

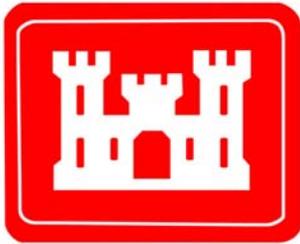
FINAL

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

FOR THE

**PHASE I REMEDIAL INVESTIGATION OF
RAMSDALL QUARRY LANDFILL 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 CY11**

October 2003



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Prepared by

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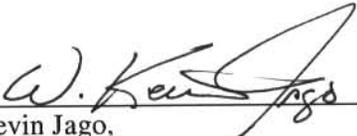
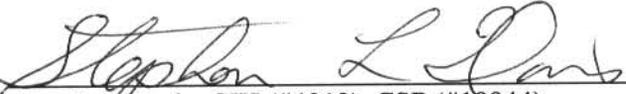
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contributed to the preparation of this document and should not
be considered an eligible contractor for its review.

APPROVALS

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October 2003

| | | |
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ACRONYMS

| | |
|-------|--|
| CPR | cardiopulmonary resuscitation |
| PPE | personal protective equipment |
| RI | Remedial Investigation |
| RVAAP | Ravenna Army Ammunition Plant |
| RQL | Ramsdell Quarry Landfill |
| SAIC | Science Applications International Corporation |
| SSHO | Site Safety and Health Officer |

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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 2001) 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 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 I Remedial Investigation at Ramsdell Quarry. Copies of the FSHP and this SSHP Addendum will be present at the work site during all fieldwork.

SAIC will perform field investigations at Ramsdell Quarry. Ramsdell Quarry is located in the northeastern portion of RVAAP and encompasses about 14 acres. The quarry was excavated about 9 to 12 m (30 to 40 ft) below existing grade into the Sharon Member (sandstone and quartzite pebble conglomerate) of the Pottsville Formation for road and construction ballast. Quarry operations were discontinued around 1941. The western and southern portion of the abandoned quarry was subsequently used for landfill operations [Ramsdell Quarry Landfill (RQL)] between 1941 and 1989. No information is available regarding landfill disposal activities between 1941 and 1976. From 1976 until the landfill was closed in 1989, only non-hazardous solid waste was deposited in RQL. In 1978, a portion of the abandoned quarry was permitted as a sanitary landfill by the state of Ohio. Closure of the permitted sanitary landfill was completed in May 1990 under State of Ohio solid waste regulations (OAC 3745-27-10). In addition, from 1946 to the 1950s, the bottom of the quarry was used to burn waste explosives from Load Line 1. Approximately 18,000 225-kg (500-lb) incendiary or napalm bombs were reported to have been burned in the abandoned quarry. Liquid residues from annealing operations were also dumped in the quarry. No additional historical information currently is available on how the quarry was used, other than for landfill operations, from the 1950s until 1976, when operational records show that non-hazardous solid wastes were placed RQL.

Based upon available information and past uses of the abandoned quarry, wastes may include domestic, commercial, and industrial solid and liquid wastes, including explosives (e.g., trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, and Composition B), napalm, gasoline, acid dip liquor, annealing residue (e.g., sulfuric acid, shell casings, sodium orthosilicate, chromic acid, and alkali), aluminum chloride, and inert material. Interviews with former RVAAP personnel have indicated that much of the landfilled wastes and debris at the abandoned quarry were removed in the 1980s.

Groundwater at Ramsdell Quarry has been monitored routinely since 1987 as part of RQL post-closure requirements under state of Ohio solid waste regulations and data reported to the Ohio Environmental Protection Agency. Additionally, a groundwater investigation (USACE 1999, USACE 2000) was conducted at the quarry

in 1998 and 1999, which included sampling of existing wells, installation and sampling of six new monitoring wells, and collection of co-located sediment and surface water samples from eight locations within and surrounding a small, intermittent pond that forms in the bottom of the quarry at the toe of the landfill.

Planned site activities consist of environmental sampling and support tasks. These tasks include sampling of surface soil, monitoring well installation, sampling of groundwater, and topographic surveys. Potential hazards posed by the planned tasks include injury from ordnance and explosives; noise and cut hazards associated with clearing vegetation; striking, rotation, and noise hazards from 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 historical 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. Physical hazards are associated with excavation and drilling equipment, hand-operated power tools (chainsaw, etc.), and soil sampling equipment (hand bucket augers, 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 SSHP Addendum. Specific tasks such as drilling, brush clearing, and chainsaw use require additional PPE (e.g., hardhats, leather gloves, face shield, and chainsaw 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. Bulk explosives (trinitrotoluene; hexahydro-1,3,5-trinitro-1,3,5-triazine, and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine), propellants (nitrocellulose and nitroguanidine), and various munitions were handled on the installation, including artillery rounds of 90 mm or more and bombs up to 2,000 lbs.

Ramsdell Quarry is located in the northeastern portion of RVAAP and encompasses about 14 acres. The quarry was excavated to a depth of about 9 to 12 m (30 to 40 ft) below existing grade into the Sharon Conglomerate Member of the Pottsville Formation. The original unconsolidated glacial material overlying the sandstone was only a few feet (<10 ft) thick and appears to have been entirely removed. The excavated material, consisting of sandstone and quartz pebble conglomerate, was used for road and construction ballast. Quarry operations were discontinued around 1941.

The western and southern portion of the abandoned quarry was subsequently used for landfill operations [Ramsdell Quarry Landfill (RQL)] between 1941 and 1989. No information is available regarding landfill disposal activities between 1941 and 1976. From 1976 until the landfill was closed in 1989, only non-hazardous solid waste was deposited in RQL. In 1978, a portion of the abandoned quarry was permitted as a sanitary landfill by the state of Ohio. The permit required a 30-m (100-ft) buffer be maintained between the landfill and the pond; the extent of the pond prior to this time is not known. Closure of the permitted sanitary landfill was completed in May 1990 under state of Ohio solid waste regulations (OAC 3745-27-10). A requirement of closure was installation and semiannual monitoring of five monitoring wells.

In addition, from 1946 to the 1950s, the bottom of the quarry was used to burn waste explosives from Load Line 1. Approximately 18,000 225-kg (500-lb) incendiary or napalm bombs were reported to have been burned in the abandoned quarry. Liquid residues from annealing operations were also dumped in the quarry. No additional historical information currently is available on how the quarry was used, other than for landfill operations, from the 1950s until 1976, when operational records show that non-hazardous solid wastes were placed in RQL.

1.2 CONTAMINANTS

[Table 1-1](#) lists contaminants known to occur in groundwater, surface water, and sediment at Ramsdell Quarry. Inclusion in this table indicates the potential to encounter a contaminant during Phase I Remedial Investigation (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 Constituents of Potential Concern at Ramsdell Quarry

| Chemical | Units | Maximum Detect^a |
|---------------------------------------|--------------|-----------------------------------|
| <i>Groundwater</i> | | |
| TAL Metals (Unfiltered) | | |
| Aluminum | mg/L | 15.2 |
| Antimony | mg/L | 0.0243 |
| Arsenic | mg/L | 0.0747 |
| Barium | mg/L | 0.085 |
| Beryllium | mg/L | 0.014 |
| Calcium | mg/L | 152 |
| Chromium | mg/L | 0.01 |
| Cobalt | mg/L | 0.439 |
| Copper | mg/L | 0.0113 |
| Iron | mg/L | 178 |
| Lead | mg/L | 0.0435 |
| Magnesium | mg/L | 116 |
| Manganese | mg/L | 7.66 |
| Mercury | mg/L | 0.0001 |
| Nickel | mg/L | 1.47 |
| Potassium | mg/L | 11.4 |
| Selenium | mg/L | 0.0048 |
| Sodium | mg/L | 26.1 |
| Thallium | mg/L | 0.002 |
| Zinc | mg/L | 1.94 |
| Explosives and Propellants | | |
| 1,3-Dinitrobenzene | mg/L | 0.000099 |
| 2,4-Dinitrotoluene (as explosive) | mg/L | 0.00035 |
| 2-Nitrotoluene | mg/L | 0.00016 |
| HMX | mg/L | 0.00009 |
| Nitrobenzene (as explosive) | mg/L | 0.00062 |
| Nitroglycerin | mg/L | 0.0028 |
| RDX | mg/L | 0.00049 |
| Tetryl | mg/L | 0.00016 |
| Pesticides and PCBs | | |
| Beta-BHC | mg/L | 0.000016 |
| Delta-BHC | mg/L | 0.000031 |
| Endrin Aldehyde | mg/L | 0.000012 |
| Semivolatile Organic Compounds | | |
| Bis(2-ethylhexyl)phthalate | mg/L | 0.084 |
| Volatile Organic Compounds | | |
| Acetone | mg/L | 0.009 |
| Benzene | mg/L | 0.00052 |
| Carbon Disulfide | mg/L | 0.0024 |
| Methylene Chloride | mg/L | 0.0037 |
| Tetrachloroethene | mg/L | 0.00066 |
| Toluene | mg/L | 0.00072 |

Table 1-1. Maximum Concentrations of Constituents of Potential Concern at Ramsdell Quarry (continued)

| Chemical | Units | Maximum Detect^a |
|--|--------------|-----------------------------------|
| Indicator Parameters and Anions | | |
| Phenols, Total | mg/L | 0.047 |
| Chloride | mg/L | 18.4 |
| Sulfate | mg/L | 380 |
| Nitrate/Nitrite | mg/L | 0.3 |
| <i>Surface Water</i> | | |
| TAL Metals (Unfiltered) | | |
| Aluminum | mg/L | 49.6 |
| Arsenic | mg/L | 0.0393 |
| Barium | mg/L | 0.405 |
| Cadmium | mg/L | 0.0042 |
| Calcium | mg/L | 96.7 |
| Chromium | mg/L | 0.0647 |
| Cobalt | mg/L | 0.0295 |
| Copper | mg/L | 0.16 |
| Iron | mg/L | 80.2 |
| Lead | mg/L | 0.143 |
| Magnesium | mg/L | 202 |
| Manganese | mg/L | 5.62 |
| Mercury | mg/L | 0.00026 |
| Nickel | mg/L | 0.0701 |
| Potassium | mg/L | 9.55 |
| Selenium | mg/L | 0.0046 |
| Sodium | mg/L | 6.15 |
| Thallium | mg/L | 0.0018 |
| Vanadium | mg/L | 0.0853 |
| Zinc | mg/L | 1.57 |
| Explosives and Propellants | | |
| 4-nitrotoluene | mg/L | 0.24 |
| Pesticides and PCBs | | |
| Aldrin | mg/L | 0.000012 |
| Semivolatile Organic Compounds | | |
| No Detects | | |
| Volatile Organic Compounds | | |
| Acetone | mg/L | 0.0063 |
| Methylene Chloride | mg/L | 0.012 |
| Tetrachloroethene | mg/L | 0.0006 |
| <i>Sediment</i> | | |
| TAL Metals | | |
| Arsenic | mg/kg | 32.5 |
| Barium | mg/kg | 145 |
| Beryllium | mg/kg | 0.65 |
| Cadmium | mg/kg | 6.4 |
| Chromium | mg/kg | 30.9 |
| Cobalt | mg/kg | 33.6 |
| Copper | mg/kg | 134 |
| Iron | mg/kg | 54,500 |
| Lead | mg/kg | 87.2 |
| Magnesium | mg/kg | 58,000 |

Table 1-1. Maximum Concentrations of Constituents of Potential Concern at Ramsdell Quarry (continued)

| Chemical | Units | Maximum Detect^a |
|-----------------------------------|--------------|-----------------------------------|
| Manganese | mg/kg | 2590 |
| Mercury | mg/kg | 0.89 |
| Nickel | mg/kg | 86.8 |
| Selenium | mg/kg | 2 |
| Thallium | mg/kg | 1.9 |
| Vanadium | mg/kg | 40.7 |
| Zinc | mg/kg | 894 |
| Cyanide | mg/kg | 894 |
| Volatile Organic Compounds | | |
| Acetone | mg/kg | 26 |
| 2-butanone | mg/kg | 10 |
| Methylene chloride | mg/kg | 0.73 |
| Explosives and Propellants | | |
| TNT | mg/kg | 0.47 |
| 2,6-DNT | mg/kg | 0.34 |
| HMX | mg/kg | 0.14 |
| Nitrocellulose | mg/kg | 4.3 |

^a Laboratory qualifiers not shown, some results are estimated values less than reporting limits.

Source: USACE 1999 and USACE 2000.

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

PCB = polychlorinated biphenyl.

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

TAL = Target Analyte List.

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 and 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 and Lyme disease) |
| | X | Radiation or radioactive contamination |
| X | | Noise (excavation equipment, powered auger, and drill rig) |
| | X | Drowning |
| X | | OE (potential to encounter unexploded ordnance) |

OE = ordnance and explosives.

Specific tasks are as follows:

- soil sampling with hand augers or scoops,
- vegetation clearing with machetes and chainsaws,
- 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 Ramsdell Quarry 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 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 Ramsdell Quarry. 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 and 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 |
|---|--|---|
| 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 |
| <i>Groundwater Well Development, Groundwater Monitoring, Groundwater Sampling, and Sample Preservation</i> | | |
| 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-min. 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 and 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 |
|---|--|---|
| <i>Soil Boring, Soil Sampling, and Monitoring Well Installation Using Air Rotary or Auger Drill Rig</i> | | |
| 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 and 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. Note – one live overhead electrical line is present at Load Line 2 | Visual of all work areas |
| <i>Soil Sampling Using Hand Augers or Scoops</i> | | |
| 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 and 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 |

Table 2-2. Hazards Analysis (continued)

| Safety and Health Hazards | Controls | Monitoring Requirements |
|---|--|---|
| <i>Vegetation Clearing with Chainsaws, Machetes, and Sling Blades</i> | | |
| 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. 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 faceshield 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 |
| 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 inspections |
| 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 |

Table 2-2. Hazards Analysis (continued)

| Safety and Health Hazards | Controls | Monitoring Requirements |
|---|---|--|
| Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus) | PPE (boots and 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 |
| <i>Investigation-Derived Waste Handling</i> | | |
| General hazards (lifting equipment, manual lifting, slips) | Level D PPE: long pants, shirts with sleeves, safety glasses, safety 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) in accordance with their procedures. 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 operation 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 |

Table 2-2. Hazards Analysis (continued)

| Safety and Health Hazards | Controls | Monitoring Requirements |
|--|--|---|
| 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 |
| 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 |
| <i>Equipment Decontamination (Hot Water Washing, Soap and Water Washing, HCl, and Methanol Rinse)</i> | | |
| 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 Saranex 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.
 O&M = operations and maintenance.
 OE = ordinance and explosives.

PID = photoionization detector.
 PPE = personal protective equipment.
 PVC = polyvinyl chloride.
 RVAAP = Ravenna Army Ammunition Plant.
 SAIC = Science Applications International Corporation.
 SSHO = Site Safety and Health Officer.
 USACE = U.S. Army Corps of Engineers.

Table 2-3. Contaminant Properties

| Chemical ^a | TLV/PEL/STEL/IDLH ^b | Health Effects/ Potential Hazards ^c | Chemical and Physical Properties ^c | Exposure Route(s) ^c |
|---|--|--|---|--|
| Chromium | TLV/TWA: 0.5 mg/m ³ , A4 IDLH: 25 mg/m ³ | Eye irritation, sensitization | Solid; properties vary depending upon specific compound | Inhalation Ingestion Contact |
| DNT (dinitrotoluene) | TLV/TWA: 0.2 mg/m ³ , A2 IDLH: Ca [50 mg/m ³] | 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 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: 6,000 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. Contaminant Properties (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 (2,4,6-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, kidney damage | Pale solid; FP: explodes; VP: 0.0002 mm | Inhalation Absorption Ingestion Contact |

^aThe potential chemicals were obtained from the *Ravenna Army Ammunition Plant Phase I Remedial Investigation Report* (USACE 1998).

^bFrom 2003 Threshold Limit Values, *American Conference of Governmental Industrial Hygienists*.

^cFrom *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.

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.

PPE = personal protective equipment.

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 section 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

| Position | Name | Phone |
|------------------------------------|----------------------|--------------|
| Program Manager | Robin Brandon | 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 | 330-405-5804 |
| 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 area of concern will have general Red Cross first aid/CPR training.

Table 4-1. Training Requirements

| Training | Worker | Supervisor | Site Visitor (exclusion zone) |
|--|---------------|-------------------|--|
| 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 the 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 section (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 SSHO. A copy of SAIC’s PPE Procedures is included as Appendix A to this SSHP Addendum. Specific tasks such as drilling, brush clearing, and chainsaw use require additional PPE (e.g., hardhats, leather gloves, face shield, and chainsaw chaps), as delineated in [Table 5-1](#) below and [Table 2.2](#).

Table 5-1. Baseline Personnel Protective Equipment for the Ramsdell Quarry Phase I 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^a

| Baseline | Routine | Overexposure | Termination |
|--------------------------|---|---|-----------------------------------|
| 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 |

^aAll 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, and propellants) are materials with relatively low vapor pressures.

Air monitoring of the breathing zone using a photoionization detector or equivalent is planned during soil sampling, groundwater monitoring well drilling, and trenching. 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

| Hazard or Measured Parameter | Area | Interval | Limit | Action | Tasks |
|--|--|---|--|---|--|
| Airborne organics with PID or equivalent | Breathing zone [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"> • evaluate need for PPE upgrade • identify contaminants • notify project manager and H&S manager | 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 = personal protective equipment.

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 fenced, and bystanders are not anticipated. The RVAAP installation is not open to the public, and only authorized personnel are allowed in the Ramsdell Quarry area. 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

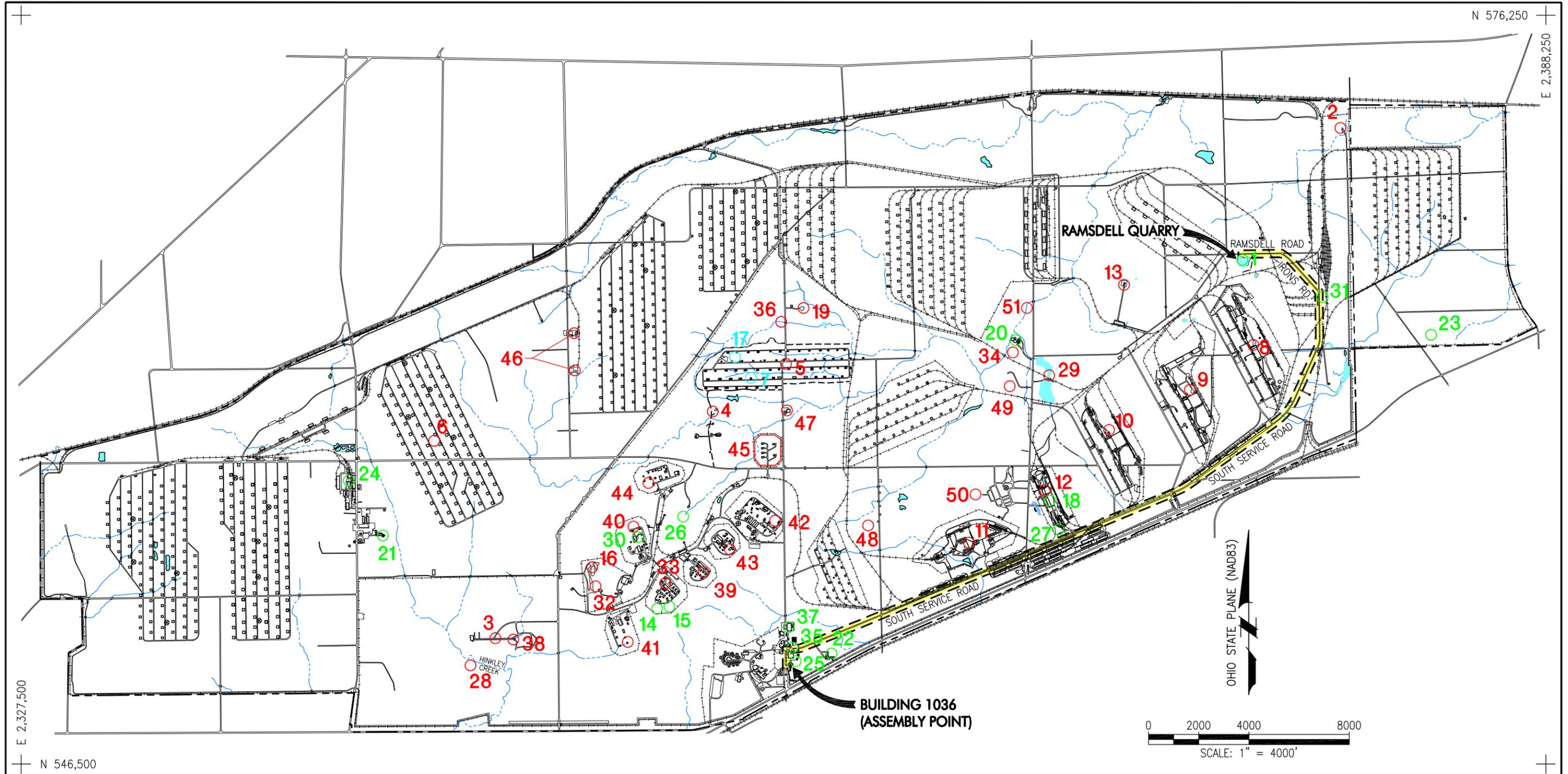
Listed below are emergency groups and their telephone numbers. A telephone and two-way radios will be present in the field and available for use. Tol-Test Co., Inc. will be contacted first for any emergency service. Tol-Test Co., Inc. will then coordinate the response.

| 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 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:

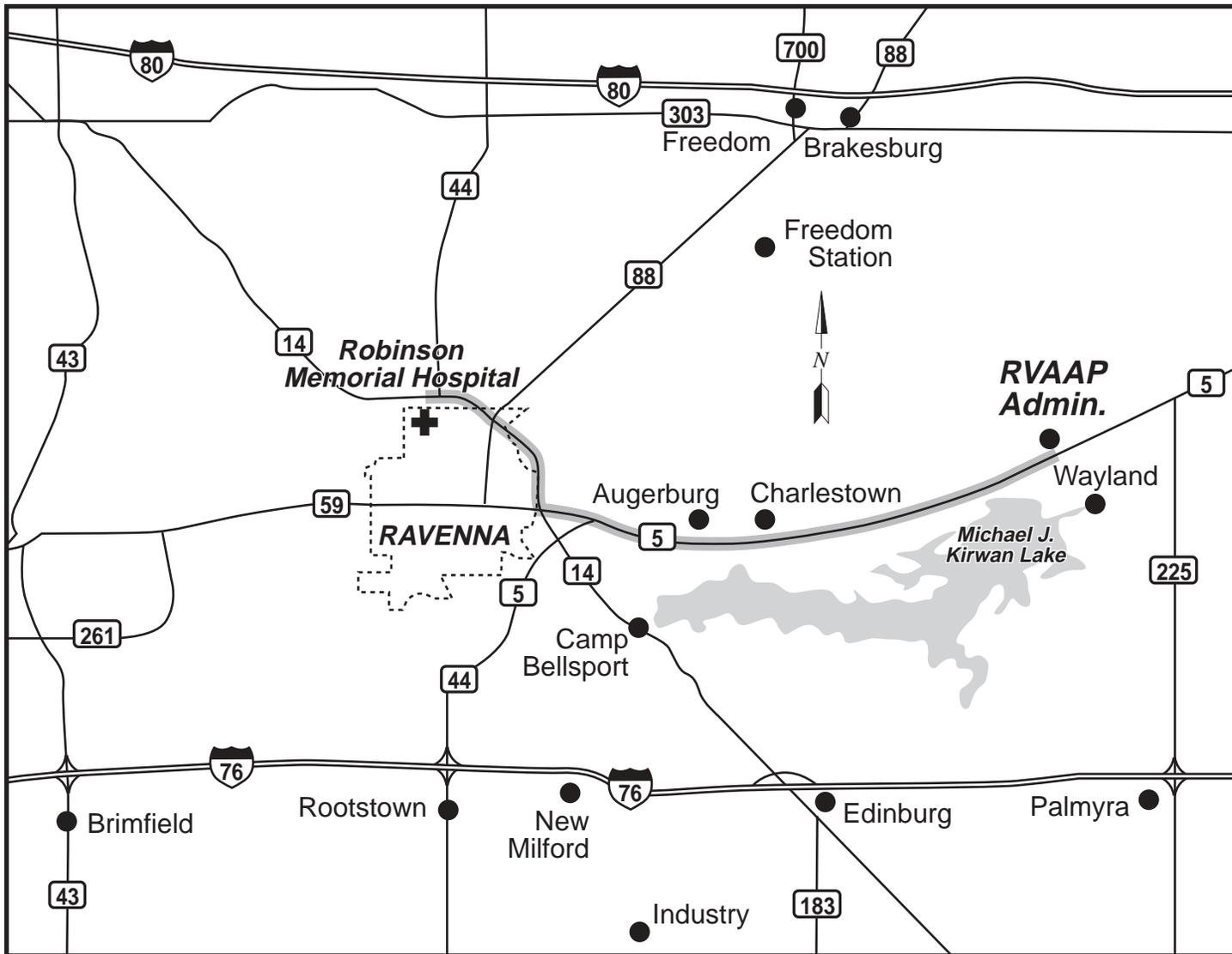
| | | | | |
|--|---|--|--|--|
| 1 RAMSDELL QUARRY LANDFILL | 13 BUILDING 1200 AND DILUTION/SETTLING POND | 25 BUILDING 1034 MOTOR POOL WASTE OIL TANK | 37 PESTICIDE STORAGE BUILDING T-4452 | 49 CENTRAL BURN PITS |
| 2 ERIE BURNING GROUNDS | 14 LOAD LINE 6, EVAPORATION UNIT | 26 FUZE BOOSTER AREA SETTLING 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 | ----- 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
 US Army Corps of Engineers
 Louisville District
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY: R. BEELER
 REV. NO./DATE: 0 / 10-22-03
 CAD FILE: /00012/DWGS/M36LOC02

Figure 12-1. Egress Route from Ramsdell Quarry Landfill 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

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

NIOSH (National Institute for Occupational Safety and Health). *NIOSH Pocket Guide to Chemical Hazards, the Condensed Chemical Dictionary*, online 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 (U.S. Army Corps of Engineers). *Safety and Health Manual*, EM-385-1-1-13.

USACE (U.S. Army Corps of Engineers) 1999. *Initial Phase Report, Groundwater Investigation, Ramsdell Quarry Landfill, Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA27-97-D-0025, D.O. 003, January.

USACE (U.S. Army Corps of Engineers) 2000. *Final Report on the Groundwater Investigation of the Ramsdell Quarry Landfill, Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA27-97-D-0025, D.O. 003, August.

USACE (U.S. Army Corps of Engineers) 2001. *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.

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

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: _____

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