to reduce noise levels associated with the machinery operation. Wear hearing protection when operating noise levels exceed 85dBA. SSHO will be responsible for implementing the Site Specific Hearing Conservation Program. Provisions for initial monitoring; selection of types of hearing protection and performance requirements are provided there. HSGM 	05.C	L
Loading soils into truck transport	1. Airborne dust	 Use water to control dust emissions (>2mg/m³ visible dust) during excavation activities. Personnel shall remain to the extent possible upwind. If water suppression is unsuccessful at controlling dust emissions a particulate meter will be employed to quantify airborne levels. Contaminant exposure will be calculated based on individual contaminant concentration. 	18.C.16 0.6A	L

Date Prepared: 11-16-2015

Project:	Camp Raven	na Job: Transporting a	nd Disposal of Contaminated Soil and Debris		
JOB	STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
			5. The use of these instruments will be performed until sufficient data is accumulated as determined by the SSHO.		

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Excavators and transport trucks	SSHO to inspect each vehicle prior to permitting site access using	Heavy equipment operators must demonstrate experience in proper vehicle/equipment operations. Over the road heavy motorized vehicle operators must possess appropriate
	Heavy Equipment Inspection	DOT licenses.
	Checklist provided in Attachment	
	III.	
Personal Protective Equipment: Minimum:	Initial PPE inspection performed	PPE training in proper use, care, storage, and limitations.
Hard hats, steel toe boots, sleeved shirt, long	by SSHO. Ongoing (prior to each	
pants, safety glasses, high visibility vests	use) inspections responsibilities of	
Optional items: Hearing protection when	PPE users.	
required and surgeons gloves when sampling		

All persons working within the operation will sign this AHA indicating that they have reviewed the document and are aware of their responsibilities as stated in the AHA.

Name (Printed)	Signature	Occupation	Date Reviewed/Training

Date Prepared: 11-16-2015

Risk Assessment Code (RAC)*:

L

Project:Camp RavennaPrepared By:J. Laffey, CESCO

Job: Decontamination

O **Reviewed By* (USACE):** N. Peters/K. Tait

Recommended Protective Clothing & Equipment:	E =	Extremely High Risk		Р	robabili	t y	
Safety toe boots, safety glasses	M : L =	= Moderate Risk Low Risk	Frequent	Likely	Occasional	Seldom	Unlikely
	s	Catastrophic	Ε	Е	н	a bility asional Seldom H H M L L L	Μ
	e v	Critical	Ε	H	н	M	L
	r i	Marginal	Η	Σ	Μ	L	L
	t y	Negligible	Μ	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
Personal Decontamination1.Slips, Trips, Falls1.Clear intended decon area location of ground ha2.Practice good housekeeping to keep the site clear and other tripping hazards.2.3.Wear appropriate foot protection to prevent slip4.Use caution when working on uneven and wet state		 Clear intended decon area location of ground hazards. Practice good housekeeping to keep the site clear of obstructions, materials, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet surfaces. 	28.G.01.h	L
(wash and rinse reusable items, dispose of non- reusable items)	2. Exposure to contaminated media	 Follow good decontamination practices (work from top down and outside in). Nitrile gloves are to be the last item of PPE removed. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity. 	28.G.01.h	L
Decontamination of excavation equipment and large tooling (e.g.,	3. Noise	 Pressure washer operator must wear hearing protection (muffs or plugs with NRR of at least 25 dB). Restrict other personnel from decon pad during pressure washing operations. 	05.C	L
large tooling (e.g., vehicles, etc.) using pressure washer	4. Flying projectiles	 Pressure washer operator must exercise care when directing the wand so that it is not pointing at himself/herself or at any other worker. Pressure washer operator must wear full face shield over safety glasses with side shields and brow protection. At SSHO discretion, additional PPE consisting of hardhat, rainsuit, apron, and or boot covers may be required during decon operations - depending on observations 	05.A-B-D	L
ACTIVITY HAZARDS ANALYSIS

Date Prepared: 11-16-2015

Project: Camp Ravenna Job: Decontamination

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
		indicating that significant contact with decon overspray and/or windy conditions during washing activities.		
	5. Foot injuries	 Place items to be decontaminated on ground or on washing/drying racks in a manner that they are secure and will not fall. Wear safety toe safety footwear. 	05.E	L
	6. Strains/sprains from heavy lifting	 Practice safe lifting techniques Use mechanical lifting devices such as a dolly whenever possible Ensure clear path of travel Have a good grasp on object Perform "test lift" to gauge ability to safely make the lift Lift with legs not back Obtain help when needed to lift large, bulky, or heavy items. 	14.A.01	L
	7. Slips/trips/falls	 Keep decon areas orderly Maintain good housekeeping Spread light coating of sand on decon pad liner to increase traction. 	14.D	L
	8. Exposure to contaminated media	 Follow good decontamination practices (work from top down and outside in). Surgeon's gloves are to be the last item of PPE removed. Wash hands and face following personal decontamination and prior to performing any hand-to-mouth activity. 	06.A.01	L

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (hand brushes, garden sprayers, etc.)	None required.	Visual inspection prior to use by user. Check wooden handles for cracks or splinters.
Pressure washer	Review manufacturer's instructions and safety guidelines prior to use.	Inspect pressure washer prior to putting into service to ensure that it is in good working order, and ensure that fittings are secure.
	Competent or Qualified Person(s): TBD	
Personal Protective Equipment: <u>Minimum</u> : Safety toe boots, safety glasses <u>Optional items</u> : Hardhat, hearing protection. Decontamination pad pressure washer operators are to wear full	Initial site specific H&S training to cover review of this APP/SSHP. Daily tail-gate and pre-task briefings to review appropriate AHAs and other relevant topics. OSHA 40 HAZWOPER training,	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.

ACTIVITY HAZARDS ANALYSIS

Date Prepared: 11-16-2015

Project: Camp Ravenna Job: Decontamination

EQUIPMENT TO BE USED INSPECTION REQUIREMENTS TRAINING REQUIREMENTS face shield over safety glasses with side shields plus appropriate 8-hour annual refresher training for the task participants. Supervisors must have and brow protection, hearing protection, and nitrile gloves. If contact with overspray cannot completed additional 8 hours of HAZWOPER be avoided, rain suit or moisture-repellant training. Also Review of AHA during tailgate safety disposable coveralls may be specified by the briefing with the intended task participants. SSHO. **HTRW**: see above PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees' 40 hour HAZWOPER training, which is to be verified by the SSHO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities

I have read and understand this AHA:

Name (Printed)	Signature	Date

Page 1 of 2

L

Risk Assessment Code (RAC)*:

ACTIVITY HAZARDS ANALYSIS

Date Prepared: 11-16-2015

Project: Camp Ravenna

Job: IDW Management

Prepared By: J. Laffey, CESCO

Reviewed By* (USACE): N. Peters/K. Tait

Recommended Protective Clothing & Equipment:	Ē	= Extremely High Risk		Р	robabili	t y	
Safety toe boots, safety glasses	M L	= Moderate Risk = Low Risk	Frequent	Likely	Occasional	Seldom	Unlikely
	s	Catastrophic	Е	Е	н	н	Μ
	e v	Critical	Е	н	н	Μ	L
	r i	Marginal	Н	Μ	Μ	L	L
	t y	Negligible	Μ	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
Filling, moving 55- gallon drums of IDW	1. Struck by/pinches compressions	 Exercise caution when handling drums. Position drums so that there is adequate room between them for placement and repositioning. 	14.A	L
	3. Falling objects (drums)	 Do not stack drums on top of each other. Do not place more than 4 drums to a pallet. Leave at least 4 ft. of clearance between pallets for clear access. 	14.A	L
	4. Slips, Trips, Falls	 Maintain good housekeeping in IDW storage areas, keeping it clear of loose debris and other potential tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. 	14.D	L
	5. Foot injuries	1. Safety toe foot protection will be required for IDW container handling activities	05.E	L
	6. Strains/sprains due to heavy lifting	 Practice safe lifting techniques Use mechanical lifting devices such as a dolly whenever possible Ensure clear path of travel Get a good grasp on object Lift with legs not back Obtain help when needed to lift large, bulky, or heavy items 	14.A.01	L

Page 2 of 2

ACTIVITY HAZARDS ANALYSIS

Date Prepared: 11-16-2015

Project: Camp Ravenna

Job: RDW Management

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)	RAC
	7. Minor contusions, abrasions, cuts	1. Wear cut-resistant gloves when handling items with sharp or rough edges.	05.A.07	L

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (drum dollies, wrenches, etc.)	Site personnel participating in this activity must be current with HAZWOPER training requirements Competent or Qualified Person(s): TBD	Visual inspection prior to use by user. Check wooden handles for cracks or splinters.
Personal Protective Equipment: <u>Minimum:</u> Safety toe boots, safety glasses <u>Optional items</u> : Hardhat, cotton or leather work gloves.	Initial site specific H&S training to cover review of this APP/SSHP. Daily tail-gate and pre-task briefings to review appropriate AHAs and other relevant topics.	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.
<u>HTRW</u> : If contact with IDW is likely, wear chemical-resistant coveralls (e.g., surgeon's nitrile gloves under leather/cotton work gloves.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the SSHO through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.	

I have read and understand this AHA:

Name (Printed)	Signature	Date

11.0 REFERENCES, MATERIALS AND DOCUMENTATION

United States Army Corps of Engineers (USACE). 30 November 2014. Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual. Available online at: <u>http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-</u>1-1/entire.pdf

United States Department of Labor Occupational Safety and Health Administration (OSHA) standards 29 CFR 1910.120 and 1926.65.

USACE Engineering Regulations for Hazardous Toxic and Radiological Waste Sites, ER 385-1-92, Appendix B

USACE Baltimore Military Munitions Response Program (MMRP) Design District (USACE-NAB) ESS, September 2015

Tetra Tech, Inc. Project Management Plan Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds Camp Ravenna, Ohio, September 2015

Camp Ravenna Joint Military Training Center (CRJMTC) Restoration Contractor Information, March 2014

Munitions and Explosives of Concern Survey and Munitions Response at Winklepeck Burning Grounds, Revision 3, Amendment 2

The Tetra Tech SSHO shall ensure the following materials/documents are taken to the project site and used when required. The following documentation is to be posted or maintained at the site for quick reference purposes. For this project, the items so noted below will be maintained in the Tetra Tech work vehicle.

Chemical Inventory Listing (posted) - This list represents the chemicals brought onsite, including decontamination solutions, sample preservations, fuel, etc. This list will be maintained in the Tetra Tech Work Trailer.

Safety Data Sheets (SDSs) (maintained) - The SDSs will be maintained in the Tetra Tech Work vehicle. These documents should match the listings on the chemical inventory list for substances used onsite. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The OSHA Job Safety & Health Protection Poster (posted) - This poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. The SSHO shall ensure that this poster is not defaced, altered, or covered by other material. See Attachment V.

Site Clearance (maintained) - This list is found within the training section of this APP/SSHP. This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities. This list will be maintained in a vehicle onsite during operations.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be completed by onsite personnel and filed in the Tetra Tech Work Trailer. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to personnel to carry at all times on site.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - This standard will be posted any time hearing protection or other noise abatement procedures are used.

Personnel Monitoring (maintained) - Results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

FIGURES

1

FIGURE 2-1

OSHA's Form 300A (Rev. 01/2004) Summary of Work-Related Injuries and Illnesses

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordskeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths 0 (G)	Total number of cases with days away from work 14 (H)	Total number of cases with job transfer or restriction 12 (I)	Total number of other recordable cases 34 (J)
Number of Days			
Total number of days away from work		Total number of days of job transfer or restriction	
505 (K)	_	458	



Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a courrently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, CSHA Office of Statistics, Room H3644, 200 Constitution Ave. NW, Washington, DC 20210. Do not send the completed toms to this affice.



U.S. Department of Labor Occupational Bafety and Health Administration

Form approved OMB no. 1218-0176

Establish	ment information			
Youre	establishment nameTetra Tech, In	c. All Enterprise Repor	t	
Street	3475 East Foothill Blvd			
City	Pasadena	State	California	Zip 91107
Indust	ry description (e.g., Manufacture of m Professional, Scientific and Technic	otor truck trailers) al Services		
Stand	ard Industrial Classification (SIC), if kr	nown (e.g., SIC 3715)		
OR North	American Industrial Classification (NA	NCS), if known (e.g., 3	36212)	
mploym	ent information			
Annus Total I	I average number of employees hours worked by all employees last	12,093		
year		23,586,978		
lign here	•			
Know	ingly falsifying this document may	result in a fine.		
l certil compl	y that I have examined this document ete.	and that to the best of	my knowledge the entries a	re true, accurate, and
	Chuotin M. McClan Company executive			VP, Corporate H&B Title
	626 470 2542			January 31, 2015
	Phone			Date

OSHA's Form 300A (Rev. 01/2004) Summary of Work-Related Injuries and Illnesses

All establishments covered by Pert 1904 must complete this Summery page, even if no injuries or filnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, mexing sure you've added the entries from every page of the log. If you had no cases write '0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in to entrely. They also have limited access to the OSHA Form 301 or its equivalent. See 35 CFM 502-435, in OSHA's Recordingening nulls, for further details on the access provisions for these forms.

Number of Cases			
Total number of deaths 0	Total number of cases with days away from work 19	Total number of cases with job transfer or restriction 13	Total number of other recordable cases 54
(G)	(H)	(1)	(J)
Number of Days			
Total number of days away from work		Total number of days of job transfer or restriction	
617		588	
(K)	-	(L)	5
Injury and Illness 1	Types		
Total number of (M)			
(1) Injury	77	(4) Poisoning	0
(2) Skin Disorder	5	(5) Hearing Loss	0
Condition	0	(6) All Other Illnesses	4
		And a second sec	

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average SS minutes per response, including time to review the instruction, search and garber the state nearesc. and complete and review the collection of information. Persons are not required to respond to the collection of information unless it, displays a currently valid CMIS control number. If you have any comments about these estimates or any aspects of this care collection, contact: US Department or Labor, CBA4 Office of Statistics, Room M-3844, 200 Constitution Ave. MXI, Washington, DC 2021: Do not sand the completes forms to this office of Labor, CBA4 (Office of Statistics, Room M-3844, 200 Constitution Ave. MXII, Washington, DC 2021: Do not sand the completes forms to this office



Breet 3475 East Foothill Blvd.			
Dity Pasadena	State	Celifornia	Zip 91107
ndustry description (e.g., Manufa Environmental Consulting	cture of motor truck trailers) Senifices		
Standard Industrial Classification	(SIC), If known (e.g., SIC 3715	9	
North American Industrial Classifi	cetion (NAICS), If known (e.g.,	336212)	
<u>5 4 1</u>	6 2 0		
oyment information			
Annual average number of emplo	/449		
Total hours worked by all employe	es lest		
nere			
Knowingly faisifying this docur	nent may result in a fine.		
certify that I have examined this complete.	document and that to the best	of my knowledge the entries ar	re true, accurate, and
in the second			
(24 m.)			100 Dansa Lin G

D

OSHA's Form 300A (Rev. 01/2004) Summary of Work-Related Injuries and Illnesses

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write '0."

Employees former employees, and their representatives have the right to review the CSHA Form 300 in its entirely. They also have limited access to the CSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordingenjar guie, for further details on the access provisions for threse forms.



Post this Summary page from February 1 to April 30 of the year following the year covered by the	form
--	------

Public reporting burden for this collection of information is estimated to average 59 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless if displays a currently valid OMS-control number. If you have any comments about these estimates or any aspects of this data collection, contact. US Department of Labor, CSH Ceffe of Statistics, Room N-S644, 200 Constitution Ave, NW, Washington, CD 22020. Do not send the completed forms to this office.

-



Form approved OME no. 1218-0176

stablis	nment information			
Your	establishment nameTetra Tech. Inc.			
Stree	3475 East Foothill Boulevard			
City	Pasadena	State	CA	Zip91107
Indus	try description (e.g., Manufacture of mot Environmental Consulting Services	or truck trailers)		
Stand	dard Industrial Classification (SIC), if kno	wn (e.g., SIC 3715)		
R North	American Industrial Classification (NAIC	CS), if known (e.g., 33	6212)	
	5 4 1 6 2	0		
mployn	nent information			
Annu	al average number of employees	12,250		
Total year	hours worked by all employees last	24,904,295		
ign her	e			
Knov	vingly falsifying this document may re	esult in a fine.		
l certi comp	ify that I have examined this document a lete.	nd that to the best of	my knowledge the entries a	re true, accurate, and
l certi comp	fy that I have examined this document a lete. Chuctor M. McCan Company executive	nd that to the best of	my knowledge the entries a	e true, accurate, and <u>VP Corporate H&S</u> Title

FIGURE 4-1 ORGANIZATION CHART FIELD ACTIVITIES AT CAMP RAVENNA



* To be determined prior to the initiation of the remedial action.

FIGURE 8-1 INCIDENT REPORT FORMS



Report Date	Report Prepared B	у	Incident Report Number		
INSTRUCTIONS: All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form. Complete any additional parts to this form as indicated below for the type of incident selected.					
TYPE OF INCIDENT (Check all that a	pply)	Additional Form	n(s) Required for this type of incident		
Near Miss (No losses, but could have res or damage)	sulted in injury, illnes	SS, Complete	e IR Form Only		
Injury or Illness		Complete	e Form IR-A; Injury or Illness		
Property or Equipment Damage, Fire, S	pill or Release	Complete Release	e Form IR-B; Damage, Fire, Spill or		
Motor Vehicle		Complete	e Form IR-C; Motor Vehicle		
INFORMATION ABOUT THE INCID	ENT				
Description of Incident					
Date of Incident	Tim	e of Incident			
		AM [\square PM \square OR Cannot be determined \square		
Weather conditions at the time of the in-	cident Was	s there adequate light	ing?		
			Yes 🗌 No 🗌		
Location of Incident					
	Was location of inci	dent within the empl	loyer's work environment? Yes [] No		
Street Address		City, State, Zip Code and Country			
Project Name/Number		Client:			
Tt Supervisor or Project Manager		Was supervisor on the scene?			
			Yes No		
WITNESS INFORMATION (attach add	ditional sheets if nec	essary)			
Name		Company			
0					
Street Address		City, State and Zij	p Code		
The Lore New Lock					
relephone Number(s)					

CORRECTIVE ACTIONS								
Corrective action(s) immediately taken by unit reporting the incident:								
Corrective estion	(a) still to be taken (b	www.whom and whon);						
	(s) still to be taken (t	y whom and when).						
ROOT CAUSE A	NALYSIS LEVEL I	REOLURED						
Root Cause Analy	vsis Level Required:	Level - 1 Level - 2	None					
Root Cause Analy	vsis Level Definition	s						
Root Cause Analysis Level Definitions Definition: A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office. Level - 1 The following events may trigger a Level 1 RCA: Work related fatality Hospitalization of one or more employee where injuries result in total or partial permanent disability Property damage in excess of \$75,000 When requested by senior management Definition: A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided. Level - 2 The following events will require a Level 2 RCA: OSHA recordable lost time incident New events will require a Level 2 RCA: OSHA recordable lost time incident 								
Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause								
NOTIFICATION	S							
Title	~	Printed Name	Signature	Telephone	Date			
				Number	Dute			
Project Manager	or Supervisor							
Site Safety Coor H&S Representat	rdinator or Office ive							
Operating Unit H	&S Representative							
Other:								

The signatures provided above indicate that appropriate personnel have been notified of the incident.



INSTRUCTIONS: Complete all sections below for incidents involving injury or illness. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.						
Incident Report Number: (From the IR I	Form)					
EMPLOYEE INFORMATION						
Company Affiliation						
Tetra Tech Employee? Tetr	aTech subcontractor	employee (directly	supervised	by Tt personnel)?		
Full Name		Company (if not T	ft employee	e)		
Street Address, City, State and Zip Code	2	Address Type				
		Home address (for Business address (r Tt employ (for subcon	yees)		
Telephone Numbers						
Work:	Home:		Cell:			
Occupation (regular job title)		Department				
Was the individual performing regular jo	ob duties?	Time individual began work				
Yes	□ No □	AM \square PM \square OR Cannot be determined \square				
Safety equipment						
Provided? Yes No	Type	e(s) provided: Hard	d hat	Protective clothing		
Used? Yes No If no,	explain why	Glo	oves	High visibility vest		
		Eye	e protection	Fall protection		
		Saf	fety shoes	Machine guarding		
			spirator	Other (list)		
NOTIFICATIONS			1			
Name of Tt employee to whom the injury reported	or illness was first	Was H&S notified	within one	hour of injury or illness?		
			Yes No			
Date of report		H&S Personnel No	otified			
Time of report		Time of Report				
If subcontractor injury, did subcontracto	or's firm perform the	ir own incident inves	stigation?			
Yes 🗌 No 🗌 If yes, request a copy	Yes No If yes, request a copy of their completed investigation form/report and attach it to this report.					

TETRATECH, INC. Safety Excellence



INJURY / ILLNESS DETAILS							
What was the individual doing just be	fore the incide	ent occurred? Describe	the activity as well as	the tools, equipment, or			
chlorine from a hand sprayer"; "Daily con	mputer key-ent	ry"	while carrying room	ig materials, spraying			
		5					
What Happened? Describe how the inju "Worker was sprayed with chlorine when	What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor and worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; Worker developed soreness in wrist over time"						
Describe the object or substance that d	irectly harme	1 the individual: Examp	les: "Concrete floor": '	'Chlorine": "Radial Arm			
Saw". If this question does not apply to the	ne incident, wr	te "Not Applicable".	,				
				-			
MEDICAL CARE PROVIDED							
Was first aid provided at the site: Vas		f was describe the type of	f first aid administored	and by whom?			
was mist and provided at the site. Tes		i yes, describe the type o					
Was treatment provided away from the si	te: Yes 🗌	No If yes, provide	the information below				
Name of physician or health care profession	ional	Facility Name					
Street Address City State and Zip Code		Type of Care?					
Succi Address, City State and Zip Code		Was individual treated in emergency room? Yes No					
		Was individual hospital	ized overnight as an ir	n-patient? Yes 🗌 No 🗌			
Telephone Number		Did the individual die?	Yes 🗌 No 🗌 If ye	s, date:			
		Will a worker's compen-	nsation claim be filed?	Yes 🗌 No 🗌			
NOTE: Attach any police reports or related	ed diagrams to	this report.					
SIGNATURES							
I have reviewed this report and agree that	I have reviewed this report and agree that all the supplied information is accurate						
Affected individual (print)	Affected indi	vidual (signature)	Telephone Number	Date			
			*				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



INSTRUCTIONS: Complete all sections below for incidents involving property/equipment damage, fire, spill or release. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.							
Incident Report Number:	(From the IR Forr	n)					
TYPE OF INCIDENT (Check all that apply)							
Property Damage	Equipment	Damage	Fire or Ex	xplosion	Spill or Relea	ase	
INCIDENT DETAILS							
Results of Incident: Fully	y describe damage	es, losses, etc.					
Response Actions Taken:							
Responding Agency(s) (i.e	e. police, fire depa	artment, etc.)	Agency(s) C	Contact Name(s)			
DAMAGED ITEMS (List	all damaged item	ns, extent of damag	ge and estima	ated repair cost)			
Item:	Ex	ttent of damage:		Estimated	repair cost		
SPILLS / RELEASES (Pr	ovide information	for spilled/releas	ed materials)		(7.0)		
Substance	Estimated quant	tity and duration	Specify R	Reportable Quantit	y (RQ)	_	
				Exceeded? Yes	No NA		
FIRES / EXPLOSIONS (I	Provide information	on related to fires/	explosions)				
Firefighting equipment us	ed? Yes 🗌 No	If yes, type	of equipmen	ıt:			
NOTIFICATIONS							
Required notifications		Name of person	notified	By whom		Date / Time	
Client:	Yes 🗌 No 🗌						
Agency:	Yes No						
Other:	Yes No						
Who is responsible for rep	porting incident to	outside agency(s))? Tt 🗌	Client 🗌 Other	Name:		
Was an additional written	report on this inci	ident generated?	Yes \Box N	No 🗌 If yes, pla	ce in project f	file.	



INSTRUCTIONS: Complete all sections below for incidents involving motor vehicle accidents. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.						
Incident Report Num	ber: (From the IR	Form)				
INCIDENT DETAIL	S					
Name of road, street, occurred	highway or locat	ion where accident	Name of intersecti	ng road, street or highway if applicable		
County		City		State		
Did police respond to	the accident?		Did ambulance resp	pond to the accident?		
	Ye	s 🗌 No 🗌		Yes No		
Name and location of	responding polic	e department	Ambulance compar	ny name and location		
Officer's name/badge	e #					
Did police complete	an incident report	? Yes 🗌 No 🗌	If yes, police repo	ort number:		
Request a copy of co	mpleted investiga	tion report and attac	ch to this form.			
How many vehicles y	ATION	he accident?				
(Attach additional she	eets as applicable	for accidents invol	ving more than 2 vel	nicles.)		
Vehicle Number 1 –	Tetra Tech Vehic	le	Vehicle Number 2	– Other Vehicle		
Vehicle Owner / Contact Information			Vehicle Owner / Contact Informatio	n		
Color			Color			
Make			Make			
Model			Model			
Year			Year			
License Plate #			License Plate #			
Identification #			Identification #			
Describe damage to v	vehicle number 1		Describe damage to vehicle number 2			
Insurance Company I	Name and Addres	s	Insurance Company Name and Address			
Agent Name			Agent Name			
Agent Phone No.			Agent Phone No.			
Policy Number			Policy Number			

DRIVE	ER INFORMA	TION						
Vehicle	e Number 1 –	Tetra Te	ch Vehicle		Vehicle Number	2 – Other Vehicle		
Driver'	's Name				Driver's Name			
Driver'	s Address				Driver's Address	5		
Phone	Number				Phone Number			
Date of	f Birth				Date of Birth			
Driver'	s License #				Driver's License #	2		
Licensi	ing State				Licensing State			
Gender		Male	Female]	Gender	Male Femal	e 🗌	
Was tra Yes	affic citation is	ssued to	Tetra Tech	driver?	Was traffic citati Yes 🗌 No 🗌	ion issued to drive	r of other vehicle?	
Citation	n #				Citation #			
Citation	n Description				Citation Description			
PASSE	ENGERS IN V	EHICLI	ES (NON-II	NJURED)				
List all Informa Injured	non-injured p ation related to Tt employee	assenger o person informat	rs (excludin s injured in tion is captu	g driver) in each the accident (non red on FORM IR	vehicle. Driver inf a-Tt employees) is a-A	formation is captured in the se	red in the preceding section. ction below on this form.	
Vehicle	e Number 1 –	Tetra Te	ch Vehicle		Vehicle Number 2 – Other Vehicle			
How m	any passenger	rs (exclu	ding driver) in the vehicle?	How many passengers (excluding driver) in the vehicle?			
Non-In Passeng and Ad	Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address					
Non-In Passeng and Ad	Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address					
Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address						
INJUR	IES TO NON	-TETRA	TECH EM	PLOYEES				
Name of injured person 1			Address of injured person 1					
Age	Gender		Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male 🗌 Fem	ale			Yes No	Yes No	Injured Died	
Name of	of injured pers	on 2			Address of inju	red person 2		
Age	Gender		Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?	
	Male Fem	ale 🗌			Yes 🗌 No 🗌	Yes 🗌 No 🗌	Injured Died	



OTHER PROPERTY DAMAGE

Describe damage to property other than motor vehicles

Property Owner's Name	Property Owner's Address



FIGURE 8-1 TETRA TECH, INC. INCIDENT FORM IR-C

COMPLETE AND SUBMIT DIAGRAM DEPICTING WHAT HAPPENED

EMERGENCY CONTACTS

CAMP RAVENNA, OH

AGENCY	TELEPHONE		
EMERGENCY (during non-duty hours 9-1-1)	(614) 336-6041		
Range Control	(614) 336-6041		
Main Guard Shack (after hours notification)	(330) 358-2017		
UH Portage Medical Center, 6847 N Chestnut St, Ravenna, OH	(330) 297-2448-patient info. (330) 297-2850-Emer.Dept		
Chemtrec	(800) 424-9300		
National Response Center	(800) 424-8802		
Ohio Poison Control Center	(800) 222-1222		
WorkCare Incident Intervention Hotline	(888) 449-7787		
USACE COR, Nathaniel Peters II	(502) 315-2624		
USACE Program Manager, Greg Moore	(502) 315-6902-office (502) 381-6061-cell		
ARNG Restoration Project Manager, Kevin Sedlak	(614) 336-6000 ext. 2053		
ARNG Program Manager-RVAAP Restoration, Mark Leeper	703-607-7955		
OHARNG Restoration Representative, Katie Tait	(614) 336-6136		
Tetra Tech Project Manager, Scott Nesbit	(412) 921-7134-office (412) 559-8133-cell		
Tetra Tech Field Superintendent, To Be Determined			
Tetra Tech SSHO, To Be Determined			
Tetra Tech UXO Program Manager, Norm Piper	(770) 635-0049-office (404) 316-2429-cell		
Tetra Tech PHSM, Jim Laffey	(412) 921-8678-office (412) 370-6668-cell		
Tetra Tech Pittsburgh Office	(412) 921-7090-main (412) 921-4040-fax		

ROUTE TO UH PORTAGE MEDICAL CENTER

UH Portage Medical Center 6874 N. Chestnut St Ravenna, Ohio 44266 Patient Information (330) 297-2448

- Exit the Main gate. Take State Route 5 west 7.2 miles to the junction of Routes 14 and 44 north. You will be at a stop light next to a McDonalds/BP.
- Turn right onto Routes 14/44 north.
- Go 2.4 miles to North Chestnut Street. You will pass a light at the intersection of Route 88 and will be at a second light at the intersection where Route 14 goes straight and Route 44 splits to the right and goes north, you need to be in the left lane at this intersection, to turn left (south) on North Chestnut Street.
- After turn, get into the right lane. The hospital entrance is 2/10ths of a mile on your right.
- •
- Follow the signs to the Emergency Room.



MEDICAL DATA SHEET

This Medical Data Sheet must be completed by on-site personnel and kept in a secured location or on your person during site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project:		
Name:		Home Telephone
Address:		
Age: Height	t:	Weight:
Person to notify in the event of an emergency:	Name	
(Relationship):	Phone:	
Drug or other Allergies:		
Doctor Prescribed Antidotes:		Prescription Expiration date:
Particular Sensitivities (Previous Medical Condition	ns):	
Do You Wear Contact Lenses?		
What medications are you presently using?		
Name, Address, and Phone Number of your person	al physician:	

Note: Health Insurance Portability and Accountability Act (HIPAA) Requirements

HIPAA took effect in 1996 then was amended in June 14, 2003. Loosely interpreted, HIPAA regulates the disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on this Medical Data Sheet), provision of health care, or other information. HIPAA also requires Tetra Tech to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form may not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that they can access this form so it may accompany an injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

Name (Print clearly)

Signature

Date

Unit first aid item	Minimum Size or Volume (metric)	Minimum Size or Volume (US)	Item quantity per unit package	Unit package size
Absorbent Compress	206 cm^2	32 in ²	1	1
Adhesive Bandage	2.5 x 7.5 cm	1 x 3 in.	16	1
Adhesive Tape	2.3 m	2.5 yd. (total)	1 or 2	1 or 2
* Combat style Tourniquet with Windlass	95.3 X 3.8	37.5 X 1.5 in. Width	1	1
Antiseptic Wipe	2.5 x 2.5 cm	1 x 1 in.	10	1
Aspirin, Individually Wrapped	325 mg	-	2	2
Bandage Compress (2 in4 in).	5 x 91 cm	2 x 36 in.	4	1
Hand Sanitizer	0.9 g	1/32 oz.	6	
Burn Dressing	10 x 10 cm	4 x 4 in.	1	1-2
Burn Treatment	0.9	1/32 fl. oz.	6	1
CPR Breathing Barrier	-	-	1	1
Cold Pack	10 x 12.5 cm	4 x 5 in	1	1-2
Eye Covering, with means of attachment	19 cm2	2.9 in2	2	1
Eye/Skin Wash	118 ml (total)	4 fl. Oz. total	1	2
First Aid Guide	-	-	1	1
Gloves, latex free	XL	XL	2 pair	1
Occlusive Dressing	10.2 X 10.2	4 X 4	1	2
Roller Bandage (4 in.).	10 x 366 cm	4 in. x 4 yd.	1	1
Roller Bandage (2 in.)	5 x 366 cm	2 in. x 4 yd.	2	1
Sterile pad	7.5 x 7.5 cm	3 x 3 in.	4	1
Triangular Bandage	101 x 101 x 142 cm	40 x 40 x 56 in.	1	1

REQUIREMENTS FOR BASIC FIRST AID UNIT PACKAGE

* Required when power tools in use.

ATTACHMENTS

ATTACHMENT I SITE-SPECIFIC TRAINING DOCUMENTATION FORM AND EMPLOYEE TRAINING/QUALIFICATIONS/MEDICAL CLEARANCE

TO BE ATTACHED BY PM/FIELD SUPERINTENDENT/SSHO

(40-Hour HAZWOPER Certificates; 8-Hour HAZWOPER Refresher Certificates; First Aid/CPR Certificates; employee resumes as required)

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing field investigation activities at Camp Ravenna, Ravenna, Ohio and that I have received site-specific training which includes the following elements:

- Names of personnel responsible for site safety and health
- Safety, health, and other hazards present onsite
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- · Medical surveillance requirements
- · Signs and symptoms of overexposure
- Emergency response procedures (evacuation/assembly area)
- Incipient response procedures
- · Review of the contents of relevant Safety Data Sheets
- Review of the use of AHAs
- Stop work authorization and process

I have been given the opportunity to ask questions and my questions have been satisfactorily answered. The dates of my training and medical surveillance requirements indicated below are accurate.

Name Printed and Signature	Site- Specific	40-Hour	8-Hour Refresher	8-Hour Supervisor	Medical Exam	Basic First Aid/BBP
	specific			Supervisor		
	1					

Insert employee documents here.

1 ATTACHMENT II 2 EXCAVATION/TRENCHING CHECKLISTS

INSERT TETRA TECH DOCUMENT DCN 4-05F TRENCHING AND EXCAVATION CHECKLIST

SOILS ANALYSIS CHECKLIST

This checklist must be completed when soil analysis is made to determine the soil type(s) present in the excavation. A separate analysis must be performed on each layer of soil in excavation walls. A separate analysis must also be performed if the excavation (trench) is stretched over a distance where soil type may change.

Site location:					
Date:					
Time:					
Competent Person					
Where was the sample ta	aken from?				
Excavation:					
Depth:					
Width:					
Length:					
VISUAL TEST					
Particle type:		Fine Grained (cohesive	e)] Cour	se grained (sand or gravel)
Water conditions:		Wet Dry Surfa	ace water pro	esent	Submerged
Previously disturbed soi	ls?] Yes	🗌 No
Underground utilities?] Yes	🗌 No
Layered soils?] Yes	🗌 No
Layered soil dipping inte	o excavation?] Yes	🗌 No
Excavation exposed to v	ibrations:] Yes	🗌 No
Crack-like openings or s	spallings observed?] Yes	🗌 No
Conditions that may cre	ate hazardous atmo	sphere?] Yes	🗌 No
If yes, identify condition	and source:				
Surface encumbrances:] Yes	🗌 No
Work to be performed near public vehicular traffic?] Yes	🗌 No
Possible confined space	exposure?] Yes	🗌 No
MANUAL TEST					
Plasticity:	Cohesive		Non-col	hesive	
Dry Strength:	Granular (crumb	oles easily)	Cohesiv	e (bro	ken with difficulty)

NOTE: The following unconfined compressive strength tests should be performed on undisturbed soils.

THUMB TEST (used to estimate unconfined compressive strength of cohesive soil)					
Test performed: Image: Yes No					
Type A (soil indented by thumb with very great effort)					
Type B (soil indented by thumb with some effort)					
Type C (soil easily penetrated several inches by thumb with little or no effort). If soil is submerged, seeping water, subjected to surface water, runoff, exposed to wetting.)					
PENETROMETER OR SHEARVANE (used to estimate unconfined compressive strength of cohesive soils)					
Test performed:					
Type A (soil with unconfined compressive strength of 1.5 tsf or greater)					
Type B (soil with unconfined compressive strength of 0.5 tsf to 1.5 tsf)					
Type C (soil with unconfined compressive strength of 1.5 tsf or less). If soil is submerged, seeping water, subjected to surface water, runoff, exposed to wetting.)					
WET SHAKING TEST (used to determined percentage of granular and cohesive materials). Compare results to soil textural classification chart to determine soil type. Test performed Yes					
Type A (clay, silty clay, sandy clay, clay loam, and in some cases silty clay, loam and sandy clay loam)					
Type B [angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and in some cases, silty clay loam and sandy clay loam					
Type C (granular soil including gravel, sand and loamy sand)					
% granular					
% cohesive					
% silt					
NOTE: Type A no soil is Type "A" if soil is fissured; subject to vibration; previously disturbed; layered dipping into the excavation on a slope of 4H:1V.					
SOIL CLASSIFICATION					
Type A					
Type B					
Type C					
SELECTION OF PROTECTIVE SYSTEM					
Sloping, Specify angle:					

Timber Shoring

Aluminum Hydraulic Shoring

ATTACHMENT III EQUIPMENT INSPECTION CHECKLIST

Heavy Equipment Inspection Checklist

Company:				Unit/Serial No#:		
Inspection Date:	1	1	Time:	:	Equipment Type:	
Project Name:					(e.g, earthmoving equipment - tractors backhoes, buildozers, etc.) Project No#:	

Yes	No	NA	Requirements	Comments
			 Seat Belts Are available for intended operator and passengers (where applicable) Seat Belts are operational? 	
			 Roll-Over Protection (ROPS) Roll-over protection structures (ROPS) are provided on vehicles and heavy equipment (including scrapers, tractors, loaders, bulldozers, carryalls, etc.) 	
			 Brakes Brake systems capable of stopping and holding fully loaded equipment Parking Brake functions properly Wheel Chocks available (where and as applicable) 	
			Access Non-slip steps Grab Handles (3-Point Grab/Step Mounting Points) 	
			 Audible Alarms Audible alarms –Bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed 	
			 when the machine is moving in either direction. Back up Alarms –Self propelled equipment with an obstructed view to the rear will be equipped with a reverse gear signal alarm distinguishable from the gurran direction level. 	
			- Horn functioning properly	
Yes	No	NA	Requirements	Comments
-----	----	----	---	----------
			 Highway Use Fenders for equipment that can exceed 15mph Fire Extinguisher Are exhaust emissions directed away from the Operator? Cab Clean, free from debris, tools or equipment that can interfere with foot Control. 	
			 Free from storage of flammable material/solvents Mirrors, Safety glass Equipped with defrosters Windshield wipers Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use? 	
			 Gauges functioning properly Tires (Tread) or tracks Steering (standard and emergency) Are tools and material secured to prevent movement during transport? 	
			Fluid Levels: - Engine oil - Transmission fluid - Brake fluid - Cooling system fluid - Hoses and belts - Hydraulic oil	
			 Fueling Fueling of vehicles and heavy equipment is done with the engine off. No smoking is permitted at or near the fuel storage or refueling area. A sign is posted stating: NO SMOKING WITHIN 50 FEET. No sources of ignition are present near the fuel storage or refueling area. A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area, no closer than 50-feet. Safety cans available? 	

Yes	No	NA	Requirements	Comments
			 Safety Guards – Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) the points of operations protected from accidental contact? 	
			 Hot pipes and surfaces are protected from accidental contact? High pressure pneumatic lines have safety cable to prevent thrashing should it become disconnected? 	
			Attachments Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? 	
			 Operator Qualifications Does the operator have proper licensing where applicable, (e.g., CDL)? Does the operator, understand the equipment's operating instructions? Is the operator experienced with this equipment? Is the operator 21 years of age or more? 	
			PPE Required - Hardhat - Safety glasses - Work gloves - Chemical resistant gloves	
			Key(s)? Operating Manual?	
			Other Hazards - Excessive Noise Levels	
Approv	ved for	Use	Yes No See Comments	

Site Health and Safety Officer

Operator

HAND TOOL INSPECTION CHECKLIST

Yes	No	NA	Requirement	Comments
			Are all tools and equipment (both company and employee owned) used by employees at their	
			workplace in good condition?	
			Missing pins and/or bolts?	
			Are broken or fractured handles on hammers, axes and similar equipment replaced promptly?	
			Are hand tools such as chisels and punches, which develop mushroomed heads during use,	
			reconditioned or replaced as necessary?	
			Are worn or bent wrenches replaced regularly?	
			Are appropriate handles used on files and similar tools?	
			Are employees made aware of the hazards caused by faulty or improperly used hand tools?	
			Are jacks checked periodically to ensure they are in good operating condition?	
			Are tool handles wedged tightly in the head of all tools?	
			Are tool cutting edges kept sharp so the tool will move smoothly without binding or skipping?	
			Are tools stored in dry, secure locations where they won't be tampered with?	
			Are appropriate safety glasses, face shields, etc. used while using hand tools or equipment which might produce flying materials or be subject to breakage?	
			Power Tool Inspection Checklist	
Yes	No	NA	Requirement	Comments
			Are grinders, saws and similar equipment provided with appropriate safety guards?	
			Are power tools used with the correct shield, guard, or attachment, recommended by the manufacturer?	
			Are portable circular saws equipped with guards above and below the base shoe? Are circular saw guards checked to assure they are not wedged up, thus leaving the lower portion of the blade	
			unguarded?	
			Are rotating or moving parts of equipment guarded to prevent physical contact?	
			Are all cord-connected, electrically operated tools and equipment effectively grounded or of this Approved double insulated type?	
			Are effective guards in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, and air compressors?	
			Are portable fans provided with full guards or screens having openings ¹ / ₂ inch or less?	

Yes	No	NA	Requirement	Comments
			Is hoisting equipment available and used for lifting heavy objects, and are hoist ratings and characteristics appropriate for the task?	
			Are ground-fault circuit interrupters provided on all temporary electrical 15 and 20 ampere circuits, used during periods of construction?	
			Are pneumatic and hydraulic hoses on power operated tools checked regularly for deterioration or damage?	
			 Air compressor: Is the air compressor equipped with a Surge Check Valve? Pressure regulator gauge and valve? Pressure relief valve? Water trap and filter? 	
			Chainsaws	
Yes	No	NA	Requirement	Comments
			Is the chain sharp, well oiled, and properly adjusted (Chain tension)?	
			Is the Bar straight? • Are there indications of excessive wear?	
			Does the chain brake lever move freely? Does chain brake stop the chain when applied?	
			Does the chain move when idling?	
			Are the cans used to fuel the chainsaw safety cans?	
			Does the on/off switch function properly?	
			Does the throttle lock function properly? Is the chainsaw equipped with continuous pressure throttle control?	
			PPE: Is the following PPE in serviceable condition? Hardhat with mesh visor and ear muffs? Safety glasses? Chainsaw chaps? Gloves with protection also on the hack of the hands?	

Yes	No	NA	Requirement	Comments
			Emergency Equipment: Is a Fire extinguisher (3A:B:C) available for immediate use? Is a First-Aid Kit immediately available for use? Does it contain the minimum content as required in the HASP?	
			Communication – Is an acceptable means of communication available (Hand signals, radios, air horns, etc.) that will support communication over the engine noise? Type?	
			Are SDSs available for the fuels, fuel additives, and lubricating oils?	
			Is the operator trained in proper operation of the chainsaw? Does the operator demonstrate knowledgeable operation?	

ATTACHMENT IV FIRST RESPONDER REPORTING FORM

FIRST RESPONDER REPORTING FORM (Print all information)

Collect as much of the information on the top half of this form as possible before making initial notification. Comp top and bottom of the form before turning in to Camp Ravenna.	lete the
Name of individual reporting spill:	
When did the spill occur (Date and Time)?	
Spill Location (Building or area name / number, indoors or out; if vehicle involved, type and bumper number):	
What was spilled?	
Rate at which material is currently spilling	
Extent of spill travel?	
Did the spill reach water (ditch, creek, stream, pond, well head)	
Number of injured personnel and type injuries, if applicable.	
Do you need the Fire Department to respond to protect life, property, and environment?	
Unit: State: Report Date & Time:	
On Scene Coordinator Name and Grade: Phone:	
How did the spill occur (be specific)	
What remedial action was taken?	
Was soil and absorbent material generated? How much?	
What is the location of the soil and absorbents?	
Was the Environmental Office contacted (yes or No, date and time)?	
Who did you talk to in the Environmental Office?	
Was the site cleared by the Env. Office (Yes or No, date and time)?	
Who cleared the site (name and grade, date and time)?	

Initial information is critical. Get as much information as you can, but don't hesitate to make the initial notification if a spill is moving or worsening rapidly!

This form must be completed for all releases and turned-in to Camp Ravenna Range Control within 24 hours.

FIRST RESPONDER SPILL/RELEASE RESPONSE ACTIONS

Units or contractors performing training or other operations at Camp Ravenna shall be responsible for adhering to the provisions identified in the Camp Ravenna Integrated Contingency Plans (ICP). A copy of the ICP may be obtained from the Camp Ravenna Environmental Supervisor. Following discovery of a spill (any size), the procedures outlined below shall be executed where applicable:

- 1. If necessary, initiate evacuation of the immediate area.
- 2. Notify Camp Ravenna Range Control via two-way radio or by calling <u>(614) 336-6041</u>, and report information contained on the "First Responder Reporting Form" if it is known or can reasonably be determined. This form has been copied on the opposite side of this page. If Range Control cannot be reached, contact a Camp Ravenna OSC (listed below).
- 3. Stop spill flow when possible without undue risk of personal injury.
- 4. If trained, contain the spill using available spill response equipment or techniques.
- 5. Make spill scene OFF LIMITS to unauthorized personnel.
- 6. Restrict all sources of ignition when flammable substances are involved.
- 7. Report to the OSC upon his/her arrival to the scene.
- 8. Turn in a completed copy of the Camp Ravenna First Responder Form to Camp Ravenna Range Control for ALL releases, even ones cleaned up by the reporter.

TELEPHONE NUMBER

When Camp Ravenna Range Control is not available, the Camp Ravenna OSC must to be contacted by the discoverer/first responder following a release if it is in water, at or above a reportable quantity (25 gallons or more of POL), a hazardous or extremely hazardous substance, a hazardous waste, or involves fire, explosion, or is otherwise a major incident.

NAME	JOB TITLE	OFFICE	24 HOUR
Camp Ravenna Range Control	Operations and Training	(614)336-6041	(614) 202-5783
Tim Morgan (Primary OSC)	Environmental Supervisor	(614)336-6568	(330)322-7098
Katie Tait	Environmental Specialist	(614)336-6136	Contact Alternate
CPT Mike Yates	Range Operations	(614)336-6193	(330) 819-5038
MAJ Richard Saphore	Logistics Officer	(614)336-6790	(614) 593-1654
LTC Ed Meade	Garrison Commander	(614)336-6560	(614)307-0493
Joint Forces Command (Alternate POC)	OHARNG Emergency Center	(888)637-9053	(888)637-9053

Off-site (from Camp Ravenna area code 614 phones)

Windham Fire Department9-1-330-326-2222 Portage County Sheriff9-1-330-296-5100 Trumbull County Police, Fire Department and Hazmat.....911 SEE REVERSE FOR FIRST RESPONDER REPORTING FORM

ATTACHMENT V OSHA POSTER





Job Safety and Health IT'S THE LAW!

All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a workrelated injury or illness, without being retaliated against.
- Receive information and training on job hazards, including all hazardous substances in vour workplace.
- Request an OSHA inspection of your workplace if you believe there are unsafe or unhealthy conditions. OSHA will keep your name confidential. You have the right to have a representative contact OSHA on your behalf.
- Participate (or have your representative participate) in an OSHA inspection and speak in private to the inspector.
- File a complaint with OSHA within 30 days (by phone, online or by mail) if you have been retaliated against for using your rights.
- See any OSHA citations issued to your employer.
- Request copies of your medical records, tests that measure hazards in the workplace, and the workplace injury and illness log.

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health and safety concern with you or with OSHA, or reporting a work-related injury or illness.
- Comply with all applicable OSHA standards.
- Report to OSHA all work-related fatalities within 8 hours, and all inpatient hospitalizations, amputations and losses of an eye within 24 hours.
- Provide required training to all workers in a language and vocabulary they can understand.
- Prominently display this poster in the workplace.
- Post OSHA citations at or near the place of the alleged violations.

FREE ASSISTANCE to identify and correct hazards is available to small and mediumsized employers, without citation or penalty, through OSHA-supported consultation programs in every state.



APPENDIX D

EXPLOSIVE SAFETY SUBMISSION



DEPARTMENT OF THEARMY US ARMY DEFENSE AMMUNITION CENTER 1 C TREE ROAD MCALESTER OK 74501-9053

ATCL-AC

17 May 2016

MEMORANDUM FOR Military Munitions Center of Expertise, (CEHNC-EMM/Mr. Zange/Mr. Barker), P.O. Box 1600, Huntsville, AL 35807-4301

SUBJECT: Army and DDESB Approval of Explosives Safety Submission (ESS), Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio. USATCES MEC File Number 1490.

1. References:

a. Memorandum, DDESB-PE, dated 11 May 2016, Subject: DDESB Approval of Amendment 1, Non-Time Critical Removal Action Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH [USATCES MEC File Number 1490] (Encl).

b. Department of the Army Pamphlet 385-64, Ammunition and Explosives Safety Standards, 10 October 2013, Rapid Action Revision.

2. Any changes that increase risk or hazard will require additional approval; an Amendment to this ESS must be submitted to USATCES and DDESB for review and approval. This approval and all other stipulations and requirements will be made part of the administrative record for the site.

3. The primary USATCES POC is Mr. Chad Williams, (918) 420-8044, <u>chad.t.williams7.civ@mail.mil</u>, alternate POC Mr. Landon Johnson, (918) 420-8807, DSN 956-8807, <u>landon.k.johnson5.civ@mail.mil</u>.

> UPTON R. SHIMP Executive Director Defense Ammunition Center/U.S. Army Technical Center for Explosives Safety

CF(w/Encl):

Office of the Director of Army Safety, (Mr. Patton), Building 1456, 9351 Hall Road, Fort Belvoir, VA 22060-5860

Office of the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health, Special Assistant for Munitions, DASA-DESOH (Mr. King), 110 Army Pentagon, Washington, DC 20310-0110



DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD

4800 MARK CENTER DRIVE, SUITE 16E12 ALEXANDRIA VIRGINIA, 22350

MAY 11 2016

DDESB-PE

MEMORANDUM FOR DIRECTOR, U.S. ARMY DEFENSE AMMUNITION CENTER ATTENTION: ATCL-AC

- SUBJECT: DDESB Approval of Amendment 1, Non-Time Critical Removal Action Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH [USATCES MEC File Number 1490]
- References: (a) DAC ATCL-AC Memorandum of 21 April 2016, Subject: Request DDESB Approval of Explosives Safety Submission, Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio. USATCES MEC File Number 1490.
 - (b) DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards, date varies by volume
 - (c) DDESB TP-16, Methodologies for Calculating Primary Fragment Characteristics, Revision 4, 2 August 2012

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject Amendment 1 to the non-time critical removal action explosives safety submission (NTCRA-ESS) forwarded by reference (a) against the requirements of reference (b). Based on the information provided, approval is granted for removal and treatment of material potentially presenting an explosive hazard (MPPEH) and munitions and explosives of concern (MEC) at Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH.

a. This amendment adds mechanized low input unintentional detonation operations within the Winklepeck Burning Grounds (WBG); adds storage of MEC/MPPEH; and incorporates the 7 March 2016 Fragmentation Data Review Forms of reference (c).

b. The munition with the greatest fragmentation distance (MGFD) for the WBG remains the Mk II Grenade; the minimum separation distance (MSD) for teams for manual unintentional detonation operations is 20 feet (ft) and 62 ft for low input mechanized unintentional detonation operations, based respectively on K40 and the hazardous fragment distance (HFD) of the MGFD; the MSD for nonessential personnel from manual and low input mechanized unintentional detonation operations is 62 ft based on the HFD of the MGFD; and the MSD for all personnel from intentional detonations remains 521 ft based on the maximum fragment distance of the MGFD.

c. Operators of mechanized equipment will be shielded from hazardous fragments based on an unintentional detonation from mechanized operations involving the MEC identified in reference (a). The use of barricades/shields is authorized as an engineering control to prevent fragment penetration provided the Army ensures usage per reference (c). Additionally, operators will be provided blast overpressure protection of 12 ft based on K24 of the MGFD.

d. The use of hearing protection is authorized as an engineering control for unintentional detonation operations to provide equivalent K24 blast overpressure protection for essential personnel at 9 ft based on K18 of the MGFD. The Army shall ensure the use of double hearing protection which provides > 9 decibel (dB) attenuation.

e. One ATF Type II aboveground magazine is approved for a maximum credible event of 100 pounds net explosive weight of hazard division 1.1. The MSD for nonessential personnel is 658 ft based on the HFD.

All other stipulations and requirements established via the original NTCRA-ESS remain in effect.

The point of contact for this action is Ms. Kristene Bigej, (571) 372-6705, DSN 372-6705, E-mail address: kristene.a.bigej.civ@mail.mil.

RRY/L CHIAPELLO xecutive Director



ATCL-AC

21 April 2016

MEMORANDUM FOR Department of Defense Explosive Safety Board (DDESB-PE/MS. Bigej), 4800 Mark Center Drive, Suite 16E12, Alexandria, VA 22350-3606.

SUBJECT: Request DDESB Approval of Explosives Safety Submission, Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio. USATCES MEC File Number 1490.

1. References:

a. Memorandum, CEHNC-EMM, dated: 20 April 2016, SUBJECT: Explosives Safety Submission Plan (ESS), Amendment 1, Camp Ravenna Joint Military Training Center (Camp Ravenna). Winklepeck Burning Grounds (WBG), former Ravenna Army Ammunition Plant (RVAAP), April 2016, (Encl).

b. DoD 6055.09-M, Ammunition and Explosives Safety Standards, date varies by Volume, Administratively Reissued 4 August 2010.

c. Department of the Army Pamphlet (DA PAM) 385-64, Ammunition and Explosives Safety Standards, 24 May 2011, RAR 10 October 2013.

2. Reference 1.a. with enclosed explosives safety submission, is provided for DDESB review and approval IAW reference 1.b. and 1.c. USATCES has reviewed the subject explosives safety submission and recommends approval.

3. The purpose of this amendment is (1) to add intrusive low input mechanized operations, (2) site a type II magazine for storage of recovered acceptable to move MEC/MPPEH, other than UXO (3) revise paragraph 7.1 and (4) to replace the Fragmentation Data Sheet with an updated sheet.

4. The primary USATCES POC is Mr. Chad Williams, (918) 420-8044, <u>chad.t.williams7.civ@mail.mil</u>, alternate POC Mr. Landon Johnson, (918) 420-8807, DSN 956-8807, <u>landon.k.johnson5.civ@mail.mil</u>.

ATCL-AC

SUBJECT: Request DDESB Approval of Explosives Safety Submission, Amendment 1, Munitions and Explosives of Concern, Non-Time Critical Removal Action, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio. USATCES MEC File Number 1490.

> UPTON R. SHIMP Executive Director Defense Ammunition Center/U.S. Army Technical Center for Explosives Safety

CF (w/Encl):

Office of the Director of Army Safety, (DACS-SF/Mr. Patton), Bldg. 1456, 9351 Hall Rd, Fort Belvoir, VA 22060-5527

Office of the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health, Special Assistant for Munitions, (DASA-DESOH/Mr. King), 110 Army Pentagon, Washington, DC 20310-0110

Military Munitions Center of Expertise, (CEHNC-EMM/Mr. Zange/Mr. Barker), P.O. Box 1600, Huntsville, AL 35807-4301



DEPARTMENT OF THE ARMY HUNTSVILLE CENTER, CORPS OF ENGINEERS P.O. BOX 1600 HUNTSVILLE, ALABAMA 35807-4301

REPLY TO ATTENTION OF

CEHNC-EMM

20 April 2016

MEMORANDUM FOR US Army Technical Center for Explosives Safety, Explosives Safety Knowledge, OE and Chemical Division, (ATCL-ACE/ Mr. Jimmy Langley), Building 35, 1C Tree Road, McAlester, OK 74501-9053.

SUBJECT: Explosive Safety Submission Plan (ESS), Amendment 1, Camp Ravenna Joint Military Training Center (Camp Ravenna). Winklepeck Burning Grounds (WBG), former Ravenna Army Ammunition Plant (RVAAP), April 2016.

1. References:

a. ER 385-1-95, Safety and Health Concerns for Munitions and Explosives of Concern (MEC) Projects, March 2007.

b. DOD 6055.09-M, Ammunition and Explosives Safety Standards, February 2008.

c. National Guard Bureau (NGB) Memo dated 17 Dec 2013, SUBJ: Explosives Site Plan (ESP)/Explosive Safety Submission (ESS) approval for submission by USACE-CX-MM.

2. This ESS Amendment 1 has been reviewed for technical adequacy and to insure compliance with US Army Corps of Engineers (USACE), Department of the Army and Department of Defense requirements. USACE participation is approved.

3. Per reference c, CEHNC-EMM is submitting this ESS for approval on behalf of HQ National Guard Bureau (NGB).

4. If you have any questions, please contact Mr. Walt Zange at (256) 895-1586 or Mr. Carl Barker at (256) 895-1513.

Encl

SANDRA M. ZEBROWSKI, P.E. Director, Environmental and Munitions Center Of Expertise

CF: (electronically w/o encls) USACE, (CENAB-EMDC/Mr. Paul Greene) USACE, HQUSACE, (CESO-SWD/Mr. Clint Henker)



EXPLOSIVES SAFETY SUBMISSION

AMENDMENT 1

MUNITIONS AND EXPLOSIVES OF CONCERN NON-TIME CRITICAL REMOVAL ACTION FOR WINKLEPECK BURNING GROUNDS (WPG) AT THE RAVENNA ARMY AMMUNITION PLANT, RVAAP-5, RAVENNA, OHIO

April 2016

Prepared by U.S. Army Corps of Engineers Baltimore District Baltimore, MD



NATIONAL GUARD BUREAU 111 SOUTH GEORGE MASON DRIVE ARLINGTON VA 22204-1382

ARNG-ILE

17 December 13

MEMORANDUM FOR THE Commander, US Army Corps of Engineers, Environmental and Munitions Center of Expertise (USACE CX-MM), PO Box 2600, Huntsville AL, 35809

SUBJECT: Explosives Site Plan (ESP)/Explosive Safety Submission (ESS), Military Munitions Response Program (MMRP) Remedial Investigation (RI)/Removal Action/Time Critical Removal Action for Army National Guard (ARNG-HQ)

1. Reference: DOD 6055.09-M, Ammunition and Explosives Safety Standards, February 2008, Administratively Reissued 4 August 2010.

2. The ARNG-ILE-C approves of USACE, submitting all ESPs and ESSs, for projects in which the Corps of Engineers is assisting, through USATCES and DDESB for approval.

3. The POC for this memorandum is MAJ Erick Wells, 703-601-7984.

MICHAEL C. AHN COL, EN Chief, Environmental Programs Division

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Appendices

Appendix A – Regional and Site Maps Appendix B – Fragmentation Data Sheets The purpose of this amendment is (1) to add intrusive low input mechanized operations, (2) site a type II magazine for storage of recovered acceptable to move MEC/MPPEH, other than UXO (3) revise paragraph 7.1 and (4) to replace the Fragmentation Data Sheet with an updated sheet.

- 1. Background No change from original ESS
- 2. Maps/Figures

See Appendix A for listing of maps/figures for this ESS. (Figure 4 – added)

3. Explosive Safety Quantity-Distance – No change from original ESS

Site				MSI	D (ft)		
Name	MGFD	Unin	tentional Det	onations	5	Intentional D	etonations
		Team	Hazardous			Without	Using
		Separation	Fragment	K-18	K- 24	Engineering	Sandbag
		Distance	Distance			Controls	Mitigatio
		(TSD)	(HFD)			(MFD-H)	n
No	No	No change	No change			No change	No
change	change	from	from			from	change
from	from	original	original	9	12	original ESS	from
original	original	ESS ²	ESS				original
ESS	ESS						ESS

Table 3 Minimum Separation Distance

Footnotes:

- 1. No change from original ESS
- 2. TSD during Mechanized MEC Operations will be the HFD

3.1 MEC Operations

The MSDs for personnel are listed in Table 3. Any occupied buildings or public roadways in the MSD area during MEC operations will be evacuated and/or roadways blocked to prevent non-essential personnel from entering during the performance of MEC operations. In the event non-essential personnel enter the MSD, work will halt until non-essential personnel have departed. *During Low Input Mechanized MEC operations, non-essential personnel will be kept at the HFD from the operations.* Preliminary site work activities, such as surveying, laying grid lanes, vegetation removal, and anomaly detection, do not require establishing an MSD for Q-D purposes.

3.2 Demolition Operations

3.2.1 Delivery on an as-needed basis - No changes from original ESS

3.2.2 Explosive Storage Magazine

At ATF Type II magazine will be used to hold acceptable-to-move recovered MEC/MPPEH, other than UXO, items pending disposal. The NEW for this magazine will be 100 pounds. All recovered MEC, is HD 1.1. Table V3.E3.T2, Open column, DoDM 6055.09 will be used to determine the ESQD arc for this magazine.

3.3 Planned or Established Demolition Areas – No change from original ESS

3.4 Footprint Areas – No change from original ESS

3.5 MCE – No change from original ESS

4.0 Types of MEC – No change from original ESS

5.0 Start Date – No change from original ESS

6.0 MEC Migration – No change from original ESS

7.0 Detection Equipment and Response Techniques

7.1 Demolition Operations

If disposal activities are required, they will be performed by qualified UXO personnel meeting the requirements of DDESB TP 18. The MSDs for intentional detonations are shown in Table 3. Q-D arcs for the site are presented in Figures 2 through 4 of Appendix A. *All explosives operations will follow the procedures outlined in the Work Plans, SOPs, and EM 385-1-97, Explosives Safety and Health Requirements Manual.* Demolition operations will be performed as needed on a daily basis, or if the MEC/MPPEH items are determined to be acceptable to move, placed in the magazine identified in this ESS.

7.2 Explosive Storage, Accountability, and Transportation – No changes from original ESS

7.3 Exclusion Zone Control – No changes from original ESS

7.4 Intrusive Investigation

Only qualified UXO personnel and UXO Technician I, under supervision of UXO qualified personnel will perform excavation and investigation of anomalies. *To gain access to a*

subsurface anomaly, excavation may be accomplished utilizing Earth Moving Machinery (EMM). This will be a "Low Input" mechanized MEC operation. The equipment will be armored in accordance with the requirements identified in the Fragmentation Data Sheet. Operators will wear additional hearing protection that will provide added protection to 9 decibels, to reduce the required K24 distance to K18. Non-essential personnel will be kept at HFD during these mechanized MEC operations.

7.5 Quality Control and Quality Assurance – No change from original ESS

7.6 MPPEH Procedures – No change from original ESS

7.6.1 Inspection and Certification – No change from original ESS

7.7 Alternative Disposal Techniques – No change from original ESS

8. Disposition Techniques – No change from original ESS

9. Environmental, Ecological or Cultural Considerations – No change from original ESS

10. Technical Support – No change from original ESS

11. Residual Risk Management – No change from original ESS

12. Safety Education Program – No change from original ESS

13. Stakeholder Involvement – No change from original ESS

14. Contingencies – No change from original ESS

Appendix A

Regional and Site Maps

- Figure 1 No change from original ESS
- Figure 2 No change from original ESS
- Figure 3 No change from original ESS
- Figure 4 MPPEH Storage magazine Location (Added)



Winklepeck Burning Grounds Ravenna, OH



EMDC, Baltimore District US Army Corps of Engineers

Figure 4 MPPEH Storage Magazine

> Magazine ESQD 658ft

> > IN

<u>Appendix B</u>

Fragmentation Data Review Form

Fragmentation Data Review Form

Database Revision Date 3/7/2016

ategory:	Grenades & Mines
unition:	Mk II Grenade
ase Material:	Cast Iron, Grey, CL35
ragmentation Method:	Pre-formed Fraamentina
econdary Database Category:	Hand Grenade
unition Case Classification:	Robust
Munition Fragmentat	Information and ion Characteristics
Explosive Type:	TNT
Explosive Weight (Ib):	0.125
Diameter (in):	2.2600
Cylindrical Case Weight (lb):	0.24047
Maximum Fragment Weight (Intentional) (lb):	0.0129
Design Fragment Weight (95%) (Unintentional) (lb):	0.0043
Critical Fragment Velocity (fps):	578
Sandbag and Wat	ter Mitigation Options
TNT Equivalent (Impulse):	1
TNT Equivalent Weight - Impulse	e (lbs): 0.125
Kinetic Energy 10 ⁶ (lb-ft ² /s ²):	0.0021
Single	e Sandbag Mitigation
Required Wall & Roof Thickness	(in) 12
Expected Max. Throw Distance (ft): 25
Minimum Separation Distance (fi	t): 25
Double	Sandbag Mitigation
Required Wall & Roof Thickness	(in) 24
Expected Max. Throw Distance (ft): 10
Minimum Separation Distance (f	t): 12.5
Wa	ater Mitigation
Minimum Separation Distance (ft)	200/200
Water Containment System:	5 gal carboys/ inflatable pool
Note: Use Sandbag and Water Mi applicable documents and guidan grams is utilized, the above mitig applicable. Subject matter exper specific mitigation options.	tigation in accordance with all ice. If a donor charge larger than 32 ation options are no longer ts may be contacted to develop site

DODIC:	G890
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	1/13/2010
Individual Last Updated Record:	SDH
Date Record Retired:	

Theoretical Calculated Fragment Distance	es
HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	62
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	521
MFD-V [Maximum Fragment Distance, Vertical] (ft):	397
Overpressure Distances	
Overpressure Distances TNT Equivalent (Pressure):	1
Overpressure Distances TNT Equivalent (Pressure): TNT Equivalent Weight - Pressure (Ibs):	1
Overpressure Distances TNT Equivalent (Pressure): TNT Equivalent Weight - Pressure (Ibs): Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	1 0.125 9

Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	9	
Public Traffic Route Distance (2.3 psi); K24 Distance:	12	
Inhabited Building Distance (1.2 psi), K40 Distance:	20	
Intentional MSD (0.0655 psi), K328 Distance:	164	
Note: Par VE E2 2 2 1 of DoD 40EE 00 M the minimum cited K229		

te: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 stance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation			
	Intentional	Unintentional	
4000 psi Concrete			
(Prevent Spall):	1.15	0.79	
Mild Steel:	0.07	0.05	
Hard Steel:	0.06	0.04	
Aluminum:	0.16	0.10	
LEXAN:	1.61	1.23	
Plexi-glass:	0.73	0.51	
Bullet Resist Glass:	0.55	0.37	

Item Notes

ragment sizes, number of fragments and HFD came from test formation. These numbers were used to calculate MFD-H using TP 6 Eq 4-34 & iterating using TRAJ to calculate the intial velocity. With his information, standard TP 16 methods were used to calculate MFDand thicknesses to prevent perforation.

Distribution authorized to the Department of Defense and U.S. DoD contractors only for Administrative-Operational Use (17 October 2002). Other requests shall be referred to the Chairman, Department of Defense Explosives Safety Board, Room 856C, Hoffman Building I, 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.



DEPARTMENT OF THE ARMY US ARMY DEFENSE AMMUNITION CENTER 1 C TREE ROAD MCALESTER OK 74501-9053

ATCL-ACE

13 Oct 2015

MEMORANDUM FOR Military Munitions Center of Expertise (CEHNC-EMM/Mr. Zange/Mr. Barker), P.O. Box 1600, Huntsville, AL 35807-4301

SUBJECT: Army and DDESB final approval of Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH.

1. References:

a. Memorandum, CEHNC-EMM, dated: 15 Sep 2015, Subject: Explosive Safety Submission (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna), Winklepeck Burning Grounds (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015.

b. DoD 6055.09-M, Ammunition and Explosives Safety Standards, date varies by Volume, Administratively Reissued 4 August 2010.

c. Department of the Army Pamphlet 385-64, Ammunition and Explosives Safety Standards, 10 October 2013, Rapid Action Revision.

d. Memorandum, DDESB-PE, dated: 08 Oct 2015, Subject: DDESB Approval of Non-Time Critical Removal Action Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Tumbull Counties, OH, (encl).

2. The subject Explosives Safety Submission, transmitted by reference 1.a, has been reviewed in accordance with reference 1.b. and 1.c. This memorandum with the enclosed reference 1.d provides US Army Technical Center for Explosives Safety (USATCES) and Department of Defense Explosives Safety Board (DDESB) final approval.

3. Storage and handling of commercial explosives at Winklepeck Burning Grounds must comply with Chapter 21 of the Department of the Army Pamphlet 385-64, Storage and Handling of Commercial Explosives, reference 1.c.

4. Army Technical Manual TM-60 series cannot be used in explosive site plan as a reference for contractors to use during demolitions operations. The procedures for the contractors to conduct demolition operations is written in their submitted work packages and standard operating procedures.

ATCL-ACE

SUBJECT: Army and DDESB final approval of Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH.

5. Any changes that increase risk or hazard will require additional approval; an Amendment to this Explosives Safety Submission must be submitted to USATCES and DDESB for review and approval. This approval and all other stipulations and requirements will be made part of the administrative record for the site.

6. Point of contact for this submission is the undersigned, email: <u>usarmy.mcalester.usamc.list.dac-est-siteplan@mail.mil</u>

PAUL A. CUMMINS Chief, Risk Management Division, US Army Technical Center for Explosives Safety

CF(w/Encl):

Office of the Director of Army Safety (Mr. Patton), Building 1456, 9351 Hall Road, Fort Belvoir, VA. 22060-5860

Office of the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health, Special Assistant for Munitions, DASA-DESOH (Mr. King), 110 Army Pentagon, Washington, DC 20310-0110



DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD 4800 Mark Center Drive, Suite 16e12 ALEXANDRIA VIRGINIA, 22350

DDESB-PE

OCT 08 2015

MEMORANDUM FOR DIRECTOR, U.S. ARMY DEFENSE AMMUNITION CENTER ATTENTION: ATCL-ACE

- SUBJECT: DDESB Approval of Non-Time Critical Removal Action Explosives Safety Submission, Winklepeck Burning Grounds, Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH
- References: (a) DAC ATCL-ACE Memorandum of 29 September 2015, Subject: Request DDESB Approval, Explosives Safety Submission (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna), Winklepeck Burning Ground (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015, USATCES MEC File Number 1429.
 - (b) DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards, date varies by volume
 - (c) DDESB TP-15, Approved Protective Construction, Revision 3, May 2010
 - (d) DA PAM 385-64, 24 May 2011/RAR 10 October 2013

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject non-time critical removal action explosives safety submission (NTCRA-ESS) forwarded by reference (a) against the requirements of reference (b). Based on the information provided, approval is granted for removal and treatment of material potentially presenting an explosive hazard (MPPEH) and munitions and explosives of concern (MEC) at Camp Ravenna Joint Military Training Center, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, OH. This approval is based on the following:

a. The efforts addressed in this NTCRA-ESS involve manual unintentional detonation operations (to include mechanized unintentional detonation operations employing anomaly avoidance) and intentional detonations supporting munitions response actions within the Winklepeck Burning Grounds (WBG).

b. The DDESB acknowledges, as noted in reference (a), that munitions response actions have occurred at WBG with DDESB approval. Consequently this ESS serves to zero base all previous actions and the DDESB waives the requirement to submit after action reports for the DDESB approved ESS noted in reference (a) and considers those actions closed.

c. The property will remain under Ohio National Guard control.

d. The munition with the greatest fragmentation distance (MGFD) for the WBG is the Mk II Grenade; the minimum separation distance (MSD) for teams for manual unintentional detonation operations is 20 feet (ft) based on K40 of the MGFD; the MSD for nonessential personnel from manual unintentional detonation operations is 62 ft based on the hazardous fragment distance of the MGFD; and the MSD for all personnel from intentional detonations is 521 ft based on the maximum fragment distance of the MGFD.

e. Collection points and consolidated shots are authorized provided the Army ensures usage of reference (c), paragraph C6.2.7.5.

f. The use of sandbags is authorized as an engineering control for intentional detonations involving the MEC identified in reference (a) provided the Army ensures usage per reference (c), paragraph C6.2.7.5.

g. Demolition materials, per reference (a), will be delivered as needed. Handling of commercial explosives must comply with reference (d).

h. If a munition with an unknown fill or chemical warfare material is encountered, all work will cease pending Army assessment of the need to submit a Chemical Safety Submission.

i. Prior to initiation and through completion of on-site explosives operations, all nonessential personnel will be evacuated and prevented from entering any area/facility encumbered by the MSD required for the operation being conducted, or explosives operations will be suspended if nonessential personnel enter the MSD.

j. MPPEH will be inspected and classified as material documented as safe prior to release to the public.

If changes occur during or after completion of this effort that could increase explosive hazards to site workers or the public due to the presence of military munitions at the site, an amendment to this NTCRA-ESS must be submitted to DDESB for review and approval.

The point of contact for this action is Ms. Kristene Bigej, (571) 372-6705, DSN 372-6705, E-mail address: kristene.a.bigej.civ@mail.mil.

THIERRY L. CHIAPELLO Executive Director



ATCL-ACE

29 September 2015

MEMORANDUM FOR Department of Defense Explosives Safety Board (DDESB-PE/Ms. Bigej), 4800 Mark Center Drive, Suite 16E12, Alexandria, VA 22350-3606.

SUBJECT: Request DDESB Approval, Explosives Safety Submission (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna), Winklepeck Burning Ground (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015, USATCES MEC File Number 1429.

1. References:

a. Memorandum, CEHNC-EMM, dated 15 September 2015, Subject: Explosives Safety Submission (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna), Winklepeck Burning Ground (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015

b. DoD 6055.09-M, Ammunition and Explosives Safety Standards, date varies

by Volume, Administratively Reissued 4 August 2010.

c. Department of Army Pamphlet (DA PAM) 385-64, Ammunition and Explosives Safety Standards, 24 May 2011, RAR 10 October 2013.

2. Reference 1.a, with enclosed Explosives Safety Submission, is provided for your review and approval IAW reference 1.b, we have reviewed the subject Explosives Safety Submission against the requirements of references "b" and "c" and recommend approval.

3. This ESS supersedes the 31 August 2004 ESS for Winklepeck Burning Ground with DDESB approval provided on 10 December 2004 and Amendment 3 was provided DDESB approval on 18 November 2008.

4. The purpose of the subject Explosives Safety Submission is a munitions and explosives of concern (MEC) removal action up to 2 feet in depth to allow construction of a Multi-Purpose Machine Gun (MPMG) Range at Camp Ravenna. The Ohio National Guard (OHARNG) will retain the property. ATCL-ACE, 22 September 2015

SUBJECT: Request DDESB Approval, Explosives Safety Submission (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna), Winklepeck Burning Ground (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015, USATCES MEC File Number 1429.

5. Point of contact this submission is the undersigned, email: <u>usarmy.mcalester.usamc.list.dac-est-siteplan@mail.mil</u>.

PAUL A. CUMMINS Chief, Risk Management Division, US Army Technical Center for Explosives Safety

CF (w/Encl):

Office of the Director of Army Safety, (DACS-SF/Mr. Patton), 223 23 rd Street, Crystal Plaza 5, Suite 980, Arlington, VA 22202 Military Munitions Center of Expertise, (CEHNC-EMM/Mr. Zange/Mr. Barker), P.O. Box 1600, Huntsville, AL 35807-4301



REPLY TO ATTENTION OF

CEHNC-EMM

15 September 2015

MEMORANDUM FOR US Army Technical Center for Explosives Safety, Explosives Safety Knowledge, OE and Chemical Division, (ATCL-ACE/ Mr. Jimmy Langley), Building 35, 1C Tree Road, McAlester, OK 74501-9053.

SUBJECT: Explosive Safety Submission Plan (ESS), Camp Ravenna Joint Military Training Center (Camp Ravenna). Winklepeck Burning Grounds (WBG), former Ravenna Army Ammunition Plant (RVAAP), September 2015.

1. References:

a. ER 385-1-95, Safety and Health Concerns for Munitions and Explosives of Concern (MEC) Projects, March 2007.

b. DOD 6055.09-M, Ammunition and Explosives Safety Standards, February 2008.

c. National Guard Bureau (NGB) Memo dated 17 Dec 2013, SUBJ: Explosives Site Plan (ESP)/Explosive Safety Submission (ESS) approval for submission by USACE-CX-MM.

2. This ESS has been reviewed for technical adequacy and to insure compliance with US Army Corps of Engineers (USACE), Department of the Army and Department of Defense requirements. USACE participation is approved.

3. Per reference c, CEHNC-EMM is submitting this ESS for approval on behalf of HQ National Guard Bureau (NGB).

4. If you have any questions, please contact Mr. Walt Zange at (256) 895-1586 or Mr. Carl Barker at (256) 895-1513.

SANORA M. ZEBROWSKI, P.E. Director, Environmental and Munitions Center Of Expertise

Encl

CF: (electronically w/o encls)

USACE, (CENAB-EMDC/Mr. Clint Henker)



EXPLOSIVES SAFETY SUBMISSION

MUNITIONS AND EXPLOSIVES OF CONCERN NON-TIME CRITICAL REMOVAL ACTION FOR WINKLEPECK BURNING GROUNDS (WPG) AT THE RAVENNA ARMY AMMUNITION PLANT, RVAAP-5, RAVENNA, OHIO

September 2015

Prepared by U.S. Army Corps of Engineers Baltimore District Baltimore, MD

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Appendices

Appendix A – Regional and Site Maps

Appendix B – Fragmentation Data Sheets
1. BACKGROUND

The Ohio Army National Guard (OHARNG) plans to construct a new Multi-Purpose Machine Gun (MPMG) Range at the Camp Ravenna Joint Military Training Center (Camp Ravenna). The location chosen for the MPMG Range is the current location of the Mark 19 (Mk19) Practice Range at the former Winklepeck Burning Grounds (WBG) of the former Ravenna Army Ammunition Plant (RVAAP).

Camp Ravenna is located in northeastern Ohio within Portage and Trumbull counties, approximately 1.6 kilometer (km) (1 mile) northwest of the City of Newton Falls and 4.8 km (3 miles) east-northeast of the City of Ravenna (Figure 1). The facility is a parcel of property approximately 17.7 km (11 miles) long and 5.6 km (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan 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..

This ESS supersedes the ESS for Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant dated August 31, 2004 with three revisions and 3 amendments, once this ESS is approved by DDESB. This ESS is being rewritten in order to implement newer guidance from Department of the Army and Department of Defense.

1.1 SITE DESCRIPTION

1.1.1 Terrain and Vegetation

There are no terrain or vegetation concerns that would limit or hinder the removal action.

1.1.2 Soil Conditions

There are no soil conditions that would limit or hinder the removal action.

1.2 SITE HISTORY

The RVAAP was constructed primarily as a site for loading medium and large caliber artillery ammunition, bombs, mines, fuze and boosters, primers and percussion elements as well as finished ammunition and ammunition components. Additionally, over the years the RVAAP has handled and stored strategic and critical materials for various government agencies and received stored, maintained, transported, and demilitarized ammunition and explosive items.

Past Department of Defense (DOD) activities at the RVAAP date back to 1940 and include storage, handling, and packing of military ammunition and explosives. The industrial operations at RVAAP consisted of 12 munitions assembly facilities referred to as "load lines" (LLs). In addition, RVAAP also had several areas used for burning, demolition and testing of munitions and buildings/areas designated for clean up and decontamination activities for production equipment.

Load lines 1 through 4 were used to melt and load TNT and Composition B into larger caliber shells and bombs. Components such as fuzes, primers, percussion elements and boosters were manufactured on LLs 5 through 11. Building F15 was used during World War II, the Korean War, and Vietnam War to test miscellaneous explosives and propellants (quantities tested are unknown). Buildings 1200, S-4605, and T-4602 were used from 1941 to 1971 for ammunition demilitarization. Information on total quantities is not available.

1.3 CURRENT AND FUTURE LAND USE

The current mission of the RVAAP is storage of explosives and the restoration and management of the environment. As Areas Of Concern are remediated, transfer of the remaining acreage to the Ohio Army National Guard (OHARNG) will occur.

Winklepeck Burning grounds are currently used as a MK 19 training range for practice 40 mm firing. There is no evidence of live 40 mm being used on the range.

2. MAPS/FIGURES

See Appendix A for listing of maps/figures for this ESS.

3. EXPLOSIVE SAFETY QUANTITY DISTANCE

Based on the munitions previously recovered during previous environmental responses, the MGFD anticipated is the U.S. MK II Hand Grenade. The Q-D arcs for the hazardous fragment distance (HFD) (unintentional detonation), maximum fragment distance-horizontal (MFD-H) (intentional detonation without engineering controls), and the MSD for intentional detonations using engineering controls that will be used during the MEC removal action are presented in **Figures 1** through **3** of **Appendix A**. The minimum separation distances (MSDs) for the site based on the MGFD are presented in **Table 3**. If MEC with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with DDESB TP 16/Fragmentation Data

Base, operations will continue, and an amendment to this ESS will be promptly submitted for approval (a copy of this document will be available on site). Q-D arcs will be adjusted accordingly

			MSI	D (ft)	
Site Name	MGFD	Unintention	al Detonations	Intentional Detonations	
		Team Separation Distance (TSD)	Hazardous Fragment Distance (HFD)	Without Engineering Controls (MFD-H)	Using Sandbag Mitigation
WPG	U.S. MK II Hand Grenade	20	62	521	25 ¹

Table 3 Minimum Separation Distances

1. Single Sandbag mitigation

See Appendix B for calculation sheets and documentation of MSD.

3.1 MEC OPERATIONS

The MSDs for personnel are listed in **Table 3**. Any occupied buildings or public roadways in the MSD area during MEC operations will be evacuated and/or roadways blocked to prevent nonessential personnel from entering during the performance of MEC operations. In the event nonessential personnel enter the MSD, work will halt until non-essential personnel have departed. Preliminary site work activities, such as surveying, laying grid lanes, vegetation removal, and anomaly detection, do not require establishing an MSD for Q-D purposes.

3.2 DEMOLITION EXPLOSIVES

3.2.1 Delivery on an As-Needed Basis

Explosives will be provided by a local vendor on an as-needed basis. MEC will be marked and guarded, if necessary, until disposal is accomplished.

3.2.2 Explosive Storage Magazine

An explosives storage magazine will not be used for this project.

3.3 PLANNED OR ESTABLISHED DEMOLITION AREAS

There are no planned or established demolition areas for this project.

3.4 FOOTPRINT AREAS

3.4.1 Blow-in-Place

The MSD for blow-in-place (BIP) operations is shown in **Table 3** under intentional detonations. The MSD calculation sheet is provided in **Appendix B**. The UXO Team will normally detonate munitions encountered in place. The exception is when technically qualified personnel who are performing the function of the SUXOS and UXOSO determine that the risk associated with movement is acceptable, and movement is necessary for the protection of people, property or critical assets, or the efficiency of the activities being conducted. In such cases, the SUXOS and UXOSO responsible for the MEC activities may evaluate the munition and authorize movement within the MRS.

3.4.2 Collection Points

Collection points are those areas used to temporarily accumulate MEC which are determined acceptable to move by the SUXOS and UXOSO pending destruction using consolidated shots. MEC items at collection points must be laid out as shown in "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites, August 1998 (terminology update March 2000)". The maximum net explosive weight (NEW) at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the HFD for the area. Consolidating multiple MEC is anticipated for this project.

3.4.3 Consolidated Shots

If determined acceptable to move by the SUXOS and UXOSO consolidating multiple MEC may be anticipated for this project, US Army Engineering and Support Center, Huntsville (USAESCH) publication "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites", dated March 2000 will be used and a copy of this report will be available on site. The maximum NEW for a consolidated shot will be limited such that the K328 overpressure distance for the total NEW (including donor charges) does not exceed the MSD for the intentional detonation.

3.4.4 Engineering Controls

Sandbag mitigation may be used as engineering controls to reduce the intentional detonation MSD. The sandbag controls will be used IAW HNC-ED-CS-98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998, its Amendment 1, February 2011 and its Amendment 2, Nov 2014; CEHNC-EMM Memorandum, Safety Advisory: Use of Jet Perforator During Intentional Detonation While Using Sandbag Mitigation for Engineering Controls, 7 November 2011; and DDESB-PD memorandum of 22 May 2014, Subject: Revision of DDESB Approval for Use of Sandbags for Mitigation of Fragmentation and Blast Effects Resulting From Intentional Detonation of Munitions.

3.5 MAXIMUM CREDIBLE EVENT

No explosive contaminated soil is expected for the areas addressed by this submission. Therefore, no maximum credible event is calculated.

4. TYPES OF MEC

Type of Munitions	Maximum Depth of MEC Recovered during nearby response actions	Maximum Geophysical Detection Depth (inches below ground surface [bgs])
MK II H.Grenade	< 2 feet	18

Table 4 Type and Depth of MEC Recovered

5. START DATE

The anticipated start date for this removal action is November 2015.

6. MEC MIGRATION

The potential transport mechanisms for MEC include soil/sediment disturbance, frost heave and erosion/deposition. The maximum frost line in this area is up to 42 inches.

7. **DISPOSITION TECHNIQUES**

7.1 DEMOLITION OPERATIONS

If disposal activities are required, they will be performed by qualified UXO personnel meeting the requirements of DDESB TP 18. The MSDs for intentional detonations are shown in Table 3. Q-D arcs for the site are presented in **Figures 2** through **3** of **Appendix A**. All explosive operations will follow the procedures outlined in Technical Manual (TM) 60A-1-1-31 and EM 385-1-97, *Explosives Safety and Health Requirements Manual*. Demolition operations will be performed as needed on a daily basis or items will be guarded until operations can be conducted.

7.2 EXPLOSIVE STORAGE, ACCOUNTABILITY, AND TRANSPORTATION

Explosives will be delivered on an as-needed basis. Total control of explosives will be maintained while the explosives are on-site. All vehicles transporting explosives will be properly inspected, equipped, and placarded prior to loading of explosives onto the vehicle, and DD Form 626, Motor Vehicle Inspection, will be completed.

7.3 EXCLUSION ZONE CONTROL

Prior to initiation of on-site MEC operations, all nonessential personnel will be removed to a location outside the MSD for the operation being conducted. Once MEC operation commences, positive control of the MSD will be maintained and only essential personnel will be allowed inside the MSD. During MEC operations, non-essential personnel will be prevented from entering the MSD by a combination of road closures and the use of spotters, or by the spotters notifying the UXO Team to stop work when a vehicle or person approaches the MSD boundary.

7.4 INTRUSIVE INVESTIGATION

Only qualified UXO personnel and UXO Technician I under supervision of UXO-qualified personnel will perform excavation and investigation of anomalies. To gain access to a subsurface anomaly, excavation will be initiated to the side of the anomaly and will not be conducted directly until the depth of the anomaly can be ascertained. The UXO Team may use earth moving machinery (EMM) to assist in manual excavation of anomalies. A UXO Technician on the ground will guide excavation. Excavation with EMM will stop at least 12 inches from anomalies and continue with hand tools. A detailed accounting of all MEC located at the site will be made and maintained by the SUXOS. A log entry will be made for each MEC item indicating the item's identity, its explosive hazards, location (x, y, and z measurements) and final disposition.

7.5 QUALITY CONTROL AND QUALITY ASSURANCE

Upon conclusion of the removal activities in each area, the UXO Quality Control Specialist (UXOQCS) will conduct a surface and subsurface quality control (QC) inspection. Areas that pass the QC inspection will be submitted for quality assurance (QA) inspection by USACE. Any non-conformance to contractual requirements will be documented and reported in writing to the SUXOS and project manager (PM). The SUXOS will be responsible for the field remediation of the non-conformance.

7.6 MPPEH PROCEDURES

7.6.1 Inspection and Certification

All Material Potentially Presenting Explosive Hazard (MPPEH) procedures will be in accordance with DoDI 4140.62 and EM 385-1-97. All MMPEH will be assessed and its explosive safety status determined and documented prior to transfer within DoD or release from DoD control. Prior to release to the public, MPPEH will be documented by authorized and technically qualified personnel as Material Documented as Safe (MDAS) after 100% inspection

and an independent 100% re-inspection to determine that it is safe from an explosives safety perspective.

7.7 ALTERNATIVE DISPOSAL TECHNIQUES

No off-site destruction of recovered MEC is anticipated for this MEC removal action. All detonations will occur within the site. No other disposal techniques are anticipated for this MEC removal action.

8. DETECTION EQUIPMENT AND RESPONSE TECHNIQUES

8.1 REMOVAL DEPTH

The objective of this removal action is to remove MEC to the depth of detection in areas within the WPG.

8.2 DETECTION EQUIPMENT

The expected MEC at the WPG site are MK II Hand Grenades that are made of ferrous casings that are easily detectable by a variety of geophysical instruments. A combination of one or more of the following geophysical instruments will be used at the site.

8.2.1 Analog Mag and Flag using Flux-Gate Magnetic Gradiometers

Approved detectors for this project include Schonstedt 52-CX or Subsurface magnetometer. These instruments have similar detection characteristics and can be expected to consistently detect the MEC items shown in **Table 3** at their expected depths.

8.3 SWEEP PROCEDURES

The personnel operating detection equipment will demonstrate proficiency with the particular instrument(s) used before site investigations begin. During site operations they will concurrently conduct a surface and subsurface investigation in each grid. The site will be divided into grids

for administrative purposes. Search lanes will be used which are suitable for the equipment and terrain.

9. ENVIRONMENTAL, ECOLOGICAL/ CULTURAL CONSIDERATIONS

No environmental, ecological or cultural considerations are anticipated at the site.

10. TECHNICAL SUPPORT

All on-site Contractor UXO personnel will meet the training and minimum experience required by Technical Paper 18, Minimum Qualifications for UXO Technicians and Personnel (DDESB, 2015).

11. RESIDUAL RISK MANAGEMENT

Control and accountability of WBG will be transferred to the National Guard Bureau (NGB) who will license the property to OHARNG. The property will be used by OHARNG as a Mark 19 Firing Range training facility. OHARNG has agreed to accept this property for reuse and construction of the firing range, without limitations, upon completion of this MEC clearance scope of work. As such, MEC land use restrictions for public reuse do not apply.

12. SAFETY EDUCATION PROGRAM

As previously mentioned in Subsection 10.1, a UXO safety video is shown to personnel before they are allowed access to the site. Access is permitted to those on official business only.

13. STAKEHOLDER INVOLVEMENT

The primary stakeholders for the MEC removal action at the WPG location are OHARNG, Ohio EPA, installation personnel. Public review for this removal action is not required.

14. CONTINGENCIES

During the course of the removal action if MEC with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with DDESB TP 16, "Methodologies for Calculating Primary Fragment Characteristics (a copy of this document will be available onsite). Q-D arcs will be adjusted accordingly and an amendment to this safety submission submitted for approval.

No chemical warfare materiel (CWM) is suspected at this site. However, if a munition with an unknown filler is found, or if a MEC item cannot be positively identified, installation procedures will be followed for contacting and facilitating Explosive Ordnance Disposal (EOD) response. If the item is recovered chemical warfare materiel (RCWM) or has an unknown liquid filler, the on-site U.S. Army Corps of Engineers (USACE) project team will notify the Chemical Warfare Design Center (CWM-DC) at USAESCH.

APPENDIX A

REGIONAL AND SITE MAPS



Winklepeck Burning Grounds Ravenna, OH



EMDC, Baltimore District US Army Corps of Engineers

> Figure 1 Regional Map

> > Legend

MRS Boundary



Winklepeck Burning Grounds Ravenna, OH



EMDC, Baltimore District US Army Corps of Engineers

> Figure 2 MRS Map

> > Legend

MRS Boundary



Winklepeck Burning Grounds Ravenna, OH



EMDC, Baltimore District US Army Corps of Engineers

Figure 3 Exclusion Area Map





HFD 62ft

MFD 521ft

APPENDIX B

FRAGMENTATION DATA REVIEW FORMS

Fragmentation Data Review Form

Database Revision Date 8/21/2014

alegoly.	Grenades & N	Aines	DODIC:	1	G890	
Aunition:	Mk II Grenad	e	Date Record Creater	4.	2/21/2004	
			Record Created By:	······································	MC.	
ase Material:	Cast Iron, Gr	ey, CL35	Last Date Record Up	odated:	1/13/2010)
			Individual Last Upda	ited Record:	SDH	_
ragmentation Method:	Pre-formed F	ragmenting	Date Record Retired	: 1		_
condary Database Category:	Hand Grenad	e				
unition case classification:	RODUST		Theoretical Ca	Iculated Fragment	Distance	s
Munitio Fragment	n Information ation Characte	and eristics	HFD [Hazardous Fragment I than 1 hazardous fragment	Distance: distance to per 600 square feet]	no more (ft):	62
Explosive Type:		TNT	MFD-H [Maximum Fragment	t Distance, Horizontal	(ft):	521
Explosive Weight (lb):		0.125	MFD-V [Maximum Fragment	Distance, Vertical] (f	t):	397
Diameter (in):		2.2600	Ove	erpressure Distance	25	
Cylindrical Case Weight (lb):		0.24047	TNT Equivalent (Pressure):			1
Maximum Fragment Weight		0.0129	TNT Equivalent (Fressure).	(11-2)		0.105
Design Fragment Weight (95%	6)	0.0043	Unbarricaded Intraline Dista	ince (3.5 psi), K18 Dis	tance:	9
(Unintentional) (Ib): Critical Fragment Velocity (fps):	578	Public Traffic Route Distance	e (2.3 psi); K24 Dista	nce:	12
)·		Inhabited Building Distance	(1.2 psi), K40 Distand	:e:	20
Sandbag and W	/ater Mitigatio	on Options	Intentional MSD (0.0655 psi), K328 Distance:		164
TNT Equivalent (Impulse):		1	Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328			
TNT Equivalent Weight - Impu	ılse (lbs):	0.125	distance may be no smaller	than 200 ft.		
Kinetic Energy 10 ⁶ (lb-ft ² /s ²):		0.0021	Minimum Th	nickness to Prevent	Perforat	ion
Sir	ale Sandhaa Mi	tigation		Intentional		Unintentional
Required Wall & Roof Thickne	ss (in)	12	4000 psi Concrete	1 15		0.70
Expected Max Throw Distance	⊃ (ft)·	25	Mild Steel	0.07		0.05
Minimum Constantion Distance	(ft).	25	Hard Steel:	0.06		0.04
Minimum Separation Distance	(11):	25	Aluminum:	0.16	i i	0.10
Doul	ole Sandbag Mit	igation	LEXAN:	1.61	i i	1.23
Required Wall & Roof Thickne	ss (in)	24	Plexi-glass:	0.73	Γ Γ	0.51
Expected Max. Throw Distance	e (ft):	10	Bullet Resist Glass:	0.55	Г Г	0.37
Minimum Separation Distance	(ft):	12.5				
	Water Mitigation	1		Item Notes		
Minimum Separation Distance	(ft):	200/200	Fragment sizes, number of	fragments and HFD	ame from	n test
Water Containment System:	ĺ	5 gal carboys/ inflatable pool	Eq 4-34 & iterating using T information, standard TP 1	RAJ to calculate the i 6 methods were used	ntial veloc to calcula	ity. With this ate MFD-V an
Note: Use Sandbag and Water applicable documents and guid grams is utilized, the above mi applicable. Subject matter exp	Mitigation in acc lance. If a donc tigation options perts may be cor	cordance with all or charge larger than 32 are no longer ntacted to develop site	thicknesses to prevent perf	foration.		

Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	1/13/2010
Individual Last Updated Record:	SDH
Date Record Retired:	

Theoretical Calculated Fragment Distances	S
HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	62
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	521
MFD-V [Maximum Fragment Distance, Vertical] (ft):	397
Overpressure Distances	
TNT Equivalent (Pressure):	1

TNT Equivalent Weight - Pressure (lbs):	0.125	
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	9	
Public Traffic Route Distance (2.3 psi); K24 Distance:	12	
Inhabited Building Distance (1.2 psi), K40 Distance:	20	
Intentional MSD (0.0655 psi), K328 Distance:	164	
Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328		

Minimum Thickness to Prevent Perforation					
	Intentional	Unintentional			
4000 psi Concrete					
(Prevent Spall):	1.15	0.79			
Mild Steel:	0.07	0.05			
Hard Steel:	0.06	0.04			
Aluminum:	0.16	0.10			
LEXAN:	1.61	1.23			
Plexi-glass:	0.73	0.51			
Bullet Resist Glass:	0.55	0.37			

Item Notes



APPENDIX E

CONSTRUCTION QUALITY CONTROL PLAN

FINAL CONSTRUCTION QUALITY CONTROL PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS CAMP RAVENNA, OHIO

Contract No. W912QR-12-D-0004 Delivery Order No. 0003



U.S. ARMY CORPS OF ENGINEERS LOUISVILLE DISTRICT 600 Dr. Martin Luther King, Jr. Place, Room 821 Louisville, Kentucky 40202-2267

June 2016

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Tetra Tech, Inc., has completed the preparation of this <u>Construction Quality Control Plan</u> as part of the <u>Soil Removal Action</u> for <u>RVAAP-05 Winklepeck Burning Grounds</u> at the <u>former Ravenna Army</u> <u>Ammunition Plant (RVAAP)/Camp Ravenna</u>. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of data quality objectives; technical assumptions; methods, procedures, and material to be used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

Sutt A-Nelf

Scott Nesbit Project Manager

Richard B. Wie

Rick Wice Independent Technical Review Team Leader

<u>6/9/2016</u> Date

<u>6/9/2016</u> Date

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111504/P

FINAL CONSTRUCTION QUALITY CONTROL PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS Camp Ravenna, Ohio

Submitted to: USACE Louisville District

Submitted by: Tetra Tech, Inc. 661 Andersen Drive Pittsburgh, Pennsylvania 15220

Multiple Award Remediation Contract Contract No. W912QR-12-D-0004 Delivery Order No. 0003

June 2016

PREPARED UNDER THE SUPERVISION OF & APPROVED FOR SUBMITTAL BY:

Suit A-Nelf

SCOTT NESBIT, PE PROJECT MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

STEVEN H. RUFFING, PE PROGRAM MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

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Construction Quality Control Plan Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds Camp Ravenna, Ohio

ACRONYMS AND ABBREVIATIONS

COC	Contaminant of Concern
COR	Contracting Officer's Representative
CQCP	Contractor Quality Control Plan
CY	Cubic Yards
ITR	Independent Technical Review
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
PAH	Polynuclear Aromatic Hydrocarbons
PM	Project Manager
PMP	Project Management Plan
QA	Quality Assurance
QC	Quality Control
RD	Remedial Design
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RVAAP	Ravenna Army Ammunition Plant
SSHP	Site Safety and Health Plan
Tt	Tetra Tech, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WBG	Winklepeck Burning Ground

1.0 INTRODUCTION

Tetra Tech, Inc. (Tt) has developed this Construction Quality Control Plan (CQCP) to comply with the Performance Work Statement, dated June 2, 2015 and revised June 26, 2015, for Soil Removal Action, RVAAP-05 Winklepeck Burning Ground (WBG), Former Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Camp Ravenna, Portage and Trumbull Counties. The CQCP covers the remedial action activities, including work by subcontractors and suppliers.

The CQCP incorporates elements of Tt's Quality Assurance Program Manual (Tt, 2012), Tt's Quality Practices Manual (Tt, 2011), and Timberline's Range Residue Removal Quality Control Program Plan, (Timberline, 2012). The Tt and Timberline quality programs were developed to provide evidence to customers, suppliers, and employees of what specific controls are implemented to ensure service quality. These manuals serve as the guiding quality document and define the minimum requirements and general responsibilities for implementing the CQCP.

The CQCP provides guidance for remediation activities and data quality for the activities described in the final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds (USACE, 2015). This document is hereafter referred to as the Winklepeck Burning Grounds (WBG) Remedial Design (RD). The removal action will be conducted under the USACE Louisville District's Environmental Restoration Service Contract W912QR-12-D-0004 Delivery Order 0003.

2.0 QUALITY CONTROL ORGANIZATION

The following section describes the authority and responsibility of the quality management team for Tt's operations at WBG. Personnel were selected based on qualifications, previous experience, training, and their familiarity with the Tt Quality Assurance/Quality Control (QA/QC) system so that the completed remedial activities conform to the WBG RD. The project team will provide the specific technical and management capabilities and qualifications to perform the contract work.

The Tt QA organization hierarchy of positions responsible for establishing Tt's QA is shown in Figure 2-1. It includes the Program Manager, Corporate QC Manager, Project Manager (PM), Project QC Manager, Project Health and Safety Manager, and Project Unexploded Ordnance (UXO) QC Manager.

Project staff members will be qualified to perform their assigned tasks in accordance with terms outlined in the WBG RD and this CQCP. Verification of personnel qualifications will be documented and the UXO Site Specialist will review expiration dates to ensure the PM is aware of training requirements.

2.1 PROGRAM MANAGER – STEVE RUFFING, PE

The Program Manager is ultimately responsible for the effective implementation of the CQCP for field operations. He implements the Corporate Policy Statement and directs project manager and workers to follow the requirements of the CQCP. The Program Manager has chosen to delegate QC authority as defined in the following paragraphs. Each designee is held accountable for delegated authorities.

2.2 CORPORATE QC MANAGER – TOM JOHNSTON, PHD

The QC Manager reports to the Program Manager and has the authority and overall responsibility for independently verifying that quality is achieved. The QC Manager is responsible for

development, maintenance, and implementation of the quality program. This responsibility includes overseeing activities under the guidance of this CQCP, performing periodic reviews of the processes being implemented, evaluating any recommendations made by the project team over the course of the program regarding use of these processes, and implementing continuous improvement evaluations of the program.

The QC Manager will:

- Foster a culture of excellence for quality;
- Manage the QC Organization and maintain the CQCP;
- Approve QA requirement documents, project and program implementing procedures, and subcontractor CQCP;
- Assess the effective implementation of the CQCP;
- Ensure that personnel are properly trained and adequately experienced for the duties;
- Establish guidelines to assist in the development of program, project, site and task specific QC policies and procedures;
- Ensure corrective actions are documented and acknowledged by the PM and field personnel, as well as communicated to the client, when adverse situations or defective work result from a project activity;
- Conduct periodic field audits of the programs, projects, and sites and submit a report of findings to the President;
- Monitor results of the site audits;

- Conduct project audits;
- Ensure project deliverables are defined prior to initiation of field operations and are submitted as required by the RD and project schedule; and
- Report regularly to the President of Tt on the adequacy, status, and effectiveness of the QC program.

2.3 **PROJECT MANAGER – SCOTT NESBIT, PE**

The PM is responsible for ensuring the availability of the resources needed to implement the project CQCP and will ensure the QC processes are incorporated in the project plans, procedures, and training for the specific project. The primary responsibility of the PM is the overall direction of the project and accountability for work activities undertaken as part of the WBG project. The PM is responsible for the quality and timeliness of the project activities, including those performed by subcontractors and suppliers.

The PM's global quality related responsibilities include:

- Understanding the Contract and project objectives for the specific project;
- Overall Project Quality Management;
- Maintaining contact with the client;
- Scheduling of activities and preparing documents and reports associated with the project.
- Ensuring that submittals are completed and submitted as required;
- Insuring project staff is knowledgeable of client requirements and Tt's QC processes;

- Review and approval of sampling, testing, and field investigation methods and CQCP, including schedules and labor allocations;
- Preparing progress reports with the assistance of key support personnel;
- Organizing of project staff and assigning tasks;
- Coordinating with the Project UXO QC Manager and UXO Site Specialist to ensure project quality and safety issues are addressed;
- Developing Project Plans and associated documentation;
- Technical review of project deliverables;
- Approving project documents;
- Communicating project related information from the client;
- Liaison between the project staff and subcontractors;
- Liaison between project staff and other internal groups;
- Investigation of nonconformance and implementation of corrective actions;
- Evaluation of the effects that nonconformance has on the project and the appropriateness of reporting these issues with the client;
- Providing appropriate documentation of nonconformance when reporting to the client;

- Serving as final reviewer prior to release of project information; and
- Approving and signing outgoing correspondence.

The PM may delegate portions of the responsibilities to the Tt Field Superintendent who are assigned to be on-site for the duration of the project.

2.4 TT FIELD SUPERINTENDENT – TBD, PE OR PG

The Tt Field Superintendent is responsible for assuring the resources of the project team are dedicated to execute the field phases of the project, overseeing remediation and site restoration activities. The Tt Field Superintendent is responsible for on-site client coordination relating the details of the project and activities of the project team. He/she will assist the PM in maintaining sufficient resource allocations to meet the project schedule and budget and provides daily reports to the PM on progress of the project. The Tt Field Superintendent will be a Professional Engineer or Professional Geologist with knowledge of specific construction practices relating to earthwork, regulations, observation and testing procedures, and documentation procedures.

The responsibilities of the Tt Field Superintendent as they relate to quality of the project include:

- Regularly reviewing the project RD and RD Supplement;
- Monitoring work progress and adherence to project requirements for task completion;
- Conducting or delegatings inspections to verify spill equipment is maintained and no spills have occurred (daily), dust generation is minimized, and storm water pollution prevention and environmental protection controls (erosion and sedimentation controls, weekly Stormwater Construction Site Inspection Report provided in Appendix A) are in place and operating properly (weekly and after storm events). Spill response requirements are described in Tt's Site Safety and Health Plan (SSHP) and dust control and storm water pollution prevention and environmental protection are described in Tt's Remedial Design Supplement.

- Administering the QA/QC program, reporting inspection and certifications to the Project QC Manager;
- Providing logistical support for field operations;
- Interfacing with the subcontractors;
- Conducting onsite status meetings on a weekly basis;
- Assisting in preparing required submittals;
- Providing integration of subcontractor services to provide optimum support;
- Liaison with project staff and subcontractors as well as the onsite client representative; and
- Notifying the PM if conflicts arise with the proposed schedule.

2.5 PROJECT QC MANAGER - RICK WICE, PG

The Project QC Manager supports the PM in day-to-day operations and also reports directly to the Corporate QA Manager on matters relating to quality. The Project QC Manager has sufficient authority, including stop work authority, to ensure that project activities comply with applicable specifications of the contract and CQCP. This authority applies equally to all project activities, whether performed onsite or offsite, by Tt or by subcontractors and suppliers.

The Project QC Manager responsibilities include:

- Overall Project Quality Control;
- Selection of fully qualified field personnel;

- Training field personnel in the performance of their duties;
- Ensure compliance with contract documents specifications relating to QC;
- Assess the effective implementation of the project CQCP;
- Has the authority to stop work when significant conditions adversely impact the quality of work and such action is warranted; and
- Identify quality problems and ensure that unsatisfactory conditions are controlled until proper disposition has occurred.

2.6 PROJECT HEALTH AND SAFETY MANAGER - JAMES LAFFEY, CESCO

Tt's Project Health and Safety Manager will be responsible for:

- Preparing the Site Safety and Health Plan in compliance with USACE EM 385-1-1, OSHA standards 29 CFR 1910.120 and 1926.65, and Engineering Regulations for Hazardous Toxic and Radiological Waste Sites, ER 385-1-92. The Site Safety and Health Plan will also comply with the Facility-wide Safety and Health Plan for Environmental Investigations.
- Implementing the Tt Corporate Health and Safety Program and Site Safety and Health Plan;
- Reviewing and monitoring compliance with project-specific health and safety plans;
- Implementing corrective measures for health and safety deficiencies; and
- Enduring required training and medical monitoring of personnel.

The Project Health and Safety Manager has the authority to require corrective measures related to health and safety issues and to stop work if required, to ensure a safe working environment.

2.7 PROJECT UXO QC MANAGER - NORMAN PIPER

The Project UXO QC Manager supports the PM in day-to-day operations on matters relating to UXO quality control. The Project UXO QC Manager has sufficient authority, including stop work authority, to ensure that project activities comply with applicable specifications of the contract and CQCP. This authority applies equally to all project activities, whether performed onsite or offsite, by Tt or by subcontractors and suppliers.

The Project UXO QC Manager responsibilities include:

- Project QC on Munitions and Explosives of Concern (MEC);
- Selection of fully qualified personnel as UXO SITE SPECIALIST;
- Training site UXO Site Specialist in the performance of their duties;
- Supervision of UXO Site Specialist;
- Ensure compliance with contract documents specifications relating to QC;
- Assess the effective implementation of the project CQCP;
- Has the authority to stop work when significant conditions adversely impact the quality of work and such action is warranted; and
- Identify quality problems and ensure that unsatisfactory conditions are controlled until proper disposition has occurred.

2.8 UXO/MEC SITE MANAGER/SITE SAFETY AND HEALTH OFFICER - TBD

The Tt site UXO/MEC Site Manager/Site Safety and Health Officer has the responsibility and authority to enforce the site-specific QC plans and procedures and SSHP. This individual reports to directly to the Project UXO QC Manager and Project Health and Safety Manager and coordinates site activities with the Tt Field Superintendent.

The UXO/MEC Site Manager/Site Safety and Health Officer's responsibilities include:

- Conducting UXO avoidance surveys prior to and during site activities.
- Participating in site specific training sessions.
- Maintaining familiarity with the Tetra Tech UXO SOP.
- Conducting daily and in progress functional tests on instruments used in the survey
- Conducting the instrument assisted survey.
- Coordinating with the Tt Field Superintendent and client to ensure that QC objectives appropriate to the project are set and all personnel are aware of these objectives;
- Maintaining a QC log to document details for field activities during QC monitoring activities to serve as a memory aid in preparation of the daily QC Report;
- Coordinating with the Tt's Project UXO QC Manager to ensure that QC procedures are being followed and are appropriate for achieving data validity sufficient to meet QC objectives;
- Conducting periodic QC surveillances of the site activities using the 3 phase inspection process and recording the findings in the Preparatory, Initial, and Follow-on Phase Daily Quality QC Report;

- Reporting noncompliance with QC criteria to Tt's Project UXO QC Manager and PM and documenting these non-conformances on the Tt Nonconformance Report;
- Initiating a Rework Items List on nonconformance areas that must be re-accomplished to meet quality specifications;
- Conducting QC Meetings. Record meeting outcome in the Follow-on Phase Daily Quality Control Report;
- Coordinating with the responsible parties to initiate the proper corrective actions to be taken in the event of a QC deviation and documenting these actions on the Corrective Action Request; and
- Making sure that Lessons Learned are documented and forwarded to the Tt Corporate QC Manager and Project QC Manager for analysis.
- Selecting, inspecting, implementing, and maintaining personal protective equipment.
- Establishing work zones and control points.
- Implementing air-monitoring program for onsite activities.
- Verifying training and medical status of onsite personnel status in relation to site activities.
- Coordinating emergency services.
- Providing site specific training for onsite personnel.
- Investigating accidents and injuries.
- Developing and maintaining current chemical inventories and Safety Data Sheets (SDS) files for hazardous chemicals that will be used/stored at that workplace.
- Making sure that onsite personnel who may use hazardous chemicals have access to and review pertinent SDSs prior to using or dispensing such chemicals.
- Making sure compliance with container labeling requirements.

Figure 2-1 Quality Assurance Organization



* To be determined prior to the initiation of the remedial action.

3.0 THREE-PHASE CONTROL SYSTEM

Tt will use the Three-Phase Control System to ensure that the Team is ready to begin each new feature of work. The complexity of each task or group of tasks will determine the definable features of work and, therefore, the number of meetings and inspections. The control system will cover work on-site and off-site, and the work performed by Tt subcontractors and suppliers. The Project QC Manager and staff will be responsible for:

- Developing the definable features of work;
- Notifying appropriate people for meetings;
- Documenting the meetings and distributing the minutes; and
- Monitoring the work.

3.1 PREPARATORY PHASE

Before the start of a new phase (definable feature) of work, a 14 day notice of field work will be sent to the Ohio EPA in writing, and the USACE Contracting Officer's Representative (COR) and PM will be notified at least 48 hours in advance of a Preparatory Meeting. This meeting will be conducted by the Project QC Manager and attended by the Tt Field Superintendent, other applicable QC Personnel, and other key participants in the new phase of work. The minutes of the meeting will be prepared by the Project QC Manager, distributed to the participants, and documented on the Preparatory Phase Daily Quality Control Report (Appendix A). The applicable workers will be instructed as to the performance required to meet the requirements of the contract for this phase of work. Specific topics for review at this meeting include:

- Review of each paragraph of applicable RD, RD Supplement, figures, and drawings;
- Ensure that all submittals and permits have been approved;
- Review inspection and/or testing criteria;
- Examine the work area to assure that preliminary work has been completed satisfactorily;

- Examination of required materials and verification that equipment are on hand, properly stored, and ready for use;
- Review the activity hazard analysis to assure safety requirements are met;
- Ensure that site personnel have been trained in required classes for safety and security;
- Discuss procedures for the execution of work; and
- Establish levels of performance and review minimum acceptable performance standards.

3.2 INITIAL PHASE

The Initial Phase inspection for each definable feature of work will occur after a representative portion of that feature of work has been completed. The purpose of the Initial Phase is to verify the workmanship standards are being implemented and corrected, if need be, and the work is performed to the level of workmanship mutually agreed to. The USACE COR will be notified 48 hours in advance of the Initial Phase. Minutes of this phase will be taken by a QC representative, distributed to participants, and documented on the Initial Phase Daily Quality Control Report (Appendix A). The Initial Phase inspection will:

- Review minutes of the Preparatory Meeting;
- Verify contract compliance;
- Verify plans for control inspection and testing;
- Verify level of workmanship versus standards;
- Resolve differences; and
- Review safety versus activity hazard analysis.

The Initial Phase will be repeated for each new crew to work on site, at the start of each new work feature, any time acceptable specified quality standards are not being met, or when modifications will impact existing Tt procedures.

3.3 FOLLOW-ON PHASE

Follow-on Phase inspections will occur daily throughout the task to assure continuing compliance with both contract specifications and the requirements of the WP. The inspections and observations will be conducted by the Field Supervisor and will be documented on the Follow-on Phase Daily Quality Control Report (Appendix A) by the Field Supervisor. Deficiencies will be corrected and a follow-up check conducted to ensure that a deficiency does not continue. If deficient work is identified, Tt will implement corrective action immediately and will provide the USACE COR with a written description of the corrective action within five days.

3.4 ADDITIONAL PREPARATORY AND INITIAL PHASES

Tt will conduct additional Preparatory and Initial Phase meetings and inspections during the same definable feature of work at the direction of USACE if the quality of work is unacceptable, if there are changes in the QC staff or task supervisors, if a definable feature of work is restarted after a substantial period of inactivity, or if other problems develop.

4.0 TRACKING DEFICIENCIES

Nonconforming items and activities are those that do not meet the design drawings, RD, RD Supplement, procurement document criteria, approved work procedures, or the CQCP. Nonconformance may be detected and identified by any site worker including:

- CQCP personnel during construction operations by field inspections and/or verification testing;
- Laboratory personnel during the preparation for and performance of laboratory testing and/or during calibration of equipment;
- USACE personnel during the performance of audits or surveillances; and
- Construction team during construction operations by field inspections.

Each nonconformance affecting quality will be documented by the personnel identifying or originating the nonconformance. For this purpose, the results of calibration and laboratory analysis QC tests, audit reports, inspection reports, or an internal memorandum or letter can be used as appropriate. This documentation will be compiled by the Project QC Manager and documented in a Nonconformance Report and Corrective Action Request form and submitted to the USACE COR. Nonconformance Report and Corrective Action Request forms are found in Appendix A.

This report will, when necessary, include:

- Description of nonconformance;
- Identification of individual(s) identifying or originating the nonconformance;
- Method(s) for completing corrective action and corrective action taken;
- Schedule for completing corrective action and corrective action taken; and
- Responsible individuals for correcting the nonconformance and verifying satisfactory resolution.

It is the responsibility of every one working on the site to inform the QC personnel of a nonconformance. The QC personnel will discuss the issue and if necessary stop work to resolve the issue. In addition, the USACE COR will be notified by the PM or Project QC Manager, as soon as practical, of nonconformance that could impact the results of the work. A corrective action will be determined and implemented. QC personnel will verify completion and effectiveness of corrective actions for nonconformance. Any recurring nonconformance will be evaluated by the USACE COR, PM, and Project QC Manager to determine its cause and the appropriate changes instituted to prevent future recurrence. When such an evaluation is performed, the results will be documented.

5.0 PROJECT PROCESS QUALITY CONTROL

5.1 ACCESS PROTOCOL

Access to Camp Ravenna and the WBG site is restricted and protocols to request access are described below.

5.1.1 <u>Camp Ravenna Access Protocol</u>

Camp Ravenna access requests will be made through Vista Sciences Corporation. A 48 hour notice is required to obtain access. Vista Sciences Corporation will coordinate facility access approval through OHARNG. Personnel approved to enter Camp Ravenna will provide government-issued identification (e.g., driver's license, passport) at the entrance. Upon entry and exit to Camp Ravenna, drivers will provide a valid driver's license. Additionally, Vista Sciences Corporation (Becky Shreffler <u>rebecca.shreffler@vistasciences.com</u>) will be provided the cell phone numbers of each individual and the license plates of each vehicle that will enter the facility.

Personnel and vehicles will enter Camp Ravenna through the Camp Ravenna Main Gate (8451 State Route 5, Ravenna, OH 44266) and are subject to search and inspection. Weapons and alcoholic beverages are prohibited within Camp Ravenna; prohibited items may be placed with security personnel while onsite. Security personnel will confiscate prohibited items discovered during inspections.

5.1.2 <u>WBG Access Protocol</u>

Tt will verify the proper communications protocol and points of contact with the USACE COR and Camp Ravenna personnel prior to mobilization for the remedial action activities. Tt will communicate with the Camp Ravenna personnel and Camp Ravenna Range Control (614-336-6041) to coordinate construction activities and access to the WBG/MK19 range gate. Access to the WBG will be coordinated with OHARNG Range Control daily prior to arriving at WBG. Supervisors, workers, and site visitors entering the construction area will provide training records specified in Tt's SSHP prior to entering the construction area and/or exclusion zones. Site visitors arriving throughout the day must: 1) undergo a briefing by the Tt Field Superintendent; and 2) provide necessary training records and documentation prior to approaching or entering the exclusion zone. Site visitors must be approved by the Tt Field Superintendent to enter the construction area and/or exclusion zones.

5.1.3 <u>Traffic Rules and Protocol</u>

Tt and its subcontractors will comply with Ohio and Camp Ravenna traffic rules. Speed limits will be maintained as posted around the main entrance area of the facility. The Tt team will not exceed the posted speed limits of 35 miles per hour (mph) during daylight hours and 25 mph at night while on other Camp Ravenna main roads. A speed limit of 20 mph will be maintained when passing troops during the day or night. A speed limit of 10 mph around the project area will be maintained. At no time will the Camp Ravenna main roads be blocked by the Tt team during remediation activities. Traffic flow must be maintained on at least half of the roadway width. Prior to starting an activity that will obstruct traffic flow, approval will be obtained from the Camp Ravenna personnel and Range Control.

5.2 **REMEDIATION**

At the start of the project, the Tt field crew will participate in a pre-work briefing on objectives, health and safety, proposed deviations, and project schedule with the Tt Field Superintendent. Daily tailgate briefings will be conducted in accordance with the SSHP, Tt field crews will participate in daily planning briefings to determine the plan of action for the work day. This briefing will include, at a minimum, the following:

- A discussion of the planned activities for the work day;
- Planned area of earthwork or excavation;
- MEC awareness;

- Weather considerations;
- Deliveries;
- Transportation schedule;
- Scheduled forecast; and
- Issues which would result in an impact to the project.

Daily audits will be performed by the Tt Field Superintendent or UXO Site Specialist to verify that excavations and MEC operations and explosive management activities are in compliance with the current RD, RD Supplement, and quality objectives. The audit and surveillance activities will be performed and documented using the Follow-on Phase Daily Quality Control Report found in Appendix A.

The Tt Field Superintendent or UXO Site Specialist will perform a daily surveillance to assess adherence to project and task specific performance criteria and effective applications of this criteria to existing work site conditions.

Validation of work procedures will be accomplished by sampling each area requiring customer acceptance. The Tt Field Superintendent or UXO Site Specialist will perform sampling as follows:

- Existing Stockpile and Off-site Borrow Characterization The existing stockpile and off-site borrow materials that will be used for backfill will be sampled. One sample will be collected using incremental sampling methodology for every 4,000 cubic yards of earth fill (2 samples total) and the samples will be analyzed for VOCs (target compound list), SVOCs (target compound list), pesticides (target compound list), PCBs, Explosives, Nitro-glycerine, Nitro-guanadine, Nitrocellulose, metals (target analyte list), and pH as defined in the Sampling and Analysis Plan.
- Processing Area and Stockpile Area Samples The surface soil will be sampled before (8 samples) and after (8 samples) the remedial action using incremental sampling methodology

and analyzed for polynuclear aromatic hydrocarbons (PAHs), TNT, and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) as defined in the Sampling and Analysis Plan.

- Waste Disposal Characterization Material to be transported off site to a landfill, representative composite sample(s) will be collected as follows
 - Samples will be collected in-situ within the proposed excavation areas prior to the initiation of work. Samples will be collected at a depth of 0 to 2 feet below ground surface at each of the pads identified in the RD.
- The sampling will meet the requirements of the landfill (Waste Management American Landfill in Sandy Township, Waynesburg, Ohio) of one characterization sample for the first 500 tons of contaminated soil shipped followed by a sample for every 1000 tons disposed thereafter. For the sake of conservatism, a sampling frequency of 1 per 500 tons will be used. A grid will be established in the proposed excavation areas so that each area will represent 500 tons of excavated soil. Pads 61/61A and Pad 66 will be sampled at a frequency of once per every 250 tons (or approximately once per every 170 cubic yards) due to the concern for lead concentrations. The number of samples that will be collected for each Pad is provided in the table below

Pad/Contaminant	Pad 61/61A PAHs	Pad 38 TNT	Pad 66 RDX/TNT	Pad 67 & West 67 RDX/TNT
Estimated Volume from RD (cy)	3872	645	645	87.2
Estimated Weight (1.4 Tons/CY)	5420	903	903	122
Samples required (1 per 500 tons)	22*	2	4*	1

* This sampling frequency is one per 250 tons (or approximately one per 170 cy)

- Samples from Pads 38, 66, 67, and West of 67 will be analyzed for TNT/RDX, Toxicity Characteristic Leaching Procedure semivolatile organic compounds and metals, and benzene, toluene, ethylbenzene, and xylenes as defined in the Sampling and Analysis Plan.
- Samples from Pad 61/61A will be analyzed for PAHs, Toxicity Characteristic Leaching Procedure semivolatile organic compounds and metals, and benzene, toluene, ethylbenzene, and xylenes as defined in the Sampling and Analysis Plan.

 Confirmation Samples – Upon completion of the contaminated soil excavation, samples will be collected and analyzed as defined in the Sampling and Analysis Plan according to the table below:

Pad	Number of Samples and Location	Analysis
38	1 sample using incremental sampling methodology at the bottom of the excavation at 2 to 3 feet bgs	TNT
61/61A	4 samples using incremental sampling methodology at the bottom (2 feet bgs) of the excavation at 2 to 3 feet bgs	PAHs
66	1 sample using incremental sampling methodology at the bottom of the excavation at 2 to 3 feet bgs	TNT & RDX
67	1 sample using incremental sampling methodology at the bottom of the excavation at 10 feet bgs	TNT & RDX
West of 67	1 sample using incremental sampling methodology at the bottom of the excavation at 2 to 3 feet bgs	TNT & RDX

- 10% of the samples (1 sample from Pad 66) will be split and shipped to a USACE-designated QA laboratory for analysis of TNT and RDX.
- Replicate samples, as identified in the Facility-wide Sampling and Analysis Plan, 2009, will be collect in accordance with this Remedial Design Supplement Sampling and Analysis Plan from Pads 61/61A and 66.

Removal operations for this project will be performed as defined in the Soil Removal Action RVAAP-05 WBG Performance Work Statement revised 26 June 2015 and the Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 WBG dated August 2015.

5.2.1 <u>Inspection of Excavated Areas</u>

Upon completion of an excavation, the UXO Site Specialist will inspect the excavation for any surface anomalies. A "Z" path approach, that will randomly inspect the excavation and is equal to a minimum of 10% coverage of the excavation, will be used.

During the QC process where a hand held magnetometer was used to conduct the operational investigation and removal actions, the UXO Site Specialist will conduct a magnetometer aided

visual surface sweep quality inspection and surface anomalies detected will be clearly marked and mapped using a Global Positioning System (GPS) unit for follow-up corrective action.

The UXO Site Specialist will be satisfied that the work performed has met the clearance standards set forth in the RD, RD Supplement, and project specifications and passed QC before offering the grid to the government representative and Title II Services Contractor for QA inspection. Results of the QC inspections will be recorded in the Follow-on Phase Daily Quality Control Report found in Appendix A.

5.2.2 <u>Inspection of Excavated Soils</u>

Excavated contaminated soil will be processed to remove potential MEC items. MEC and munitions debris (MD) will be removed from the excavated soil using a conveyor separator and magnetic separation process. A non-ferrous metal separator will be used to separate non-ferrous materials from the soil. The final piles of soil and other material will be free of explosive hazards and MEC using these processes.

Ferrous items will be conveyed off the side onto another conveyor that will 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, recycle scrap metal, and remove those MEC items that contain explosive hazards in accordance with the ESS. To enhance safety, personnel manning the conveyor lines will have an emergency cut-off switch located at the conveyor work area.

The materials will then be conveyed to a non-ferrous metal separator for removal. Non-ferrous metal items will be conveyed away from the primary conveyor to a stockpile location at the end of the belt and will be stockpiled for later inspection and subsequent disposal.

The metal items (ferrous and non-ferrous) that are stockpiled at the end of their respective conveyors will be collected by a hardened front-end loader or dozer and moved to a final location where QC checks and inspection for off-site recycling of the MD and non-MD scrap separated from the soil.

If MEC is encountered it will be handled in accordance with the ESS prepared by USACE Baltimore District. Tetra Tech will use the procedures identified in the DDESB approved ESS developed by USACE Baltimore District and the RD to conduct the MEC demolition operations. MEC demolition operations will be processed in the Buried Explosion Module at Open Demolition Area #2. The Open Demolition Area #2 munitions response site overlaps the WBG so it is the same munitions response site. A Type II portable magazine will be used in screening production area to hold MEC/MPPEH items discovered during screening operations until disposal is planned. If the item is determined unsafe to move the item will be treated at WBG by using Blow in Place procedures.

MEC/MPPEH will be handled in accordance with the approved ESS. MPPEH determined to be 100% free of an explosive hazard will be certified as material documented as safe (MDAS). MDAS will also be released to a certified recycler for final disposition and documented.

The excavated soil and any other materials that pass through the non-ferrous separator and will pass past 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. The excavated soil that is stockpiled at the end of the conveyor will be collected by a hardened front-end loader or dozer and moved to a final location where QC checks and inspection for off-site disposal of the sifted soil.

During QC of the excavated soil the UXO Site Specialist shall select a randomized 10% of the final processed soils, which shall be (in an anomaly free area) laid out to a depth of no more than 12 inches and using the same hand held magnetometer as was used for excavation clearance, inspect the soil. This randomized selection of soils shall be performed throughout the process and not the grouped 10% of the soils processing. Inspection shall be performed throughout the process to establish that the process is effective and complete. Results of the QC inspections will be recorded in the Follow-on Phase Daily Quality Control Report found in Appendix A.

Any item located within the inspected soils which constitutes failure shall be reported to the SUXOS and the procedures to correct the system shall be initiated. The QC shall in conjunction with the SUXOS, determine if increased inspection percentages are required. The increased percentage (if adopted) shall be randomly selected as above and the process will continue. Upon verification that specified effectiveness has been achieved the QC percentage may be reduced to the minimum 10%.

5.2.3 <u>Pass/Fail Criteria</u>

During QC of MEC field activities, encountering a munitions or related component as specified below which went undetected during the operational sweeps would result in QC failure if:

• Munitions items which have a shape, size or mass greater than or equal to a 20 millimeter (mm) projectile are not removed from the excavation or spoils.

Quality failure can also be defined in the workmanship as not complying with the required procedures as defined.

Anomalies that were determined to be non-MEC related metal debris and meet the same pass/fail criteria as stated above would be cause for QC failure of the excavation or spoils.

In the event a non-conformance is identified, the UXO Site Specialist will initiate reporting detailing the root cause of the non-conformance, notify the SUXOS and recommend corrective actions. A copy of the Non-Conforming forms are provided in Appendix A. Excavation of soil failing QC inspection will be reprocessed through the clearance and quality processes as described in Section 5.1.2 and 5.1.3 above and the results will be tracked through the Follow-on Phase Daily Quality Control Report.

5.3 SOIL AND MEC SEPARATION PROCESS

The soil and MEC separation process will follow the procedures described in RD and RD Supplement. UXO personnel will observe the material at each step in the sifting process to make sure that the material is properly sifted. Effluent materials from the sifting process will undergo a QC inspection prior to recycling or disposal.

5.4 EXCAVATION SURVEY

Pre and Post excavation surveys will be performed by a State of Ohio licensed surveyor during this project. The following is a list of QC measures for surveys:

- Review reporting and logging systems for content, consistency and accuracy;
- Examine survey control and surveying techniques;
- Compare pre-plot and post-plot survey data for positioning errors;
- Monitor survey techniques, deployment, performance, and logging;
- Inspect, test and monitor recording instrumentation to ensure performance meets manufacturer's specifications; and
- Review of field records.

6.0 SAMPLING AND TESTING

The purpose of sampling and testing is to obtain an objective, typically quantitative, measure of conformance with the RD and RD Supplement. Tt will outline the type and frequency of sampling and testing to be conducted for each specific task in the RD and RD Supplement. The testing and analytical laboratories will be discussed with the USACE COR for approval. The sampling and testing include:

- Soil sampling and testing for environmental contaminants;
- UXO/ MEC surveys;
- Waste sampling for waste characterization and disposal requirements.

The Project QC Manager and support personnel will verify that the sampling and testing personnel are trained in the relevant procedures. They will check the sampling and testing process to verify that the proper equipment is available, that the equipment has been calibrated against certified standards, that the procedures are followed, and that the activities are documented. Any nonconformance will be discussed and resolved immediately or corrective actions will be instituted. The analysis for environmental contaminants, confirmation samples, and waste characterization samples will be conducted by a laboratory that will provide analytical results and associated QA/QC information that will support an Ohio EPA Tier I data validation.

The sampling and testing events will be identified and reported in the Follow-on Phase Daily Quality Control Report and analytical and test result forms will be filed. The USACE COR personnel will be advised of the analytical and test results on a regular basis. Tt understands that the USACE COR may conduct QA checks of testing techniques and results.

6.1 EQUIPMENT CALIBRATION AND TESTS

Measurement equipment used on site will be checked for operational reliability and calibration in accordance with the manufacturer's specifications.

6.2 DOCUMENTATION OF TESTING

Results will be documented by the individual performing the test. Calibration and maintenance records associated with the measuring and testing equipment will be generated by the individual performing the activity. Documentation for required calibrations, testing and maintenance of measuring and testing equipment will be stored in the field office until the project is completed. When the project is completed, the files will be transferred to the Tt office in Pittsburgh, Pennsylvania. The project files will be made available to the COR upon request.

6.3 MAINTENANCE PROGRAM

Tools, instruments, and equipment deployed to the project will be properly maintained and calibrated (as necessary) in accordance with the instrument manufacture specifications or standard industry practices. This applies to equipment used in the field for UXO safety support and related activities affecting quality, including communications equipment, vehicles/machinery, environmental monitoring equipment, and personal protective equipment.

Equipment will be protected from dust and contamination and visually checked for damage prior to use. Preventative maintenance on the metal detectors will be performed on a regular basis. Critical spare parts will be kept on site to minimize downtime.

7.0 SUBMITTALS

Tt and the USACE COR will determine the submittals required for each specific task and include them in the Project Management Plan (PMP). The list of submittals provided in the PMP may be modified during the preparation of the task RD and RD Supplement. This will allow the USACE COR time to review and approve the submittals before work begins.

The Project QC Manager and PM will delegate staff to assist with the collection of, and the scheduling of submittals for each task. Each submittal will be delivered to the USACE COR and other stakeholders as identified in the PMP. Tt will make sure that the submittals are in compliance with the contract.

The submittals will be reviewed and approved by the USACE COR. Any modifications will be made by Tt. The submittal schedule will be maintained by the Project QC Manager or delegate. Adjustments of dates will be justified to the USACE COR. Submittals to be furnished by subcontractors or suppliers will be managed by Tt.

8.0 DOCUMENTATION

Tt will comply with its reporting and documentation procedures requiring multiple peer and technical reviews and a final technical edit before submitting a report to the USACE COR and other stakeholders. The PM and Independent Technical Review (ITR) team will work together to make sure instructions and procedural items are given to the reviewers and that the reviews are documented. The Project QC Manager will audit the report review and documentation process. The independent reviews will be performed by persons equally qualified as those performing the original work but who were not performing the work. These independent reviewers may be from within Tt or non-Tt personnel.

Compliance with the requirements of the construction specifications for each task of the WBG removal action will be documented. Wastes and scrap metal will be tracked by means of a waste tracking log, and weekly waste inspections will be conducted in accordance with the Waste Management Plan. Documentation will consist of records prepared by QC personnel, the testing and analytical laboratories, the construction personnel, and the subcontractors. The various reports are discussed below.

8.1 FOLLOW-ON PHASE DAILY QUALITY CONTROL REPORT

For the construction activity, a Follow-on Phase Daily Quality Control Report will be prepared. Other records required will depend on the specific work being performed that day.

The Follow-on Phase Daily Quality Control Report will be prepared by the QC personnel and reviewed by the Project QC Manager and the Tt Field Superintendent. The Follow-on Phase Daily Quality Control Report form is found in Appendix A. It will contain the following:

- Tt name and subcontractor name and area of responsibility;
- Date and report number;
- Summary of the weather conditions;

- Summary of locations where work is occurring;
- List of personnel on the project and names of visitors to the site;
- Summary of meetings held and attendees;
- Submittals reviewed and action taken;
- Description of off-site surveillances;
- Description of materials received and acceptability;
- Reference to test or control inspection performed and results;
- Description of equipment with hours worked and down time;
- Certificates for calibration and recalibration of test equipment;
- Results of safety evaluations and results;
- Description of nonconformance and corrective actions taken; and
- Signature of person completing the report and Project QC Manager's review.

The original and one copy of the Follow-on Phase Daily Quality Control Report will be provided to the USACE COR and/or designated site representatives and PM. Non-work days will be covered in the next work day so that each calendar day of the task will be accounted for throughout the contract period. Copies of the test results will be attached.

8.2 SOIL REMOVAL SUMMARY TABLE

The Soil Removal Summary Table will list the number of truck loads and cubic yards of soil excavated at each of the pads. A copy of the Soil Removal Summary Table is provided in Appendix A.

8.3 WEEKLY REPORTS

Weekly progress reports will be prepared by the Tt Field Superintendent and submitted through the Tt PM to the USACE COR. The weekly progress report will summarize the progress, plans for the next week, and problems.

8.4 NONCONFORMANCE REPORT AND CORRECTIVE ACTION REQUEST

Whenever material or workmanship does not meet the specified requirements or has an obvious defect, the appropriate personnel will be notified and a Nonconformance Report and Corrective Action Request will be completed by the Project QC Manager.

8.5 PHOTOGRAPHIC RECORD

Photographs used to document the progress and acceptability of the work activity will be referenced in the Follow-on Phase Daily Quality Control Report and attached to the final report. Each photo will be identified individually as well as in a photograph log that contains the following information:

- Date, time, location, and direction of the photograph,
- The name of the photographer, and
- Brief description of the activity photographed.

8.6 FINAL REPORT (REMEDIAL ACTION COMPLETION REPORT)

When the construction task for WBG has been completed and the final inspection/punch list shows that the final inspection/punch list items have been resolved, Tt will prepare a final report (Remedial Action Completion Report) to submit to the USACE COR. The final report contents will document the following items:

- Historical background and scope of work;
- Description of the preparatory activities and plans;
- Detail of the task activities;
- Sampling and testing performed and reference to the results files;
- Waste management and disposal activities;
- Site restoration activities;
- Project/task administration and financial results; and

• Attachments.

- Weekly Progress Reports;
- Nonconformance Reports and Corrective Action Requests;
- Field Test Results;
- Laboratory Analytical Results including Chain of Custody Forms;
- Design Assumptions and Calculations;
- Photographic Log; and
- Design Changes.

8.7 DOCUMENT CONTROL

The Tt files will include historical documents related to the site and task as well as site-related documents prepared under this contract until the completion. The master file will contain the following information: proposal documents, project initiation documents, contract documents, project accounting and finance documents, schedules, correspondence, meeting notes, project permits, laboratory documentation, deliverables, field photos, waste management documentation, environmental safety and health documentation. subcontracts. client-furnished drawings/data/equipment documents, company reviews and comments, client approval/reviews and comments, quality documents, manuals, maps, project training records, and superseded/void documents. Documents in the Tt file will contain the following information, if applicable: document number, title, date, revisions, and supplements to the document.

Documents will be retained in a safe location and protected from environmental damage. The original documents will be delivered as a hard copy and/or electronic file to the USACE COR after the final report is approved.

8.8 **DEFINABLE FEATURES OF WORK**

Each task or group of similar tasks will be divided into separate and distinct subtasks. The definable features of work for this project have been identified as:

- Conduct pre-excavation survey and collect in-situ soil samples within the pad area for disposal characterization
- Remedial Action at Pad 38: Excavate 645 cubic yards (CY) to remove the site Contaminant of Concern (COCs) of TNT
- Remedial Action at Pads 61/61A: Excavate approximately 3,872 CY to remove the site COCs of PAHs.
- Remedial Action at Pads 66/67: Excavate contaminated soil at the following three locations
 - Pad 66 645 CY to remove the site COCs of RDX and TNT
 - Sample WBG-252 within Pad 67 81 CY to remove the site COCs of RDX and TNT
 - Sample WBG-070 west of Pad 67 7 CY to remove the site COCs of RDX and TNT
- Process excavated soils through ferrous and non-ferrous separator to remove MEC and MD.
- Collect confirmatory soil samples from resultant excavations for PAHs, TNT, and/or RDX.
- Dispose of excavated soil and recovered MEC and/or MD items.
- Collect Processing Area samples and Soil Stockpile Area samples
- Site restoration.

8.9 **PRECONSTRUCTION MEETING**

A Preconstruction Meeting will be scheduled before the start of the work. The preconstruction meeting will be attended by Tt and its subcontractors, Ohio EPA, and Camp Ravenna and other USACE team members. The preconstruction meeting will communicate USACE and contractual expectations to the project team, establish internal expectations, define and communicate the project requirements, and make sure that the project/team members understand their individual

roles and responsibilities. The preconstruction meeting will also review this CQCP and reach a mutual understanding of the roles for QC. Details of the control process will be discussed to include forms, testing, reports, definable features of work, and final inspections. Changes to the CQCP will be discussed and the changes must be approved before work begins. The meeting minutes will be recorded and distributed to the participants.

8.10 COMPLETION INSPECTION

At the completion of each task the Tt Field Superintendent will conduct an inspection and create a punch list of items which need to be completed or modified to comply with the requirements. The list of deficiencies becomes a part of the quality documentation. The Tt Field Superintendent will re-inspect the list of items to verify correction of the deficiencies and document the completion. The punch list with the re-inspection documentation will be submitted to the Project QC Manager.

8.11 NOTIFICATION OF NONCOMPLIANCE

Tt will take immediate corrective action after notification by the USACE COR of a noncompliance issue. Tt will gather the required personnel to meet with the USACE COR and delegates to discuss the noncompliance issue and agree upon the corrective action. Tt understands that if a corrective action takes more than a day the work could be stopped until the action has been approved.

8.12 **DEFICIENCY TRACKING SYSTEM**

Tt will track the deficiencies on a log which identifies the task, date, initiated by, description, responsible party, corrective action date, re-inspection results, and corrective action approval date. The log will be maintained at the work site and be available to the USACE for review and submitted to the USACE COR monthly.

APPENDIX A

PROJECT FORMS

TE TETRA TECH

PREPA	RATORY PHASE	CHECKLIS	т	SPEC SECTION	ON	DATE
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ц	GOVERNMENT REP NOTIFIED		DVANCE	YES	NO 🗌	
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	REVIEW SUBMITTALS AND/O	R SUBMTTAL REGISTE	R. HAVE ALL SUBMITTALS	S BEEN	VES	
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	REVIEW EACH PARAGRAPH	OF SPECIFICATIONS.				
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-	REVIEW TESTING PLAN.	
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	Š	WILL THE INITIAL WORK BE CO	NSIDERED AS A S	SAMPLE?	YES	NO 🗌	
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Task									Day:	
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6		Tetra Tech N	US, Inc.	Init.	Name	Hrs.	Vis	sitors	Init.	Status
	73.	Project Manage	er:							
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661 Ar	nderson Driv	Site Safety & F	lealth				US	ACE	Init.	Status
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		E	SCONTROL				
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DAILY C	QUALITY CONTROL REPORT		DATE Enter (E	DD/MMM/YY)		
	(ATTACH ADDITIONAL SHEETS IF NECESSARY)					
PHASE	CONTRACT NO CONTRACT TITLE		•			
~	WAS PREPARATORY PHASE WORK PERFORMED TODAY?		YES	NO		
, K	IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CH	ECKLIST.				
T I	Schedule Activity No. Definable Feature of Work			Index #		
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	WAS INITIAL PHASE WORK PERFORMED TODAY?		YES	NO		
	IF YES, FILL OUT AND ATTACH INITIAL PHASE CHECKLIST.					
AL	Schedule Activity No. Definable Feature of Work			Index #		
Ē						
Z						
			1 1			
	WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE	Ξ?	YES	NO		
	WORK COMPLIES WITH SAFETY REQUIREMENTS?		YES	NO 🗌		
	Schedule Activity No. Description of Work, Testing Performed & By Whom, Defin	able Feature of Work, Specification	Section, Location and List of Pers	onnel Present		
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REWORK ITEMS	B IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)	REWORK ITEMS CORREC	TED TODAY (FROM REWORK I	TEMS LIST)		
Schedule Activity	4	Schedule Activity	Schedule Activity			
No.	Description	No. Descrip				
REMARKS (Also	L Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NC	D"), Manuf. Rep On-Site, etc.				
Schedule Activity	4					
No.	Description					
On behalf of the	contractor. I certify that this report is complete and correct and equipment and mate	rial				
used and work pe	erformed during this reporting period is in compliance with the contract drawings and	t				
specifications to	ne best of my knowledge except as noted in this report.	AUTHORIZED QC MAN	IAGER AT SITE	DATE		
GOVERNM						
QUALITY ASSU	KANGE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPOP	≺ I				
No.	Description					
		GOVERNMENT QUALI	TY ASSURANCE MANAGEF	R DATE		

Soil Removal Summary Table Pad

		TE TETRATECH					
	PAD SOIL						
DATE	# of TRUCK LOADS	VOLUME - DAILY (Cubic Yards)					
WEEKLY TOTAL	0	0					
WEEKLY TOTAL	0	0					
WEEKLY TOTAL	0	0					
WEEKLY TOTAL	0	0					
WEEKLY TOTAL	0	0					
<u></u>							
WEEKLY TOTAL	0	0					
GRAND TOTAL TO DATE	0	0					

Control of Nonconforming Product/Service

PURPOSE

Product or service that does not conform to specified requirements must be identified and controlled to prevent unintended delivery or use. The responsibility for review and disposition of nonconforming product or service is defined.

PROCEDURE

Responsibility for Identification

TT provides services in the form of deliverable reports and completed field actions such as site remediation, building decontamination and demolition, and waste management. Program and Project Managers have the responsibility to identify when deliverables, project inspections, and project completions fail to meet the specified requirements at any stage of the project. When a nonconformity is identified it is reported on a Nonconformance Report (Attachment 1). Nonconformities do not include the typical customer review comments between draft and final reports. They do not include the design development changes between submittal stages.

Controls

a) Take action to eliminate the nonconformity.

In the case of deliverable reports at any stage of their submittal, TT will perform an internal review by discipline knowledgeable staff and editors before the report is submitted. In some cases an independent technical reviewer may be asked to review a report. Time for the reviews must be incorporated into the project schedule.

In the case of field activities that are not conforming to requirements, the managers will stop work long enough to solve the problem and restart activity. The customer must be notified if the delay is longer than a day.

b) Authorize the release, acceptance, or use.

The Program Manager, Project Manager, or higher TT Management can decide to release the deliverable, field activity, or item if they believe the nonconformity will have a minimal effect on the project. The customer can also give a written concession to a nonconformity.

c) Take action to preclude the original intended use or application.

The TT Management and the customer can agree to accept a nonconformity for a different use or application.

d) Nonconformity detected after delivery or use.

In the case of deliverable reports at any stage of their submittal, TT will notify the customer that a nonconformity was detected and will be corrected with a revised report submitted as a replacement.

In the case of a field activity where a nonconformity was detected after completion, for example, a final inspection, TT will perform the appropriate work to satisfy the requirement.

If material is found to be out of conformance, it will be marked or tagged and segregated from usable material to prevent inadvertent use.

Attachment 1 Nonconformance Report

NON-COMPLIANCE REPORT



CONTRACTOR/RESPONSIBLE INDIVIDUAL FOR COP	RRECTIVE ACTION	NOTICE NUMBER
CONTRACT NUMBER AND TITLE		DATE
SPECIFICATION PARAGRAPH AND/OR DRAWING NU	JMBER	NON-COMPLIANCE DATE
REFERENCE (Shop Drawing, Certification, Work Plan, e	etc.)	
DESCRIPTION OF NON-COMPLIANCE		
METHOD FOR COMPLETING CORRECTIVE ACTION	AND SCHEDULE	
CORRECTIVE ACTION IMPLEMENTATION/COMPLET	ION DESCRIPTION	
TETRA TECH SITE SUPERVISOR:	TETRA TECH QC M	ANAGER OR SITE QC REP:
NAME:	NAME:	
SIGNATURE:	SIGNATURE:	
DATE:	DATE:	
USACE ACKNOWLEDGEMENT	USACE NOTES:	
NAME:		
SIGNATURE:		
DATE:		
This Notice does NOT authorize any work not included in the c or time.	contract and shall not co	nstitute a basis for additional payment

DISTRIBUTION

Original - Tetra Tech QC Manager (Original) Copies to - Tetra Tech PM, USACE Representative or COR, Project File
Attachment 2 Nonconformance Report Tracking Log

NONCONFORMANCE REPORT TRACKING LOG

Project Name/Location ______Project No._____

Contract No. _____ Task Order No_____

NCR No	Origination Date	Initiated By	NC Description	Responsible Party	C/A Date	Reinspection Results	C/A Approved Date

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F-NONCONFLOG-11 /15

CORRECTIVE ACTION REQUEST

1	TŁ	TETRA TECH

Project Name/Location No		Project
Contract No No:		Task Order
CAR Number	Date: _	Adverse Trend: Yes No

Organization/Project Department:	
Person Contacted:	Date:
Discrepancy (include specific requirements	violated):
Originator:	_Response Due Date:

Corrective Action Taken/Proposed to Correct Discrepancy:								
Corrective Action Taken to Prevent Recurrence (cause of the discrepancy must also be included here):								
Corrective Action Taken by: Signature:	Date:	Date When						
Corrective Action Completed:								

(Cont)



Corrective Action Evaluated:								
Verification of Implementation:								
Evaluated by:	Title:	_ Date:						
Verified by:	Title:	_ Date:						

CORRECTIVE ACTION REQUEST LOG

Project Name/Location ______Project No._____Project No._____

Contract No. _____ Task Order No_____

CAR No	Origination Date	Initiated By	CA Description	Responsible Party	C/A Due Date	Re-inspection Results	C/A Approved Date

Stormwater Construction Site Inspection Report

General Information							
Project Name							
NPDES Tracking No.		Location					
Date of Inspection		Start/End Time					
Inspector's Name(s)							
Inspector's Title(s)							
Inspector's Contact Information							
Describe present phase of construction							
Type of Inspection:	During storm event	Post-storm e	vent				
	Weather Info	rmation	vent				
Has there been a storm event since	the last inspection? DVes						
If yes, provide:							
Storm Start Date & Time: S	torm Duration (hrs):	Approximate Amount of Precipitation (in):					
Weather at time of this inspection?	•						
\Box Clear \Box Cloudy \Box Rain	Sleet 🛛 Fog 🖵 Sno	wing 🛛 High Win	ıds				
□ Other:	Temperature:						
Have any discharges occurred since the last inspection? □Yes □No If yes, describe:							
Are there any discharges at the tin If yes, describe:	ne of inspection? UYes U	No					

Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	ВМР	BMP	Corrective Action Needed and Notes
		Installed?	Maintenance	
			Required?	
1		□Yes □No	□Yes □No	
2		□Yes □No	□Yes □No	
3		□Yes □No	□Yes □No	
4		□Yes □No	□Yes □No	
5		□Yes □No	□Yes □No	
6		□Yes □No	□Yes □No	
7		□Yes □No	□Yes □No	
8		□Yes □No	□Yes □No	
9		□Yes □No	□Yes □No	
10		□Yes □No	□Yes □No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	□Yes □No	Yes No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	□Yes □No	□Yes □No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	□Yes □No	□Yes □No	
4	Are discharge points and receiving waters free of any sediment deposits?	□Yes □No	□Yes □No	
5	Are storm drain inlets properly protected?	□Yes □No	□Yes □No	
6	Is the construction exit preventing sediment from being tracked into the street?	□Yes □No	□Yes □No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	□Yes □No	□Yes □No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	□Yes □No	□Yes □No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	□Yes □No	□Yes □No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	□Yes □No	□Yes □No	
11	Are non-stormwater	□Yes □No	□Yes □No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
	discharges (e.g., wash water, dewatering) properly controlled?			
12	Are spoil piles stabilized with vegetations and/or contained by silt fence or other appropriate and required controls?	□Yes □No	□Yes □No	
13	Are wastes properly stored with no risk of discharge?	□Yes □No	□Yes □No	
14	(Other)	□Yes □No	□Yes □No	

Non-Compliance Describe any incidents of non-compliance not described above:

Describe any merdents of non comphance not described above.							

Prepared By

Date

Reviewed By

Date

SECONDARY CONTAINMENT INSPECTION FORM

1. Date:_____

2. Building/Reference Number and Site Location:

3.	Are the access panels locked and secure? Yes / No
4.	Are the valves and/or drain plugs intact and functional? Yes / No
5.	Are there two filters located at drainage points? Yes / No
5.	Are the filters saturated with POL or otherwise non-functional?
7.	If yes to 6, did you replace the filters (if no explain in 14 below)? Yes / No
8.	Is the system intact with no noticeable breaches?
9.	Are the ramps in place?
10.	Is the system grounded?
11.	Is there water in the system?
2.	If yes on question 10, Complete "Release of Rain Water from Secondary Contain form.
3.	Is the system functional and acceptable for use?
4.	Note any deficiencies and action taken to have them corrected, including notification to Camp Ravenna Logistics (614-336-6790) and Environmental (656 system is not functional and needs to be dead lined.
5.	Person(s) who completed this form: Phone:

	RELEASE OF RAIN WATER FROM SECONDARY CONTAINMENT
1.	Date:
2.	Building/Reference Number and Site Location:
2	
3.	what is the water level height (in inches) inside the containment area?
4.	Is a hydrocarbon (POL) sheen noted on the surface of the water?
5.	Is a hydrocarbon (POL) odor noted for the water?
6.	If hydrocarbons (POL) present, what action was taken to remove the hydrocarbons prior to releasing the water (or was the water removed for off-site treatment and disposal)?
7.	What was the approximate volume of water released from the containment (gallons or cubic feet)?
8.	Following the release of the water, was the valve locked in the closed position and functioning (or drain plug screwed in)?
9.	Note any deficiencies and action taken to have them corrected, including notification to Camp Ravenna Range Control (614-336-6041) and Environmental (6568) if POL was released to the environment.
10.	Person(s) who completed this form:
	Phone:

FIELD CHANGE REQUEST

FCR NO		DATE INITIATED
PROJECT		
REQUESTOR IDENTIFICATION NAME	ORGANIZATION	PHONE
TITLE	SIGNATURE	
BASELINE IDENTIFICATION BASELINE(S) AFFECTED Cost] Scope	Method of Accomplishment
AFFECTED DOCUMENT (TITLE, NUMB	BER AND SECTION)	
DESCRIPTION OF CHANGE:		
JUSTIFICATION:		
IMPACT OF NOT IMPLEMENTING RE	QUEST:	
PARTICIPANTS AFFECTED BY IMPLE	EMENTING REQUEST:	
COST ESTIMATE (\$) <u>0</u> ESTIM PHON	ATOR SIGNATURE [DATE
PREVIOUS FCR AFFECTED 🗌 YES	□ NO; IF YES, FCR NO.	
USACE COTR:		_ DATE:
OHIO EPA PROJECT MANAGER:		DATE:
LEIDOS H&S MANGER:		DATE:

APPENDIX F

WASTE MANAGEMENT PLAN

FINAL WASTE MANAGEMENT PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS CAMP RAVENNA, OHIO

Contract No. W912QR-12-D-0004 Delivery Order No. 0003



U.S. ARMY CORPS OF ENGINEERS LOUISVILLE DISTRICT 600 Dr. Martin Luther King, Jr. Place, Room 821 Louisville, Kentucky 40202-2267

June 2016

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188			
The public reporting burden for this collection gathering and maintaining the data needed, and information, including suggestions for reducing 1215 Jefferson Davis Highway, Suite 1204, Ar penalty for failing to comply with a collection of PLEASE DO NOT RETURN YOUR FO	of information completing and the burden, to lington, VA 2 information if DRM TO TH	is estimated to average 1 hour d reviewing the collection of infor Department of Defense, Washin 2202-4302. Respondents shou it does not display a currently val IE ABOVE ADDRESS.	per response, incl mation. Send com ngton Headquarters Id be aware that no lid OMB control nur	luding the tir iments regard s Services, D otwithstandir mber.	me for reviewing instructions, searching existing data sources, ding this burden estimate or any other aspect of this collection of irectorate for Information Operations and Reports (0704-0188), ng any other provision of law, no person shall be subject to any	
1. REPORT DATE (DD-MM-YYYY)	2. REPC	DRT TYPE			3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE				5a. COI	NTRACT NUMBER	
				5b. GRANT NUMBER		
				5c. PRC	DGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PRC	DJECT NUMBER	
				5e. TASK NUMBER		
				5f. WO	RK UNIT NUMBER	
7. PERFORMING ORGANIZATION N	iame(s) an	ND ADDRESS(ES)			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AG	ENCY NAM	E(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)	
					11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT						
13. SUPPLEMENTARY NOTES						
14. ABSTRACT						
15. SUBJECT TERMS				_		
16 SECURITY CLASSIFICATION OF		17. LIMITATION OF	18. NUMRFR	19a NAI	ME OF RESPONSIBLE PERSON	
a. REPORT b. ABSTRACT c. T	HIS PAGE	ABSTRACT	OF PAGES			
				ISD. IEL	EPHONE NUMBER (Include area code)	

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Tetra Tech, Inc., has completed the preparation of this <u>Waste Management Plan</u> as part of the <u>Soil</u> <u>Removal Action</u> for <u>RVAAP-05</u> <u>Winklepeck Burning Grounds</u> at the <u>former Ravenna Army</u> <u>Ammunition Plant (RVAAP)/Camp Ravenna</u>. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This independent technical review included evaluation of data quality objectives; technical assumptions; methods, procedures, and material to be used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

Sutt A-Nelf

Scott Nesbit Project Manager

Richard B. Wine

Rick Wice Independent Technical Review Team Leader

<u>6/9/2016</u> Date

<u>6/9/2016</u> Date

Final Document Distribution List

DOCUMENT DISTRIBUTION
FINAL WASTE MANAGEMENT PLAN

	Number of	Number of
Name/Organization	Printed Copies	Electronic Copies
Mark Leeper, ARNG-ILE-CR	0	1
Kevin Sedlak, ARNG – Camp Ravenna	0	1
Katie Tait, OHARNG – Camp Ravenna	1	0
Nathaniel Peters II, USACE Louisville	2	1
Greg Moore, USACE Louisville Transmittal Letter Only		Letter Only
Pat Ryan, REIMS Transmittal Letter Only		
Gail Harris, AR Manager – Camp Ravenna	2	2
AR = Administrative Record		
ARNG-ILE-CR = Army National Guard – Installations Logistics Environmental – Cleanup Restoration		
ARNG – Camp Ravenna = Army National Guard – Camp Ravenna Joint Military Training Center		

OHARNG – Camp Ravenna = Ohio Army National Guard – Camp Ravenna Joint Military Training Center USACE = United States Army Corps of Engineers

REIMS = Ravenna Environmental Information Management System

FINAL WASTE MANAGEMENT PLAN

SOIL REMOVAL ACTION AT RVAAP-05 WINKLEPECK BURNING GROUNDS Camp Ravenna, Ohio

Submitted to: USACE Louisville District

Submitted by: Tetra Tech, Inc. 661 Andersen Drive Pittsburgh, Pennsylvania 15220

Multiple Award Remediation Contract Contract No. W912QR-12-D-0004 Delivery Order No. 0003

June 2016

PREPARED UNDER THE SUPERVISION OF & APPROVED FOR SUBMITTAL BY:

Suit A-Nelf

SCOTT NESBIT, PE PROJECT MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

STEVEN H. RUFFING, PE PROGRAM MANAGER TETRA TECH, INC. PITTSBURGH, PENNSYLVANIA

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	1.2	PROJECT BACKGROUND			
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3.0	STO	RAGE LOCATION			
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7.0	REFE	ERENCES			

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LIST OF APPENDICES

- A Camp Ravenna Waste Management Guidelines and Waste Inspection Form
- B Waste/Soil Characterization Sampling
- C Manifest Log

ACRONYMS AND ABBREVIATIONS

Camp Ravenna Camp	Ravenna Joint Military Training Center
FS	Feasibility Study
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
РАН	Polynuclear aromatic hydrocarbon
PWS	Performance Work Statement
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RVAAP	Ravenna Army Ammunition Plant
SSHP	Site Safety and Health Plan
TCLP	Toxicity Characteristic Leaching Procedure
Tt	Tetra Tech, Inc.
USACE	United States Army Corps of Engineers
US DOT	United States Department of Transportation
UXO	Unexploded Ordinance
WBG	Winklepeck Burning Grounds
WMP	Waste Management Plan

1.0 INTRODUCTION

Tetra Tech (Tt) is providing this Waste Management Plan (WMP) under the Environmental Restoration Service Contract W912QR-12-D-0004, Delivery Order 0003 for the United States Army Corps of Engineers (USACE) Louisville District. This Delivery Order is to provide Environmental Remediation Services for Camp Ravenna Joint Military Training Center (Camp Ravenna), the former Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. The WMP complies with the Camp Ravenna Waste Management Guidelines and the Camp Ravenna Hazardous Waste Management Plan that are attached in Appendix A.

This WMP for RVAAP-05 Winklepeck Burning Grounds (WBG) is required to complete a soil removal action at Pads 38, 61/61A, and 66/67 that will excavate and dispose of contaminated soil to an acceptable level of risk in accordance with the selected remedy as presented in the Final Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds (USACE, 2015) and the final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds (USACE, 2015). The removal action will also require disposal of construction debris and decontamination water and recycling of scrap metal.

1.1 PROJECT DESCRIPTION

The scope of work covered under this WMP includes waste management activities consisting of temporary storage, inspection, transportation and disposal of solid waste (non-hazardous contaminated soil), munitions and explosives of concern (MEC) if found, and hazardous wastes if identified, generated from the soil removal action. The contaminated soil will be excavated from the pads based on the Remedial Design, transported to the processing area where the soil will be screened and sifted to separate MEC, and loaded into trucks for disposal at Waste Management's American Landfill in Waynesburg, Ohio.

Small waste streams from decontamination of the equipment will also be generated. Liquid derived waste such as wash water generated from decontamination will be collected in drums or small tanks stored in an area with secondary containment. The liquid derived waste will be disposed properly after it is analyzed. Personal protective equipment will be disposed as a municipal waste.

If MEC is found during the screening and sifting of the soil it will be removed from the soil and demolition/detonation of the MEC will be processed in the Buried Explosion Module at Open Demolition Area #2. The Open Demolition Area #2 munitions response site overlaps the WBG so it is the same munitions response site. A Type II portable magazine will be used in screening production area to hold MEC/MPPEH items discovered during screening operations until disposal is planned. If the item is determined unsafe to move the item will be treated at WBG in using Blow in Place procedures.

Tetra Tech will use the procedures identified in the DDESB approved ESS developed by U.S. Army Corps of Engineers Baltimore District and the Remedial Design to conduct the MEC demolition operations. Tt EOD technicians are DOT certified to transport explosives within a military installation and will transport the explosives from WBG to the Buried Explosion Module at Open Demolition Area #2 in accordance with Camp Ravenna requirements. Large munition debris fragments, other debris, and ferrous and non-ferrous metals will be recycled after it is inspected and certified that it is free of explosive hazards.

The non-hazardous solid waste for disposal will consist of approximately:

- 1400 cubic yards of hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and TNT contaminated soil and
- 3900 cubic yard of polynuclear aromatic hydrocarbon (PAH) contaminated soil.
- Limited decontamination fluids and contaminated accumulated precipitation. These liquids will be collected in drums or temporary storage tanks stored in an area with secondary containment.

Tt will manage the contaminated soil and limited liquid waste stream at the RVAAP WBG. The transportation of the contaminated soil will be performed by TBD and the disposal of the contaminated soil will be at the Waste Management American Landfill in Sandy Township, Waynesburg, Ohio. Metal that is removed during the screening process will be recycled at Niles Iron Metal in Niles, Ohio and construction debris will be disposed at Lafarge in Warren, Ohio. The generator of record for the waste streams generated, stored, transported, and disposed will be former RVAAP. The Ohio Army National Guard (OHARNG) Restoration Representative will sign the waste profiles and manifests. The Camp Ravenna Compliance Manager is the alternate if the OHARNG Restoration Representative is not available.

The field work must be accomplished in a manner which makes sure the health and safety of the workforce and the public at large are not affected or impacted. As such, the work will be completed in accordance with the Final Remedial Design (USACE, 2015), this WMP, the Site Safety and Health Plan, and applicable Federal, State and Local rules, laws and regulations. Tt will perform the project in a manner that minimizes the environmental impact to the site and its surroundings.

1.2 PROJECT BACKGROUND

WBG, designated as area of concern # RVAAP-05, encompasses approximately 200 acres in the central portion of RVAAP. Historical operations at WBG included destruction of explosives from various types of munitions by open burning. There are approximately 70 former burn pads located along five east/west oriented gravel or dirt roads. The former burn pads range in appearance from distinct areas of soil and slag that are partially vegetated to non-descript (no visible slag and heavily vegetated).

WBG was the subject of a Phase I Remedial Investigation (RI), a Phase II RI, and a Phase III RI. A Focused Feasibility Study was completed in 2005. A removal action for MEC was performed between March and August 2005 in preparation for the then future land use as a MK19 Grenade Machine Gun Range, a target practice range for use in firing non-explosive 40mm practice rounds. The MEC removal action included the removal of soil contaminated with MEC and chemical contaminants and soil containing transite.

At the conclusion of MEC and soil removal actions, confirmation sampling indicated that additional soil contamination above risk-based cleanup goals for Commercial/Industrial Land Use (the proposed Reasonably Anticipated Future Land Use) to allow for the potential of full-time employees on WBG remained on site at Pads 38, 61/61A, and 66/67. An additional RI was conducted to collect additional data to determine the nature and extent of the residual contamination and assess the potential risks to a full-time occupational exposure receptor. An RI/Feasibility Study (FS) Supplement (USACE, 2014) was prepared and showed that five distinct areas involving Pads 38, 61/61A, and Pad 66/67 required additional soil removal to allow the site to be used for military training and by full-time workers with fewer restrictions and Land Use Controls. The USACE prepared a final remedial design that delineated the horizontal and vertical extent and the implementation process for the soil removal action.

1.3 WASTE MANAGEMENT PLAN ORGANIZATION

The WMP is structured to present the means and methods for accomplishing the management of the solid waste (non-hazardous contaminated soil), MEC (if found) and hazardous wastes (if identified) generated from the soil removal action for temporary storage, inspection, transportation and disposal. The contaminated soil and wastes will be managed in accordance with the Camp Ravenna Waste Management Guidelines and Waste Inspection Form (Appendix A), Camp Ravenna Hazardous Waste Management Plan, Section 8.0 of the Facility-Wide Sampling and Analysis Plan, and federal and state of Ohio Small-Quantity Hazardous Waste Generator Requirements. Wastes and scrap metal will be tracked by means of the waste tracking logs provided in the Construction Quality Control Plan.

The Site Safety and Health Plan and Accident Prevention Plan is included in the Remedial Design Supplement in Appendix C that was prepared in accordance with the Facility-Wide Safety and Health Plan (SAIC, 2011). The Construction Quality Control Plan is included in the Remedial Design Supplement in Appendix E. The Site Safety and Health Plan includes the names, telephone numbers, and e-mail addresses of the points of contact for this project. The Construction Quality Control Plan include an organizational chart of the points of contact.

2.0 TYPES OF WASTE MATERIALS

The waste stream from the WBG is soil contaminated with PAHs or RDX and TNT and debris. Previous removal actions in 2005 and 2008 included removal of contaminated soil and MEC and soil containing transite. MEC removal is not one of the remedial action objectives of this additional soil removal, however historical operations have shown that MEC items may still be present at WBG. Therefore, appropriate MEC safety measures will be incorporated into the removal action, and MEC will be screened from the excavated soil before disposal of the soil. Also, MEC or scrap metal recovered during the soil separation process will be properly disposed or recycled.

The soil and MEC separation process is described in detail in the Remedial Design (Appendix A of the Remedial Design Supplement). The primary goal of the separation process is to safely and effectively remove all MEC and munitions debris (MD) from the excavated soils so that the final piles of soil and other material can be certified as free of explosive hazards and MEC. The ferrous and non-ferrous materials and debris that are separated from the contaminated soil will be inspected for the presence of explosive hazards before these materials and debris are declared/certified as scrap metal.

Prior to excavation, the areas to be excavated will be sampled in-situ to characterize the soil for off-site disposal as described in Appendix B. The contaminated soil is anticipated to be a non-hazardous solid waste. The contaminated soil is not a listed hazardous waste on the F, K, P, or U lists of specific waste streams from industrial or manufacturing processes or discarded commercial chemical products. The contaminated soil would only be considered hazardous solid waste if it exhibits any of the four characteristics: ignitability, corrosivity, reactivity, or toxicity. With the information from the site history provided to the disposal facility, the disposal facility and Camp Ravenna require the contaminated soil be tested for

- Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311) Semivolatile Organic Compounds
- TCLP Metals
- Benzene, Toluene, Ethybenzene, and Xylene
- Percent concentration of TNT and RDX by weight
- pH and Flashpoint
- RDX and TNT
- PAHs

The waste characterization data and associated QA/QC data will be included with the waste profile that is submitted to the disposal company (Waste Management's American Landfill) for approval prior to disposal. In addition each load of waste is also required to have an unexploded ordinance (UXO) certification declaring it is free of explosive hazards and MEC.

3.0 STORAGE LOCATION

The contaminated soil and ferrous and non-ferrous debris will be stored within the WBG at the centralized processing area located at the western side of WBG near the entrance from Greenleaf Roads between Pallet Road C West and Pallet Road B West. The contaminated soil will be stockpiled in lots by the chemicals of concern (Pads 38 and 66/67 – RDX and TNT in 70 cubic yard lots and Pad 61/61A – PAHs in 150 cubic yard lots), so that each lot can be sampled and analyzed to characterize each lot of contaminated soil for disposal. The ferrous and non-ferrous debris will also be stockpiled in the approximate same location be separated from the contaminated soil.

The former RVAAP facility is in a remote area and is secured with a perimeter fence. Access to WBG is controlled by Range Control with gates at the entrance roads that are locked with pad locks. Range Control unlocks the pad locks in order to enter WBG.

Safety equipment and spill containment supplies will be provided by Tt during the duration of the project. A figure showing the location of the centralized processing area (soil screening and staging) is provided.

RVAAP has been assigned U.S. EPA Identification Number OH5210020736 for the generation, storage and treatment of hazardous wastes as a small-quantity generator. The contaminated soil is anticipated to be non-hazardous; however, storage will not exceed 90 days from the accumulation start date of each stockpile. After Tt received Waste Management's acceptance of the waste profile for the characterized contaminated soil, Tt will schedule transport of the contaminated soil to make sure the 90 days will not be exceeded.

The temporary storage areas for the contaminated soil will be inspected at required intervals (weekly) in accordance with Camp Ravenna Waste Management Guidelines.

The contaminated soil stockpiles will be covered at the end of each day to prevent wind damage to the stockpile and contact of precipitation with the contaminated soil. Storm water collected in the stockpile areas will be contained and disposed in accordance with local, state, and federal rules, laws, and regulations and in general accordance with the requirements of the Ohio EPA Permit No. OHC000004 that implements the best management practices during construction activities.

Liquid waste will also consist of precipitation that accumulated in excavations and decontamination fluids. The liquid waste will be collected and pumped directly into labeled, DOT-approved 55-gallon drums or polyethylene tanks and will be stored on secondary containment.

The storage area for the liquid waste will be inspected at required intervals (weekly) in accordance with Camp Ravenna Waste Management Guidelines.

4.0 INSPECTION REQUIREMENTS FOR TRANSFERS

The processed contaminated soil stockpile will be loaded out for off-site disposal as soon as practical following the excavation and sampling operations. The stockpiled soil and debris will most likely be loaded, transported, and disposed of off-site as non-hazardous contaminated material.

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 dust 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.

Before loading, trucks will be inspected and surveyed for damage and residual contamination by Tt 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 pullover 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 (placards) and licensing and will be lined in accordance with applicable federal, state, and local rules, laws, and regulations. Before 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 Tt for record keeping purposes. Tt will maintain the manifest log in Appendix C. Copies of records will be presented in the Remedial Action Completion Report. The report will provide information of the activities: the quantity of contaminated soil shipped, inspection records, disposal manifests, and any other pertinent information.

Federal DOT regulations will be followed during transport activities. The soil will be DOTclassified based on direct sample results. The DOT labeling requirements will be followed; and appropriate placards, bill of lading, and waste profile approval to transport contaminated soil from the RVAAP will be in place.

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 USACE and OHARNG. Precipitation accumulated in secondary containment areas may be discharged to the ground surface. Ground surface discharges are subject to strict state and federal discharge conditions as well as Camp Ravenna specific guidelines. Ground surface discharges are allowed after a Camp Ravenna rain water release form is completed. Liquid wastes will be generated and handled in accordance with local, state, and federal regulations.

Off-site transportation routes will pre-determined by the transporter. A primary and secondary route to the facility will be identified. The secondary route will be used only if the primary becomes impassible due to weather or road conditions or blockage from construction or accidents. The appropriate State and interstate officials will be consulted as to whether any proposed routes are scheduled for construction or seasonal closures during the implementation of this project.

The suggested primary route is

- 1. Start out going southwest on State Route 5/OH-5 toward Pa Street 1 for approximately 10.3 miles
- 2. Stay straight to go onto OH-44/Ravenna Louisville Rd. Continue to follow OH-44 for approximately 23.2 miles
- 3. Turn left onto Walnut St E/US-30 E/OH-44. Continue to follow US-30 E/OH-44 for approximately 0.8 mile
- 4. Take the 2nd right onto Ravenna Ave SE/OH-44 for approximately 5.6 miles
- 5. Turn right onto Chapel St SE for approximately 0.21 miles. American Landfill is on the right.

5.0 DISPOSAL REQUIREMENT

Off-site disposal facilities will be selected based on waste characterization data collected from the contaminated soil, ferrous and non-ferrous metal, and liquid waste. It is anticipated that the contaminated soil does not exceed TCLP limits and, therefore, will be profiled as non-hazardous waste for disposal at Waste Management's American Landfill.

If waste characterization results determine soil to be hazardous, it will be disposed at a 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 OHARNG Restoration Representative.

For the wastes shipped off-site from WBG, records will be maintained in accordance with local, state, and federal regulations.

Waste Management's American Landfill has many authorizations from federal, state, and local regulatory agencies. The Ohio EPA is the primary agency that regulates the facility. American Landfill began solid waste disposal operations on December 17, 1976 after the facility's first Permit To Install from the Ohio EPA. Since this time, the facility has received several Permit To Install as the solid waste disposal operations expanded. The facility currently operates under a Subtitle D permit that was issued on May 15, 1996. As part of this permit, American Landfill is required to construct the facility in accordance with the "Best Available Technology", which includes but not limited to the installation of a state of the art liner system, leachate collection system, landfill gas collection system, and capping system.

In addition to the solid waste permit, the facility operates under several other permits:

- Solid waste license issued by Stark County Health Department
- Tire monofill (tire shredding and disposal) issued by the Ohio EPA

- Title V permit (air permit) issued by the Ohio EPA
- Surface water permit issued by the Ohio EPA
- Coal mining permit issued by the Ohio EPA
- Bulking facility permit (solidification) permit issued by the Ohio EPA

In addition to the permits, American Landfill maintains numerous monitoring plans. Some examples include the waste acceptance program, groundwater monitoring plan, stormwater pollution prevention plan, gas monitoring plan, odor control and management plan and various other plans required as part of facility operations.

Contact information is:

Chad Abell District Manager Waste Management American Landfill 7916 Chapel St S.E. Waynesburg, OH, 44688 Phone: 330-866-3265 Email: cabell@wm.com

6.0 WASTE MINIMIZATION METHODS

The generation of waste will be minimized to the maximum extent practicable, and necessary precautions will be in place to avoid mixing clean and contaminated wastes. Scrap metal generated during the soil separation process will be recycled and documented. Runoff from secondary containment areas will be collected and analyzed for disposal options. If analytical results are acceptable, Tt will discharge the collected runoff to ground surface following approval by USACE and the OHARNG in accordance with local, state, and federal regulations and Camp Ravenna-specific discharge parameters. Requirements of 40 CFR 266 shall apply to if hazardous wastes are generated and recycled in a manner constituting disposal. These procedures will include:

- Re-using materials that do not require decontamination, to the extent practicable;
- Minimizing the volume of decontamination fluids;
- Minimizing contact with potentially contaminated materials;
- Minimizing foot and vehicle traffic through potentially contaminated areas; and
- Utilizing good housekeeping practices.

7.0 REFERENCES

Camp Ravenna, 2015. Camp Ravenna Waste Management Guidelines and Waste Inspection Form

Camp Ravenna. Camp Ravenna Hazardous Waste Management Plan

Science Applications International Corporation (SAIC), 2011. Facility Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plan, Ravenna, Ohio. Final. February.

SAIC, 2011. Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Final. February.

US Army Corps of Engineers (USACE), 2015. Final Explanation of Significant Differences for Post-ROD Changes to the Remedy at RVAAP- 05 Winklepeck Burning Grounds Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumball Counties, Ohio, USACE, March 2015

USACE, 2015. Performance Work Statement, Soil Removal Action at RVAAP-05 Winklepeck Burning Grounds, Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbell Counties, Ohio, June.

USACE, 2015. Final Remedial Design for the Post-ROD Changes to the Remedy at RVAAP-05 Winklepeck Burning Grounds, Former Ravenna Army Ammunition Plant/Camp Ravenna, Portage and Trumbell Counties, Ohio, August.

USACE, 2016. Explosive Safety Submission, Amendment 1, Munitions and Explosives of Concern Survey, Non- Time Critical Removal Action for Winklepeck Burning Grounds (WBG) at the Ravenna Army Ammunition Plant, RVAAP-5, Ravenna, Ohio. April,




Pallet Road D West	~				≥ 0
	CONTRACT NUMBER CTO NUMBEI	PROVED BY DATE	ł	PPROVED BY DATE 	GURE NO. 2 R
Pallet Road C West	SOIL SCREENING AND	STAGING AREA		CAMP RAVENNA	RAVENNA, OHIO
Legend -SF/FS- Silt Fence or Filter Sock Projection: NAD 1983 SPCS Ohio North (Feet).	DRAWN BY DATE J. ENGLISH 02/18/16	CHECKED BY DATE	T. RILEY 06/06/16	REVISED BY DATE	SCALE AS NOTED

APPENDIX A

CAMP RAVENNA WASTE MANAGEMENT GUIDELINES AND WASTE INSPECTION FORM

CAMP RAVENNA WASTE MANAGEMENT GUIDELINES

- **PURPOSE:** Guidelines to be followed by contractors working at Camp Ravenna Joint Military Training Center who are generating/shipping Hazardous, Non-Hazardous, Special or Universal Waste.
- **POLICY:** The policy at Camp Ravenna is to comply with all local, state, federal and installation requirements. Contractor is responsible for waste minimization and is required to recycle materials if possible.

Restoration Program POC: Katie Tait (614) 336-6136 Military & Non-Restoration POC: Brad Kline (614) 336-4918

Coordination:

- Coordinate all waste generation and shipments with the appropriate Camp Ravenna POC listed above or the Environmental Supervisor in their absence at (614) 336-6568.
- Notify Camp Ravenna POC prior to waste sampling for characterization. Details about sampling activities must be included (i.e., number of sample, analyticals, etc.).
- All Hazardous and Non-Hazardous waste management storage locations must be pre-approved prior to generation.
- Ensure all labels include: Date, Contractor, and Waste Type.
- When contractors have waste onsite, a weekly Inspection inventory must be completed and submitted to the appropriate POC in the Camp Ravenna environmental office.
- All wastes shall be tracked and logged throughout the duration of the project. Contractor will provide Camp Ravenna POC with a monthly rollup report of all waste and recycled streams generated by no later than the 10th day of the following month.

Hazardous Waste Treatment, Storage and Disposal Facilities and Waste Haulers: Contractors are required to utilize

hazardous waste haulers and Treatment, Storage, and Disposal Facilities on the latest Defense Reutilization Marketing Office (DRMO) approved list. The current qualified waste hauler and TSDF list can be viewed by following the "Qualified Facilities" and "Qualified Transporters" links found on the DLA Hazardous Waste Disposal Homepage, http://www.dispositionservices.dla.mil/newenv/hwdisposal.shtml.

Hazardous or Non-Hazardous manifest form, the following must be included:

- Military and non-restoration operations waste Site Name = Camp Ravenna Joint Military Training Center. Mailing and Site address: Camp Ravenna ENV, 1438 State Route 534 SW, Newton Falls, Ohio 44444, (614) 336-4918. Ohio EPA ID # OHD981192925.
- Restoration Program waste Site Name = Former Ravenna Army Ammunition Plant. Mailing address is same as address above. Site address: 8451 State Route 5, Ravenna, Ohio 44266, (614) 336-6136. Ohio EPA ID # – OH5210020736.
- Contractor's shipping Hazardous Waste must provide a Land Disposal Restriction (LDR) in accordance with 40 CFR Part 268.
- Profiling:
 - The required shipping documentation (i.e. waste profile and executive summary of lab reports (if available)) need to be submitted to appropriate Camp Ravenna POC or designee(s) for approval and signature prior to shipping.
 - Results of characterization must be submitted to appropriate Camp Ravenna POC within 30 days after collecting sample. Manifests - Hazardous and Non-Hazardous:
- The waste carrier/transporter provides appropriate manifest to the contractor.
 - The contractor is required to:
 - Ensure that Camp Ravenna POC or designee(s) is available to sign the manifest on the scheduled day of shipment;
 - Verify that each manifest is properly completed and signed by Camp Ravenna POC or designee(s);
 - Provide the Generator copy of the manifest to Camp Ravenna POC or designee(s); and
 - Ensure that the original Generator copy of the manifest signed by the treatment storage disposal facility is returned to Camp Ravenna within 30 days of the shipping date for Hazardous and Non-Hazardous Waste.
 - The use of a Bill of Lading, in lieu of a waste manifest, must be approved by the Camp Ravenna environmental office.

All satellite accumulation storage sites and containers will comply with 40CFR 262.34(c)(1):

- Any material that is subject to Hazardous Waste Manifest Requirements of the US Environmental Protection Agency must comply with 40 CFR Part 262.
- From the time any waste is placed in a satellite storage container, proper labeling must be on the container (proper labeling includes date, contractors name and product type).
- Pending analysis label is to be used from the time the sample is taken until the results are received.
- In no case will waste labeled pending analysis exceed 45 days.

All Camp Ravenna Hazardous and Non-Hazardous records are maintained at the Camp Ravenna environmental office, point of contacts are Katie Tait at (614) 336-6136 and Brad Kline at (614) 336-4918.

2 February 2015

CAMP RAVENNA WEEKLY NON-HAZARDOUS & HAZARDOUS WASTE INSPECTION/INVENTORY SHEET

Contractor: N	Nonth:	Year:	Waste Desc	ription:
Container Nos.				
	WEEK 1	WEEK 2	WEEK 3	WEEK 4
	Date: Time:	Date: Time:	Date: Time:	Date: Time:
Point of Contact (Name / Number)				
Project Name:				
Contracting Agency and POC: Waste Determination: Pending Analysis, Hazardous, Non-Hazardous, etc.				
*Location of waste on installation:				
Date Generated:				
Projected date of disposal:				
Non-Haz, Satellite, 90 day storage area				
Waste generation site:				
Number of Containers (size / type):				
Condition of Container:				
Containers closed, no loose lids, no loose bungs?	yes / no	yes / no	yes / no	yes / no
Waste labeled properly and visible (40 CFR 262.34 (c) (1):	yes / no	yes / no	yes / no	yes / no
Secondary containment	yes / no	yes / no	yes / no	yes / no
Incompatibles stored together?	yes / no	yes / no	yes / no	yes / no
Any spills?	yes / no	yes / no	yes / no	yes / no
Spill kit available?	yes / no	yes / no	yes / no	yes / no
Fire extinguisher present and charged?	yes / no	yes / no	yes / no	yes / no
Containers grounded if ignitables?	yes / no/na	yes / no / na	yes / no/na	yes / no/na
Emergency notification form/info present?	yes / no	yes / no	yes / no	yes / no
Container log binder present?	yes / no	yes / no	yes / no	yes / no
Signs posted if required?	yes / no	yes / no	yes / no	yes / no
Photo's submitted	yes / no	yes / no	yes / no	yes / no
Printed Name:				
Signature:				

This form is required for Non-Hazardous and Hazardous waste including PCB and special waste.

CONTRACTORS ARE REQUIRED TO SUBMIT THIS FORM WEEKLY TO THE CAMP RAVENNA ENV OFFFICE WHEN WASTE IS STORED ON SITE.

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CONTRACTORS ARE ENCOURAGED TO INCLUDE PHOTOS WITH EACH WEEKLY INSPECTION SHEET WHEN WASTE IS STORED ON SITE.

*Draw detailed map showing location of waste within the site.

APPENDIX B

WASTE/SOIL CHARACTERIZATION SAMPLING

WASTE/SOIL CHARACTERIZATION SAMPLING

This document is intended to act as an addendum to the final approved Remedial Design for Winklepeck Burning Grounds (WBG) and replaces Section 4.12.2 of that document. When that document was written, the Army intended to mechanically process the soil, place it in stockpiles, and characterize the soil from the stockpiles. In order to increase the efficiency of the handling and disposal process, the Army and Tetra Tech now intend to characterize the soil for disposal by sampling it in-situ, prior to removal. This revision to the process will minimize the processed soil that must be stockpiled and reduce the opportunity for environmental impact due to runoff and erosion from the stockpile. Efficiency will also be achieved, because the waste characterization analyses can be completed before the soil is removed from the ground. In all but one case, the soil to be removed is from the surface to two feet below ground surface, so collecting characterization samples before excavation will be easily accomplished. Additionally, it will be easier to obtain a representative composite sample (or samples) from the in-situ soil, than it would be to collect a representative sample(s) from a stockpile. Pads 38, 61/61A, and 66, as well as the area west of Pad 67 are all to be excavated from the surface to two below ground surface. In one case, the removal at Sample Station WBG-252, to a depth of 10 feet within Pad 67, the soil will not be characterized in-situ. This soil will have to be removed and stockpiled prior to mechanical screening to obtain a waste characterization sample.

The objective for the waste disposal characterization sampling is to collect a suitable number of samples from the proposed excavation areas at WBG prior to the initiation of remedial action to ensure that the soils are properly managed and disposed at a permitted landfill.

Extensive characterization of the soils at WBG has been performed as part of the CERCLA investigation. Prior to this removal action, the residual chemical contamination had been deemed, by both the Army and the Ohio EPA, safe to leave in place and allow military training by part-time National Guard Soldiers. The planned remedial action, addressed in this document, is being conducted because there were some residual concentrations of explosives (TNT and RDX) and PAHs which exceeded the risk-based standards that would allow full-tome worker exposure. The Army has since determined that it would be prudent to also meet the full-time worker standard.

These prior investigations contribute to the Army's level of generator knowledge concerning the soil.

The soil to be disposed of is not a listed hazardous waste on the F, K, P, or U lists of specific waste streams from industrial or manufacturing processes or discarded commercial chemical products. Therefore, it will be disposed of as non-hazardous solid waste if it does not exhibit any of the following four characteristics: ignitability, corrosivity, reactivity, or toxicity.

The soil to be disposed of will be tested for toxicity using methods consistent with the Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311). Typically, after the leaching procedure is performed, the resulting extract is analyzed for specific metals, specific volatile organic compounds (VOCs), specific semi-volatile organic compounds (SVOCs), and specific herbicides and pesticides. Since neither VOCs nor pesticides/herbicides were identified as chemicals of concern at WBG, the TCLP extract will be analyzed only for the TCLP metals and SVOCs, based on generator knowledge of the waste. The land disposal facility has also requested additional testing as shown in Table 2.

To support the generator knowledge, historical total metals analyses for the eight RCRA metals are provided in Attachment 1. Reviewing the total metals results and applying "the rule of 20" indicates that most of the metals are not expected to fail the TCLP limits for non-hazardous waste. The "rule of 20" is a rule-of-thumb that dividing a total metal result by 20 provides an indicator of the level that might be found in the leachate. This is not an exact rule, but it is an indicator. The lead results shown in Attachment 1, Tables 1 through 4 are the only results that appear to have a problem using the rule of 20. The lead limit for TCLP is 5 mg/kg. That means that if there are several total lead results significantly above 100 mg/kg, there is some concern that the soil could be characteristically toxic for lead and be classified as a hazardous waste.

Table 1 of Attachment 1 shows that of the 22 lead results for Pad 38, 17 results were below 100 mg/kg, with 15 of those under 40 mg/kg. Only five of 22 results for lead at Pad 38 were above 100 mg/kg and they ranged from 190 to 504 mg/kg.

Table 2 of Attachment 1 shows that of the 29 lead results for Pad 61, 16 results were below 100 mg/kg and 13 results were above 100 mg/kg, ranging from 173 to 1130 mg/kg.

Table 3 of Attachment 1 shows that of the 18 lead results for Pad 66, 12 results were below 100 mg/kg and 6 results were above 100 mg/kg, ranging from 208 to 1010 mg/kg.

Table 4 of Attachment 1 shows that of the 39 lead results for Pad 67, 34 results were below 100 mg/kg, with 27 of those under 40 mg/kg. Only five of 39 results for lead at Pad 38 were above 100 mg/kg and they ranged from 110 to 147 mg/kg.

Evaluation of these results causes some concern that, on the average, soil from Pads 61 and 66 are more likely to fail the TCLP test for lead, while soil from Pads 38 and 67 show much less potential that they may fail the TCLP test for lead. Therefore, soil from Pads 61/61A and 66 will be analyzed for TCLP metals on a higher frequency than samples from the other pads.

The sampling and analysis program proposed would meet the requirements of the landfill proposed for the project, the Waste Management American Landfill in Sandy Township, Waynesburg, Ohio. The landfill requires one characterization sample for the first 500 tons of contaminated soil shipped followed by a sample for every 1000 tons disposed thereafter. For the sake of conservatism, a sampling frequency of 1 per 500 tons is proposed as presented in Table 1. Pads 61/61A and Pad 66 will be sampled at a frequency of once per every 250 tons (or approximately once per every 170 cubic yards) due to the concern for lead concentrations.

Pad/Contaminant	Pad 61/61A PAHs	Pad 38 TNT	Pad 66 RDX/TNT	Pad 67 & West 67 RDX/TNT
Estimated Volume from Remedial Design (cy)	3872	645	645	87.2
Estimated Weight (1.4 Tons/CY)	5420	903	903	122
Samples required (1 per 500 tons)	22*	2**	4***	1****

Table 1 Number of Samples for Each Pad

*For Pad 61/61A divide the area into 22 equal areas and collect 1 composite sample from each area using a stratified random sampling approach. This is a sampling frequency of one per 250 tons (or approximately one per 170 cy).

*** For Pad 66 collect 4 composite samples using a stratified random sampling approach. This is a sampling frequency of one per 250 tons (or approximately one per 170 cy).

*** For Pads 67 and West 67 collect a single composite sample using a stratified random sampling approach.

Table 2 presents the Proposed Sampling and Analysis requirements for waste disposal characterization. The stratified random sampling approach consists of taking soil aliquots of similar mass for each represented sample. For the stratified random sample collection, a grid will be established by field personnel across the sample area and then one random aliquot sample location will be selected in each sub-unit. Sample points will not be pre-located.

The soil aliquots will be collected using a soil probe or hand auger at a depth of 0 to 24 inches below the ground surface. Multiple borings using the soil probe may be advanced at each sample location, if necessary, to obtain a sufficient sample volume for the laboratory. A minimum of 15 stratified random soil aliquots for each sample will be collected and composited. These composite sample will be air dried, sieved, and ground following proper health and safety measures and the procedures listed in the Remedial Design Supplements.

^{**} For Pads 38 collect 2 composite samples using a stratified random sampling approach. This is a sampling frequency of one per 500 tons.

Table 2 Proposed Sampling and Analysis

						А	nalysis and	l EPA Met	hod	
Sample	Sampling Method	Location of	Number of	Number of	PAHs	TNT/ RDX	TCLP SVOCs	TCLP Metals	pH/ Flashpoint	BTEX
Type/Location		Sample	Samples	Dupicates	8270C /8310	8330B	1311/ 8270C	1311/ 6010/ 6020 & 7471		8260B
Waste Disposal/Stockp	ile Characterization									
TNT/RDX Contaminated Soil (Pads 38, 66, 67, & West of 67)	stratified random sampling	Composite	7	0		Х	Х	Х	Х	Х
PAH Contaminated Soil (Pad 61/61A)	stratified random sampling	Composite	22	0	X		X	X	Х	X

1 Laboratory turnaround time of 10 days will be requested.

- PAH Polynuclear Aromatic Hydrocarbon
- RDX Hexahydro-1,3,5-trinitro-1,3,5-triazine
- TCLP Toxicity Characteristic Leaching Procedure
- SVOC Semivolatile Organic Compounds
- BTEX Benzene, Toluene, Ethylbenzene, Xylene



PGH P:\GIS\RAVENNA\MAPDOCS\REMOVAL_AREA_PAD61.MXD 11/18/15 JEE







Attachment 1



Proposed Remediation at Winklepeck Burning Grounds

Attachment 1 - Table 1										
Metals Results for Soil Samples										
Near Pad 38 in mg/kg										
Area				38	38	38	38	38	38	38
Station				WBG-229	WBG-229	WBG-230	WBG-231	WBG-231	WBG-232	WBG-232
Sample Id				WBGss-229- 4102-SO	WBGso-229- 4103-SO	WBGss-230- 4105-SO	WBGss-231- 4108-SO	WBGso-231- 4109-SO	WBGss-232- 4111-SO	WBGso-232- 4112-SO
Date				10/21/00	10/25/00	10/20/00	10/21/00	10/22/00	10/22/00	10/22/00
Depth (ft)				0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	2.0 - 4.0
Inside Proposed Excavation				N	N	Ν	Y	Y	Y	Y
Inside Previous Excavation				N	N	N	Y	Y	Y	Y
Analyte	CAS Number	Surface Background (mg/kg)	Subsurface Background (mg/kg)							
Arsenic	7440-38-2	15.4	19.8	16.1	15.8	13.7	17.8	13.8	12.6	12.9
Barium	7440-39-3	88.4	124	54.8 J	67 J	63 J	203 J	66.7	112	189
Cadmium	7440-43-9	0	0	0.5 J	<0.57 UJ	<0.64 UJ	43.6 J	0.12 J	31.6	201
Chromium	7440-47-3	17.4	27.2	13.9 J	16.9 J	18.7 J	26.3 J	14.8	14.4	20.8
Lead	7439-92-1	26.1	19.1	16.9	12.8	18.5	223	16.8	37.4	190
Mercury	7439-97-6	0.036	0.044	0.038 J	<0.11 U	0.027 J	0.023 J	0.041 J	0.027 J	0.015 J
Selenium	7782-49-2	1.4	1.5	0.98	1	1.1	2.5	<0.99 U	<0.58 U	<0.75 U
Silver	7440-22-4	0	0	<1.3 U	<1.1 U	<1.3 U	<1.3 U	<1.3 U	<1.2 U	<1.2 U
Data Qualifiers: 'NA'=Not analyzed,										
U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

Attachment 1 - Table 1									
Metals Results for Soil Samples									
Near Pad 38 in mg/kg									
Area	38	38	38	38	38	38	38	38	38
Station	WBG-232	WBG-232	WBG-232	WBG-416	WBG-416	WBG-416	WBG-416	WBG-416	WBG-417
Sample Id	WBGso-232- 4113-SO	WBGso-232- 4114-SO	WBGso-232- 4115-SO	WBGss-416- 0001-SO	WBGsb-416- 0002-SO	WBGsb-416- 0003-SO	WBGsb-416- 0004-SO	WBGsb-416- 0005-SO	WBGss-417- 0001-SO
Date	10/22/00	10/22/00	10/22/00	11/27/12	11/27/12	11/27/12	11/27/12	11/27/12	11/27/12
Depth (ft)	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	0.0 - 2.0	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	0.0 - 2.0
Inside Proposed Excavation	Y	Y	Y	Ν	N	N	N	N	Ν
Inside Previous Excavation	Y	Y	Y	Ν	N	N	N	N	N
Analyte									
Arsenic	11.8	18.4	15.9	8.7	NA	NA	NA	NA	NA
Barium	152	87.4	38.2	71.2	NA	NA	NA	NA	NA
Cadmium	69.1	28	1.2	0.1 J	<0.03 UJ	<0.03 UJ	<0.06 UJ	<0.02 UJ	<0.021 UJ
Chromium	16.9	13.4	12.9	9.9	NA	NA	NA	NA	NA
Lead	83.6	38.6	11.7	11.3 J-	NA	NA	NA	NA	NA
Mercury	0.015 J	0.012 J	<0.12 U	0.032 J-	NA	NA	NA	NA	NA
Selenium	<0.43 U	<0.86 U	<0.58 U	<0.72 UJ	NA	NA	NA	NA	NA
Silver	<1.2 U	<1.1 U	<1.2 U	<0.05 UJ	NA	NA	NA	NA	NA
Data Qualifiers: 'NA'=Not analyzed,									
U'=Not Detected, 'J'=Estimated,									
R'=Rejected.									

Attachment 1 - Table 1									
Metals Results for Soil Samples									
Near Pad 38 in mg/kg									
Area	38	38	38	38	38	38	38	38	38
Station	WBG-417	WBG-417	WBG-417	WBG-417	WBGso-035	WBGss-034	WBGss-035	WBGss-108	WBGss-109
Sample Id	WBGsb-417- 0002-SO	WBGsb-417- 0003-SO	WBGsb-417- 0004-SO	WBGsb-417- 0005-SO	WBGso-035- 0763-SO	WBGss-034- 0491-SO	WBGss-035- 0492-SO	WBGss-108- 0697-SO	WBGss-109- 0698-SO
Date	11/27/12	11/27/12	11/27/12	11/27/12	04/25/98	08/06/96	08/06/96	04/23/98	04/23/98
Depth (ft)	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	2.0 - 4.0	0.0 - 2.0	0.0 - 2.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Ν	Ν	Ν	Ν	Y	Y	Y	Ν	Ν
Inside Previous Excavation	Ν	Ν	Ν	Ν	Y	Y	Y	Ν	Ν
Analyte									
Arsenic	NA	NA	NA	NA	14.5	10.5 J	7.1 J	16.1 J	12.6 J
Barium	NA	NA	NA	NA	87.3	596 J	255 J	70.7 J	136 J
Cadmium	<0.021 UJ	<0.05 UJ	<0.05 UJ	<0.021 UJ	0.62	877 J	63.4 J	<0.63 UJ	3.3 J
Chromium	NA	NA	NA	NA	17.6	26.6 J	27.2 J	16.5 J	21.9 J
Lead	NA	NA	NA	NA	15.5 J	504	236	18.3 J	300 J
Mercury	NA	NA	NA	NA	<0.042 U	<0.03 U	<0.03 U	<0.13 U	0.034 J
Selenium	NA	NA	NA	NA	<0.58 U	5 J	1.4 J	<0.63 UJ	<0.67 UJ
Silver	NA	NA	NA	NA	<1.2 U	<0.2 U	<0.19 U	<1.3 U	<1.3 U
Data Qualifiers: 'NA'=Not analyzed,									
U'=Not Detected, 'J'=Estimated,									
R'=Rejected.									

Attachment 1 - Table 1						
Metals Results for Soil Samples						
Near Pad 38 in mg/kg						
Area	38	38	38	38	38	38
Station	WBGss-110	WBGss-322	WBGss-324	WBGss-325	WBGss-326	WBGss-334
Sample Id	WBGss-110- 0699-SO	WBGss-322- 1003-SO	WBGss-324- 1002-SO	WBGss-325- 1004-SO	WBGss-326- 1001-SO	WBGss-334- 1005-SO
Date	04/23/98	08/08/00	08/08/00	08/08/00	08/08/00	08/08/00
Depth (ft)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Ν	Y	Y	Y	Y	Y
Inside Previous Excavation	Ν	Y	Y	Y	Y	Y
Analyte						
Arsenic	9.2 J	13.4	14.9	9.1	16.5	13.5
Barium	117 J	56.2	62.4	108	60.3	70.3
Cadmium	13.2 J	6.1	1.9	6.7	1.9	0.68
Chromium	15.2 J	15.9	16.8	14.4	17.1	17.3
Lead	43.2 J	21.4 J	18.8 J	30.2 J	19.8 J	15 J
Mercury	<0.13 U	0.037 J	0.04 J	0.041 J	0.028 J	0.049 J
Selenium	0.71 J	1.2	1.3	0.92	1.3	1.5
Silver	<1.3 U	<1.2 U	<1.2 U	<1.1 U	<1.2 U	<1.2 U
Data Qualifiers: 'NA'=Not analyzed,						
U'=Not Detected, 'J'=Estimated,						
R'=Rejected.						

Attachment 1 - Table 2										
Metals Results for Soil Samples										
Near Pad 61 in mg/kg										
Area				61	61	61	61	61	61	61
Station				WBG-217	WBG-217	WBG-218	WBG-218	WBG-219	WBG-219	WBG-219
Sample Id				WBGss-217- 4064-SO	WBGso-217- 4065-SO	WBGss-218- 4067-SO	WBGso-218- 4068-SO	WBGss-219- 4070-SO	WBGso-219- 4071-SO	WBGso-219- 4072-SO
Date				10/19/00	10/22/00	10/19/00	10/22/00	10/18/00	10/22/00	10/25/00
Depth (ft)				0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	2.0 - 4.0	4.0 - 6.0
Inside Proposed Excavation				Y	Y	Y	Y	Y	Y	Y
Inside Previous Excavation				Y	Y	Y	Y	Y	Y	Y
Analyte	CAS Number	Surface Background (mg/kg)	Subsurface Background (mg/kg)							
Arsenic	7440-38-2	15.4	19.8	18	18.5	14.5	29.8	16.2	24	16.1
Barium	7440-39-3	88.4	124	232	250	511	406	476	1040	185 J
Cadmium	7440-43-9	0	0	4.1	8.3	2.4	<3 U	2.8	0.88 J	0.36 J
Chromium	7440-47-3	17.4	27.2	37.2	57	41	67.6	61.3 J	80.9	28.8 J
Lead	7439-92-1	26.1	19.1	328	326	497	293	754 J	1130	173
Mercury	7439-97-6	0.036	0.044	0.058 J	0.073 J	0.046 J	0.014 J	0.089 J	0.028 J	0.02 J
Selenium	7782-49-2	1.4	1.5	2.4	3.6	2.7	4.2	<0.63 U	4.6	1.9
Silver	7440-22-4	0	0	0.96 J	0.71 J	1.5	2.6	3.2	5.7	0.78 J
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
'R'=Rejected.										

Attachment 1 - Table 2										
Metals Results for Soil Samples										
Near Pad 61 in mg/kg										
Area	61	61	61	61	61	61	61	61	61	61
Station	WBG-221	WBG-221	WBG-222	WBG-222	WBG-275	WBG-419	WBG-419	WBG-419	WBG-423	WBG-423
Sample Id	WBGss-221- 4076-SO	WBGso-221- 4075-SO	WBGss-222- 4079-SO	WBGso-222- 4080-SO	WBGss-275- 4230-SO	WBGss-419- 0001-SO	WBGsb-419- 0002-SO	WBGsb-419- 0003-SO	WBGsb-423- 0003-SO	WBGsb-423- 0002-SO
Date	10/19/00	10/25/00	10/18/00	10/25/00	10/24/00	11/28/12	11/28/12	11/28/12	11/27/12	11/27/12
Depth (ft)	0.0 - 1.0	4.0 - 6.0	0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	0.0 - 2.0	2.0 - 4.0	4.0 - 6.0	4.0 - 6.0	4.0 - 6.0
Inside Proposed Excavation	Y	Y	Y	Y	Ν	Ν	Ν	Ν	Y	Y
Inside Previous Excavation	Y	Y	Y	Y	N	Ν	Ν	Ν	Y	Y
Analyte										
Arsenic	13.9	18.8	11.3	14.4	12.7	NA	NA	NA	12	12.4
Barium	130	52.4 J	69.7	86 J	64.8	52.3 J-	88.2 J-	58.5 J-	20.3	20.5
Cadmium	0.27 J	<0.57 UJ	0.27 J	<0.58 UJ	<0.63 U	NA	NA	NA	0.081 J	0.1 J
Chromium	20.8	17.5 J	24.6 J	19.6 J	22.7 J	NA	NA	NA	4.9	5.5
Lead	60.9	12.2	30.7 J	12	16.1 J	NA	NA	NA	8.2 J-	9.7 J-
Mercury	0.037 J	<0.11 U	0.058 J	<0.12 U	0.042 J	NA	NA	NA	0.0062 J-	0.0068 J-
Selenium	1.5	0.92	<0.64 U	1.1	1.3	NA	NA	NA	<0.86 UJ	<0.8 UJ
Silver	<1.3 U	<1.1 U	<1.3 U	<1.2 U	<1.3 U	NA	NA	NA	<0.1 UJ	<0.1 UJ
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
'R'=Rejected.										

Attachment 1 - Table 2										
Metals Results for Soil Samples										
Near Pad 61 in mg/kg										
Area	61	61	61	61	61	61	61	61	61	61
Station	WBG-424	WBGso-059	WBGso-196	WBGss-059	WBGss-059	WBGss-060	WBGss-124	WBGss-126	WBGss-127	WBGss-195
Sample Id	WBGss-424- 0001-SO	WBGso-059- 0760-SO	WBGso-196- 0943-SO	WBGss-059- 0518-FD	WBGss-059- 0521-SO	WBGss-060- 0522-SO	WBGss-124- 0713-SO	WBGss-126- 0715-SO	WBGss-127- 0716-SO	WBGss-195- 0936-SO
Date	11/27/12	04/25/98	05/08/98	08/08/96	08/08/96	08/08/96	04/22/98	04/22/98	04/22/98	05/07/98
Depth (ft)	0.0 - 2.0	2.0 - 4.0	2.0 - 4.0	0.0 - 1.0	0.0 - 1.0	0.0 - 2.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Ν	Y	Y	Y	Y	Y	Y	Y	Y	Y
Inside Previous Excavation	Ν	Y	Y	Y	Y	Y	Y	Y	Y	Y
Analyte										
Arsenic	8.9	12.5	13.5	14.5	14.3	11.5	15.1	10.4	12.3	14.5
Barium	57.7	71.6	75.6 J	100	138	58	77.6 J	237 J	63.3	64.7
Cadmium	0.24 J	3.2	11.9	27.1	52.6	1.1	3.6	21.7	0.76	<0.63 U
Chromium	11	18.7	19.6	14.8	18.5	13.1	16.1	52	14.7	17.2
Lead	17.4 J-	21.2 J	38	89.5	124	27.9	55.2	393	57.2	23.4
Mercury	0.035 J-	<0.13 U	<0.13 U	0.05	0.04	0.04	0.057 J	0.083 J	0.032 J	0.04 J
Selenium	<0.59 UJ	<0.64 U	<0.64 U	2.6	3.7	0.85	1	3.1	0.95	1.1
Silver	<0.17 UJ	<1.3 U	<1.3 U	0.35 J	0.48 J	<0.22 UJ	<1.2 U	<1.3 U	<1.2 U	<1.3 U
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
'R'=Rejected.										

Attachment 1 - Table 2					
Metals Results for Soil Samples		-			
Near Pad 61 in mg/kg		-			
Area	61	61A	61A	61A	61A
Station	WBGss-196	WBG-220	WBG-220	WBG-220	WBGss-125
Sample Id	WBGss-196- 0937-SO	WBGss-220- 4073-SO	WBGso-220- 4272-SO	WBGso-220- 4074-SO	WBGss-125- 0714-SO
Date	05/07/98	10/19/00	10/22/00	10/22/00	04/22/98
Depth (ft)	0.0 - 1.0	0.0 - 1.0	2.0 - 4.0	2.0 - 4.0	0.0 - 1.0
Inside Proposed Excavation	Y	Y	Y	Y	Y
Inside Previous Excavation	Y	Y	Y	Y	Y
Analyte					
Arsenic	12.3	11.8	18.1	16.2	10.7
Barium	91	299	491	403	289 J
Cadmium	2.7	3.2	2.2	2.2	3.3
Chromium	15.6	26.1	55.3	55.2	16.4
Lead	44.2	206	715	1050	206
Mercury	0.039 J	0.029 J	0.045 J	0.056 J	0.073 J
Selenium	1.3	1.7	<0.94 U	<1.1 U	1.2
Silver	<1.3 U	0.71 J	1.8	1.8	0.75 J
Data Qualifiers: 'NA'=Not analyzed,					
'U'=Not Detected, 'J'=Estimated,					
'R'=Rejected.					

Attachment 1 - Table 3									
Metals Results for Soil Samples									
Near Pad 66 in mg/kg									
Area				66	66	66	66	66	66
Station				WBG-245	WBG-246	WBG-246	WBG-247	WBG-247	WBG-429
Sample Id				WBGss-245- 4156-SO	WBGss-246- 4159-SO	WBGso-246- 4160-SO	WBGss-247- 4162-SO	WBGso-247- 4163-SO	WBGsb-429- 0002-SO
Date				10/23/00	10/23/00	10/25/00	10/22/00	10/22/00	11/28/12
Depth (ft)				0.0 - 1.0	0.0 - 1.0	2.0 - 4.0	0.0 - 1.0	2.0 - 4.0	2.0 - 4.0
Inside Proposed Excavation				Y	Y	Y	Y	Y	N
Inside Previous Excavation				Y	Y	Y	Y	Y	Ν
Analyte	CAS Number	Surface Background (mg/kg)	Subsurface Background (mg/kg)						
Arsenic	7440-38-2	15.4	19.8	17.9	13.6	14.5	13	20.2	12.5 J-
Barium	7440-39-3	88.4	124	3500	7160	220 J	1320	303	75.9 J-
Cadmium	7440-43-9	0	0	1.5	15.7	0.4 J	8.3	1	0.089 J
Chromium	7440-47-3	17.4	27.2	18.9 J	18.5 J	17.2 J	24	26.6	12.7 J-
Lead	7439-92-1	26.1	19.1	37 J	208 J	17.9	336	338	13.2 J
Mercury	7439-97-6	0.036	0.044	0.14	0.53	0.029 J	0.12 J	0.024 J	0.027 J-
Selenium	7782-49-2	1.4	1.5	1.3	1.1	1.7	<0.73 U	<0.67 U	<0.51 UJ
Silver	7440-22-4	0	0	<1.2 U	<1.2 U	<1.2 U	0.21 J	<1.3 U	<0.22 UJ
Data Qualifiers: 'NA'=Not analyzed,									
'U'=Not Detected, 'J'=Estimated,									
R'=Rejected.									

Attachment 1 - Table 3									
Metals Results for Soil Samples									
Near Pad 66 in mg/kg									
Area	66	66	66	66	66	66	66	66	66
Station	WBGso-069	WBGso-069	WBGso-168	WBGss-068	WBGss-069	WBGss-133	WBGss-134	WBGss-135	WBGss-168
Sample Id	WBGso-069- 0750-SO	WBGso-069- 0751-SO	WBGso-168- 0773-SO	WBGss-068- 0532-SO	WBGss-069- 0533-SO	WBGss-133- 0722-SO	WBGss-134- 0723-SO	WBGss-135- 0724-SO	WBGss-168- 0768-SO
Date	04/24/98	04/24/98	05/05/98	08/09/96	08/09/96	04/21/98	04/21/98	04/21/98	04/29/98
Depth (ft)	2.0 - 4.0	4.0 - 5.0	2.0 - 4.0	0.0 - 2.0	0.0 - 2.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Y	Y	Y	Y	Y	Y	Ν	Y	Y
Inside Previous Excavation	Y	Y	Y	Y	Y	Y	Ν	Y	Y
		1.7	15.0		4.7.4		12.1	12.2	
Arsenic	14	15.6	17.9	11.7	15.6	12.1	12.4	12.2	15.1
Barium	243	137	84.9 J	176	7780	1570 J	756 J	883 J	698
Cadmium	<0.6 U	<0.58 U	<0.64 U	<0.05 U	4.8	1.4	<0.61 U	<0.58 U	1.2
Chromium	18.7	19.6	21.1	14.9	16.5	14.5	18.9	15.7	26.6
Lead	14.8	11.1	16.6	17.5	289	31.2	36.3	34.7	1010
Mercury	<0.12 U	<0.12 U	<0.069 U	<0.04 U	0.28	0.26	0.066 J	0.058 J	0.052 J
Selenium	<0.6 U	<0.58 U	<0.64 U	<0.36 U	<0.37 U	1.3	1.1	0.92	<0.62 U
Silver	<1.2 U	<1.2 U	<1.3 U	<0.23 U	0.33 J	<1.3 U	<1.2 U	<1.2 U	1.8
Data Qualifiers: 'NA'=Not analyzed,									
'U'=Not Detected, 'J'=Estimated,									
R'=Rejected.									

Attachment 1 - Table 3			
Metals Results for Soil Samples			
Near Pad 66 in mg/kg			
Area	66	66	66
Station	WBGss-388	WBGss-389	WBGss-390
Sample Id	WBGss-388- 2017-SO	WBGss-389- 2016-SO	WBGss-390- 2018-SO
Date	08/08/00	08/08/00	08/08/00
Depth (ft)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Y	Y	Y
Inside Previous Excavation	Y	Y	Y
Analyte			
Arsenic	15.5	12.4	11.8
Barium	197	411	234
Cadmium	0.75	2.3	0.76
Chromium	19.5	19.3	16.2
Lead	38.2 J	290 J	69.1 J
Mercury	0.073 J	0.075 J	0.059 J
Selenium	1.4	1.4	1.4
Silver	<1.2 U	<1.1 U	<1.2 U
Data Qualifiers: 'NA'=Not analyzed,			
'U'=Not Detected, 'J'=Estimated,			
R'=Rejected.			

Attachment 1 - Table 4										
Metals Results for Soil Samples										
Near Pad 67 in mg/kg										
Area				67	67	67	67	67	67	67
Station				WBG-249	WBG-250	WBG-251	WBG-252	WBG-252	WBG-252	WBG-252
Sample Id				WBGss-249- 4170-SO	WBGss-250- 4173-SO	WBGss-251- 4176-SO	WBGss-252- 4179-SO	WBGso-252- 4180-SO	WBGso-252- 4181-SO	WBGso-252- 4182-SO
Date				10/23/00	10/23/00	10/23/00	10/22/00	10/22/00	10/22/00	10/22/00
Depth (ft)				0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0
Inside Proposed Excavation				N	N	N	Y	Y	Y	Y
Inside Previous Excavation				N	N	N	Y	Y	Y	Y
Analyte	CAS Number	Surface Background (mg/kg)	Subsurface Background (mg/kg)							
Arsenic	7440-38-2	15.4	19.8	10.6	14.5	14.2	10.2	13.1	13.1	14.7
Barium	7440-39-3	88.4	124	1400	2190	180	783	149	344	172
Cadmium	7440-43-9	0	0	10	0.94	0.077 J	0.86	<0.59 U	0.17 J	0.081 J
Chromium	7440-47-3	17.4	27.2	11.1 J	25.1 J	19.4 J	16.3	17	22	18.5
Lead	7439-92-1	26.1	19.1	37.7 J	36.4 J	31.1 J	147	34.8	72.7	146
Mercury	7439-97-6	0.036	0.044	0.084 J	0.16	0.051 J	0.038 J	0.021 J	0.015 J	0.017 J
Selenium	7782-49-2	1.4	1.5	0.98	1.4	0.78	<1 U	<0.67 U	<0.41 U	<0.83 U
Silver	7440-22-4	0	0	<1.1 U	<1.2 U	<1.3 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

Attachment 1 - Table 4										
Metals Results for Soil Samples										
Near Pad 67 in mg/kg										
Area	67	67	67	67	67	67	67	67	67	67
Station	WBG-252	WBG-432	WBG-432	WBG-432	WBG-432	WBG-433	WBG-433	WBG-434	WBG-434	WBG-439
Sample Id	WBGso-252- 4183-SO	WBGss-432- 0001-SO	WBGsb-432- 0002-SO	WBGsb-432- 0005-SO	WBGsb-432- 0003-SO	WBGsb-433- 0004-SO	WBGsb-433- 0001-SO	WBGss-434- 0001-SO	WBGsb-434- 0002-SO	WBGss-439- 0001-SO
Date	10/22/00	11/28/12	11/28/12	11/28/12	11/28/12	11/28/12	11/28/12	11/28/12	11/28/12	11/28/12
Depth (ft)	8.0 - 10.0	0.0 - 2.0	2.0 - 4.0	10.0 - 12.0	10.0 - 12.0	6.0 - 8.0	6.0 - 8.0	0.0 - 2.0	2.0 - 4.0	0.0 - 2.0
Inside Proposed Excavation	Y	Y	Y	Y	Y	Ν	N	Ν	N	Ν
Inside Previous Excavation	Y	Y	Y	Y	Y	Ν	N	Ν	N	Ν
Analyte										
Arsenic	16.2	NA	NA	18.9 J-	18.5 J-	19 J-	17.6 J-	NA	NA	NA
Barium	201	NA	NA	37.9 J-	42 J-	40 J-	37.9 J-	NA	NA	105 J-
Cadmium	<0.58 U	NA	NA	0.15 J	0.15 J	0.13 J	0.12 J	NA	NA	NA
Chromium	19.7	NA	NA	12.8 J-	10.7 J-	12.9 J-	12.5 J-	NA	NA	NA
Lead	23.9	NA	NA	10.1 J	10.2 J	12.1 J	11.7 J	NA	NA	NA
Mercury	0.014 J	NA	NA	0.0057 J-	0.0051 J-	0.0067 J-	0.0062 J-	NA	NA	NA
Selenium	<0.48 U	NA	NA	<0.82 UJ	<0.79 UJ	<0.91 UJ	<0.69 UJ	NA	NA	NA
Silver	<1.2 U	NA	NA	<0.25 UJ	<0.2 UJ	<0.22 UJ	<0.21 UJ	NA	NA	NA
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

Attachment 1 - Table 4										
Metals Results for Soil Samples										
Near Pad 67 in mg/kg										
Area	67	67	67	67	67	67	67	67	67	67
Station	WBG-439	WBG-439	WBG-439	WBGsd-082	WBGso-070	WBGso-070	WBGso-070	WBGso-140	WBGso-178	WBGso-186
Sample Id	WBGsb-439- 0002-SO	WBGsb-439- 0003-SO	WBGsb-439- 0004-SO	WBGsd-082- 0547-SD	WBGso-070- 0877-SO	WBGso-070- 0748-SO	WBGso-070- 0749-SO	WBGso-140- 0769-SO	WBGso-178- 0928-SO	WBGso-186- 0770-SO
Date	11/28/12	11/28/12	11/28/12	08/11/96	04/24/98	04/24/98	04/24/98	04/28/98	05/06/98	04/28/98
Depth (ft)	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	0.0 - 2.0	2.0 - 4.0	2.0 - 4.0	4.0 - 6.0	4.0 - 6.0	2.0 - 4.0	2.0 - 4.0
Inside Proposed Excavation	Ν	Ν	Ν	N	Y	Y	Y	Ν	Ν	Y
Inside Previous Excavation	N	Ν	Ν	N	N	N	N	Ν	Ν	Y
Analyte										
Arsenic	NA	NA	NA	13.1	20.6	14.7	14.5	16.1	16.2	11.4
Barium	65.5 J-	65.8 J-	55.9 J-	528	71.1	75.2	69.4	367	148	275
Cadmium	NA	NA	NA	0.16 J	<0.56 U	<0.58 U	<0.59 U	<0.62 U	<0.58 U	<0.64 U
Chromium	NA	NA	NA	14.2	16.7	15.3	19.1	14.3	11.9	16.9
Lead	NA	NA	NA	11.3	15.9	10.5	10.8	18.2	14.1	29.2
Mercury	NA	NA	NA	<0.04 U	<0.11 U	<0.12 U	<0.12 U	0.046 J	<0.12 U	0.034 J
Selenium	NA	NA	NA	0.49 J	<0.56 U	<0.58 U	<0.59 U	<0.62 U	<0.58 U	<0.64 U
Silver	NA	NA	NA	<0.22 U	<1.1 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.3 U
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

Attachment 1 - Table 4										
Metals Results for Soil Samples										
Near Pad 67 in mg/kg										
Area	67	67	67	67	67	67	67	67	67	67
Station	WBGso-186	WBGss-070	WBGss-071	WBGss-098	WBGss-098	WBGss-136	WBGss-137	WBGss-137	WBGss-138	WBGss-139
Sample Id	WBGso-186- 0927-SO	WBGss-070- 0534-SO	WBGss-071- 0535-SO	WBGss-098- 0566-FD	WBGss-098- 0565-SO	WBGss-136- 0725-SO	WBGss-137- 0867-SO	WBGss-137- 0726-SO	WBGss-138- 0727-SO	WBGss-139- 0728-SO
Date	05/06/98	08/09/96	08/09/96	08/14/96	08/14/96	04/22/98	04/22/98	04/22/98	04/22/98	04/22/98
Depth (ft)	4.0 - 6.0	0.0 - 2.0	0.0 - 1.0	0.0 - 2.0	0.0 - 2.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	Y	Y	Y	Ν	Ν	Ν	Ν	Ν	Ν	Ν
Inside Previous Excavation	Y	Ν	Y	Y	Y	Ν	N	Ν	Ν	Ν
Analyte										
Arsenic	17.5	10.7	15.8	16.1 J	10.3 J	8.5	10.2	9.5	8.8	12.7
Barium	90.5	377	69.8	323	190	235 J	858 J	562 J	154 J	1130 J
Cadmium	<0.59 U	0.23 J	0.07 J	0.34 J	0.14 J	<0.66 U	0.69	<0.68 U	<0.59 U	1
Chromium	15.2	12.5	7	9.5	11.1	19.7	14.4	15.4	9.9	14.6
Lead	14.6	54.7	16.1	15.9 J	14.5 J	48.5	27.1	24	25	24.3
Mercury	<0.12 U	0.04 J	0.13	0.04	0.04	0.072 J	0.11 J	0.12 J	0.11 J	0.098 J
Selenium	0.81	0.42 J	<0.34 U	0.49 J	0.36 J	0.83	1.5	1.6	<0.59 U	1.3
Silver	<1.2 U	<0.23 U	<0.22 U	<0.22 U	<0.22 U	<1.3 U	<1.4 U	<1.4 U	<1.2 U	<1.3 U
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

Attachment 1 - Table 4										
Metals Results for Soil Samples									1	1
Near Pad 67 in mg/kg										
Area	67	67	67	67	67	67	67	67	67	67
Station	WBGss-140	WBGss-178	WBGss-179	WBGss-398	WBGss-401	WBGss-401	WBGss-406	WBGss-408	WBGss-410	WBGss-412
Sample Id	WBGss-140- 0729-SO	WBGss-178- 0890-SO	WBGss-179- 0891-SO	WBGss-398- 2015-SO	WBGss-401- 2029-SO	WBGss-401- 2013-SO	WBGss-406- 2014-SO	WBGss-408- 2012-SO	WBGss-410- 2010-SO	WBGss-412- 2011-SO
Date	04/22/98	05/04/98	05/04/98	08/08/00	08/08/00	08/08/00	08/08/00	08/08/00	08/08/00	08/08/00
Depth (ft)	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Inside Proposed Excavation	N	N	Ν	Ν	Ν	Ν	Y	Y	Y	N
Inside Previous Excavation	N	N	N	Y	Y	Y	Y	Y	Y	Y
Analyte										
Arsenic	12.5	13.3	16.4	12.6	12.2	12.1	11.2	8.4	9.8	9.4
Barium	1260 J	1160 J	2260 J	1520	1230	1330	2050	714	2090	424
Cadmium	<0.7 U	<0.68 U	<0.65 U	1.6	1.2	4.3	8.7	0.96	1.9	0.63
Chromium	20.2	17.8	18.2	15.5	19.8	24.3	18.1	20.2	21.2	21.3
Lead	24.9	32	31.5	62.2 J	97.8 J	110 J	71.3 J	114 J	129 J	83.7 J
Mercury	0.17	<0.1 U	<0.081 U	0.29	0.08 J	0.12	0.19	0.077 J	0.088 J	0.082 J
Selenium	0.94	<0.68 U	<0.65 U	1.3	1.3	0.94	1.7	0.69	0.95	0.6 J
Silver	<1.4 U	<1.4 U	<1.3 U	<1.2 U	<1.2 U	<1.2 U	<1.3 U	<1.2 U	0.22 J	<1.2 U
Data Qualifiers: 'NA'=Not analyzed,										
'U'=Not Detected, 'J'=Estimated,										
R'=Rejected.										

APPENDIX C

MANIFEST LOG



Date of Generation	Disposal Date	Type of Waste	Source/ Location	Transporter	Truck License No.	Disposal Facility	Waste Profile No.	Manifest Document No.	Facility Quantity (tons)	Copy of initial manifest received (Y/N)	Final Signed Manifest Received from Landfill (Y/N)	Notes
				•								

Completed by: _____