FINAL

SAMPLING AND ANALYSIS PLAN ADDENDUM NO. 2

FOR THE

WINKLEPECK BURNING GROUNDS FEASIBILITY STUDY, RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

US Army Corps of Engineers®

PREPARED FOR

LOUISVILLE DISTRICT
CONTRACT No. DACA62-00-D-0001
DELIVERY ORDER CY08

February 2006

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

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Prepared by

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
151 Lafayette Drive
Oak Ridge, Tennessee 37831

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Science Applications International Corporation (SAIC) has completed the Final Sampling and Analysis Plan Addendum No. 2 for the Winklepeck Burning Grounds Feasibility Study at the Ravenna Army Ammunition Plant, Ravenna, Ohio. 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 included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; 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 Corps policy.

W. Kevin Jago — 2-6-06

Kevin Jago
Study/Design Team Leader

Date

Sally Absher — 2-6-06

Sally Absher
Independent Technical Review Team Leader

Date

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

Internal SAIC Independent Technical Review comments are recorded on a Document Review Record per SAIC quality assurance procedure QAAP 3.1. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader.

As noted above, all concerns resulting from independent technical review of the project have been considered.

William P Kuhn — 2-6-2006

Principal w/ A-E firm

Date

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CONTENTS

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FIGURES

TABLE

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, Liability Act
FSHP	facility-wide safety and health plan
MEC	munitions and explosives of concern
Ohio EPA	Ohio Environmental Protection Agency
P&A	plugging and abandonment
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	sampling and analysis plan
SSHP	site safety and health plan
USACE	U. S. Army Corps of Engineers
UXO	unexploded ordnance
WBG	Winklepeck Burning Grounds

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) Addendum No. 2 for the Winklepeck Burning Grounds (WBG) Feasibility Study at the Ravenna Army Ammunition Plant (RVAAP) has been prepared by Science Applications International Corporation (SAIC) under contract DACA62-00-D-0001, Delivery Order No. CY08, with the U. S. Army Corps of Engineers (USACE), Louisville District. This SAP Addendum has been developed to tier under and supplement the *Facility-Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2000a), referred to in this report as the Facility-wide SAP. The Facility-wide SAP provides the base documentation, technical procedures, and investigative protocols for conducting environmental investigations and related activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RVAAP. Where appropriate, this SAP Addendum contains references to the Facility-wide SAP for standard procedures and protocols.

Both the Facility-wide SAP and this SAP Addendum have been developed following the USACE guidance document, *Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3* (USACE 1994), to collectively meet the requirements established by the Ohio Environmental Protection Agency (Ohio EPA), Northeast District, and the U. S. Environmental Protection Agency, Region 5, for conducting CERCLA investigations.

This SAP Addendum outlines a program for the plugging and abandonment (P&A) of obsolete/substandard monitoring wells at WBG (wells OBG-1 through OBG-4). This SAP describes the methods to be used to properly decommission monitoring wells at WBG.

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2.0 WINKLEPECK BURNING GROUNDS HISTORY AND DESCRIPTION

WBG began operation in 1941 and encompasses approximately 80.9 ha (200 acres) in the central portion of RVAAP. A site map for WBG is shown on Figure 2-1. Historical operations at WBG include melting explosives out of heavy artillery projectiles using open burning. In some instances, high-energy material such as black powder and explosives were also laid out in a string along a road and burned (USATHAMA 1978). Burning is also known to have occurred along Road D. Prior to 1980, wastes disposed by burning included hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX); antimony sulfide; Composition B; lead oxide; lead thiocyanate; 2,4,6-trinitrotoluene; propellant; black powder; sludge and sawdust from load lines; and domestic wastes. Also, small amounts of laboratory chemicals were routinely disposed of during production periods. Shrapnel and other metallic munitions fragments were allowed to remain on-site after detonation, as were possible residual explosives. Waste oil (hydraulic oils from machines and lubrication oils from vehicles) was disposed in the northeast corner of WBG until 1973.

Prior to 1980, burning was carried out in four burn pits, on burn pads, and sometimes on the roads. The burn pits consisted of areas bermed on three sides, approximately 15.2 to 22.9 m (50 to 75 ft) in width and length. It is suspected (USACE 2000b), but not presently confirmed, that the four burn pits correspond to pads 58, 59, 60, and 61, with Pit #1 corresponding to pad 58. Of the four pits, Pit #1 was used most frequently. The burn pads generally consisted of level areas without berms 6 to 12.2 m (20 to 40 ft) in width and length. It is not known how many pads were contained within the area of concern. Currently, 70 burning pads have been identified from historical drawings and aerial photographs. Burning was conducted on bare ground. Ash from these areas was not collected (Jacobs Engineering 1989). Scrap metal was reclaimed and taken to the landfill north of Winklepeck (RVAAP-19).

After 1980, thermal treatment of munitions and explosives was conducted only in a 0.4-ha (1-acre) Resource Conservation and Recovery Act (RCRA) area at Burning Pad #37 (Figure 2-2). Burning was conducted in metal refractory-lined trays set on top of a bed of crushed slag in an area approximately 30.5 × 30.5 m (100 x 100 ft) in size. Ash residues were drummed and stored in Building 1601 on the west side of WBG pending proper disposition. The burn trays were removed from Burning Pad #37 in 1998, and the site was closed under RCRA.

Two additional RCRA-regulated units besides Burning Pad #37 are located within WBG and have either been closed or are in the process of closure. These two units are the Deactivation Furnace and Building 1601 (pads 45 and 19, respectively, Figure 2-2). Building 1601 has been certified closed. A closure plan for the Deactivation Furnace is currently in preparation. Additional sampling of surface and subsurface soils at the Deactivation Furnace and Building 1601 in support of closure activities was conducted in the fall of 1997. Closure activities for Pad #37 consisted of the decontamination and removal of the burning trays; those at Building 1601 included sampling through the floor and outside the doors of Building 1601 with subsequent decontamination of the structure. To date, closure activities at the Deactivation Furnace have included removal of structures and sampling and analysis of the subsurface soils.

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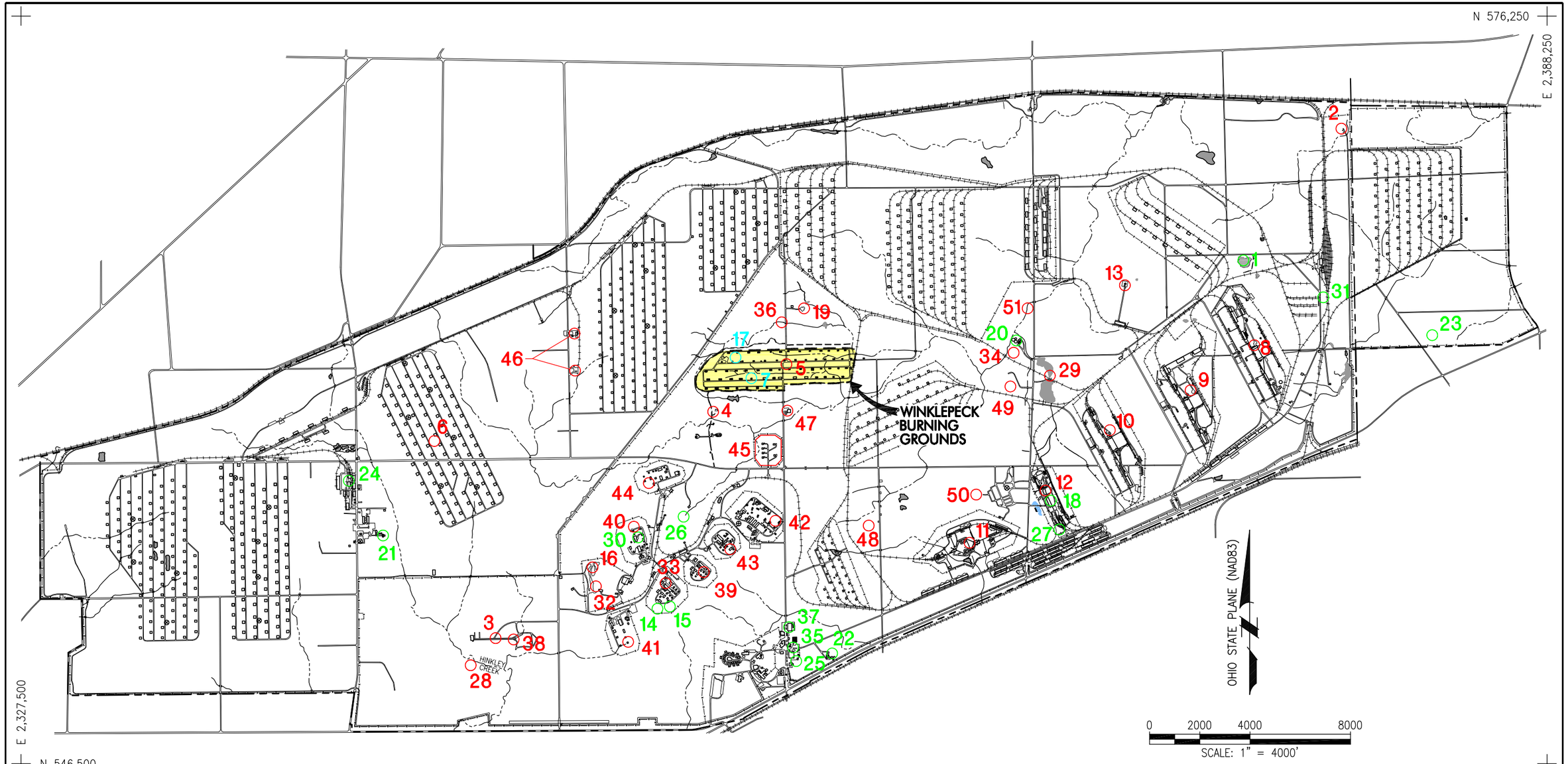

LEGEND:

1 RAMSDELL QUARRY LANDFILL
2 ERIE BURNING GROUNDS
3 DEMOLITION AREA #1
4 DEMOLITION AREA #2
5 WINKLEPECK BURNING GROUNDS
6 C BLOCK QUARRY
7 BUILDING 1601 HAZARDOUS WASTE STORAGE
8 LOAD LINE 1 AND DILUTION/SETTLING POND
9 LOAD LINE 2 AND DILUTION/SETTLING POND
10 LOAD LINE 3 AND DILUTION/SETTLING POND
11 LOAD LINE 4 AND DILUTION/SETTLING POND
12 LOAD LINE 12 AND DILUTION/SETTLING POND
13 BUILDING 1200 AND DILUTION/SETTLING POND
14 LOAD LINE 6, EVAPORATION UNIT
15 LOAD LINE 6, TREATMENT PLANT
16 QUARRY LANDFILL/FORMER FUZE & BOOSTER BURNING PITS
17 DEACTIVATION FURNACE
18 LOAD LINE 12 PINK WASTEWATER TREATMENT
19 LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20 SAND CREEK SEWAGE TREATMENT PLANT
21 DEPOT SEWAGE TREATMENT PLANT
22 GEORGE ROAD SEWAGE TREATMENT PLANT
23 UNIT TRAINING SITE WASTE OIL TANK
24 RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25 BUILDING 1034 MOTOR POOL WASTE OIL TANK
26 FUZE BOOSTER AREA SETTLING TANKS
27 BUILDING 854–PCB STORAGE
28 MUSTARD AGENT BURIAL SITE
29 UPPER AND LOWER COBB'S POND COMPLEX
30 LOAD LINE 7 PINK WASTEWATER TREATMENT PLANT
31 ORE PILE RETENTION POND
32 40– AND 60–MM FIRING RANGE
33 FIRESTONE TEST FACILITY
34 SAND CREEK DISPOSAL ROAD LANDFILL
35 1037 BUILDING–LAUNDRY WASTEWATER SUMP
36 PISTOL RANGE
37 PESTICIDE STORAGE BUILDING T–4452
38 NACA TEST AREA
39 LOAD LINE 5/FUZE LINE 1
40 LOAD LINE 7/BOOSTER LINE 1
41 LOAD LINE 8/BOOSTER LINE 2
42 LOAD LINE 9/DETONATOR LINE
43 LOAD LINE 10/PERCUSSION ELEMENT
44 LOAD LINE 11/ARTILLERY PRIMER
45 WET STORAGE AREA
46 BUILDINGS F–15 AND F–16
47 BUILDING T–5301 DECONTAMINATION
48 ANCHOR TEST AREA
49 CENTRAL BURN PITS
50 ATLAS SCRAP YARD
51 DUMP ALONG PARIS–WINDHAM ROAD
CERCLA
RCRA
OTHER REGULATORY
RAILROAD TRACKS
FENCELINE
PROPERTY BOUNDARY
STREAM OR CREEK

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
R. BEELER	B / 09–29–04	/03046/DWGS/T55LOC01

Figure 2-1. RVAAP Facility Map

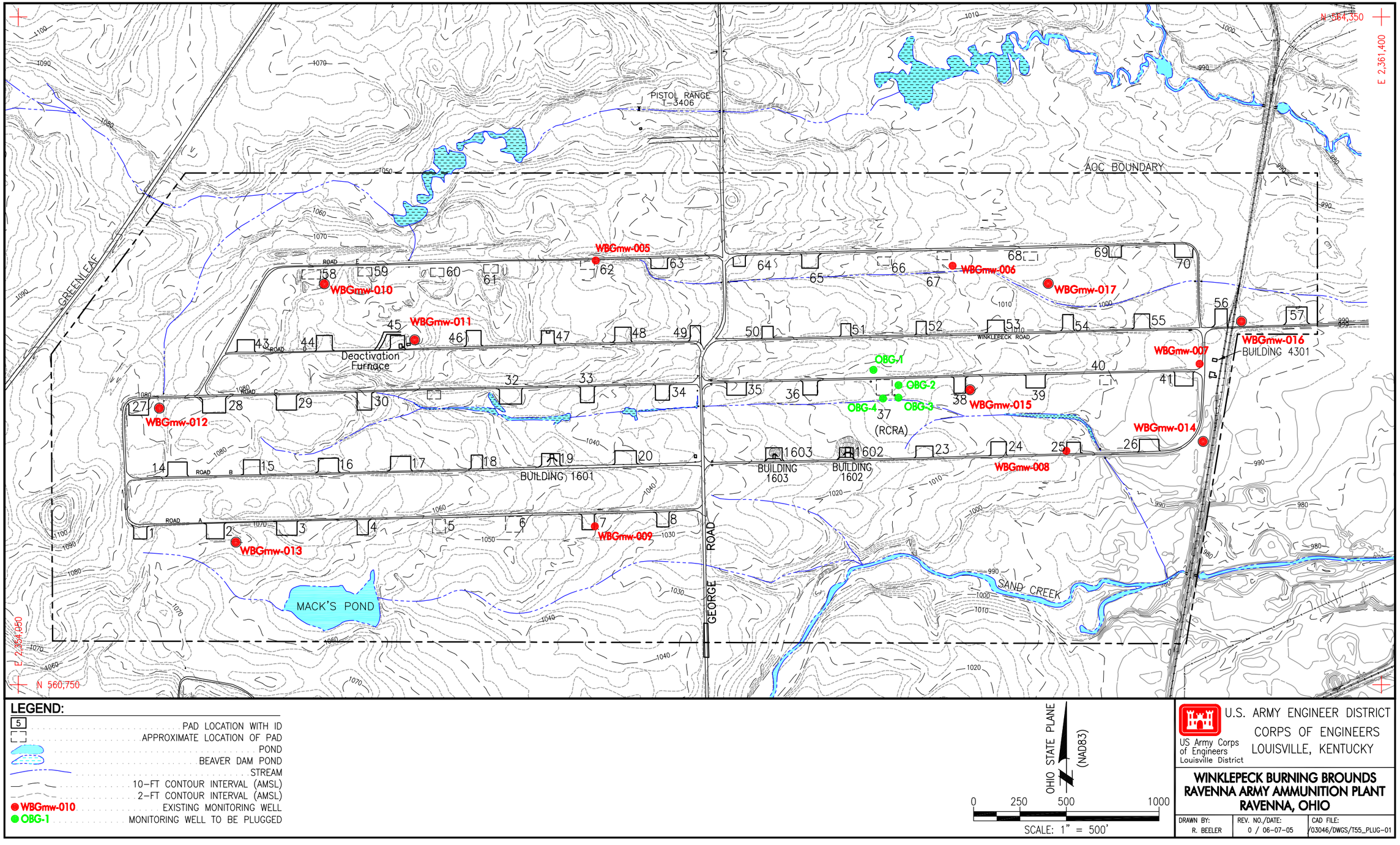

Figure 2-2. Wells to be Decommissioned at Winklepeck Burning Grounds

3.0 MONITORING WELLS

The monitoring wells scheduled for P&A are: OBG-1, OBG-2, OBG-3, and OBG-4. The wells are located around Pad #37 at WBG (Figure 2-2). The monitoring wells were installed in 1992; however, few well construction details are known. The wells are constructed of 2-in. diameter polyvinyl chloride (PVC), and finished using flush-mounted completions. It is assumed that the wells are completed with slotted PVC screens. The screen lengths are not documented, but are suspected to be 10 ft in length. Table 3-1 presents additional location and construction information for the monitoring wells.

Table 3-1. Location and Construction Information for Monitoring Wells to be Decommissioned at Winklepeck Burning Grounds

Well Number	Easting Coordinate[a]	Northing Coordinate[a]	Total Depth[b]	TOC Elevation[c]	Monitoring Interval
OBG-1	2358660.70	562447.16	18.0	1017.42	Unconsol.
OBG-2	2358795.76	562364.55	19.0	1013.47	Unconsol.
OBG-3	2358795.76	562297.23	19.0	1012.91	Unconsol.
OBG-4	2358712.98	562293.20	18.2	1013.33	Unconsol.

[a] Ohio State Plane Coordinates.
[b] Feet below ground surface.
[c] Feet above mean sea level.

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4.0 WELL ABANDONMENT

P&A of the monitoring wells at WBG will be conducted in a manner precluding any current or subsequent fluid media from entering or migrating within the subsurface environment along the axis or from the endpoint of the well/borehole. This is necessary to: (1) prevent poor quality water from one saturated zone from entering another, (2) prevent contamination of groundwater by surface contaminants, (3) restore the local aquifer to as close to its original condition as possible, (4) eliminate physical hazards, and (5) reduce the potential for future liability.

P&A of the WBG wells will be accomplished using the following general procedure:

- Remove all obstacles (e.g., pumps, cables, string-lines, measurement tapes, etc.) from the well and remove all surface components (i.e., protective casing, concrete pad, traffic posts, etc.).

- Remove all well materials (including the well screen and casing, annular seal, bentonite seal, and filter pack) from the wellbore by overdrilling the well using a bit with a diameter at least 1.5 times greater than the original diameter of the borehole. The well should be overdrilled deeper than the original borehole depth to ensure complete removal.

- Plug the entire borehole from the bottom to within 3 ft of the ground surface using a grout composed of Type I Portland cement, 6 lbs dry bentonite per 42.6-kg (94-lb) sack of dry cement, and a maximum of 0.02 to 0.03 m^3 (6 to 7 gal) of approved water per sack of cement. The plugging should be accomplished using the tremie method, and in one continuous procedure to prevent segregation, dilution, or bridging. After the grout has cured, the remaining borehole should be capped using native soil.

The abandonment of each well/borehole will follow the field procedures outlined in Chapter 9 of Ohio EPA's *Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring* (Ohio EPA 1995).

For each abandoned monitoring well, a P&A record will be prepared and submitted to the Army, USACE, and Ohio EPA via a letter report. P&A records will also be provided to the Ohio Department of Natural Resources in accordance with Ohio Revised Code 1521.05. An example of an Ohio EPA-approved well P&A report is included in Appendix A. All depths reported in the P&A records will be designated in feet from ground surface. The letter report will include the following information:

- project and well/borehole designation;

- location with respect to the replacement well or borehole (if any);

- open depth of the well/borehole before grouting;

- casing or items left in the borehole by depth, description, composition, and size (if applicable);

- copy of the borehole log;

- copy of the construction diagram for abandoned well (if applicable);

- reason for abandonment;
- description and total quantity of the grout used initially;
- description and daily quantities of grout used to compensate for settlement;
- dates of grouting;
- water or mud level prior to grouting and date measured; and
- remaining casing above ground surface: type (well, drill, protective), height above ground, size, and composition of each (if applicable).

5.0 UNEXPLODED ORDNANCE AVOIDANCE

A qualified unexploded ordnance (UXO) subcontractor, approved by the USACE, Louisville District, will be present at WBG during P&A activities. The UXO subcontractor will employ a Schonstedt Model GA-52 and GA-72 (or equivalent) magnetic locator for surface anomaly surveys, and a Schonstedt Model MG-220 (or equivalent) magnetic gradiometer for any downhole surveys. UXO technician support will be present during all field operations. The UXO Team Leader will train all field personnel to recognize and stay away from propellants and munitions and explosives of concern (MEC). Safety briefings for MEC avoidance will also be provided to all site personnel and site visitors. All well locations and access routes to the well locations will be cleared for potential MEC and clearly defined prior to entry using visual and magnetometer surveys. Access routes will be at least twice as wide as the widest vehicle that will use the route. The UXO technician will clearly mark the boundaries of the cleared well locations and access routes. If surface MEC is encountered, the approach path will be diverted away from the MEC, the area clearly marked, and the area will be avoided. Any identified magnetic anomaly will also be clearly marked and the anomaly will be avoided. The cleared approach paths will be the only ingress/egress routes to a particular sampling location.

P&A personnel must be escorted by UXO personnel at all times in areas potentially contaminated with MEC until the UXO team has completed the access surveys and the cleared areas are marked. Escorted P&A personnel will follow behind the UXO technician escort. If anomalies or MEC are detected, the UXO technician will halt escorted personnel in place, select a course around the item, and instruct escorted personnel to follow. Downhole magnetometer surveys will be performed at 2-ft intervals to a depth of 4 ft or 2 ft below the top of native, undisturbed soil, whichever is greater. Should MEC be discovered, the UXO team will not be tasked with the mission of disposal. In the event of UXO or bulk explosives discovery, the SAIC Field Operations Manager will contact the RVAAP Environmental Coordinator who will initiate the appropriate response actions.

An MEC Avoidance Plan prepared by the UXO support contractor is contained in Appendix B.

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6.0 HEALTH AND SAFETY

It is the goal of the USACE, Louisville District and RVAAP to conduct monitoring well P&A activities in a manner that ensures maximum safety and health for all RVAAP and subcontractor personnel. All P&A activities will adhere to the Facility-wide Safety and Health Plan (FSHP) and the WBG Site Safety and Health Plan (SSHP) Addendum No. 1 for the WBG Focused Feasibility Study (USACE 2000c). The FSHP presents a list of safety rules applicable to drill rig operations in the section on Standard Operating Safety Procedures (Section 9). A task-specific hazard analysis for soil boring, soil sampling, and monitoring well installation using a drill rig or a Geoprobe is provided in the WBG Focused Feasibility Study SSHP Addendum No. 1. It is the responsibility of all site personnel to ensure adherence to these plans. All site personnel are required to (1) have completed the 40-hr Hazardous Waste Site Operations training in accordance with 29 *Code of Federal Regulations* 1910.120 and applicable annual refresher requirements, (2) have had a respirator fit test within the previous year, and (3) be enrolled in a medical monitoring program.

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7.0 REFERENCES

Jacobs Engineering Group, Inc. 1989. *Environmental Protection Agency Technical Enforcement Support at Hazardous Waste Sites*.

Ohio EPA (Ohio Environmental Protection Agency) 1995. *Technical Guidance Manual for Hydrogeologic Investigations and Groundwater Monitoring*, February.

USACE (U. S. Army Corps of Engineers) 1994. *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3, September.

USACE 2000a. *Facility-Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-00-D-0001, D.O. CY02, Draft.

USACE 2000b. Personal communication from John Jent, USACE CELRL-ED-DD, to Kevin Jago, SAIC, September.

USACE 2000c. *Site Health and Safety Plan Addendum No. 1 for the Winklepeck Burning Grounds Feasibility Study, Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-00-D-0001, D.O. CY08, Final, October.

USATHAMA (U. S. Army Toxic and Hazardous Material Agency) 1978. *Installation Assessment of Ravenna Army Ammunition Plant*, Report No. 132.

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APPENDIX A

WATER WELL SEALING REPORT FOR ABANDONED OR UNUSED WELLS

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WATER WELL SEALING REPORT
(For Abandoned or Unused Wells)
OHIO DEPARTMENT OF NATURAL RESOURCES
Division of Water, Ground Water Resources Section
1939 Fountain Square Drive
Columbus, Ohio 43224-1360

LOCATION

County _____ Township _____ Section _____
Property Owner _____
Address of Property _____
Location: _____ miles _____ (n, e, s, w) of _____ (nearest intersection)

on the _____ (n, e, s, w) side of _____ (road name)

ORIGINAL WELL

ODNR Well Log Number _____ Copy attached? Yes or No (circle one)

MEASURED CONSTRUCTION DETAILS Date of measurements _____

Depth of Well _____ Static Water Level _____
Size of Casing _____ Length of casing _____
Well Condition _____

SEALING PROCEDURE

Method of Placement _____

Placement:			Sealing Material	Volume
From	_____	To _____	_____	_____
From	_____	To _____	_____	_____
From	_____	To _____	_____	_____

Was Casing Removed? Yes or No (circle one)

Condition of Casing _____
Perforations: From _____ To _____
From _____ To _____
Date Sealing Performed _____
Reason(s) for Sealing _____

CONTRACTOR

Name _____ ODH Registration # _____
Address _____
City/State/Zip _____ Signature _____

DNR 7810.93 **SUBMIT COMPLETED FORM TO ODNR-DIVISION OF WATER**

Figure 9.1 ODNR form for reporting well abandonment procedures.

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APPENDIX B

MUNITIONS AND EXPLOSIVES OF CONCERN AVOIDANCE PLAN

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Construction Support Plan

For
Ordnance and Explosives Avoidance

During the
Monitoring Well Plugging and Abandonment,
Winklepeck Burning Grounds
Ravenna Army Ammunition Plant
Ravenna, Ohio

Prepared For:

SAIC
Science Applications
International Corporation

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EOTI
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JUNE 27, 2005

TABLE OF CONTENTS

Section **Page**

APPENDICES

A Resumes

LIST OF ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
BIP	Blow-In-Place
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardio-Pulmonary Resuscitation
CWM	Chemical Warfare Material
DGPS	Differential Global Positioning System
DO	Delivery Order
DOD	Department of Defense
DQCR	Daily Quality Control Report
EMR	Electromagnetic Radiation
EOD	Explosive Ordnance Disposal
EOTI	Explosive Ordnance Technologies, Inc.
EZ	Exclusion Zone
FUDS	Formerly Used Defense Site
GPO	Geophysical Prove-Out
GSP	Global positioning system
HAZWOPER	Hazardous Waste Site Operations and Emergency Response
HE	High Explosive
ID	Identification Number
MIS	Management Information System
MP	Military Police
MPM	Most Probable Munition
MV	Millivolts
NAD83	North American Datum of 1983
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
OSO	On-site Safety Officer
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
PRAC	Pre-placed Remedial Action Contract
PSO	Project Safety Officer
QC	Quality Control
QCP	Quality Control Plan
Q-D	Quantify-Distance
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SOW	Scope of Work
SUXOS	Senior UXO Specialist
SSHP	Site Safety and Health Plan
TSSDS	Tri-Service Spatial Data Standards
USACE	U.S. Army Corps of Engineers

USAESCH	U.S. Army Engineering and Support Center, Huntsville
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
WP	White Phosphorous

1.0 CHAPTER 1 - INTRODUCTION

Explosive Ordnance Technologies, Inc. (EOTI) is performing Ordnance Explosive Avoidance activities in support of Science Applications International Corporation (SAIC) during the Plugging and Abandonment of Monitoring Wells at the Winklepeck Burning Grounds (WBG), Ravenna Army Ammunition Plant (RVAAP), located in Ravenna, Ohio. This is a Construction Support activity, in conjunction with work being conducted for the work under contract with the U.S. Army Corp of Engineers, Louisville District (CELRL).

1.1 Project Authorization

This work plan has been prepared in accordance with Purchase Order (PO) No. _____, issued by SAIC in conjunction with work being conducted for CELRL. SAIC and its subcontractor, Explosive Ordnance Technologies, Inc. (EOTI), of Rumson, New Jersey, have prepared this Work Plan in accordance with the Scope of Work (SOW) dated June 24, 2005.

1.2 Purpose and Scope

The purpose of this investigation is to provide Unexploded Ordnance (UXO) Construction Support during the plugging and abandonment of existing monitoring wells. The UXO Construction Support will take place at WBG on the Ravenna Army Ammunition Plant (RVAAP). Anomalies resembling UXO will be identified, marked and reported to appropriate agencies.

1.3 Site Description and History

The WBG began operation in 1941 and encompasses approximately 80.9 ha (200 acres) in the central portion of RVAAP. Historical operations at WBG include melting explosives out of heavy artillery projectiles using open burning. In some instances, high-energy material such as black powder and explosives were also laid out in a string along a road and burned. Burning is also known to have occurred along Road D. Prior to 1980, wastes disposed by burning included hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), antimony sulfide, Composition B, lead oxide, lead thiocyanate, 2,4,6-trinitrotoluene (TNT), propellant, black powder, sludge and sawdust from load lines, and domestic wastes. Also, small amounts of laboratory chemicals were routinely disposed of during production periods. Shrapnel and other metallic munitions fragments were allowed to remain on the site after detonation, as were possible residual explosives. Waste oil (hydraulic oils from machines and lubrication oils from vehicles) was disposed in the northeast corner of WBG until 1973.

Prior to 1980, burning was carried out in four burn pits, on burn pads, and sometimes on the roads. The burn pits consisted of areas bermed on three sides, approximately 15.2 to 22.9 m (50 to 75 ft) in width and length. Of the four pits, Pit #1 was used most frequently. The burn pads

generally consisted of level areas without berms 6 to 12.2 m (20 to 40 ft) in width and length. It is not known how many pads were contained within the AOC. Currently 70 burning pads have been identified from historical drawings and aerial photographs. Burning was conducted on bare ground. Ash from these areas was not collected. Scrap metal was reclaimed and taken to the Landfill North of Winklepeck (RVAAP-19).

After 1980, thermal treatment of munitions and explosives were conducted only in a 0.4 ha (1 acre) RCRA area at Burning Pad #37. Burning was conducted in metal refractory-lined trays set on top of a bed of crushed slag in an area approximately 30.5 x 30.5 m (100 x 100 ft) in size. Ash residues were drummed and stored in Building 1601 on the west side of WBG pending proper disposition. The burn trays were removed from Burning Pad #37 in 1998 and the site was closed under RCRA.

The site is currently undergoing extensive alterations, including clearing and grubbing, and a large-scale UXO removal, as part of its conversion to a Mark 19 grenade practice range.

Figure 1-1 Site Location Map
(Reference SAP Addendum No. 2, Figure 2-1)

2.0 CHAPTER 2 - TECHNICAL MANAGEMENT PLAN

The UXO Construction Support for monitoring well plugging and abandonment, will be conducted by a project team consisting of SAIC personnel and Explosive Ordnance Technologies, Inc. (EOTI) ordnance technicians.

2.1 General Procedures

Guidance Documents and references under which this project is being conducted are as follows:

- DID OE-005-06 Site Safety and Health Plan
- EP 75-1-2 Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities
- EP 385-1-95a Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations
- OPNAVINST 8020.14, Department of the Navy Explosives Safety Policy
- NAVSEA OP-5 Volume1 Ammunition and Explosives Ashore: Safety regulations for Handling, Storing Production, Renovation, and shipping.

Construction Support will focus on Ordnance Avoidance during monitoring well plugging and abandonment activities.

Personnel

The OE/UXO construction support team will consist of two persons having the following minimum qualifications:

- **UXO Technician III:** One UXO Technician III with experience supervising construction support activities will serve as the competent person overseeing OE operations.
- **UXO Technician II:** One UXO Technician II with experience implementing construction support activities.

  UXO Technicians will also have 40 hours of HAZWOPER training meeting the provisions established in 29 CFR 1910.120. If this 40 hour training course is more than 1 year old, the UXO Technicians will also have completed annual refresher training in accordance with 29 CFR 1910.120(e)(8) within the last 365 days. Documentation of this training will be provided prior to initiating fieldwork.

Areas to Be Inspected

During the monitoring well plugging and abandonment activities, the UXO Technicians will visually inspect all ingress/egress and work areas for MEC/UXO or other hazardous conditions.

Inspection Procedures

The UXO Technician III will determine which UXO Technician is located at each monitoring well excavation location. Each UXO Technician will be assisted during visual inspections by the use of a Schonstedt Model GA 52Cx, Magnetic Locator or a MG230 Downhole Gradiometer which is capable of locating ferrous metals in the ground. The Schonstedt will not be used in the vicinity of the backhoe or other vehicle where the vehicle would interfere with its operation, but will be used to assist in the observation of any intrusive investigations.. Detection settings for the Schonstedt will be determined by the UXO Technicians in accordance with the conditions at the site.

Procedures to be used in the event UXO is located

If during intrusive activities, a UXO or MEC item is located, the UXO Technicians will identify, mark and report the item. **NOTE: This is an Ordnance Avoidance activity. No UXO/MEC items will be touched or moved during this phase of the project.** Notification will be made to the SAIC Site Manager and the Site Safety and Health Officer. The item will be marked by surrounding it with 4 wooden stakes and encircling the stakes with flagging ribbon or caution tape. If flagging ribbon is used, the color will be different than the color used for any other purpose on site. All site personnel will be advised of the hazard and its location. No smoking or other flame producing activities will be permitted with 100 feet of the item. No fueling operations or other operations involving flammable materials will be permitted within 100 Feet of the item. Local authorities will be notified for disposal of the item. Detailed information regarding the item, its identification, condition, and disposition will be recorded in the Daily Site Report.

The UXO Technicians, the Site Safety and Health Officer, and the Site Manager will determine whether conditions permit well plugging and capping operations to continue safely pending response from local authorities and disposal of the item.

In the unlikely event that a CWM item is found, all site personnel will withdraw upwind and secure the site. Immediate notification will be made to the SAIC Supervisor and local Hazardous Response authorities. If any site personnel including visitors are exposed to toxic materials, decontamination will take place in accordance with the SOP for personnel decontamination.

This site is not a suspected Chemical Warfare Materiel (CWM) site. However, if suspected CWM is encountered during any phase of work, all operations will cease immediately, personnel will immediately withdraw upwind from the work area, Local law enforcement and emergency response teams, and AGVIQ will be notified, who in turn will notify the local Explosive Ordnance Disposal (EOD) unit and CELRL. The suspected item will remain under constant surveillance until relieved by military EOD personnel.

Based on information provided by SAIC in the SOW regarding the site and the lack of surface evidence of UXO-related scrap in the monitoring well areas, it is not anticipated that surface UXO will be found. If a situation is encountered that UXO and or other hazardous items are

located, EOTI UXO Technicians will visually identify the UXO/MEC and mark and report it. EOTI UXO Personnel will direct construction support personnel to move to a safe distance defined by UXO Technicians prior to identification of the UXO item. Once the ordnance is item is identified, the item will be marked with four wooden stakes and encircled with flagging ribbon and or caution tape.

2.2 Project Execution

Project field activities consist of the following tasks:

- Mobilization
- Site Preparation and Safety
- UXO Avoidance support during the monitoring well plugging and capping operations
- Demobilization

The project will be accomplished in the field using a combined two-phase approach. The first phase will include mobilization, and site specific/safety training. The second phase will include UXO construction support during monitoring well plugging and capping operations, identification of UXO/MEC, and demobilization.

EOTI will furnish all labor, materials, equipment, supplies, utilities, etc. to complete the investigation of UXO-like anomalies identified..

Due to the inherent risk in this type of operation the team will be limited to a 40-hour workweek consisting of five 8-hour days while performing "OE Procedures" unless longer workweeks are approved by SAIC/EOTI management. The workday will be from 0800 hours to 1700 hours. Both the hours and days of operations may change, with the concurrence of the SAIC schedule and or weather related issues.

2.2.1 Phase I - Mobilization

EOTI will mobilize one UXO Technician III (Team Leader) and one UXO Technician II, with all certifications, resumes, licenses, equipment and materials to complete the required OE avoidance work.

Due to the short duration of the project and limited number of personnel involved in the project at any given time, no site trailer will be mobilized by EOTI to the site.

In accordance with the SOW, no brush cutting or other site preparation is anticipated to conducted. Site conditions will be documented to aid in the preparation of the final report.

Following authorization from SAIC, EOTI will begin operations with mobilization to the site within 10 days to establish an operational capability at the work site. The goal of the

mobilization is to ensure that proper attention is given to preparing and training for OE operations. Actions performed will include:

- Identifying/procuring, packaging, shipping project equipment
- Setting up support facilities
- Testing communication equipment
- Finalizing subcontract(s) and operating schedules
- Transporting to and assembling the work force at the site
- Conducting site-specific training if required
- Arranging for and occupying personnel lodging facilities

2.2.2 Phase II - UXO Avoidance for Construction Support

Monitoring Well Plugging and Abandonment

The EOTI UXO/MEC team is prepared to support the SAIC teams during all phases of the monitoring well plugging and abandonment project. During this operation a UXO Technician III/II will be present to visually inspect all surface and intrusive excavation areas for UXO/MEC and or other hazardous conditions. The visual inspection will be assisted by the use of a Schoenstedt magnetometer or downhole Gradiometer capable of detecting surface or subsurface ferrous materials.

The team leader will provide daily briefings to all on-site contractor/subcontractor personnel on specific MEC procedures employed during the monitoring well plugging and capping process.

OE Identification

MEC/OE Items will be identified by EOTI technicians and reported to the SAIC and CELRL site managers.

OE Removal

EOTI will notify SAIC/CELRL safety representative who in turn will notify the closest military installation.

OE Disposal

EOTI will notify the SAIC/CELRL safety representative who in turn will notify the closest military installation.

2.

2.2.3 Demobilization

Upon completion of the UXO Construction Support, all personnel, material, and equipment will be removed from the site.

2.2.4 OE Personnel and Qualifications

All UXO Technician team members are experienced and qualified in accordance with DID OE-02501. A UXO Technician III and a UXO Technician II will be on site for each shift.

The UXO Technician III is the technical lead for all OE operations and is assigned the following safety and health related responsibilities:

- Coordinating schedule and support with the Project Manager
- Overall coordination between operations and safety, and health personnel;
- Reviewing and becoming familiar with this Work Plan and the SSHP;
- Early detection and identification of potential problem areas, including safety and health matters; and
- Conducting and documenting UXO safety briefings for all site personnel and visitors

UXO Technician II within the UXO team is required to comply with the provisions of the SSHP, Work Plan and all applicable Federal, State and local regulations. They report to the UXO Technician III for performing duties as members of functional teams.

2.3 Public Affairs

Employees of EOTI will not publicly disclose any data generated or reviewed on this project. Personnel will refer all requests for information to SAIC. It is understood that reports and data generated under this contract are the property of the Department of Defense (DOD) and distribution to any other source, unless authorized by the Contracting Office.

3.0 CHAPTER 3 - EXPLOSIVES MANAGEMENT PLAN

N/A

4.0 CHAPTER 4 - EXPLOSIVES SITING PLAN

N/A

5.0 CHAPTER 5 - GEOPHYSICAL PROVE-OUT PLAN AND REPORT

N/A

6.0 CHAPTER 6 - GEOPHYSICAL INVESTIGATION PLAN

N/A

7.0 CHAPTER 7 - LOCATION SURVEYS AND MAPPING PLAN

N/A

8.0 CHAPTER 8 – WORK, DATA, AND COST MANAGEMENT PLAN

8.1 Daily Work Schedule

Due to the nature of the project site and the inherently risky nature of the intrusive activities, the daily project work schedule may vary. The anticipate project daily work schedule is as follows:

- 0700 Arrive at Winklepeck Burning Grounds, RVAAP, perform safety briefing and begin work
- 1700 Meet at departure location for transportation back to Hotel

*Due to the inherent risk of intrusive OE activities, UXO personnel shall not engage in OE operations for more that 40 hrs per week or more than 8hrs per day with 48hr of rest between work weeks unless approved by SAIC/EOTI management.

9.0 CHAPTER 9 - PROPERTY MANAGEMENT PLAN

N/A

10.0 CHAPTER 9 - PROPERTY MANAGEMENT PLAN

N/A

10.0 CHAPTER 10 - QUALITY CONTROL PLAN

N/A

11.0 CHAPTER 11 - ENVIRONMENTAL PROTECTION PLAN

N/A

12.0 CHAPTER 12 - INVESTIGATION-DERIVED WASTE PLAN

N/A

13.0 CHAPTER 13 - GEOGRAPHICAL INFORMATION SYSTEM (GIS) PLAN

N/A

14.0 REFERENCES

DID OE-005-06 Site Safety and Health Plan

U.S. Army Corps of Engineers (USACE) 2004. EP 75-1-2 Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities, 01 August 2004.

U.S. Army Corps of Engineers (USACE) 2004. EP 385-1-95a Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations, 27 August 2004.

OPNAVINST 8020.14, Department of the Navy Explosives Safety Policy

NAVSEA OP-5 Volume 1 Ammunition and Explosives Ashore: Safety regulations for Handling, Storing Production, Renovation, and shipping.

APPENDIX A

RESUMES

Project Assignment:	Senior UXO Supervisor/Technician III
Name/Title:	John M. Findorak III
Firm:	EOTI
Years of Experience:	21
Years of EOD Experience:	20
Military Experience:	1977 to 1997 (Retired)
Continuing Education / Training:	1977 / Basic EOD School: Phase I, II, III
	2001 / 29CFR1910.120 HAZWOPER (40-Hour)
	2003 / 29CFR1910.120 HAZWOPER (8-Hour S)
	2004/ 29RFR1910.120 HAZWOPER (8-Hour Annual)

Technical/Management Experience: Mr. Findorak has 21 years experience conducting investigation, removal, and disposal of UXO/MEC/RCWM. Since 2002, Mr. Findorak has served as an EOTI Supervisor/UXO Technician.

Representative Project Experience:

- **Ft Hood, Ft Carson, Ft Bliss, JPG:** EOTI SUXOS during ordnance avoidance operations supporting USACHPPM and Corps of Engineer teams.
- *Atlantic City, NJ:* ***EOTI UXO SUXOS at FAA site 41, Atlantic City, NJ. PCB and Ordnance contaminated environment*.**
- **Ft Hood TX, Ft Polk LA:** Performed site survey operations for EOTI at Ft Hood TX, Ft Polk LA, and for the Bureau of Indian Affairs on the Isleta Pueblo, Albuquerque New Mexico.

Flagstaff AZ: Provided Senior UXO escort and Site Safety at Camp Navajo, Flagstaff AZ Open Burn/Open Detonation site for EOTI during an endangered species investigation.

Project Assignment:	UXO Technician Level III/II
Name/Title:	David A. Farmer
Firm:	EOTI
Years of Experience:	12
Years of EOD Experience:	7.5
Military Experience:	1970 to 1979 (Retired)
Continuing Education / Training:	1970 / Basic EOD School: Indian Head
	1997 / 29CFR1910.120 HAZWOPER (40-Hour)
	1999 / 29CFR1910.120 HAZWOPER (8-Hour S)
	2005 / 29RFR1910.120 HAZWOPER (8-Hour Annual)

Technical/Management Experience: Mr. Farmer has 21 years experience in Military and Commercial UXO experience. Since 2004, Mr. Farmer has served as an EOTI UXO Technician.

Representative Project Experience:

- **Sioux Army Depot, Sidney, NE:** In charge of over 20 UXO Technicians at the Sioux Army Depot site.
- *Oak Ridge, TN:* ***Project Manager, Explosive Ordnance Technologies, Inc EOTI Oak Ridge, TN.***
- **Ft. Campbell, KY:** UXO Specialist, Explosive Ordnance Technologies, Inc EOTI Ft. Campbell, KY.
- **Oak Ridge, TN:** UXO project Manger, American Technologies Inc. Oak Ridge, TN.
- **Honey Lake, CA:** UXO Site Safety Officer, American technologies, Inc, Honey Lake, CA
- **Ft. McClellan, AL:** UXO Specialist, USA Environmental, Inc. Ft. McClellan, AL

ATTACHMENT 1

COMMENT RESPONSES FOR PRELIMINARY DRAFT SAMPLING AND ANALYSIS PLAN ADDENDUM NO. 2 FOR THE WINKLEPECK BURNING GROUNDS FEASIBILITY STUDY, RAVENNA ARMY AMMUNITITION PLANT, RAVENNA, OHIO REV. 1/24/06

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Comment Responses for Preliminary Draft

Sampling and Analysis Plan Addendum No. 2 for the Winklepeck Burning Grounds Feasibility Study, Ravenna Army Ammunition Plant, Ravenna, Ohio

Rev. 1/24/06

Comment Number	Page or Sheet	Comment	Recommendation	Response
Ohio EPA NEDO DERR (T. Fisher)				
1.	Section 4, Well Abandonment, Page 4-1, lines 25 and 26	Please indicate in the text that the P&A records will also be sent to the Ohio Department of Natural Resources (in accordance with Ohio Revised Code 1521.05(B)).		Agree. The following text has been inserted as the second sentence of the 4th paragraph: "P&A records will also be provided to the Ohio Department of Natural Resources in accordance with Ohio Revised Code 1521.05."

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