FINAL

SITE SAFETY AND HEALTH PLAN ADDENDUM NO. 1

FOR THE

PHASE II REMEDIAL INVESTIGATION OF LOAD LINE 1 AT THE RAVENNA ARMY AMMUNITION PLAN, RAVENNA, OHIO

Prepared for

US Army Corps of Engineers®

Louisville District
Contract No. DACA27-97-D-0025

Delivery Order No. 0005

August 1999

(INITIAL GROUNDWATER MONITORING)

SAIC

99-121(doc)/081299

FINAL

SITE SAFETY AND HEALTH PLAN ADDENDUM NO. 1
FOR THE
PHASE II REMEDIAL INVESTIGATION
OF THE
LOAD LINE 1
AT THE
RAVENNA ARMY AMMUNITION PLANT,
RAVENNA, OHIO

Prepared for

U.S. Army Corps of Engineers
Louisville District
Louisville, Kentucky 40201
Contract No. DACA27-97-D-0025

Prepared by

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
800 Oak Ridge Turnpike, P.O. Box 2502
Oak Ridge, Tennessee 37831

August 1999

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

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

APPROVALS

SITE SAFETY AND HEALTH PLAN ADDENDUM NO. 1
FOR THE
PHASE II REMEDIAL INVESTIGATION
OF THE
LOAD LINE 1
AT THE
RAVENNA ARMY AMMUNITION PLANT,
RAVENNA, OHIO

Stephen B. Selecman, SAIC Project Manager — Date: 8/12/99

Stephen L. Davis, CIH, CSP, SAIC Health and Safety Manager — Date: 8/12/99

CONTENTS

TABLES

ACRONYMS

CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CSP	Certified Safety Personnel
D&D	decontamination and decommissioning
DNT	dinitrotoluene
FP	flash point
FSHP	Facility-wide Safety and Health Plan
H&S	health and safety
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IDLH	immediately dangerous to life and health
IP	ionization potential
MSDS	Material Safety Data Sheet
NA	not available
NIOSH	National Institute for Occupational Safety and Health
OE	ordnance and explosives
PEL	permissible exposure limit
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
STEL	short-term exposure limit
SVOC	semivolatile organic compound
TNT	trinitrotoluene
TLV	threshold limit value
TWA	time-weighted average
USGS	U.S. Geological Survey
VP	vapor pressure

INTRODUCTION

Science Applications International Corporation's (SAIC's) formal policy, as stated in the Environmental Compliance and Health and Safety Program manual, is to take every reasonable precaution to protect the health and safety of our employees, the public, and the environment. To this end, the Ravenna Army Ammunition Plant Facility-wide Safety and Health Plan (FSHP) and this Site Safety and Health Plan (SSHP) Addendum collectively set forth the specific procedures required to protect SAIC and SAIC subcontractor personnel involved in the field activities. All field personnel are required to comply with the requirements of these plans. In addition, subcontractors are responsible for providing their employees with a safe workplace, and nothing in these plans relieves such subcontractors of this responsibility. If the requirements of these plans are not sufficient to protect the employees of a subcontractor, then the subcontractor is required to supplement this information with work practices and procedures that will ensure the safety of its personnel.

The FSHP addresses program issues and hazards and hazard controls common to the entire installation. This SSHP Addendum to the FSHP serves as the lower-tier document addressing the hazards and controls specific to this project. Copies of the FSHP and this SSHP Addendum will be present at the work site.

SAIC will perform a Phase II Remedial Investigation (RI) at the Load Line 1 location. From 1941 to 1971, this area of concern produced large volumes of process effluent (pink water) resulting from the loading, packing, and assembly of munitions. The wastewater passed through concrete sumps and sawdust filtration units prior to entering a settling pond via unlined ditches. The unlined settling pond received washdown water and wastewater from the load line operations. Building washdown water was also swept through doorways onto the ground surrounding load line buildings. Potential contaminants of concern identified in the Phase I RI include ordnance and explosives (OE); explosives residues; metals (arsenic, lead, chromium, and mercury); and semivolatile organic compounds (SVOCs) (USACE 1998). Low levels of polychlorinated biphenyls and pesticides were observed in seven samples collected during the Phase I RI.

Environmental characterization will be conducted incrementally during the Phase II RI under the auspices of the sequential Sampling and Analysis Plan Addenda. Groundwater will be the first environmental medium characterized, followed by soil, sediment, and surface water. This SSHP Addendum addresses all planned characterization activities.

The following are tasks to be performed as part of this project:

- collect 350 samples using hand augers or trowels;
- collect 175 subsurface soil samples from 2- to 4-foot depths using hand augers and hand-held power augers and 88 samples from 4- to 6-foot depths using hand-held power augers;
- drill and install eight new wells using NX coring and subsequent overdrilling with a 4-inch air rotary bit;
- develop the eight new wells;
- perform slug testing in the eight new wells;
- perform groundwater sampling using low-flow purging techniques for eight new wells and six existing wells;

- perform field analyses for trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) using on-site colorimetric analyses and metals using X-ray fluorescence; and

- decontaminate sampling equipment.

Potential hazards posed by the tasks planned at these locations include OE, moving equipment (power auger and drill rig), hand-held power tools and hand tools for brush clearing, fuel or decontamination solvent fires, chemical exposure, temperature extremes, noise, stinging/biting insects, poisonous plants, and snakes. These hazards will be minimized through the application of various control measures, such as area clearance by OE specialists, exclusion zones around heavy equipment, protective clothing, etc. These controls are detailed elsewhere in this document.

The potential for chemical overexposure appears to be low given the nature of the planned tasks. All of the expected contaminants have low vapor pressures, making overexposure through vapor inhalation very unlikely. All of the planned tasks, with the exception of air rotary drilling, pose a minimal potential for creating airborne particulates. Potable water will be used as needed to manage dust generation. Air rotary drill discharge will not be routed through a particulate control system to minimize airborne particulates unless other measures fail to perform adequately. There is some potential for adverse effects due to dermal contact with contaminated soil. The crew will use protective gloves to handle potentially contaminated materials and, if necessary, the Site Safety and Health Officer (SSHO) will upgrade the required personal protective equipment (PPE) to prevent dermal contact with potentially contaminated materials. The SSHO will observe all site tasks during daily safety inspections and will use professional judgment, coupled with instrument readings, to determine if upgrading of PPE is required. A detailed analysis of these hazards and specific appropriate controls is presented in Chapter 2, Table 2-2.

This investigation will be performed in Level D PPE, plus chemical-resistant gloves will be used when handling potentially contaminated materials, unless one of several action levels is exceeded, or the potential for increased risk becomes apparent during the investigation. Protective procedures, including protective clothing, will be upgraded as necessary by the SSHO based on established action levels or judgment.

1.0 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.1 SITE DESCRIPTION

The Ravenna Army Ammunition Plant (RVAAP) is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 km (3 miles) northeast of the town of Ravenna. The installation consists of 8,668 hectares (21,419 acres) in a 17.7-km (11-mile)-long, 5.6-km (3.5-mile)-wide tract bordered by a sparsely inhabited private residential area. The site is an inactive government-owned armament, munitions, and chemical command facility maintained by a contracted caretaker, R&R International, Inc.

The installation was active from 1941 to 1992. Activities included loading, assembling, storing, and packing military ammunition; demilitarization of munitions; production of ammonium nitrate fertilizer; and disposal of "off-spec" munitions. Munitions handled on the installation included artillery rounds of 90 mm or more and 2000-lb bombs.

The buildings associated with Load Line 1 are currently undergoing decontamination and decommissioning (D&D). These activities will be in progress during the Phase II Remedial Investigation (RI) groundwater investigation, but are expected to be completed before the RI characterization of soil, sediment, and surface is initiated.

1.2 CONTAMINANTS

The Phase I RI (USACE 1998) detected a number of contaminants at this location. Explosives residues were the most notable contaminants. Explosives residues were detected in 29 of the 46 soil samples analyzed. The maximum concentration of trinitrotoluene (TNT) was 5800 mg/kg. See Tables 1-1 and 1-2 for detailed sampling results. Inclusion in this table indicates the presence of a contaminant but does not necessarily indicate that the contaminant is present in sufficient quantity to pose a health risk to project workers.

Table 1-1. Load Line 1 Phase I RI Analytical Results (Surface Soil and Sediment)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Surface Soil									
Cyanide	mg/kg	8/ 12	•		0.11			Yes	No Background Data Available
1,3,5-Trinitrobenzene	µg/kg	10/ 47	•		550	110000		Yes	No Background Data Available
2,4,6-Trinitrotoluene	µg/kg	28/ 47	•		260	5800000		Yes	Detected > 5% of Samples
2,4-Dinitrotoluene	µg/kg	5/ 47	•		100	1500		Yes	Detected > 5% of Samples
HMX	µg/kg	2/ 47	•		2600	9100		Yes	No Background Data Available
RDX	µg/kg	2/ 47	•		1800	49000		Yes	No Background Data Available
Aluminum	mg/kg	47/ 47	15600	4/ 47	1860	47600	20000 – 100000	Yes	> 5% Detect Above Background
Antimony	mg/kg	8/ 12	•		0.45	8.8		Yes	No Background Data Available
Arsenic	mg/kg	47/ 47	19.6	3/ 37	4.5	77	5.2 – 27.0	Yes	> 5% Detect Above Background
Barium	mg/kg	47/ 47	75	21/ 47	22.2	1380	300 – 700	Yes	> 5% Detect Above Background
Beryllium	mg/kg	12/ 12	•		0.2	2.5	1.5 – 2.0	Yes	No Background Data Available
Cadmium	mg/kg	42/ 47	0.29	35/ 47	0.15	23.5	1 – 2	Yes	> 5% Detect Above Background
Calcium	mg/kg	12/ 12	•		452	56700	1100 – 31000	No	Essential Nutrient
Chromium	mg/kg	47/ 47	18.7	17/ 47	4.8	394	15.0 – 100.0	Yes	> 5% Detect Above Background
Cobalt	mg/kg	12/ 12	•		3.9	33.7	7 – 20	Yes	No Background Data Available
Copper	mg/kg	12 / 12	•		11.3	110	7.0 – 70.0	Yes	No Background Data Available
Iron	mg/kg	12/ 12	•		13500	75600	15000 – 50000	No	Essential Nutrient

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Lead	mg/kg	47/ 47	17.9	41/ 47	10.8	3610	15 – 30	Yes	> 5% Detect Above Background
Magnesium	mg/kg	12/ 12	•		750	9100	3000 – 15000	No	Essential Element
Manganese	mg/kg	47/ 47	728	10/ 47	113	2140	150 – 1000	Yes	> 5% Detect Above Background
Mercury	mg/kg	41/ 47	0.08	14/ 47	0.03	1.4	0.03 – 0.22	Yes	> 5% Detect Above Background
Nickel	mg/kg	12/ 12	•		9.4	45.8	15 – 50	Yes	No Background Data Available
Potassium	mg/kg	12/ 12	•		358	2690	11800 – 25100	No	Essential Element
Selenium	mg/kg	44/ 47	2.6	4/ 47	0.32	4.3	< 0.1 – 1.2	Yes	> 5% Detect Above Background
Silver	mg/kg	1/ 47	0.24	0/ 47	0.24	0.24	0.7	No	Below Background
Sodium	mg/kg	12/ 12	•		148	535	5000 – 7000	No	Essential Element
Thallium	mg/kg	12/ 12	•		0.84	7.9		Yes	No Background Data Available
Vanadium	mg/kg	12/ 12	•		5.5	92.9	20 – 150	Yes	No Background Data Available
Zinc	mg/kg	47/ 47	72.1	34/ 47	34.1	1560	25 – 110	Yes	> 5% Detect Above Background
4,4'-DDD	µg/kg	2/ 12	•		42	250		Yes	No Background Data Available
4,4'-DDE	µg/kg	4/ 12	•		3.3	840		Yes	No Background Data Available
4,4'-DDT	µg/kg	3/ 12	•		63	450		Yes	No Background Data Available
Aldrin	µg/kg	1/ 12	•		2.5	2.5		Yes	No Background Data Available
Alpha chlordane	µg/kg	3/ 12	•		19	140		Yes	No Background Data Available
Aroclor-1254	µg/kg	5/ 12	•		95	36000		Yes	No Background Data Available
Aroclor-1260	µg/kg	1/ 12	•		680	680		Yes	No Background Data Available

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Dieldrin	µg/kg	1/ 12	•		170	170		Yes	No Background Data Available
Endosulfan I	µg/kg	1/ 12	•		40	40		Yes	No Background Data Available
Endosulfan II	µg/kg	1/ 12	•		8.7	8.7		Yes	No Background Data Available
Endrin	µg/kg	1/ 12	•		37	37		Yes	No Background Data Available
Endrin aldehyde	µg/kg	2/ 12	•		9.6	53		Yes	No Background Data Available
Gamma chlordane	µg/kg	4/ 12	•		1.9	250		Yes	No Background Data Available
Heptachlor epoxide	µg/kg	1/ 12	•		2.3	2.3		Yes	No Background Data Available
Anthracene	µg/kg	1/ 12	•		60	60		Yes	No Background Data Available
Benzo(a)anthracene	µg/kg	5/ 12	•		77	330		Yes	No Background Data Available
Benzo(a)pyrene	µg/kg	5/ 12	•		86	420		Yes	No Background Data Available
Benzo(b)fluoranthene	µg/kg	4/ 12	•		100	400		Yes	No Background Data Available
Bis(2-ethylhexyl)phthalate	µg/kg	4/ 12	•		74	530		Yes	No Background Data Available
Carbazole	µg/kg	5/ 12	•		94	500		Yes	No Background Data Available
Chrysene	µg/kg	5/ 12	•		42	1400		Yes	Detected > 5% of Samples
Di-n-butyl phthalate	µg/kg	1/ 12	•		36	36		Yes	No Background Data Available
Dibenzo(a,h)anthracene	µg/kg	6/ 12	•		90	600		Yes	No Background Data Available
Dimethyl phthalate	µg/kg	4/ 12	•		410	14000		Yes	No Background Data Available

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Fluoranthene	µg/kg	3/ 12	•		40	160		Yes	No Background Data Available
Indeno(1,2,3-cd)pyrene	µg/kg	1/ 12	•		1900	1900		Yes	No Background Data Available
N-nitrosodiphenylamine	µg/kg	2/ 12	•		110	270		Yes	No Background Data Available
Pentachlorophenol	µg/kg	1/ 12	•		3900	3900		Yes	No Background Data Available
Phenanthrene	µg/kg	4/ 12	•		67	500		Yes	No Background Data Available
Pyrene	µg/kg	5/ 12	•		110	890		Yes	No Background Data Available
Acetone	µg/kg	1/ 9	•		270	270		Yes	No Background Data Available
Chloroform	µg/kg	3/ 12	•		2	2		Yes	Detected > 5% of Samples
Toluene	µg/kg	5/ 12	•		6	31		Yes	Detected > 5% of Samples
Sediment									
Cyanide	mg/kg	2/ 3	•		0.35	1.1		Yes	No Background Data Available
1,3,5-Trinitrobenzene	µg/kg	2/ 22	•		380	6800		Yes	No Background Data Available
2,4,6-Trinitrotoluene	µg/kg	3/ 22	•		430	770000			Detected > 5% of Samples
HMX	µg/kg	2/ 22	•		2800	12000		Yes	No Background Data Available
RDX	µg/kg	2/22	•		430	16000		Yes	No Background Data Available
Aluminum	mg/kg	22/ 22	15600	2/ 22	3400	19900	20000 – 100000		> 5% Detect Above Background
Antimony	mg/kg	2/ 3	•		15.3	2460		Yes	No Background Data Available

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Arsenic	mg/kg	22/ 22	19.6	7/ 22	6.9	67.1	5.2 – 27.0	Yes	> 5% Detect Above Background
Barium	mg/kg	22/ 22	75	16/ 22	38.5	269	300 – 700	Yes	> 5% Detect Above Background
Beryllium	mg/kg	3/ 3	•		0.38	1.7	1.5 – 2.0	Yes	No Background Data Available
Cadmium	mg/kg	20/ 22	0.29	18/ 22	0.21	26.9	1 – 2	Yes	> 5% Detect Above Background
Calcium	mg/kg	3/ 3	•		3040	36200	1100 – 31000	No	Essential Nutrient
Chromium	mg/kg	22/ 22	18.7	7/ 22	9.5	345	15.0 – 100.0	Yes	> 5% Detect Above Background
Cobalt	mg/kg	3/ 3	•		4.7	43.2	7 – 20	Yes	No Background Data Available
Copper	mg/kg	3/ 3	•		9	558	7.0 – 70.0	Yes	No Background Data Available
Iron	mg/kg	3/ 3	•		9340	199000	15000 – 50000	No	Essential Nutrient
Lead	mg/kg	22/ 22	17.9	14/ 22	12.9	2220	15 – 30	Yes	> 5% Detect Above Background
Magnesium	mg/kg	3/ 3	•		2110	9370	3000 – 15000	No	Essential Nutrient
Manganese	mg/kg	22/ 22	728	9/ 22	80.1	2340	150 – 1000	Yes	> 5% Detect Above Background
Mercury	mg/kg	15/ 22	0.08	7/ 22	0.05	1.4	0.03 – 0.22	Yes	> 5% Detect Above Background
Nickel	mg/kg	3/ 3	•		9.8	108	15 – 50	Yes	No Background Data Available
Potassium	mg/kg	3/ 3	•		185	673	11800 – 25100	No	Essential Nutrient
Selenium	mg/kg	20/ 22	2.6	4/ 22	0.43	10.3	< 0.1 – 1.2	Yes	> 5% Detect Above Background
Silver	mg/kg	2/ 22	0.24	2/ 22	1.5	3.9	0.7	Yes	> 5% Detect Above Background
Sodium	mg/kg	3/ 3	•		195	484	5000 – 7000	No	Essential Nutrient
Thallium	mg/kg	3/ 3	•		0.8	8.1		Yes	No Background Data Available

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Vanadium	mg/kg	3/ 3	•		11.9	14.5	20 – 150	Yes	No Background Data Available
Zinc	mg/kg	22/ 22	72.1	17/ 22	48.2	2530	25 – 110	Yes	> 5% Detect Above Background
4,4′-DDD	µg/kg	1/ 3	•		12	12		Yes	No Background Data Available
4,4′-DDE	µg/kg	1/ 3	•		740	740		Yes	No Background Data Available
4,4′-DDT	µg/kg	1/ 3	•		440	440		Yes	No Background Data Available
Alpha chlordane	µg/kg	1/ 3	•		9.9	9.9		Yes	No Background Data Available
Aroclor-1254	µg/kg	2/ 3	•		290	44000		Yes	No Background Data Available
Endrin	µg/kg	1/ 3	•		160	160		Yes	No Background Data Available
Endrin aldehyde	µg/kg	1/ 3	•		320	320		Yes	No Background Data Available
Gamma chlordane	µg/kg	2/ 3	•		11	130		Yes	No Background Data Available
Heptachlor	µg/kg	1/ 3	•		3.4	3.4		Yes	No Background Data Available
Anthracene	µg/kg	1/ 3	•		260	260		Yes	No Background Data Available
Benzo(a)anthracene	µg/kg	2/ 3	•		260	860		Yes	No Background Data Available
Benzo(a)pyrene	µg/kg	3/ 3	•		350	1300		Yes	No Background Data Available
Benzo(b)fluoranthene	µg/kg	2/ 3	•		600	3000		Yes	No Background Data Available
Benzo(g,h,i)perylene	µg/kg	2/ 3	•		460	1400		Yes	No Background Data Available
Benzo(k)fluoranthene	µg/kg	2/ 3	•		500	1500		Yes	No Background Data Available

Table 1-1 (continued)

Analyte	Units	Frequency of Detects	Background Criteria	Detects > Background	Minimum Detect	Maximum Detect	USGS Value	Site Related?	Justification
Bis(2-ethylhexyl)phthalate	µg/kg	2/ 3	•		120	490		Yes	Detected > 5% of Samples
Carbazole	µg/kg	1/ 3	•		240	240		Yes	No Background Data Available
Chrysene	µg/kg	3/ 3	•		130	1800		Yes	No Background Data Available
Di-n-butyl phthalate	µg/kg	1/ 3	•		870	870		Yes	No Background Data Available
Dibenzo(a,h)anthracene	µg/kg	2/ 3	•		180	560		Yes	No Background Data Available
Fluoranthene	µg/kg	2/ 3	•		510	2100		Yes	No Background Data Available
Indeno(1,2,3-cd)pyrene	µg/kg	2/ 3	•		440	1100		Yes	No Background Data Available
Phenanthrene	µg/kg	2/ 3	•		190	380		Yes	No Background Data Available
Pyrene	µg/kg	3/ 3	•		140	1400		Yes	No Background Data Available
Acetone	µg/kg	1/ 2	•		110	110		Yes	No Background Data Available
Chloroform	µg/kg	1/ 3	•		4	4		Yes	Detected > 5% of Samples

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
RI = remedial investigation
USGS = U.S. Geological Survey

Table 1-2. Load Line 1 Phase I RI Analytical Results (Groundwater)

Analyte	Frequency of Detects	Minimum Detect (µg/L)	Maximum Detect (µg/L)
Groundwater			
Cyanide	1/ 7	2.9	2.9
Aluminum	7/ 7	27.8	235
Arsenic	3/ 7	8.4	64.1
Barium	7/ 7	20.3	105
Beryllium	2/ 6	0.33	0.43
Calcium	6/ 6	4050	196000
Cobalt	5/ 6	1.4	27.5
Copper	4/ 6	0.93	7.4
Iron	4/ 6	37.3	822
Magnesium	6/ 6	2590	80700
Manganese	7/ 7	130	3120
Mercury	3/ 7	0.1	0.13
Nickel	6/ 6	1.6	73.2
Potassium	6/ 6	1010	5090
Sodium	6/ 6	4360	18100
Zinc	4/ 7	9.1	82.5
Heptachlor	1/ 6	0.05	0.05
2,4-Dimethylphenol	1/ 5	1	1
Diethyl phthalate	1/ 6	1	1
Acetone	1/ 4	18	18
Methylene chloride	1/ 7	11	11

RI = remedial investigation

THIS PAGE INTENTIONALLY LEFT BLANK

2.0 HAZARD/RISK ANALYSIS

The purpose of the task hazard/risk analysis is to identify and assess potential hazards that may be encountered by personnel and to prescribe required controls. Table 2-1, a general checklist of hazards that may be posed by this project, indicates whether a particular major type of hazard is present. If additional tasks or significant hazards are identified during the work, this document will be modified by addendum or field change order to include the additional information.

Table 2-1. Hazards Inventory

Yes	No	Hazard
	X	Confined space entry
	X	Excavation entry (deeper than 1.2 m)
X		Heavy equipment (drill rigs and power augers)
X		Fire and explosion (fuels)
X		Electrical shock (utilities)
X		Exposure to chemicals (contaminants and chemical tools)
X		Temperature extremes
X		Biological hazards (ticks, poisonous plants)
	X	Radiation or radioactive contamination
X		Noise (drill rigs, power augers, and power tools for brush clearing)
	X	Drowning
X		OE (residual explosives and propellants only)

OE = ordnance and explosives

Specific tasks are as follows:

- OE surveys and sample location clearance,
- vegetation clearing with machete and chainsaw,
- surface soil sampling with hand augers or scoops,
- subsurface soil boring and sampling with power augers and hollow-stem auger rig,
- surface water and sediment sampling using hand tools,
- bedrock coring and air rotary drilling,
- equipment decontamination at the central equipment decontamination facility,
- field analysis of explosives and metals, and
- characterization and handling of investigation-derived wastes.

2.1 TASK-SPECIFIC HAZARD ANALYSIS

Table 2-2 presents task-specific hazards, task-specific hazard analyses (Risk Assessment Code), relevant hazard controls, and required monitoring, if appropriate, for all of the planned site tasks. The Risk Assessment Codes in Table 2-2 are derived through a qualitative risk assessment process using probability codes and severity codes. The severity codes are:

- I = injuries/illnesses involving permanent total disability or death;
- II = injuries/illnesses with permanent partial disability or temporary total disability;
- III = injuries/illnesses resulting in temporary, reversible conditions with period of disability of less than 3 months; and
- IV = injuries/illnesses with reversible adverse effects requiring only minor treatment.

The probability codes are

- A = likely to occur immediately;
- B = probably will occur in time;
- C = possible to occur in time; and
- D = unlikely to occur.

2.2 POTENTIAL EXPOSURES

Environmental contamination is known to exist at this location, and controls will be used to minimize exposure. Information on the significant contaminants and chemical tools that will be used for the project is contained in Table 2-3. This table includes contaminants that pose a potential to cause adverse effects in site workers during, or after, the execution of this project. It excludes potential contaminants that are unlikely to pose a threat to site workers.

Table 2-2. Hazards Analysis

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Vegetation Clearing with Machetes and Chainsaws			
General safety hazards (rotating machinery, moving equipment, slips, and falls)	B, II	Level D PPE (see Section 5.0) plus hardhat, heavy-duty work gloves, and chainsaw chaps. Uninvolved personnel will be kept at a distance of at least 50 feet. An audible warning will be used to alert personnel when a tree is falling. No elevated (climbing trees, standing on ladders, etc.) chainsaw use. Only personnel experienced with chainsaw use will operate saws. Team members will be at least 10 feet apart but within visual contact during cutting. Chainsaw equipped with anti-kickback protection. Chainsaw adjusted so that chain does not move at idle speed. Chainsaw will not be used to cut above shoulder height. Machetes equipped with lanyard and lanyard looped around wrist during use to prevent accidental release of machete.	Daily safety inspections.
Contact with OE	C, II	Pre-entry screening survey and continuous escort by OE specialist support. On-site training in ordnance recognition for all field personnel. Withdrawal of all SAIC and subcontractor personnel from immediate area and field marking of suspect area if ordnance or suspected ordnance is discovered. Notification of USACE Project Manager and facility EOD personnel if ordnance is discovered.	Visual and instrument surveys for ordnance conducted by OE expert personnel.
Exposure to chemicals (see Table 2-3)	D, IV	No contact with potentially contaminated material is expected during this task. As a precaution, hands will be washed prior to taking anything by mouth. Medical clearance will be required.	Daily safety inspections.
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Fridays and Saturdays during season, October and November)	D, I	No field work during hunting season.	None.
Noise	B, II	Hearing protection while operating or within 25 feet of operating chainsaw.	Daily safety inspections.

Table 2-2. (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Fire (fuels)	D, III	Chainsaw turned off and allowed to cool for 5 minutes prior to fueling. Fuel in safety cans with flame arresters. No ignition sources in fuel storage or refueling areas. Fire extinguisher (see Section 9.0).	Daily safety inspections.
Biological hazards (bees, ticks, wasps, snakes, and poison ivy)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Electric shock	D, II	None expected. SSHO will verify.	Visual survey of all work areas.
Temperature extremes	C, II	Administrative controls (see Section 8.0).	Ambient temperature, heart rates as appropriate.
Soil and Shallow Sediment Sampling with Hand Augers or Scoops			
General safety hazards (manual lifting, slips, falls, traffic, and nearby D&D activities)	D, IV	Level D PPE (see Section 5). Hard hat if overhead hazards are present; HAZWOPER training. Buddy system. Coordination with D&D program personnel, high-visibility vests and other control measures if traffic poses a hazard.	Daily site safety inspections.
Contact with OE	D, II	OE clearance of sample locations in advance. Ordnance is not known or expected; thus, full-time OE support is not required during sampling. On-site training in ordnance recognition for all field personnel. Visual surveillance for OE. Withdrawal of all SAIC and subcontractor personnel and field marking of the area if ordnance or suspected ordnance is discovered. Notification of USACE Project Manager and facility EOD personnel if ordnance is discovered.	Visual and instrument surveys for ordnance conducted by OE specialist personnel. Visual surveillance for OE by all site workers.
Drowning (highly unlikely, ditches and creek expected to be less than 2 feet deep)	D, IV	Coast guard-approved personal flotation devices if working on or near water deeper than 4 feet.	Daily safety inspections.
Exposure to chemicals (see Table 2-3)	D, III	Natural rubber or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Fifteen-minute eyewash within 100 feet if corrosive sample preservatives are being poured. Hazardous Waste operations medical clearance.	Photoionization detector, visual surveillance for significant contamination.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Gunfire (deer hunting with shotguns loaded with slugs allowed in some areas on Fridays and Saturdays during season)	D, I	No field work at dawn or dusk in areas open to hunting (during open hunting season). High-visibility vests in these areas. When possible, schedule work in these areas for Sunday through Thursday.	None.
Biological hazards (poison ivy, bees, ticks, and wasps)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Temperature extremes	C, II	Administrative controls (see Section 9.0). Chilled fluids available if >70 degrees Fahrenheit. Frequent breaks in shaded area.	Ambient temperature, heart rates as appropriate.
Soil Boring and Soil Sampling Using a Hand-Operated Power Auger			
General safety hazards (rotating machinery, moving equipment, slips, falls, traffic, and nearby D&D activities)	C, II	Level D PPE (see Section 5.0). Hard hat if overhead hazards are present. Operate auger per manufacturers' directions. Positive action control (Deadman switch) or easily accessible kill switch on power auger. HAZWOPER training. Buddy system. Coordination with D&D program personnel, high-visibility vests and other control measures if traffic poses a hazard.	Daily site safety inspections.
Contact with OE	D, II	OE clearance of sample locations in advance. Ordnance is not known or expected; thus, full-time OE support is not required during sampling. On-site training in ordnance recognition for all field personnel. Withdrawal of all SAIC and subcontractor personnel from immediate area and field marking of suspect area if ordnance or suspected ordnance is discovered. Notification of USACE Project Manager and facility EOD personnel if ordnance is discovered.	Visual and instrument surveys for ordnance conducted by OE expert personnel. Visual surveillance for OE by all site personnel.
Exposure to chemicals (see Table 2-3)	D, IV	Natural rubber or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Fifteen-minute eyewash within 100 feet if corrosive sample preservatives are being poured. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Medical clearance.	PID monitoring, visual surveillance for dust generation, and visual surveillance for significant contamination.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Fridays and Saturdays during season)	D, I	No field work at dawn or dusk in areas open to hunting during hunting season. High-visibility vests in these areas. When possible, schedule work in these areas for Sunday through Thursday.	None.
Noise	B, II	Hearing protection within 7.6 m (25 feet) of equipment when operating.	Daily safety inspections.
Fire (fuels)	D, III	Fuel in safety cans with flame arresters. No ignition sources in fuel storage or refueling areas. Fire extinguisher rated at least 10-ABC immediately available (see Section 9.0). Allow power auger to cool for at least 10 minutes before refueling.	Daily safety inspection.
Biological hazards (poison ivy, bees, ticks, and wasps)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Electric shock	D, II	Identification and clearance of underground utilities. Contact local utilities clearance organization and appropriate site personnel.	Visual of all work areas.
Temperature extremes	C, II	Administrative controls (see Section 9.0). Chilled fluids if > 70 degrees Fahrenheit.	Ambient temperature, heart rates as appropriate.
Installation of Monitoring Wells Using NX Coring and Subsequent Overdrilling with 4-inch Air Rotary Bit			
General safety hazards (power machinery, moving equipment, slips, falls, traffic, and nearby D&D activities)	D, III	Level D PPE (see Section 5.0) plus hard hat. Personnel not involved with equipment will stand clear during operation. HAZWOPER training. Buddy system. Medical clearance. Drilling locations will be mowed and cleared prior to mobilization of the field team to the site. Coordination with D&D program personnel, high-visibility vests and other control measures if traffic poses a hazard.	Daily site safety inspections.
Contact with OE	D, II	Drilling sites will be cleared by OE specialist personnel. Ordnance is not known or expected; thus, full-time OE support is not required during sampling. On-site training in ordnance recognition for all field personnel. Visual surveillance for OE. Withdrawal of all SAIC and subcontractor personnel and field marking of the area if ordnance or suspected ordnance is discovered. Notification of USACE Project Manager and facility EOD personnel if ordnance is discovered.	Visual and instrument surveys for ordnance conducted by OE specialist personnel. Visual surveillance for OE by all site personnel.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Exposure to chemicals (see Table 2-3)	D, III	Natural rubber or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Air rotary drill rigs will be equipped with dust suppression systems. Fifteen-minute eyewash in the immediate area.	Photoionization detector, visual surveillance for dust generation, and visual surveillance for significant contamination.
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Fridays and Saturdays during season)	D, I	No field work at dawn or dusk in areas open to hunting (during hunting season). High-visibility vests in these areas. When possible, schedule work in these areas for Sunday through Thursday.	None.
Noise	B, III	Hearing protection within 7.6 m (25 feet) of equipment during operation.	Daily safety inspections.
Fire (fuels)	D, III	Fuel in safety cans with flame arresters. Ignition sources excluded from fuel storage and fuel pouring areas. Fire extinguisher rated at least 10-ABC immediately available (see Section 9.0).	Daily safety inspection.
Biological hazards (poison ivy, bees, ticks, and wasps)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Electric shock	D, II	Identification and clearance of aboveground and underground utilities. Contact local utilities locating organization and appropriate site personnel to locate buried utilities. Observe minimum distances from aboveground utilities specified in Section 9.0.	Visual of all work areas.
Temperature extremes	C, II	Administrative controls (see Section 9.0). Chilled fluids immediately available if temperature > 70 degrees Fahrenheit.	Ambient temperature, heart rates as appropriate.
Well Development, Slug Testing, Groundwater Sampling Using Low-Flow Purging Techniques			
Safety hazards associated with equipment, traffic, and nearby D&D activities	D, IV	Level D PPE. Hard hat if overhead hazards are present (see Section 5.0). HAZWOPER training. Buddy system. Coordination with D&D program personnel, high-visibility vests and other control measures if traffic poses a hazard.	Daily safety inspections of SAIC operations.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Contact with unexploded ordinance (OE)	D, II	Pre-clearance of well areas by OE specialist personnel. Training in ordnance recognition for all field personnel. Visual surveillance for the presence of OE. Withdrawal of all SAIC and subcontractor personnel and field marking of the area if ordnance or suspected ordnance is discovered. Notification of USACE and facility EOD personnel if ordnance is discovered.	Visual surveys for ordnance.
Exposure to chemicals (see Table 2-3)	D, IV	Natural rubber or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Fifteen-minute eyewash within 100 feet if corrosive sample preservatives are being poured.	PID if previous monitoring indicated a potential overexposure.
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Fridays and Saturdays during season)	D, I	No field work at dawn or dusk in areas open to hunting during season. High-visibility vests in these areas. When possible, schedule work in these areas for Sunday through Thursday.	None.
Biological hazards (poison ivy, bees, ticks, and wasps)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Temperature extremes	C, II	Administrative controls (see Section 9.0).	Ambient temperature, heart rates as appropriate.
Field Laboratory Analysis			
General safety hazards	D, IV	HAZWOPER training.	Daily site safety inspections.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Exposure to chemicals (see Table 2-3)	B, II	Natural rubber or similar gloves for contact with potentially contaminated material or chemicals. Safety glasses. Lab coat or long-sleeved shirt. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Perform screening in well-ventilated outdoors area or in area with forced exhaust to draw vapors out of the room. If screening is done indoors, it must be done inside an exhaust hood or immediately in front of an exhaust fan. Fifteen-minute eyewash within 100 feet. The operator must thoroughly review (and document review) all applicable MSDSs.	PID monitoring at least twice per day after 1 hour of screening.
Fire (chemical reagents)	D, III	Flammable reagents closed when not in use. If flammable solvents are used, the exhaust fan must be turned on before beginning screening and kept on during screening. Flammables cabinet if more than 25 gallons of flammable material stored inside. Fire extinguisher rated at least 10-ABC nearby (see Section 9.0).	Daily safety inspection.
Disposal of Investigation-Derived Wastes (Soil Cuttings and Decontamination Rinsates)			
General safety hazards (power machinery, moving equipment, slips, and falls)	D, III	Level D PPE (see Section 5.0) plus heavy-duty work gloves. Hardhat if overhead hazards are present. Personnel not involved with equipment (trailer-mounted liquid tank, manual drum truck, drum grappler, Tommy lift, etc.) will stand clear during operation. HAZWOPER training. Buddy system. No personnel under lifted loads. Only adequately trained, experienced personnel will be allowed to operate equipment. Equipment used to lift or move drums will be used within its rated weight capacity. Coordination with D&D program management and protective measures, potentially including high-visibility vests, if traffic or other hazards are present.	Daily site safety inspections.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Contact with OE	D, II	On-site training in ordnance recognition for all field personnel. Visual surveillance for OE. Withdrawal of all SAIC and subcontractor personnel and field marking of the area if ordnance or suspected ordnance is discovered. Notification of USACE Project Manager and facility EOD personnel if ordnance is discovered.	Visual surveys for ordnance.
Exposure to chemicals (see Table 2-3)	D, III	Natural rubber or similar gloves for contact with potentially contaminated material. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact Medical clearance.	Daily site safety inspections.
Gunfire (deer hunting with shotguns loaded with slugs allowed in some areas on Fridays and Saturdays during season)	D, I	No field work at dawn or dusk in areas open to hunting (during season). High-visibility vests in these areas. When possible, schedule work in these areas for Sunday through Thursday.	None.
Biological hazards (poison ivy, bees, ticks, and wasps)	C, III	PPE (boots, work clothes). Pants tucked into boots or wrapped with duct tape. Insect repellant, as necessary.	Visual survey.
Temperature extremes	C, II	Administrative controls (see Section 9.0). Chilled fluids immediately available if temperature > 70 degrees Fahrenheit.	Ambient temperature, heart rates as appropriate.
Equipment Decontamination (Hot Water Washing, Soap and Water Washing, Solvent Rinse)			
General equipment decontamination hazards (hot water, slips, falls, and equipment handling)	C, III	Level D+ PPE (see Section 5.0) plus: Nitrile or PVC gloves, face shield, and Saranax or rain suit (when operating steam washer). HAZWOPER training.	Daily safety inspections.
Noise (spray washer)	B, II	Hearing protection when within 7.6 m (25 feet) of operating washer.	Daily safety inspections.
Fire (flammable decontamination solvents and gasoline)	D, III	Exclusion of ignition sources during solvent use. Control of flammable materials (quantities in decontamination area limited to single-day use, proper storage). Fire extinguisher (see Section 9.0).	Daily safety inspections.

Table 2-2 (continued)

Safety and Health Hazards	Risk Assess. Codes	Controls	Monitoring
Exposure to chemicals (see Table 2-3)	D, III	Natural rubber or similar gloves for handling potentially contaminated materials. Adequate ventilation during solvent use. Washing face and hands and any other exposed areas prior to taking anything by mouth. Minimal contact. Medical clearance.	Daily safety inspection
Temperature extremes	C, II	Administrative controls (see Section 9.0).	Temperature measurements as appropriate, heart rate monitoring as appropriate.

D&D = Decontamination and Decommissioning
EOD = Explosives ordnance disposal
HAZWOPER = Hazardous Waste Operations and Emergency Response
MSDS = Material Safety Data Sheet
OE = Ordnance and explosives
PID = Photoionization detector
PPE = Personal protective equipment
PVC = Polyvinyl chloride
SAIC = Science Applications International Corporation
USACE = U.S. Army Corps of Engineers.

Table 2-3. Potential Exposures for the Phase II RI at Load Line 1

Chemical[a]	TLV/PEL/STEL/IDLH[b]	Health Effects/ Potential Hazards[c]	Chemical and Physical Properties[c]	Exposure Route(s)[c]
DNT (dinitrotoluene)	TLV/TWA: 0.2 mg/m^3, A2 IDLH: Ca [50 mg/m^3]	Suspected human carcinogen, anorexia, cyanosis, and reproductive effects	Orange-yellow solid, VP: 1 mm; FP: 404°F	Inhalation Absorption Ingestion Contact
Gasoline (used for fuel)	TLV/TWA: 300 ppm IDLH: Ca	Potential carcinogen per NIOSH, dizziness, eye irritation, and dermatitis	Liquid with aromatic odor; FP: -45°F; VP: 38 to 300 mm	Inhalation Ingestion Absorption Contact
Hydrochloric acid (potentially used to preserve water samples or for equipment decontamination)	TLV: 5 ppm ceiling IDLH: 50 ppm	Irritation of eyes, skin, and respiratory system	Liquid; VP: fuming; IP: 12.74 eV; FP: none	Inhalation Ingestion Contact
Isopropyl alcohol (potentially used for equipment decontamination)	TLV/TWA: 400 ppm STEL: 500 ppm IDLH: 2000 ppm	Irritation of eyes, skin, respiratory system; drowsiness, headache	Colorless liquid with alcohol odor; VP: 33 mm; IP: 10.10 eV; FP: 53°F	Inhalation Ingestion Contact
Lead	TLV/TWA: 0.05 mg/m^3, A3 PEL/TWA: 0.05 mg/m^3 IDLH: 100 mg/m^3	Weakness, anorexia, abdominal pain, anemia	Solid metal; VP: 0 mm; FP: NA; IP: NA	Inhalation Ingestion Contact
Liquinox (used for decontamination)	TLV/TWA: None	Inhalation may cause local irritation to mucus membranes	Yellow odorless liquid (biodegradable cleaner); FP: NA	Inhalation Ingestion
Methanol (potentially used for equipment decontamination)	TLV/TWA: 200 ppm Skin notation IDLH: 6000 ppm	Irritation of eyes, skin, respiratory system; headache; optic nerve damage	Liquid; VP: 96 mm; IP: 10.84 eV; FP: 52°F	Inhalation Absorption Ingestion Contact

Table 2-3 (continued)

Chemical[a]	TLV/PEL/STEL/IDLH[b]	Health Effects/ Potential Hazards[c]	Chemical and Physical Properties[c]	Exposure Route(s)[c]
HMX (octogen)	TLV/TWA: None established, toxicity assumed to be similar to RDX as compounds are very similar	Explosive; assumed irritation of eyes and skin, dizziness, weakness	Assumed similar to RDX- FP: explodes; VP: 0.0004 mm at 230°F	Assumed: Inhalation Absorption Ingestion Contact
RDX (cyclonite)	TLV/TWA: 0.5 mg/m^3, A4 Skin notation IDLH: none established	Explosive; irritation of eyes and skin, dizziness, weakness	White powder; FP: explodes; VP: 0.0004 mm at 230°F	Inhalation Absorption Ingestion Contact
TNT (trinitrotoluene)	TLV/TWA: 0.5 mg/m^3 Skin notation IDLH: 500 mg/m^3	Cluster headache; irritation of skin and mucus membranes, liver damage, and kidney damage	Pale solid; FP: explodes; VP: 0.0002 mm	Inhalation Absorption Ingestion Contact

[a]The potential chemicals were obtained from the *Phase I Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plan, Ravenna, Ohio* (USACE 1998).
[b]From 1999 Threshold Limit Values, *NIOSH Pocket Guide to Chemical Hazards*, 1997.
[c]From 1997 *NIOSH Pocket Guide to Chemical Hazards, the Condensed Chemical Dictionary*, Tenth Edition.

IP = ionization potential
PEL = permissible exposure limit
STEL = short-term exposure limit
TLV = threshold limit value
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
TWA = time-weighted average
VP = vapor pressure
NA = not available
NIOSH = National Institute for Occupational Safety and Health
FP = flash point
IDLH = immediately dangerous to life and health

THIS PAGE INTENTIONALLY LEFT BLANK

3.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

This section presents the personnel (and their associated telephone numbers) responsible for site safety and health and emergency response. Table 3-1 identifies the SAIC and subcontractor individuals who will fill key roles. See the Facility-wide Safety and Health Plan (FSHP) for information on the roles and responsibilities of key positions.

Table 3-1. Staff Organization

Position	Name	Phone
Program Manager (DACA62-94-D-0029)	Ike Diggs	423-481-8710
Health and Safety Manager	Steve Davis CIH, CSP	423-481-4755
Project Manager	Steve Selecman	423-481-8761
Technical Manager	Kevin Jago	423-481-4614
Field Operations Manager	Kathy Dominic	937-431-2220
Site Safety and Health Officer (well installation)	Heather Smith	423-481-4602
Site Safety and Health Officer (soil, sediment, and surface water sampling)	Martha Clough	937-431-2220

CIH = Certified Industrial Hygienist
CSP = Certified Safety Personnel

THIS PAGE INTENTIONALLY LEFT BLANK

4.0 TRAINING

Training requirements are outlined in the FSHP. In addition to the FSHP's requirements, at least two first aid/cardiopulmonary resuscitation (CPR)-trained personnel must be onsite during field activities.

THIS PAGE INTENTIONALLY LEFT BLANK

5.0 PERSONAL PROTECTIVE EQUIPMENT

General guidelines for the selection and use of PPE are presented in the FSHP. Specific PPE requirements for the Phase I RI at Erie Burning Grounds are presented in the hazard/risk analysis section (Chapter 2.0).

THIS PAGE INTENTIONALLY LEFT BLANK

6.0 MEDICAL SURVEILLANCE

Medical surveillance requirements are outlined in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

7.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Assessment of airborne chemical concentrations will be performed, as appropriate, to ensure that exposures do not exceed acceptable levels. Action levels, with appropriate actions, have been established for this monitoring. In addition to the specified monitoring, the Site Safety and Health Officer (SSHO) may perform, or require, additional monitoring such as organic vapor monitoring in the equipment decontamination area, personnel exposure sampling for specific chemicals, etc. The deployment of monitoring equipment will depend on the activities being conducted and the potential exposures. All personal exposure monitoring records will be maintained in accordance with 29 *Code of Federal Regulations* 1910.20. The minimum monitoring requirements and action levels are presented in Table 7-1.

Most of Phase II RI field work is not expected to pose airborne exposure hazards for the following reasons:

- the work will be performed in open areas with natural ventilation;
- the site has been inactive since 1971, and no activities have occurred at the site since the early 1990s; thus, any volatile contaminants should have evaporated;
- prior site sampling indicated that contaminants are unlikely to pose an airborne hazard; and
- the most probable contaminants (heavy metals and explosive residues) are materials with relatively low vapor pressures.

For these reasons, air monitoring using a photoionization detector (PID) or equivalent is planned only for subsurface soil boring and sampling and monitoring well drilling and installation. The SSHO will, of course, examine site conditions and will contact the Health and Safety Manager and initiate additional monitoring if there is any indication of potential airborne exposure.

Table 7-1. Monitoring Requirements and Action Limits

Hazard or Measured Parameter	Area	Interval	Limit	Action	Tasks
Airborne organics with PID or equivalent	Breathing zone [0.9 m (3 feet) from source or 0.36 m (14 inches)] in front of employee's shoulder	At least once every 30 minutes in areas of intrusive work, at least twice a day in the mobile lab (when lab in use)	<5 ppm >5 ppm	Level D Withdraw and evaluate • identify contaminants • notify Project Manager and H&S Manager	Drilling, soil sampling, well development, and groundwater sampling; if previous sampling indicates a potential for overexposure, on-site laboratory analysis.
Detector tubes	Breathing zone	If organic vapor >5 ppm	PEL/TLV	Withdraw and evaluate; controls may include engineering, administrative, or personal protective measures	
Flammability and oxygen content with combustible gas indicator	Near borehole and any area where flammable gases are suspected	Only if PID readings exceed 100 ppm or other indicators of flammability observed	<10% LEL >10% LEL	Continue and evaluate source Withdraw and allow area to ventilate; notify Project Manager and H&S Manager	Intrusive tasks
Noise	None; SAIC has performed monitoring of drill rigs and generators on previous projects	Only if there is some doubt about noise levels	85 dBA and any area perceived as noisy	Require the use of hearing protection	None; hearing protection will be worn within the exclusion zone around drill rigs, excavation equipment, power augers, and generators
Visible contamination	All	Continuously	Visible contamination of skin or personal clothing	Upgrade PPE to preclude contact; may include disposable coveralls, boot covers, etc.	All

Table 7-1 (continued)

Hazard or Measured Parameter	Area	Interval	Limit	Action	Tasks
Visible airborne dust	All	Continuously	Visible dust generation	Stop work; use dust suppression techniques such as wetting surface	All

H&S = Health and Safety
LEL = Lower explosive limit
PEL = Permissible exposure limit
PID = Photoionization detector
PPE = Personal protective equipment
ppm = parts per million
SAIC = Science Applications International Corporation
TLV = Threshold limit value

THIS PAGE INTENTIONALLY LEFT BLANK

8.0 HEAT/COLD STRESS MONITORING

General requirements for heat/cold stress monitoring are contained in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

9.0 STANDARD OPERATING SAFETY PROCEDURES

Standard operating safety procedures are described in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

10.0 SITE CONTROL MEASURES

Site control measures are described in the FSHP. Because Load Line 1 is currently undergoing demolition, multiple personnel are routinely working in some of the proposed sampling areas. For these reasons, site control will be implemented at subsurface soil boring and monitoring well drilling locations requiring the use of drilling rigs. Surface soil, surface water, and sediment sampling locations will not require site control measures under normal circumstances. If site conditions require site control, it will be implemented as described in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

11.0 PERSONNEL HYGIENE AND DECONTAMINATION

Personal hygiene and decontamination requirements are described in the FSHP and in Chapter 2.0 of this addendum.

THIS PAGE INTENTIONALLY LEFT BLANK

12.0 EQUIPMENT DECONTAMINATION

Equipment decontamination procedures are described in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

13.0 EMERGENCY PROCEDURES AND EQUIPMENT

Emergency contacts, telephone numbers, directions to the nearest medical facility, and general procedures can be found in the FSHP. The SAIC Field Operations Manager will remain in charge of all SAIC and subcontractor personnel during emergency activities. The SAIC field office will serve as the assembly point if it becomes necessary to evacuate one or more sampling locations. The SSHO will verify that the emergency information in the FSHP is correct during mobilization for the Phase II RI.

THIS PAGE INTENTIONALLY LEFT BLANK

14.0 LOGS, REPORTS, AND RECORD KEEPING

Logs, reports, and record keeping requirements are described in the FSHP.

THIS PAGE INTENTIONALLY LEFT BLANK

15.0 REFERENCES

NIOSH (National Institute for Occupational Safety and Health). 1997. NIOSH Pocket Guide to Chemical Hazards, the Condensed Chemical Dictionary, 10th edition.

USACE (U.S. Army Corps of Engineers). 1998. Phase I Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio, DACA62-94-D-0029, D.O. 0010 and 0022, February.

THIS PAGE INTENTIONALLY LEFT BLANK