

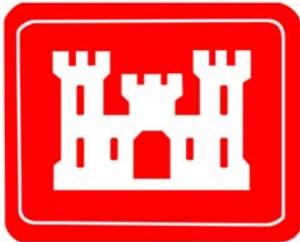
**FINAL**

**SITE SAFETY AND HEALTH PLAN  
ADDENDUM NO. 1**

*FOR THE*

**PHASE II REMEDIAL INVESTIGATION OF  
ERIE BURNING GROUNDS AT THE  
RAVENNA ARMY AMMUNITION PLANT,  
RAVENNA, OHIO**

*PREPARED FOR*



**US Army Corps  
of Engineers®**

**LOUISVILLE DISTRICT  
CONTRACT No. F44650-99-D-0007  
DELIVERY ORDER CY10**

**October 2003**



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Prepared by

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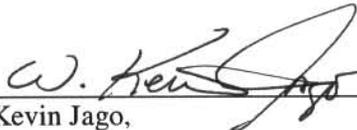
**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION**

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

**APPROVALS**

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**October 2003**

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## ACRONYMS

AOC	Area of Concern
CPR	cardiopulmonary resuscitation
EBG	Erie Burning Grounds
FSHP	Facility-wide Safety and Health Plan
PPE	personal protective equipment
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

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## INTRODUCTION

Science Applications International Corporation's (SAIC's) formal policy, 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 (RVAAP) *Facility-wide Safety and Health Plan* (FSHP) (USACE 2001a) 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. These plans are driven by requirements contained in the most current revisions of the U.S. Army Corps of Engineers *Safety and Occupational Health Requirements for Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*, and the USACE *Safety and Health Manual, EM-385-1-1-13*, which are available online via the USACE web site. SAIC activities are also subject to the requirements of the SAIC Corporate Environmental Compliance and Health and Safety Program and associated procedures. All field personnel are required to comply with the requirements of these programs and plans. In addition, subcontractors are responsible for providing their employees with a safe work place 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, that 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 the Phase II Remedial Investigation (RI) at Erie Burning Grounds (EBG). Copies of the FSHP and this SSHP Addendum will be present at the work site during all fieldwork.

SAIC will perform field investigations at EBG. The EBG, designated as Area of Concern (AOC) RVAAP-2, was in operation from 1941 to 1951 and consists of approximately 14.2 ha (35 acres). The burning grounds are situated at the northeastern corner of the RVAAP facility. The site was used to conduct open burning of explosives and related materials. Prior to purchase by the Army in 1940, the site may have been used for brick manufacturing (USACE 2001b). Bulk, obsolete, non-specification explosives, propellants, rags, and Army rail cars used for transporting explosives across the installation were treated at EBG by open burning. The principal sources of contaminants are the ash residues derived from the burning of TNT, RDX, and propellants. These residues potentially contain small amounts of explosives and heavy metals. The potential exists for ordnance and explosive waste to remain on the site.

A Phase I RI was conducted at EBG in 1999 (USACE 2001b), which involved comprehensive sampling of soil, sediment, and surface water within the site. Ordnance and explosives avoidance surveys were conducted during the Phase I RI. No ordnance, bulk explosives, or propellants were discovered during field reconnaissance and magnetometer surveys of access routes and sampling station locations. One metal fragment was found in the southern portion of the site, which was suspected to be a fragment of a shell casing; however, conclusive identification could not be made due to the degree of deterioration.

Planned site activities consist of environmental sampling and support tasks. These tasks include subsurface soil borings and sampling, surface water sampling using both waders and boat, sediment sampling, monitoring well installation and groundwater sampling, aerial surveys, equipment decontamination, and management of investigation-derived wastes (soil, drill cuttings, water, and decontamination fluids).

Potential hazards posed by the planned tasks include injury from ordnance and explosives; drowning associated with water and sediment sampling from boats; noise and cut hazards associated with clearing vegetation; striking, rotation, and noise hazards from excavating and drilling equipment; lifting, noise, and

strain hazards associated with operating soil sampling equipment; fuel or decontamination solvent fires; chemical exposure; temperature extremes; stinging/biting insects; poisonous plants; and snakes.

The potential for chemical overexposure appears to be very low, based on the nature of planned tasks and review of available data. Identified volatile contaminants to date occur in low concentrations in groundwater and identified inorganic and explosive contaminants have low vapor pressures, making overexposure through vapor inhalation very unlikely. There is some potential for chemical exposures via the inhalation pathway during drilling operations and dermal contact with contaminated soil. Airborne exposures will be monitored during drilling operations. Sampling and drilling crews 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 inhalation and/or dermal contact with potentially contaminated materials. The crew will use protective gloves to handle potentially contaminated materials, and, if necessary, the SSHO will upgrade the required PPE to prevent dermal contact with potentially contaminated materials. Physical hazards are associated with water-borne operations, excavation and drilling equipment, and hand-operated power tools (chainsaw, etc.). Task-specific hazard controls have been specified for these tasks. The SSHO will observe all site tasks during daily safety inspections and will use professional judgment and appropriate monitoring results to determine if upgrading PPE is required. A detailed analysis of these hazards and specific appropriate controls is presented in Chapter 2.0, [Table 2-2](#). Details regarding PPE are contained in Chapter 5.0.

This investigation will be performed in Level D PPE, plus chemical-resistant gloves when handling potentially contaminated materials. If 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. A copy of SAIC's PPE procedures is included as Appendix A to this SHHP Addendum. Specific tasks, such as drilling, brush clearing, and chainsaw use require additional PPE (e.g., hardhats, leather gloves, face shield, chainsaw, and chaps), as delineated in [Table 2.2](#).

## 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 ha (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, TolTest, 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. Various munitions were handled on the installation including artillery rounds of 90 mm or more and bombs up to 2,000 lbs.

A detailed discussion of the available operational history for the Erie Burning Grounds (EBG) may be found in the Phase I Remedial Investigation (RI) Report (USACE 2001b). The EBG, designated as Area of Concern RVAAP-2, was in operation from 1941 to 1951 and consists of approximately 14.2 ha (35 acres). The site is located at the northeastern corner of the RVAAP facility and was used to conduct open burning of explosives and related materials. Prior to purchase by the Army in 1940, the site may have been used for brick manufacturing. Bulk, obsolete, non-specification explosives, propellants, rags, and Army rail cars used for transporting explosives across the installation were treated at EBG by open burning. Based on available historical information, materials were offloaded from railroad cars or trucks to be burned in a designated burn area or within the “T-Area,” which was protected by three pairs of trenches excavated to approximately 4 ft deep to serve as containment barriers for fires set between the trenches. Ash residues from open burning remained on the site. The principal sources of explosives and propellant contaminants are the ash residues derived from the burning of trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, and bulk propellants. These residues also potentially contain small amounts of heavy metals from the burning process, and any accelerants used may also contribute semivolatile organic contaminants to the environment. Estimates of the quantities of wastes disposed by burning at EBG have reached as high as 1M lbs, but it is unknown if this figure is accurate. The potential exists for ordnance and explosives waste to remain at the site.

Current conditions at EBG differ greatly from those during its active life. The area became a wetland in the early 1990s as a consequence of the plugging of the primary drainage culvert and beaver damming of small streams that drained the burning grounds. Wetland areas now occupy the low lying portions of the site. The current depth of the water in the wetland areas reaches a maximum of 5 ft. Wetlands extend to the north and east beyond EBG and the RVAAP facility boundary. Dense brush vegetation now covers the portions of the site that are not submerged.

### 1.2 CONTAMINANTS

Table 1-1 lists contaminants known to occur in surface soil, sediment, and surface water at EBG. Subsurface soil characterization was limited and groundwater was not characterized during the Phase I RI investigation. Inclusion in this table indicates the potential to encounter a contaminant during Phase II RI field activities, but it does not necessarily indicate that the contaminant is present in sufficient quantity to pose a health risk to workers.

**Table 1-1. Maximum Concentrations of Site-Related Constituents at Erie Burning Grounds**

<b>Chemical</b>	<b>Units</b>	<b>Maximum Detect<sup>a</sup></b>
<i>Surface Soil</i>		
<b>Explosives and Propellants</b>		
1,3,5-Trinitrobenzene	mg/kg	0.91
2,4,6-Trinitrotoluene	mg/kg	7.10
2,4-Dinitrotoluene	mg/kg	0.62
4-Nitrotoluene	mg/kg	0.20
Nitrocellulose as N	mg/kg	5.90
<b>Inorganics</b>		
Aluminum	mg/kg	30200.00
Antimony	mg/kg	91.70
Arsenic	mg/kg	24.10
Barium	mg/kg	1050.00
Beryllium	mg/kg	3.80
Cadmium	mg/kg	19.80
Chromium	mg/kg	87.90
Cobalt	mg/kg	17.30
Copper	mg/kg	586.00
Cyanide	mg/kg	32.50
Lead	mg/kg	1060.00
Manganese	mg/kg	3820.00
Mercury	mg/kg	0.14
Nickel	mg/kg	90.50
Silver	mg/kg	3.10
Thallium	mg/kg	0.50
Vanadium	mg/kg	112.00
Zinc	mg/kg	5340.00
<b>Semivolatile Organic Compounds</b>		
Anthracene	mg/kg	0.46
Benzo(a)anthracene	mg/kg	1.70
Benzo(a)pyrene	mg/kg	1.80
Benzo(b)fluoranthene	mg/kg	3.90
Benzo(g,h,i)perylene	mg/kg	0.95
Benzo(k)fluoranthene	mg/kg	1.50
Bis(2-ethylhexyl)phthalate	mg/kg	3.50
Carbazole	mg/kg	0.16
Chrysene	mg/kg	2.40
Fluoranthene	mg/kg	1.90
Indeno(1,2,3-cd)pyrene	mg/kg	1.10
Phenanthrene	mg/kg	0.45
Pyrene	mg/kg	1.90
<b>Volatile Organic Compounds</b>		
Acetone	mg/kg	0.01
Methylene Chloride	mg/kg	0.001

**Table 1-1. Maximum Concentrations of Site-Related Constituents at Erie Burning Grounds (continued)**

<b>Chemical</b>	<b>Units</b>	<b>Maximum Detect<sup>a</sup></b>
<i>Subsurface Soil</i>		
<b>Explosives and Propellants</b>		
2,4,6-Trinitrotoluene	mg/kg	3.20
2,4-Dinitrotoluene	mg/kg	0.09
3-Nitrotoluene	mg/kg	0.22
4-Nitrotoluene	mg/kg	0.12
HMX	mg/kg	0.20
Nitrocellulose as N	mg/kg	2.90
<b>Inorganics</b>		
Aluminum	mg/kg	18300.00
Antimony	mg/kg	7.00
Barium	mg/kg	263.00
Beryllium	mg/kg	1.40
Cadmium	mg/kg	1.80
Copper	mg/kg	90.50
Lead	mg/kg	129.00
Manganese	mg/kg	1230.00
Mercury	mg/kg	0.10
Zinc	mg/kg	622.00
<b>Semivolatile Organic Compounds</b>		
Benzo(a)anthracene	mg/kg	0.06
Benzo(a)pyrene	mg/kg	0.07
Benzo(b)fluoranthene	mg/kg	0.15
Benzo(k)fluoranthene	mg/kg	0.07
Bis(2-ethylhexyl)phthalate	mg/kg	1.20
Chrysene	mg/kg	0.10
Fluoranthene	mg/kg	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	0.05
Phenanthrene	mg/kg	0.28
Phenol	mg/kg	0.05
Pyrene	mg/kg	0.16
<b>Volatile Organic Compounds</b>		
Acetone	mg/kg	0.02
Methylene Chloride	mg/kg	0.038
Toluene	mg/kg	0.03
<i>Sediment</i>		
<b>Explosives and Propellants</b>		
1,3,5-Trinitrobenzene	mg/kg	0.15
2,4,6-Trinitrotoluene	mg/kg	95.00
2,4-Dinitrotoluene	mg/kg	0.14
2,6-Dinitrotoluene	mg/kg	0.28
2-Nitrotoluene	mg/kg	0.23
3-Nitrotoluene	mg/kg	0.16
4-Nitrotoluene	mg/kg	0.22
HMX	mg/kg	1.10
Nitrobenzene	mg/kg	0.19
Nitrocellulose as N	mg/kg	19.70

**Table 1-1. Maximum Concentrations of Site-Related Constituents at Erie Burning Grounds (continued)**

<b>Chemical</b>	<b>Units</b>	<b>Maximum Detect<sup>a</sup></b>
<b>Inorganics</b>		
Aluminum	mg/kg	34800.00
Antimony	mg/kg	3160.00
Arsenic	mg/kg	119.00
Barium	mg/kg	2170.00
Cadmium	mg/kg	44.80
Chromium	mg/kg	253.00
Cobalt	mg/kg	17.50
Copper	mg/kg	1140.00
Cyanide	mg/kg	8.30
Lead	mg/kg	1870.00
Manganese	mg/kg	7390.00
Mercury	mg/kg	0.34
Nickel	mg/kg	177.00
Silver	mg/kg	6.20
Vanadium	mg/kg	51.00
Zinc	mg/kg	18400.00
<b>Polychlorinated Biphenyls</b>		
Aroclor-1254	mg/kg	0.11
<b>Semivolatile Organic Compounds</b>		
4-Methylphenol	mg/kg	0.15
Benzo(a)anthracene	mg/kg	0.27
Benzo(b)fluoranthene	mg/kg	0.70
Bis(2-ethylhexyl)phthalate	mg/kg	1.30
Carbazole	mg/kg	0.07
Chrysene	mg/kg	0.94
Fluoranthene	mg/kg	2.40
Phenanthrene	mg/kg	1.50
Pyrene	mg/kg	1.20
<b>Volatile Organic Compounds</b>		
2-Butanone	mg/kg	0.10
Acetone	mg/kg	0.28
Benzene	mg/kg	0.002
Methylene Chloride	mg/kg	0.001
Toluene	mg/kg	0.05
<i>Surface Water</i>		
<b>Explosives and Propellants</b>		
1,3-Dinitrobenzene	µg/L	0.08
2,4,6-Trinitrotoluene	µg/L	1.10
2,4-Dinitrotoluene	µg/L	0.09
3-Nitrotoluene	µg/L	0.40
HMX	µg/L	0.41
Nitrobenzene	µg/L	0.07
Nitrocellulose as N	µg/L	820.00
<b>Inorganics (Unfiltered)</b>		
Aluminum	µg/L	123000.00
Antimony	µg/L	67.00
Arsenic	µg/L	120.00

**Table 1-1. Maximum Concentrations of Site-Related Constituents at Erie Burning Grounds (continued)**

<b>Chemical</b>	<b>Units</b>	<b>Maximum Detect<sup>a</sup></b>
Barium	µg/L	1900.00
Cadmium	µg/L	23.00
Chromium	µg/L	150.00
Cobalt	µg/L	59.00
Copper	µg/L	630.00
Cyanide	µg/L	65.00
Lead	µg/L	790.00
Manganese	µg/L	11300.00
Mercury	µg/L	0.27
Nickel	µg/L	240.00
Selenium	µg/L	16.00
Vanadium	µg/L	210.00
Zinc	µg/L	5400.00
<b>Semivolatile Organic Compounds</b>		
4-Methylphenol	µg/L	120.00
Phenol	µg/L	7.80
<b>Volatile Organic Compounds</b>		
Acetone	µg/L	13.00
Carbon Disulfide	µg/L	3.70
Chloroform	µg/L	0.71
Toluene	µg/L	1.10
Xylenes, Total	µg/L	1.70

<sup>a</sup> Chemicals shown are site-related constituents as identified in the Phase I Remedial Investigation Report. Laboratory qualifiers not shown, some results are estimated values less than reporting limits.

Source: USACE 2001.

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

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## 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 (excavations will not be entered)
X		Heavy equipment (drill rigs, backhoe)
X		Fire and explosion (fuels)
X		Electrical shock (utilities and tools)
X		Exposure to chemicals (contaminants and chemical tools)
X		Temperature extremes
X		Biological hazards (poison ivy, Lyme disease)
	X	Radiation or radioactive contamination
X		Noise (excavation equipment, powered auger, drill rig)
X		Drowning
X		OE (potential to encounter unexploded ordnance)

OE = ordnance and explosives.

Specific tasks are as follows:

- soil sampling with powered auger, hand augers, or scoops;
- vegetation clearing by the RVAAP operations and maintenance contractor using a bush hog in accordance with their applicable procedures;
- vegetation clearing by SAIC personnel with machetes and chainsaws;
- surface water and sediment sampling on ponds and streams from shoreline and boats;
- civil surveying;
- investigation-derived waste handling and disposition;
- subsurface soil sampling and monitoring well installation using air rotary rigs and hollow stem auger drill rigs;
- well development and groundwater sampling; and
- sampling equipment decontamination.

## **2.1 TASK-SPECIFIC HAZARD ANALYSIS**

Table 2-2 presents task-specific hazards, relevant hazard controls, and required monitoring, if appropriate, for all of the planned tasks.

## **2.2 POTENTIAL EXPOSURES**

Prior sampling results indicate that the primary contaminants of concern at Erie Burning Grounds are explosives residues and metals. Information on the potential contaminants, as well as the reagents and chemicals that will be used for the project, is contained in Table 2-3. Material Safety Data Sheet records for reagents and chemicals to be used on the project are contained in Building 1036 at RVAAP. It is important to note that the contaminants listed in Table 2-3 have been detected in a number of locations at RVAAP and might be expected to occur at any former operations area. Exposure to chemical tools, such as corrosive sample preservatives, field laboratory reagents, or flammable fuels, is a possibility and will be controlled through standard safe handling practices.

**Table 2-2. Hazards Analysis**

Safety and Health Hazards	Controls	Monitoring Requirements
<i>Civil Surveys and Visual Surveys in Potentially Contaminated Areas</i>		
General safety hazards (moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, and hard hats if overhead hazards are present (see Chapter 5.0 of the FSHP). Site-specific training, buddy system, proper housekeeping	Daily safety inspections
Contact with OE	Compliance with the OE Avoidance Plan included as Appendix B of the SAP Addendum No. 1 for Erie Burning Grounds. 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	Visual and instrument surveys for ordnance conducted by OE expert personnel
Exposure to chemicals	Nitrile or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Wash face and hands and any other exposed areas prior to taking anything by mouth. Hazardous waste site operations training and medical clearance Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard	None
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Friday and Saturday during season, October and November)	Fieldwork will not be conducted during hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
<b><i>Soil Boring and Soil Sampling Using a Hand-Operated Power Auger</i></b>		
General safety hazards (rotating machinery, moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots (see Chapter 5.0 of FSHP) plus hard hat if overhead hazards are present. Buddy system. Site-specific training. Proper housekeeping. Operate auger per manufacturer's directions. Only experienced operators will be allowed to operate offset-drive power auger. Positive action control (deadman switch). Lifts of >50 lbs will be performed by two or more personnel or with mechanical assistance; extensive heavy lifting will require additional lifting training. Exclusion zone if there is a potential for unauthorized entry	Daily safety inspections
Contact with OE	Pre-entry screening survey and continuous escort by OE specialist support. Down-hole monitoring at 2-ft intervals. 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	Visual and instrument surveys for ordnance conducted by OE expert personnel
Exposure to chemicals	Nitrile or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard. Water used to suppress dust during concrete boring	PID or equivalent
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Noise	Hearing protection within 7.6 m (25 ft) of equipment when operating	Daily safety inspections
Fire (fuels)	Fuel in safety cans with flame arrestors. No ignition sources in fuel storage or refueling areas. Fire extinguisher in all fuel use areas. Bonding (metal to metal) contact while pouring. Gasoline-powered equipment must be shut down and allowed to cool for 5 min prior to fueling	Daily safety inspections
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, and snakes. West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
Electric shock	Identification and clearance of underground utilities. No live utilities are known to exist at Erie Burning Grounds	Visual survey of all work areas

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
<b><i>Groundwater Well Development, Groundwater Monitoring, Groundwater Sampling, and Sample Preservation</i></b>		
General safety hazards (moving equipment, lifting, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety boots, hard hats if overhead hazards are present (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Lifts of >50 lbs will be performed by two or more personnel or with mechanical assistance, extensive heavy lifting will require additional lifting training. Exclusion zone if there is a potential for unauthorized entry	Daily site safety inspections
Noise	None, unless SSHO determines that equipment potentially exceeds 85 dBA	Daily safety inspection
Fire (fuels)	Fuel stored in safety cans with flame arresters. Fire extinguisher in all fuel use areas. No ignition sources in fuel storage areas. Bonding (metal to metal contact) during pouring. Gasoline-powered equipment must be shut down and allowed to cool for 5 min prior to fueling	Daily site safety inspections
Exposure to chemicals	Level D PPE, including nitrile or PVC gloves, to handle potentially contaminated material. Minimal contact, wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Fifteen-minute eyewash within 100 ft when pouring corrosive sample preservatives; eyewash bottle within 10 ft when adding water to pre-preserved sample containers. Site training must include hazards and controls of exposure to contaminants and chemicals used on-site. MSDSs for chemical tools kept on-site. All chemical containers labeled with contents and hazard	Daily site safety inspections PID monitoring if prior monitoring during soil boring indicated a potential for exposure
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Electrical shock	GFCI for all electrical hand tools	Daily safety inspection
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
<b><i>Soil Boring, Soil Sampling, and Monitoring Well Installation Using Air Rotary or Auger Drill Rig</i></b>		
General safety hazards (rotating machinery, suspended loads, moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety boots, work gloves for material handling plus hard hat (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. No employees under lifted loads. At least two functional kill switches. Functional backup alarm. Drill rig manual on-site. Only experienced operators. Exclusion zone at least equal to mast height if there is any potential for unauthorized entry	Daily site safety inspections Weekly drill rig inspections
Noise	Hearing protection $\geq$ NRR 25 within 7.6 m (25 ft) of rig unless rig-specific monitoring indicates noise exposure of less than 85 dBA	Daily safety inspections
Fire (vehicle fuels or subsurface contaminants)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas	Combustible gas indicator if buried organic material or other source of flammable gas is suspected
Contact with unexploded ordnance	Downhole monitoring every 2 ft until cleared for continuous drilling by OE personnel. On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel in areas with a potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Stay upwind of any dust-generating activities. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard	PID or other sampling, as appropriate
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice per day. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize potential for tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Electric shock	Identification and clearance of overhead and underground utilities. GFCI required for electric hand tools	Visual of all work areas
<b><i>Soil Sampling Using Hand Augers or Scoops</i></b>		
General safety hazards (manual lifting, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, and work gloves for manual work (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping	Daily site safety inspections
Contact with unexploded ordnance	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered. Sampling of stations having known or suspected (i.e., red soil or raw product) explosives >10% (100,000 mg/kg) to be performed by OE technicians following applicable OE safety requirements	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Stay upwind of any dust-generating activities. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard	PID or other sampling, as appropriate
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
<b><i>Surface Water and Sediment Sampling on Foot</i></b>		
General safety hazards (moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, and safety shoes or boots (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping	Daily site safety inspections
Drowning	Coast Guard-approved personal flotation vests if working near ( $\leq 6$ ft) or over water deeper than 4 ft	None

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Noise	None	None
Fire	None	None
Contact with unexploded ordnance	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel when in areas with potential for OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered. Sampling of washout sumps or sedimentation basins by OE technicians if OE is confirmed or suspected to be present	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard	None
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice a day. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Snake chaps if working in overgrown areas. Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
<b><i>Surface Water and Sediment Sampling Using Hand Tools from Boats</i></b>		
General safety hazards (moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, and safety shoes or boots (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping	Daily site safety inspections
Drowning	Coast Guard-approved personal flotation vests if working near ( $\leq 6$ ft) water deeper than 4 ft	None
Noise	None	None
Fire	No gasoline-powered motors in use	Daily safety inspection

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Contact with unexploded ordnance	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel when in areas with potential for OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard	None
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP Environmental Coordinator	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP) Cooled (shaded) or warmed break area depending on the season Routine breaks in established break area (see Chapter 8.0 of FSHP) Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice a day. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Snake chaps if working in overgrown areas. Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
<b><i>Vegetation Clearing with Chainsaws, Machetes, and Sling Blades</i></b>		
General safety hazards (contact with sharp edges, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, plus heavy-duty work gloves and hard hat (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Only experienced operators. Personnel operating brush-clearing tools must maintain separation of at least 15 ft. Machetes equipped with lanyard and lanyard looped around wrist. Tools must be inspected daily and taken out of service if damaged. Exclusion zone if there is a potential for entry of unauthorized personnel	Daily site safety inspections
Chainsaw kickback and related hazards	Chainsaw chaps and face shield as additional PPE. Saws must have automatic chain brake or kickback device. Idle speed adjusted so chain does not move when idling. Only experienced operators may use chainsaw. Saws must not be used to cut above shoulder height. Saws must be held with both hands when operating. Additional requirements at 385-1-1 Section 31	Daily inspection

**Table 2-2. Hazards Analysis (continued)**

<b>Safety and Health Hazards</b>	<b>Controls</b>	<b>Monitoring Requirements</b>
Noise (chainsaw)	Hearing protection $\geq$ NRR 25 within 7.6 m (25 ft) of operating chainsaw unless specific monitoring indicates noise exposure of less than 85 dBA	Daily safety inspections
Fire (fuels)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas. Gasoline-powered equipment turned off and allowed to cool for at least 5 min prior to fueling	Daily safety inspection
Contact with unexploded ordnance	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include the hazards and appropriate controls for site contaminants and chemicals to be used or stored on-site. Chemical containers labeled to indicate contents and hazard. Medical clearance for hazardous waste work	Daily safety inspection
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice per day. Pulse rates at the start of each break if wearing impermeable clothing
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize potential for tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
<b><i>Investigation-Derived Waste Handling</i></b>		
General hazards (lifting equipment, manual lifting, slips)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, heavy-duty gloves for materials handling, and hard hat if overhead hazards are present (see Chapter 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Unnecessary personnel will stay well clear of operating equipment. Functional back-up alarm on fork trucks, Bobcats, trucks, etc. Ravenna O&M contractor personnel will provide any required fork truck services in the IDW staging area (Building 1036). IDW movement from field sites to Building 1036 will be conducted by the drilling subcontractor using a backhoe equipped with forks and drum dollies. No personnel allowed under lifted loads. Lifts of greater than 50 lbs will be made with two or more personnel or with lifting equipment. Hazardous waste safety training. Compliance with EM 385-1-1 Sections 14 and 16	Daily safety inspections of operations. Daily inspection of equipment to verify brakes and operating systems are in proper working condition
Contact with unexploded ordnance	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel if working in areas with potential for OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site	Daily safety inspections
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Fire (vehicle fuels and flammable contaminants)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Gasoline-powered equipment will be shut down and allowed to cool for 5 min before fueling. Fire extinguishers in all fuel use areas	Daily safety inspection
Noise	Hearing protection within 7.6 m (25 ft) of any noisy drum moving equipment unless equipment-specific monitoring indicates exposures less than 85 dBA	Daily safety inspections
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellent on pants, boots, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Chapter 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Chapter 9.0 of FSHP)	Visual survey
Electric shock	Identification and clearance of overhead utilities. GFCI for all electrical hand tools	Visual survey of all work areas

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
<b><i>Equipment Decontamination (Hot Water Washing, Soap and Water Washing, HCl, and Methanol Rinse)</i></b>		
General equipment decontamination hazards (hot water, slips, falls, equipment handling)	Level D PPE plus nitrile or PVC gloves (see Chapter 5.0 of FSHP). Face shield and Saranax or rain suit when operating steam washer. Site-specific training. Proper housekeeping	Daily safety inspections
Noise (spray washer)	Hearing protection when washer is operating unless equipment-specific monitoring indicates that exposure is less than 85 dBA	None
Fire (decontamination solvents and gasoline)	Flammable material stored in original containers or in safety cans with flame arrestors. Fire extinguisher kept near decontamination area	Daily safety inspection
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Minimal contact. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard	None
Temperature extremes	Administrative controls (see Chapter 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Chapter 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice a day. Pulse rates at the start of each break if wearing impermeable clothing

FSHP = Facility-wide Safety and Health Plan.  
 GFCI = ground-fault circuit interrupter.  
 HAZWOPER = Hazardous Waste Site Operations.  
 IDW = investigation-derived waste.  
 MSDS = Material Safety Data Sheet.  
 NRR= Noise Reduction Rating.  
 OE = ordinance and explosives.

O&M = operations and maintenance.  
 PID = photoionization detector.  
 PPE = personal protective equipment.  
 PVC = polyvinyl chloride.  
 RVAAP = Ravenna Army Ammunition Plant.  
 SAIC = Science Applications International Corporation.

**Table 2-3. Potential Exposures**

<b>Chemical<sup>a</sup></b>	<b>TLV/PEL/STEL/IDLH<sup>b</sup></b>	<b>Health Effects/ Potential Hazards<sup>c</sup></b>	<b>Chemical and Physical Properties<sup>c</sup></b>	<b>Exposure Route(s)<sup>c</sup></b>
Chromium	TLV/TWA: 0.5 mg/m <sup>3</sup> , A4 IDLH: 25 mg/m <sup>3</sup>	Eye irritation, sensitization	Solid; properties vary depending upon specific compound	Inhalation Ingestion Contact
DNT (dinitrotoluene)	TLV/TWA: 0.2 mg/m <sup>3</sup> , A2 IDLH: Ca [50 mg/m <sup>3</sup> ]	Suspected human carcinogen, anorexia, cyanosis, 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, dermatitis	Liquid with aromatic odor; FP: -45°F; VP: 38-300 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, 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: 2,000 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 <sup>3</sup> , A3 PEL/TWA: 0.05 mg/m <sup>3</sup> IDLH: 100 mg/m <sup>3</sup>	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. Potential Exposures (continued)

Chemical <sup>a</sup>	TLV/PEL/STEL/IDLH <sup>b</sup>	Health Effects/ Potential Hazards <sup>c</sup>	Chemical and Physical Properties <sup>c</sup>	Exposure Route(s) <sup>c</sup>
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 <sup>3</sup> , 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 (2,4,6-trinitrotoluene)	TLV/TWA: 0.5 mg/m <sup>3</sup> Skin notation IDLH: 500 mg/m <sup>3</sup>	Cluster headache; irritation of skin and mucus membranes, liver damage, kidney damage	Pale solid; FP: explodes; VP: 0.0002 mm	Inhalation Absorption Ingestion Contact

<sup>a</sup>The potential chemicals were obtained from the *Ravenna Army Ammunition Plant Phase I Remedial Investigation Report* (USACE 1998).

<sup>b</sup>From 2003 Threshold Limit Values, *American Conference of Governmental Industrial Hygienists*.

<sup>c</sup>From *NIOSH Guide to Chemical Hazards* web site.

A2 = suspected human carcinogen.

A3 = confirmed animal carcinogen with  
unknown relevance to humans.

A4 = not classifiable as a human carcinogen.

DNT = dinitrotoluene.

FP = flash point.

HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

IDLH = immediately dangerous to life and health.

IP = ionization potential.

NA = not available.

NIOSH = National Institute for Occupational Safety and Health.

PEL = permissible exposure limit.

ppm = parts per million.

RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine.

STEL = short-term exposure limit.

TLV = threshold limit value.

TNT = trinitrotoluene.

TWA = time-weighted average.

VP = vapor pressure.

### 3.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

This chapter presents the personnel (and their associated telephone numbers) responsible for site safety and health and emergency response. Table 3-1 identifies the Science Applications International Corporation (SAIC) and subcontractor staff who will fill key roles. The Field Operations Manager must attend the weekly RVAAP Contractor Coordination meeting to coordinate activities (held each Monday in Building 1037 at 08:00 am). Logistical issues and other items of interest (mission-related activities, security issues, etc.) will be discussed in this meeting. See the Facility-wide Safety and Health Plan (FSHP) for information on the roles and responsibilities of key positions.

**Table 3-1. Staff Organization**

<b>Position</b>	<b>Name</b>	<b>Phone</b>
Program Manager	Robin Brandin	505-842-7933
Health and Safety Manager	Steve Davis CIH, CSP	865-481-4755
Project Manager	Kevin Jago	865-481-4614
Field Operations Manager	Martha Clough	937-431-2242
Site Safety and Health Officer	Martha Clough	330-405-5804
Emergency Responder	Martha Clough	330-405-5804
UXO Avoidance Subcontractor (EOTI)	Wayne Lewallen	732-345-8099

CIH= Certified Industrial Hygienist.

CSP = Certified Safety Professional.

EOTI = Explosive Ordnance Technologies, Inc.

UXO = unexploded ordnance.

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## 4.0 TRAINING

Training requirements, from Chapter 4.0 of the FSHP, are summarized in [Table 4-1](#) and in [Table 2-2](#). At least one person trained in the American Red Cross cardiopulmonary resuscitation (CPR) for first responders will be present during sampling activities. All SAIC field personnel working within the AOC will have general Red Cross first aid/CPR training.

**Table 4-1. Training Requirements**

<b>Training</b>	<b>Worker</b>	<b>Supervisor</b>	<b>Site Visitor (exclusion zone)</b>
HAZWOPER (40-hr, 3-day OJT)	√	√	√
HAZWOPER Annual Refresher (8 hr)	√	√	√
HAZWOPER Supervisors Training (8 hr)		√	
American Red Cross Standard First Aid (5.5 hr)	√	√	
General Hazard Communication Training	√	√	√
Respiratory Protection Training (required only if respirators are worn)	√	√	√
Hearing Conservation Training (for workers in hearing conservation program)	√	√	√
Pre-entry Briefing	√	√	√
Site-Specific Hazard Communication (contained in pre-entry briefing)	√	√	√
Safety Briefing (daily and whenever conditions or tasks change)	√	√	√
CPR for First Responders		√	

√ = required.

CPR = cardiopulmonary resuscitation.

HAZWOPER = Hazardous Waste Site Operations.

OJT = on-the-job training.

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## 5.0 PERSONAL PROTECTIVE EQUIPMENT

General guidelines for selection and use of personal protective equipment (PPE) are presented in the FSHP. Specific PPE requirements for this work are presented in the hazard/risk analysis chapter (Chapter 2.0).

This investigation will be performed in Level D PPE, plus chemical-resistant gloves when handling potentially contaminated materials. If 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 SSO. A copy of SAIC’s PPE procedures is included as Appendix A to this SHHP Addendum. Specific tasks, such as drilling, brush clearing, and chainsaw use require additional PPE (e.g., hardhats, leather gloves, face shield, chainsaw, and chaps), as delineated in [Table 5-1](#) below and [Table 2.2](#).

**Table 5-1. Baseline Personnel Protective Equipment for the Erie Burning Ground Phase II Remedial Investigation**

ACTIVITY	PPE REQUIRED
Civil Surveys and Visual Surveys	LEVEL D PPE: long pants, shirts with sleeves, safety glasses, heavy duty work gloves, safety boots, and hardhats if overhead hazards are present, plus nitrile or similar gloves for contact with potentially contaminated material. Insect repellent on boots, pants, and elsewhere, as necessary to repel ticks and mosquitoes
Groundwater well development, groundwater monitoring, groundwater sampling, and sample preservation	Level D PPE plus nitrile or PVC gloves to handle potentially contaminated material. Insect repellent as needed
Soil boring, soil sampling, and monitoring well installation using air rotary or auger drilling	Level D PPE plus nitrile or equivalent gloves to handle potentially contaminated material, plus hearing protection as necessary. Insect repellent as needed
Soil sampling using hand augers or scoops	Level D PPE plus nitrile or equivalent gloves to handle potentially contaminated material. Insect repellent as needed
Surface water and sediment sampling on foot	Level D PPE plus Coast Guard-approved personal flotation vests if working near or over water deeper than 4 ft. Nitrile or equivalent gloves for contact with contaminated material. Insect repellent as needed
Surface water and sediment sampling using hand tools from boats	Level D PPE plus Coast Guard-approved personal flotation vests if working near or over water deeper than 4 ft. Nitrile or equivalent gloves for contact with contaminated material. Insect repellent as needed
Vegetation clearing with chainsaws, machetes, and sting blades	Level D PPE plus chainsaw chaps and face shields, hearing protection, and nitrile or equivalent gloves for handling of potentially contaminated material. Insect repellent as needed
IDW handling	Level D PPE plus nitrile or equivalent gloves for handling of potentially contaminated material
Equipment Decontamination	Level D PPE plus nitrile or PVC gloves

IDW = investigation-derived waste.  
PPE = personal protection equipment.  
PVC = polyvinyl chloride.

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## 6.0 MEDICAL SURVEILLANCE

Medical surveillance requirements, as presented in Chapter 6.0 of the FSHP, are summarized in [Table 6-1](#) and in [Table 2-2](#).

**Table 6-1. Medical Surveillance Requirements<sup>a</sup>**

<b>Baseline</b>	<b>Routine</b>	<b>Overexposure</b>	<b>Termination</b>
Prior to work assessment	Every 12 months, unless greater frequency is deemed appropriate by attending physician. Not to exceed 2-year interval	Upon developing symptoms or where exposure limits have been exceeded or suspected to have been exceeded	Upon termination or re-assignment

<sup>a</sup>All medical exams shall include (see Section 6.2 of the Facility-wide Safety and Health Plan):

- medical/work history;
- physical exam by physician;
- audiometry;
- blood screening and blood count;
- chest x-ray, as specified by physician;
- electrocardiogram, as specified by physician;
- spirometry; and
- urinalysis.

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## **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 responses, 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 field laboratory or equipment decontamination area or personnel exposure monitoring for specific chemicals. 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 the Phase II RI fieldwork is not expected to pose airborne exposure hazards for the following reasons:

- With the exception of sampling equipment decontamination, which will be performed in a well-ventilated building, work will be performed in open areas with natural ventilation.
- Prior site sampling indicated that contaminant concentrations are unlikely to pose an airborne hazard.
- The most probable contaminants (metals, explosives, propellants, and semivolatile organic compounds) are materials with relatively low vapor pressures.

Air monitoring of the breathing zone using a photoionization detector or equivalent is planned during soil sampling and groundwater monitoring well drilling. The SSHO will 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**

<b>Hazard or Measured Parameter</b>	<b>Area</b>	<b>Interval</b>	<b>Limit</b>	<b>Action</b>	<b>Tasks</b>
Airborne organics with PID or equivalent	Breathing zone [0.9 m (3 ft) from source or 0.36 m (14 in.)] in front of employee's shoulder	From 1 to 3 ft below ground surface and if site conditions, such as discolored soil or chemical smells, indicate that monitoring is necessary	<5 ppm  >5 ppm	Level D  Withdraw and evaluate <ul style="list-style-type: none"> <li>• evaluate need for PPE upgrade</li> <li>• identify contaminants</li> <li>• notify project manager and H&amp;S manager</li> </ul>	Explosive screening using test kits, drilling, hand auguring, power auguring, and other intrusive work
Noise	All	During operation of power augers and any area where there is some doubt about noise levels	85 dBA and any area perceived as noisy	Require the use of hearing protection	Hearing protection will be worn within the exclusion zone, around power augers, or other motorized equipment
Visible airborne dust	All	Continuously	Visible dust generation	Stop work; use dust suppression techniques such as wetting surface	All

H&S = health and safety.

PID = photoionization detector.

PPE = personal protective equipment.

ppm = parts per million.

## **8.0 HEAT/COLD STRESS MONITORING**

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

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## **9.0 STANDARD OPERATING SAFETY PROCEDURES**

Standard operating safety procedures are described in the FSHP.

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## **10.0 SITE CONTROL MEASURES**

Site control measures are described in the FSHP. No formal site control is expected to be necessary for this work, as the work areas are somewhat remote and bystanders are not anticipated. The RVAAP installation is not open to the public, and only authorized personnel are allowed in the EBG. If the SSHO determines that a potential exists for unauthorized personnel to approach within 25 ft of a work zone or otherwise be at risk due to proximity, then exclusion zones will be established as described in the FSHP.

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## **11.0 PERSONNEL HYGIENE AND DECONTAMINATION**

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

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## 12.0 EMERGENCY PROCEDURES AND EQUIPMENT

Emergency contacts, telephone numbers, directions to the nearest medical facility, and general procedures can be found in the FSHP. Emergency phone numbers and the hospital route map are also included in this chapter. The SAIC field operations manager will remain in charge of all SAIC and subcontractor personnel during emergency activities. The SAIC field office (Building 1036) will serve as the assembly point if it becomes necessary to evacuate one or more sampling locations (Figure 12-1).

### 12.1 EMERGENCY PHONE NUMBERS

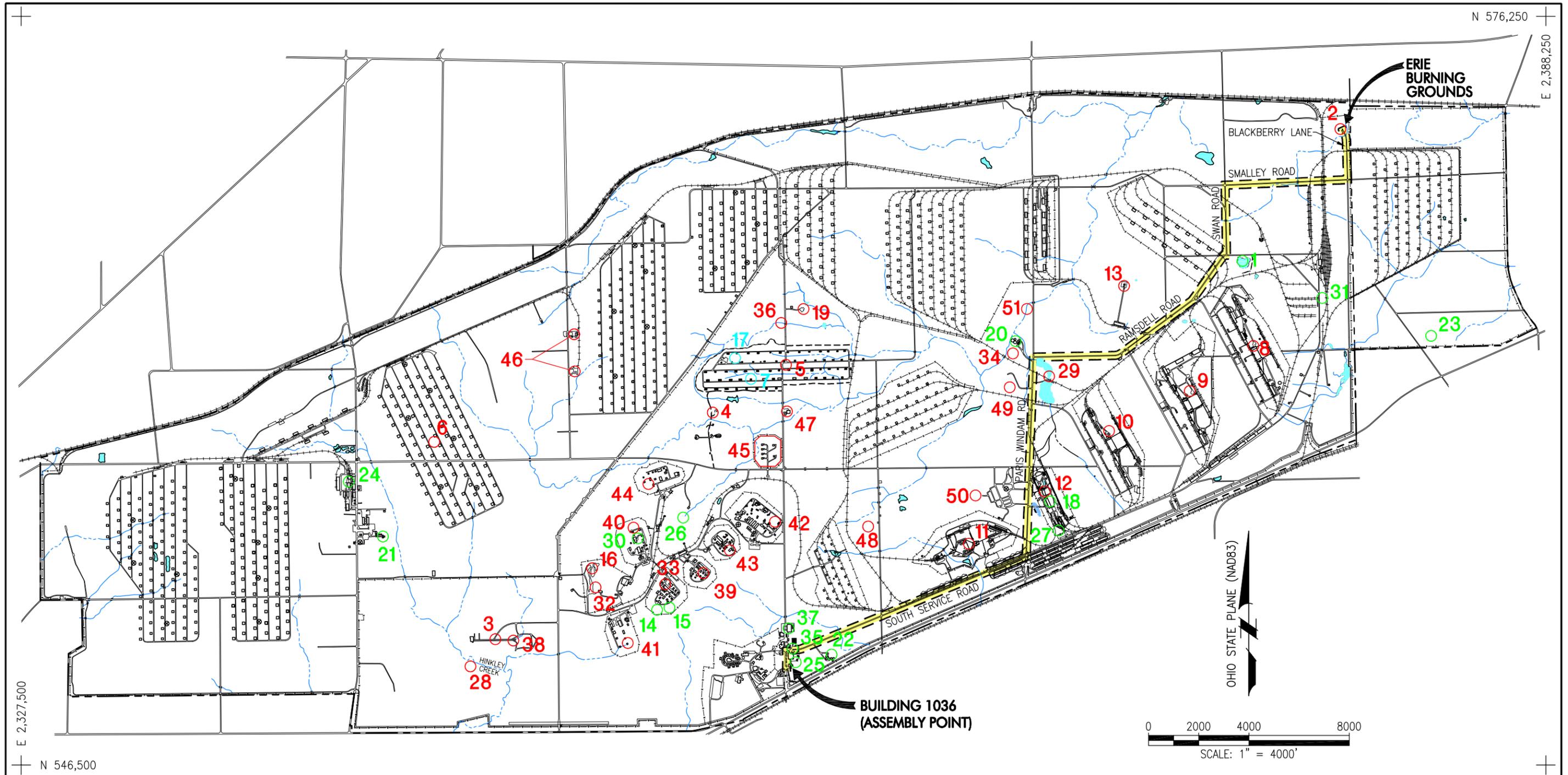
Listed below are emergency groups and their telephone numbers. A telephone and two-way radios will be present in the field and available for use. Tol-Test Co., Inc. will be contacted first for any emergency service. Tol-Test Co., Inc. will then coordinate the response.

Emergency Group	Telephone No.
Police (Tol-Test Inc./Mid-American Security)	330-338-7406 Pager: 261-626-0825
Emergency medical service (Borowski Funeral Home, Ravenna)	330-872-5050
Hospital (Robinson Memorial, Ravenna)	330-297-2449/0811
Fire department (City of Ravenna)	330-297-5738
Hazardous materials response (Tol-Test Co., Inc.)	330-358-7406/7409
RVAAP Environmental Coordinator	330-358-7311

At least one person (i.e., project manager or Field Operations Manager) must have a working two-way radio on the RVAAP frequency. The radio must be tested each morning before the start of work, by radioing Security with a communication check. Each team must have direct radio or telephone communication with the Project Manager or Field Operations Manager. For the purposes of this requirement, a team is any individual(s) not having a line of sight or within normal voice range of another individual(s) having means of communication with the Field Operations Manager.

In the event of a medical emergency, Robinson Memorial Hospital is located approximately 32 km (20 miles) from the site at 6847 N. Chestnut Street in Ravenna, Ohio (Figure 12-2). It can be reached by taking Highway 5 E. approximately 11 km (7 miles), Highway 5 approximately 3.2 km (2 miles), Highway 59, then right onto Highway 44 (Chestnut Street).

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**LEGEND OF SITES:**

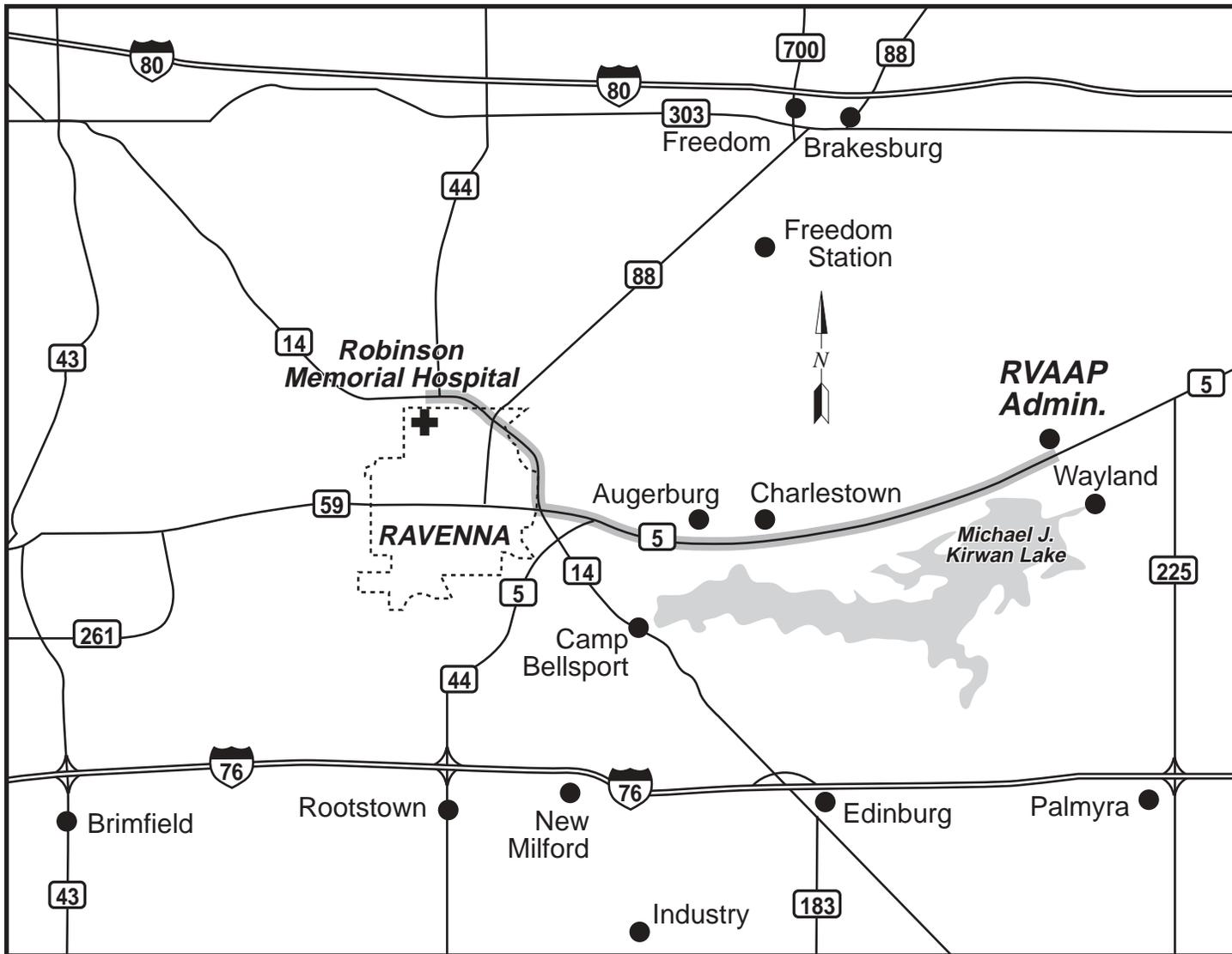
1 ..... RAMSDELL QUARRY LANDFILL	13 ..... BUILDING 1200 AND DILUTION/SETTLING POND	25 ..... BUILDING 1034 MOTOR POOL WASTE OIL TANK	37 ..... PESTICIDE STORAGE BUILDING T-4452	49 ..... CENTRAL BURN PITS
2 ..... ERIE BURNING GROUNDS	14 ..... LOAD LINE 6, EVAPORATION UNIT	26 ..... FUZE BOOSTER AREA SETTLING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


**U.S. ARMY ENGINEER DISTRICT**  
 CORPS OF ENGINEERS  
 LOUISVILLE, KENTUCKY  
 US Army Corps of Engineers  
 Louisville District

**RAVENNA ARMY AMMUNITION PLANT**  
**RAVENNA, OHIO**

DRAWN BY: R. BEELER	REV. NO./DATE: 0 / 10-22-03	CAD FILE: /00012/DWGS/M36LOC03
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Figure 12-1. Egress Route from Erie Burning Grounds to Building 1036 Assembly Point



COE NASH RV 031

Figure 12-2. Route Map to Pre-Notified Medical Facility

## **13.0 LOGS, REPORTS, AND RECORD KEEPING**

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

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## 14.0 REFERENCES

American Conference of Governmental Hygienists (ACGIH) 2003. Threshold Limit Values.

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

USACE (U.S. Army Corps of Engineers). *Safety and Occupational Health Requirements for Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OEW) Activities*, ER-385-1-92.

USACE. *Safety and Health Manual*, EM-385-1-1-13.

USACE 2001a. *Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-00-D-0001, D.O. CY02, March.

USACE 2001b. *Phase I Remedial Investigation for the Erie Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-94-D-0029, D.O. 0072, June.

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**APPENDIX A**  
**ECHS PROCEDURE 13: PERSONAL PROTECTIVE EQUIPMENT**

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## ***A1 Personal Protective Equipment***

### ***A1.1 Purpose***

To outline company policies and procedures for the provision and use of personal protective equipment (PPE).

### ***A1.2 Definition***

Personal protective equipment includes devices and clothing designed to be worn or used for the protection or safety of an individual while in potentially hazardous areas or performing potentially hazardous operations.

### ***A1.3 Policy***

- A. To protect employees from potential hazards in the workplace, SAIC will provide PPE appropriate to the task. The Local Environmental Compliance & Health and Safety (EC&HS) Official will assess the workplace to identify potential hazards which necessitate the use of PPE and advise employees on PPE required for an operation. Each division through its supervisors is responsible, however, for obtaining the equipment and enforcing its use.
- B. Defective or damaged PPE shall not be used.

### ***A1.4 Responsibilities***

- A. Local EC&HS Official
  - 1. Performs and maintains records of hazard assessments performed to identify PPE requirements.
  - 2. Assists the supervisor in selecting appropriate PPE.
  - 3. Ensures recommended PPE conforms to applicable standards (i.e., American National Standards Institute, National Institute for Occupational Safety and Health).
  - 4. Provides training on PPE requirements, use, limitations, proper care, maintenance, useful life, and disposal.
  - 5. Implements and administers the eye and foot protection programs, as applicable.
- B. Supervisor
  - 1. Ensures required PPE is readily available to employees working in areas or performing operations that require PPE for protection.
  - 2. Enforces the mandatory use of PPE when required to protect employee health and safety.
  - 3. Ensures PPE is properly stored and maintained.

- C. Employees
  - 1. Use, maintain, and store PPE in accordance with this procedure and instructions provided by the supervisor or Local EC&HS Official.
  - 2. Report all problems associated with PPE (i.e., damaged, worn, or inadequate) to the supervisor or the Local EC&HS Official.
  - 3. Do not use damaged or defective PPE.

### ***A1.5 General Requirements for Personal Protective Equipment***

- A. Hazard Assessment

OSHA regulation 29 CFR 1910.132 requires an assessment of each work place to determine if hazards are present, or are likely to be present, for which the use of personal protective equipment is needed. The “Sample Format for Hazard Assessment to Support Personal Protective Equipment Selection,” Exhibit 13-1, may be used for this purpose.

#### **Certification of Hazard Assessment**

The most recent hazard assessment for (insert location name) was performed on, (date) by (name).  
Certified by (name).

- B. Training

Each employee who is required to use PPE is required to be trained and demonstrate the ability to use PPE properly. Training must cover when PPE is necessary, what PPE is necessary, how to don, doff, adjust, and wear PPE, limitations of the PPE, and proper care, maintenance, useful life, and disposal of the PPE. Retraining is required when changes in the work place or types of PPE to be used render previous training obsolete, or if inadequacies in an employee’s knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

### ***A1.6 Eye and Face Protection Program***

- A. Policy

SAIC will provide required protective eye wear to employees working in areas in which an employee could cause injury to himself or herself or to another employee (eye hazard area) or performing tasks that present a potential for eye injury to the employee doing the task (eye hazard operation). The use of contact lenses is prohibited in any operation involving hazardous chemicals.

- B. Definitions, Performance Criteria, and Designated Eye Hazard Areas

- 1. Eye protection equipment is used to prevent injury to the eyes from flying objects, hazardous chemicals, or injurious light rays. Such

equipment includes safety glasses, chemical goggles, face shields, welding goggles, and welding face shields.

2. Safety glasses are prescription and non-prescription lenses and frames conforming to American National Standards Institute (ANSI) Z87.1-1989. Lenses of safety glasses are distinctly marked with the monogram of the manufacturer, and frames have an identification mark (Z87.1) on both the front and temples.
3. The following are designated eye hazard areas, as identified in 13.5A, at (insert location name).
4. Eye hazard operations are tasks that present a potential eye injury hazard to the employee performing the task. The following are designated eye hazard operations at (insert location name).

C. Eye Protection Issuance and Replacement

1. Full-time employees who are assigned to eye hazard areas or who as a regular part of their job perform eye hazard operations are eligible to obtain prescription safety glasses at the expense of their divisions.
2. The area supervisor and Local EC&HS Official determine the need for and type of eye protection required.
3. Eye protection devices are issued as followed:
  - a. Prescription safety glasses through the Local EC&HS Official.
  - b. Goggles, face shields, safety glasses, and visitor safety glasses through the area supervisor.
  - c. Laser safety eye wear through the Laser Safety Officer or Local EC&HS Official.
4. Prescription safety glasses are provided by the employee's division as follows:
  - a. Supervisor submits written request to the Local EC&HS Official identifying the employee for whom prescription safety glasses are required.
  - b. Once the request is signed by both the employee's supervisor and the Local EC&HS Official, the employee is authorized to choose from an approved source and selection of lenses/frames the desired style of safety glass frames and lenses.
  - c. The employee is responsible for obtaining a prescription from his or her own physician. The fee for the services of this physician and any fitting fees must be paid by the employee. In

general, safety glasses may be ordered from a prescription less than 2 years old.

- d. Division-furnished prescription safety glasses damaged by occupational wear will be repaired or replaced at the division's expense.
- e. New lenses or safety glasses will be provided at the division's expense, if the employee's prescription significantly changes.

D. Emergency Eyewash and Shower Equipment

- 1. Emergency eyewash and shower equipment meeting the requirements of ANSI Z358.1-1981 will be provided in all areas where hazardous chemicals, which may be injurious to the eyes or skin, are used in such a manner that an employee's eyes or body may be exposed. This equipment will be located within the work area where it is easily accessible for emergency use.
- 2. Emergency showers and eyewashes will be tested monthly to flush the line and verify proper operation. A record of this inspection will be maintained on a card attached to the unit and will include the date and inspector's initials. The exception is self-contained eyewash equipment, which will be filled with a commercially available bacteriostatic additive; maintenance will be performed at intervals recommended by the manufacturer (e.g., every 6 months the unit will be drained and refilled).

***A1.7 Head Protection***

A. Policy

- 1. Employees working in an area where there is a potential for injury to the head from falling objects, such as working below other employees who are using tools and materials which could fall, will be provided and required to wear protective helmets.

B. Definitions and Performance Criteria

- 1. Protective helmets that conform to ANSI Z89.1-1986 are designed to provide protection from impact and penetration hazardous caused by falling objects. Some helmets also provide protection from electrical shock and burns.

***A1.8 Foot Protection***

A. Policy

- 1. Employees performing tasks that pose a recognized foot injury hazard, such as handling equipment or working on construction, will be required to wear safety shoes.

B. Definitions and Performance Criteria

1. Safety shoes conform to ANSI Z41-1991. The inner lining of safety shoes are stamped with the ANSI Z41 identification mark.

C. Foot Protection Issuance/Replacement

1. A division may contribute an amount for the purchase of safety shoes. Contact your supervisor or Local EC&HS Official for information on reimbursement (if any) provided by your division for the purchase of safety shoes.
2. Lost or stolen safety shoes will be replaced at employee expense.
3. Worn or damaged safety shoes will be replaced in accordance with the division's policy.

***A1.9 Hand Protection***

A. Policy

Employees whose hands are exposed to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burn, thermal burns, and harmful temperature extremes will be provided and required to wear appropriate hand protection.

B. Definitions and Performance Criteria

1. Appropriate protection (gloves) depends on the nature of the hazard. Available glove materials provide only limited protection against many chemicals. Before purchasing gloves, documentation should be requested from the manufacturer that show that the gloves meet appropriate test standards for the hazard(s) anticipated.
2. For gloves used to protect against chemicals, test data for breakthrough times should be obtained to determine how long the glove can be used and if it can be reused. For use with mixtures, a glove should be selected on the basis of the chemical component with the shortest breakthrough time.

***A1.10 Respiratory Protection***

See Procedure 9, "Respiratory Protection Program."

***A1.11 Hearing Protection***

See Procedure 15, "Hearing Conservation and Noise Control Program."

## ***Exhibit 13-1. Sample Format For a Hazard Assessment to Support Personal Protective Equipment Selection***

***Operation, Task, or Area Assessed:***

### **Eye and Face Protection**

Hazards (check all identified hazards or potential hazards):

- |  |  |
|--|--|
| <input type="checkbox"/> flying particles<br><input type="checkbox"/> molten metal<br><input type="checkbox"/> liquid chemicals<br><input type="checkbox"/> welding<br><input type="checkbox"/> other eye hazard(s): | <input type="checkbox"/> acids or caustic chemicals<br><input type="checkbox"/> chemical gases or vapors<br><input type="checkbox"/> radiant energy<br><input type="checkbox"/> lasers |
|--|--|

Eye and Face Protection Selected:

Specify required capability (e.g., impact protection) and protective device:

<u>Hazard/Operation</u>	<u>Eye Protection Capability Needed</u>	<u>Protective Device</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### **Head Protection**

Hazards (check all that apply):

- Falling objects (e.g., working below other workers using tools or materials that could fall).  
 Electrical hazard (exposed energized conductors).

Head Protection Selected:

- Class A helmet (impact, penetration, low voltage electrical hazard).  
 Class B helmet (impact, penetration, high voltage electrical hazard).

***Exhibit 13-1. Sample Format For a Hazard Assessment to Support Personal Protective Equipment Selection (Continued)***

\_\_\_\_\_ Class C helmet (impact and penetration resistance only).

\_\_\_\_\_ None.

**Foot Protection**

Hazards (check all that apply):

\_\_\_\_\_ Carrying or handling materials which could be dropped and injure the employee’s feet.

\_\_\_\_\_ Work in areas where objects which would cause injury to the feet might fall onto the feet.

\_\_\_\_\_ Work involving manual material handling carts, bulk rolls, heavy pipe, etc., which could roll onto employee’s feet.

\_\_\_\_\_ Nails, wire, screws, or other sharp objects that could be stepped on and puncture the foot.

\_\_\_\_\_ Electrical hazard that requires insulating shoes.

\_\_\_\_\_ Electrical hazard that requires conductive safety shoes.

Foot Protection Selected:

Specify protective capability and safety shoe required:

<u>Hazard/Operation</u>	<u>Protective Capability Needed</u>	<u>Safety Shoe</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Hand Protection**

Hazards:

\_\_\_\_\_ Thermal (hot)                      \_\_\_\_\_ Thermal (cold)                      \_\_\_\_\_ Cuts

\_\_\_\_\_ Abrasions                              \_\_\_\_\_ Puncture

\_\_\_\_\_ contact with chemicals (specify):

***Exhibit 13-1. Sample Format For a Hazard Assessment to Support Personal Protective Equipment Selection (Continued)***

Hand Protection Selected:

Specify protective capability and glove type selected:

<u>Hazard/Operation</u>	<u>Protective Capability Needed</u>	<u>Glove Type</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_