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Revision 5

Health and Safety Plan for the Group 3 Remedial Design/ Remedial Action Sampling, Excavation, Backfilling, Packaging, and Shipment of Soil at Waste Area Group 1, Operable Unit 1-10

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Idaho Completion Project

Bechtel BWXT Idaho, LLC

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ABSTRACT

This health and safety plan establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to personnel working at Group 3, Waste Area Group 1, Operable Unit 1-10, as required by the Occupational Safety and Health Administration standard, "Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)." This health and safety plan contains information about the hazards involved in performing the work as well as the specific actions and equipment that will be used to protect personnel while working at the task site.

This health and safety plan is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of site operations based on the existing and anticipated hazards.

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ACRONYMS

ALARA	as low as reasonably achievable
BBWI	Bechtel BWXT Idaho, LLC
bgs	below ground surface
CERCLA	Comprehensive Environmental, Response, Compensation and Liability Act
CFA	Central Facilities Area
CFR	*Code of Federal Regulations*
CLP	Contract Laboratory Program
CRC	contamination reduction corridor
CRZ	contamination reduction zone
CY	calendar year
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EPA	U.S. Environmental Protection Agency
ERO	Emergency Response Organization
ES&H	environment, safety, and health
EZ	exclusion zone
FFA/CO	Federal Facility Agreement and Consent Order
FTL	field team leader
FRG	Final Remediation Goal
HASP	Health and Safety Plan
HAZWOPER	hazardous waste operations and emergency response
HEPA	high-efficiency particulate air
HSO	health and safety officer
ICP	Idaho Completion Project

IDEQ	Idaho Department of Environmental Quality
IDLH	immediately dangerous to life or health
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISMS	Integrated Safety Management System
JSA	job safety analysis
LOFT	Loss-of-Fluid Test Facility
MCP	management control procedure
NLCI	no-longer-contained-in
OSHA	Occupational Safety and Health Administration
OMP	Occupational Medical Program
OU	operable unit
PCB	polychlorinated biphenyl
PLN	plan
POD	plan of the day
PPE	personal protective equipment
PRD	program requirements document
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD/RA	remedial design/remedial action
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RPSSA	Radioactive Parts Security Storage Area
RWP	radiological work permit
SAD	site area director

SAP	Sampling and Analysis Plan
SCBA	self-contained breathing apparatus
SVOC	semi-volatile organic compound
SWP	safe work permit
SZ	support zone
TAL	target analyte list
TAN	Test Area North
TLV	threshold limit value
TPR	technical procedure
TSF	Technical Support Facility
TWA	time-weighted average
UV	ultraviolet light
VOC	volatile organic compound
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center
WRRTF	Water Reactor Research Test Facility

Health and Safety Plan for the Group 3 Remedial Design/Remedial Action Sampling, Field Screening, Excavation, Backfilling, Packaging, and Shipment of Soil at Waste Area Group 1, Operable Unit 1-10

1. INTRODUCTION

1.1 Purpose

This Health and Safety Plan (HASP) establishes the procedures and requirements that will be used to eliminate or minimize health and safety hazards to personnel working at the Group 3 Remedial Design/Remedial Action for the Technical Support Facility (TSF) –03, the Water Reactor Research Test Facility (WRRTF) -01 Burn Pits, and TSF-26 PM-2A Tanks, Waste Area Group (WAG) 1, Operable Unit (OU) 1-10 at the Idaho National Engineering and Environmental Laboratory (INEEL). The location of the INEEL within the State of Idaho is shown in Figure 1-1.

1.2 Scope and Objectives

This HASP has been written to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, "Hazardous Waste Operations and Emergency Response (HAZWOPER)," 29 *Code of Federal* Regulations (CFR) 1910.120. This HASP governs all work at the Group 3 Remedial Action Sampling, Field Screening, Excavation, Backfilling, Packaging, and Shipment of Soil for TSF-03, WRRTF-01 Burn Pits, and TSF-26 PM-2A Tanks, WAG 1, OU 1-10, that is performed by INEEL management and operations contractor personnel, subcontractors, and any other personnel who enter the project area.

This HASP has been reviewed and revised as deemed appropriate by the health and safety officer (HSO) in conjunction with other project personnel and management to ensure its effectiveness and suitability.

1.3 Idaho National Engineering and Environmental Laboratory Site Description

The INEEL, formerly the National Reactor Testing Station, encompasses 569,135 acres (890 mi^2), and is located approximately 55 km (34 mi) west of Idaho Falls, Idaho. The U.S. Department of Energy Idaho Operations Office (DOE-ID) has responsibility for the INEEL and designates authority to operate the INEEL to government management and operating contractors.

The United States Atomic Energy Commission, now the U.S. Department of Energy (DOE), established the National Reactor Testing Station (now the INEEL) in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been the storage facility for transuranic radionuclides and radioactive low-level waste since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, energy technology and conservation programs, and DOE long-term stewardship programs.

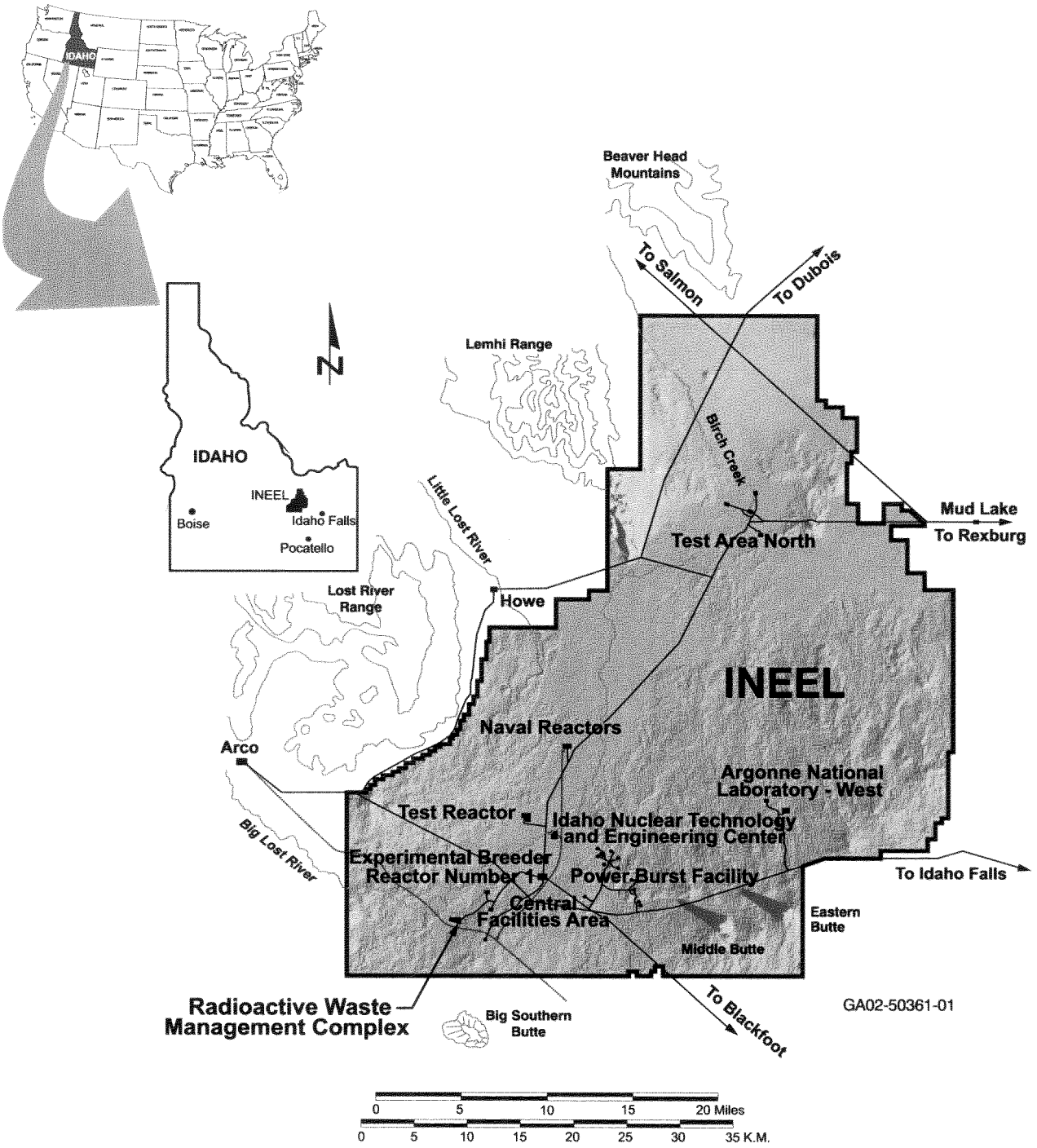

Figure 1-1. Map showing the location of the INEEL.

1.4 Background, Project Site Description, and Previous Investigations

This section provides an overview of the history, location, and previous field activities conducted at this work site. Previous investigation data results are presented to characterize site conditions.

The INEEL, a government-owned facility managed by the DOE, is located in southeastern Idaho, 55 km (34 mi) west of Idaho Falls, as shown in Figure 1-1. The INEEL encompasses approximately 2,305 km^2 (890 mi^2) of the northwestern portion of the eastern Snake River Plain, and extends into portions of five Idaho counties.

In November 1989, because of confirmed contaminant releases to the environment, the Environmental Protection Agency (EPA) placed the INEEL on the National Priorities List of the *National Oil and Hazardous Substances Contingency Plan* (54 Federal Register 48184). In response to this listing, the DOE, EPA, and the Idaho Department of Environmental Quality (IDEQ), herein referred to as the Agencies, negotiated the Federal Facility Agreement and Consent Order (FFA/CO) and Action Plan. The Agencies signed these documents in 1991, establishing the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act.

To better manage cleanup activities, the INEEL was divided into 10 waste area groups (WAGs). Test Area North (TAN), designated as WAG 1, includes fenced areas and immediate areas outside the fence lines at the Technical Support Facility (TSF), the Initial Engine Test (IET) Facility, the Loss-of-Fluid Test (LOFT) Facility, the Specific Manufacturing Capability (SMC) Facility, and the Water Reactor Research Test Facility (WRRTF) (DOE-ID 1999).

As shown in Figures 1-1 and 1-2, TAN is located in the north-central portion of the INEEL. The facility was constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program, which developed and tested designs for nuclear-powered aircraft engines. When Congress terminated this research in 1961, the area's facilities were converted to support a variety of other DOE research projects. From 1962 through the 1970s, the area was principally devoted to the LOFT Facility, where reactor safety testing and behavior studies were conducted. Beginning in 1980, the area was used to conduct research and development with material from the 1979 Three Mile Island reactor accident (DOE-ID 1998). During the mid-1980s, the TAN Hot Shop supported the final tests for the LOFT Program. Current activities include the manufacture of armor for military vehicles at the SMC Facility, and nuclear storage operations at TSF. Decontamination and decommissioning (D&D) has recently been completed at the IET Facility.

The FFA/CO also established ten operable units (OUs) within WAG 1 consisting of 94 potential release sites (DOE-ID 1999). The sites include various types of pits, spills, ponds, aboveground and underground storage tanks (USTs), and a railroad turntable. A comprehensive remedial investigation/feasibility study (RI/FS) was initiated in 1995 to determine the nature and extent of the contamination at TAN under OU 1-10, defined in the FFA/CO as the *WAG 1 Comprehensive Remedial Investigation/Feasibility Study* (DOE-ID 1997). The OU 1-10 RI/FS culminated with the finalization of the OU 1-10 Record of Decision (ROD) (DOE-ID 1999), which provides information to support remedial actions for eight sites where contaminants present an unacceptable risk to human health and the environment. This HASP addresses field activities at the Group 3 remedial design/remedial action for the Technical Support Facility (TSF) -03, Water Reactor Research Test Facility (WRRTF) -01 burn pits, and PM-2A Tanks.

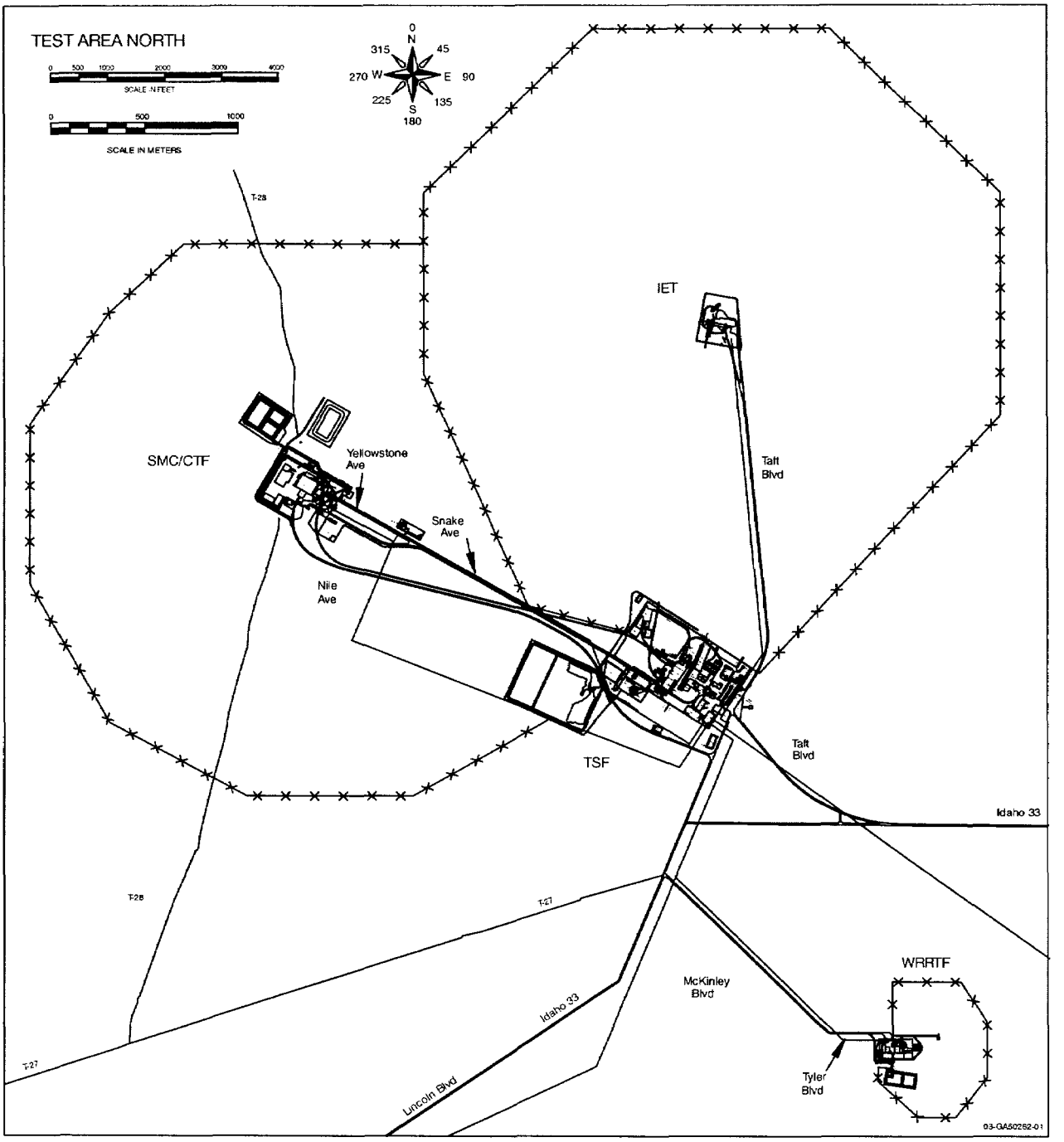

Figure 1-2. Map of the Test Area North Complex at the Idaho National Engineering and Environmental Laboratory.

The remaining sites are either covered by another decision document, were documented as "No Action" or "No Further Action" sites in the OU 1-10 ROD, or will be further evaluated by another WAG at the INEEL.

1.5 Technical Support Facility (TSF) -03 Burn Pit

The TSF-03 burn pit (Figure 1-3) is located northwest of TSF, outside the TSF perimeter fence. Technical Support Facility (TSF) -03 was used for open burning of construction debris and wastes generated at the TAN facility. At the time, incinerating waste materials in the pits after disposal was the standard operating procedure.

From 1953 to 1958, the pit received refuse, construction debris, and combustible liquids (i.e., petroleum products) from the TAN areas. Review of aerial photos indicates that the TSF-03 burn pit may have operated from 1956 to 1958. The use of this pit was discontinued when similar disposal operations started at the WRRTF-01 burn pits in 1958.

The normal operating procedure at the burn pit was to incinerate each time materials were disposed of in the pit. Although records of the types or volumes of material disposed of in the pit were not kept, the OU 1-10 RI/FS (DOE-ID 1997) reported that some Stoddard solvent and oily waste were possibly burned at this pit. Track 2 sampling also identified materials such as glass, metallic objects, fiberglass, and charcoal. The types of materials disposed in the pit were largely determined from process knowledge of TAN activities and historical information. As stated in the OU 1-10 RI/FS (DOE-ID 1997), no Resource Conservation and Recovery Act (RCRA) wastes are suspected of having been disposed of at these sites. A hazardous waste determination (HWD) for any generated wastes from the burn pits will be performed as part of the remedial design/remedial action. Sampling data indicate that the waste retrieved will not meet the definition of RCRA hazardous waste.

TSF-03 has been backfilled with 2 to 6 ft of clean soil, and vegetation has been naturally reestablished, reducing the potential for exposure to current receptors (workers). Subsidence control has been maintained at this site. Presently, the TSF-03 Burn Pit is administratively controlled with signs identifying it as a CERCLA site. No activities can be performed at the pits without contacting the INEEL Idaho Completion Project (ICP) program.

Contaminant extent data includes the following:

- Lead: Lead concentrations in the overburden samples were below background levels. The highest concentrations of lead were found in the burn layer in the center of the pit and nearest the southern end of the pit.

- Asbestos: Asbestos contamination may also be present in burn layer debris.

- Chromium: Chromium was detected above background levels in four samples. The chromium concentrations from these four samples ranged from 80 to 1,630 mg/kg. Samples collected from the over and underburden layers were below background levels.

- Chlorinated Dibenzo-Dioxins (CDDs) and -Furans (CDFs): Chemicals detected in the soil samples include CDDs and CDFs.

- PCBs: PCBs detected include Aroclor-1254, Aroclor-1260, and Aroclor-1262. PCBs were detected in two overburden samples and six burn layer samples at concentrations ranging from 0.08 to 6.2 mg/kg. PCBs were not detected in the sample collected in the underburden layer.

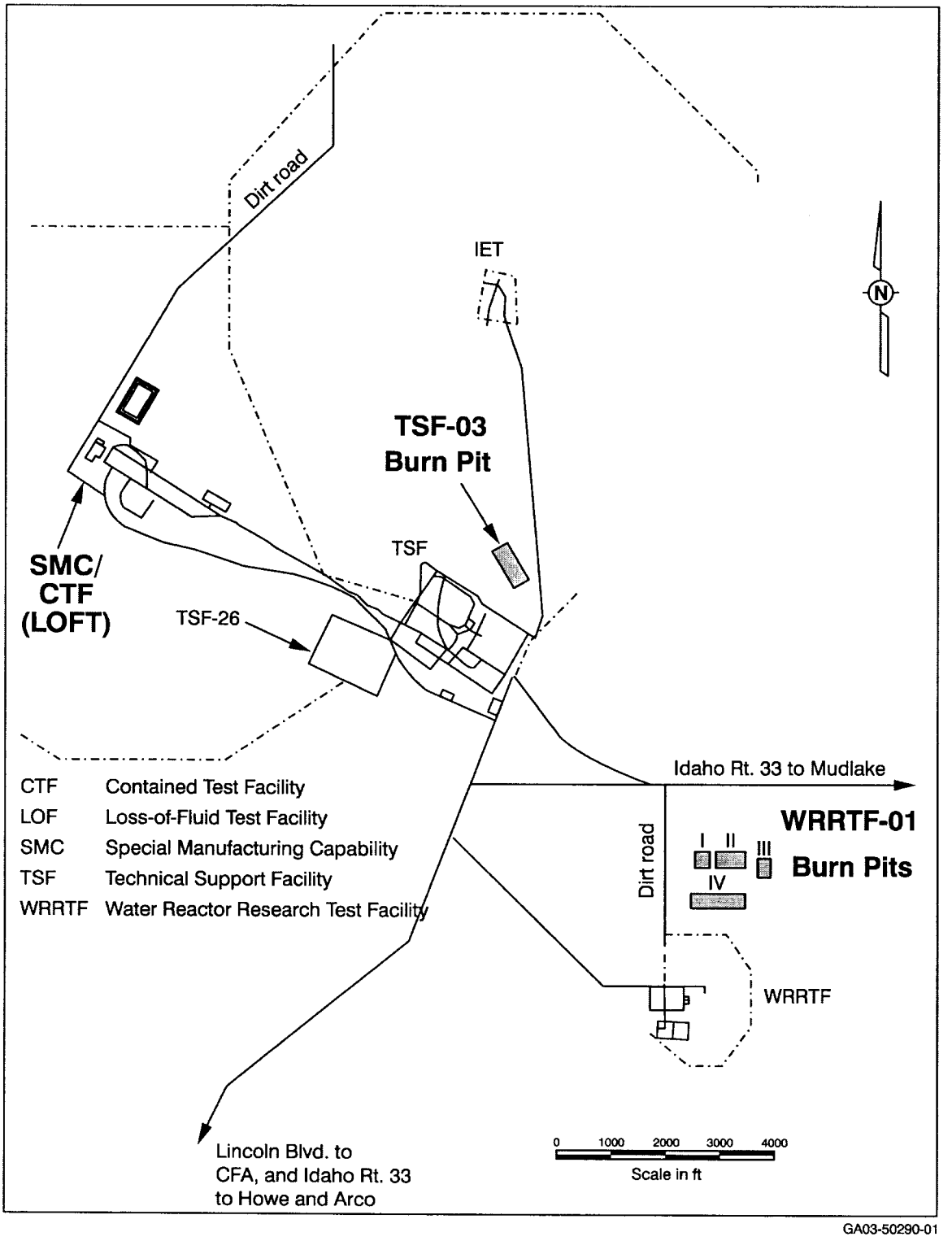

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Figure 1-3. Technical Support Facility (TSF) –03, Water Reactor Research Test Facility (WRRTF) -01 Burn Pits, and PM-2A Tank site (TSF-26).

Note: Burn Pits are not to scale.

- SVOCs: SVOCs detected include 2-methylnaphthalene, bis(2-ethylhexyl) phthalate, and phenanthrene. Bis(2-ethylhexyl)phthalate was detected in the overburden sample, the burn layer sample, and in the burn layer sample.

- Radionuclides: Americium-241 was detected above background levels in samples collected from the TSF-03 Burn Pit. The highest concentration (0.32 pCi/g) of americium-241 was detected in the overburden sample. Similar concentrations were detected in the burn layer. Plutonium-238 was also detected above background levels at the TSF-03 Burn Pit. All of the samples where radium-228 was detected exceed the radium-228 background level.

1.6 Water Reactor Research Test Facility (WRRTF) -01-I, -II, -III, and -IV Burn Pits

The WRRTF-01 Burn Pits (Figure 1-3) are located approximately 2,700 ft north of WRRTF, outside the WRRTF perimeter fence. These burn pits were used for open burning of combustible waste generated at the TAN facilities from 1958 to 1975, and involved four separate areas. The WRRTF-01-I Pit opened in 1958 and received both combustible solids and liquids from 1958 to 1964. After Burn Pit I was filled, WRRTF-01-II and -III Burn Pits were opened and operated from 1964 to 1970. Burn Pit II may have received only combustible solids, while Burn Pit III received only combustible liquids. (These liquids consisted mainly of oil from the glass windows at the TAN Hot Shop and isopropyl alcohol used to clean this oil off the windows during replacement.) During the Track 2 sampling, Pit III was characterized as being heavily stained and odoriferous. Because Burn Pit II was filled, the WRRTF-01-IV Burn Pit was opened, and mainly received combustible solids and some reportedly noncombustible solids (e.g., automobiles and metal goods). Operations at Burn Pit IV began approximately in 1970. No information was obtained regarding the exact closure date of Burn Pit IV. Minor amounts of combustible liquids may have been disposed in Burn Pit IV. Additional observations of Burn Pits II and IV detected substances described as 'possibly asbestos.' The types of materials disposed of in these pits were largely determined from process knowledge of TAN activities and historical information. As stated in the OU 1-10 RI/FS (DOE-ID 1997), no RCRA wastes are suspected of having been disposed of at these sites. A hazardous waste determination (HWD) for any generated wastes from the burn pits will be performed as part of the remedial design/remedial action.

The normal operating procedure at the WRRTF-01 Burn Pits was to incinerate each time material was disposed of in the pits. For all of the WRRTF-01 Burn Pits, the Track 2 summary describes the presence of materials such as glass, metallic objects, wood, stained soil, grease, porcelain, fiberglass, paper, and charcoal. Many of the volatile and semivolatile materials are suspected of being thermally destroyed and/or volatilized. Radionuclides are not suspected to have been disposed of in large quantities at the WRRTF-01 Burn Pits, as other protocols existed for the disposal of radioactive wastes at that time.

The sites have been backfilled with approximately 6 in. to 9 ft of clean soil, and vegetation has been reestablished. Under current conditions, subsidence control has been maintained at the WRRTF-01 Burn Pits. Presently, the WRRTF-01 Burn Pits are administratively controlled with signs identifying the area as a CERCLA site. No activities can be performed at the pits without contacting the INEEL ICP Program.

Contaminant extent data is summarized as follows:

- Lead: Lead above background levels was detected in the burn layer and in the underburden layer. Concentrations in these elevated lead samples ranged from 24.5 to 4,330 mg/kg.

- Chromium: Only one sample had chromium concentrations that exceed the background level of 50 mg/kg. This sample was collected from the burn layer.

- Asbestos: Asbestos contamination was confirmed above 1% in the burn layer in two of the four pits at WRRTF-01.

- Mercury: Mercury concentrations that exceed the background level of 0.074 mg/kg were found in the burn layer and from the overburden layer.

- PCBs: Aroclor-1260 was detected in one overburden sample and one burn layer sample.

- Radionuclides: Americium-241 above background levels was detected in one sample collected from the burn layer.

- Plutonium-238 above background levels was also detected. One overburden sample, one burn layer sample, and one underburden sample, exceed the plutonium-238 background level of 0.0091 pCi/g.

- Radium-228 was detected in concentrations that exceed the radium-228 background level of 0.38 pCi/g in the same three samples that exceeded plutonium background levels.

1.7 Description and Background of the Test Area North PM-2A Tanks

The TSF-26 PM-2A Tank site comprises two 50,000-gal carbon-steel underground storage tanks; associated concrete containment troughs; pipes; waste contents in the tanks; and contaminated soil in various locations. Each tank measures 12.5 ft in diameter by 55 ft long and lies horizontally in a concrete trough, the bottom of which is located approximately 30 ft underground. The tops of the tanks are approximately 15 ft below ground surface. Most of the liquid waste was removed from the tanks by the end of 1981 leaving heels of wet, mixed-waste sludge. Approximately 10,000 lb of diatomaceous earth were then deposited into each tank to absorb the remaining liquid, forming a layer estimated to be 8 in. thick.

The OU 1-10 ROD estimates the combined waste volume of both tanks to be 3,800 gal, which includes the sludge and diatomaceous earth. Other estimates indicate the waste volume could be between 5,600 and 8,000 gal.

Tanks V13 and V14 were installed in the mid-1950s to store radioactive liquid waste concentrated by the TAN-616 and PM-2A evaporators, and were removed from service in 1975. Before evaporation, the raw liquid was stored in Tanks V1, V2, and V3. From 1972 (when the TAN-616 evaporator was removed from service) until 1975, Tanks V13 and V14 received the raw liquid waste directly from Tanks V1 and V3, plus evaporator bottoms from the PM-2A evaporator. (Tank V2 was removed from service in 1968.) Collection Tanks V1 and V3 continued to receive liquid waste until 1982 and 1985, respectively.

The waste remaining in the tanks is Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.) F001-listed hazardous waste and contains radionuclides, polychlorinated biphenyls (PCBs), and inorganic substances including heavy metals. The waste also may contain organic compounds although the analytical results from samples obtained in 1996 are listed as undetectable. However, the detection limits exceed the concentrations corresponding to the characteristic of a toxic hazardous waste. The detection limits also exceed the land disposal restriction (LDR) treatment standards.

The soil above and in the general area of the tanks was contaminated from occasional spills during routine operations and from leaks and spills during the removal and evaporation of the liquid waste.

1.8 Scope of Work

The scope of this work will include sampling, soil excavation, packaging and disposal at ICDF, removal of abandoned utility (water, air, etc.) and tank feed lines, removal of the PM-2A tanks intact, removal of tank troughs (as required), and site backfilling and restoration. Burn pit TSF-03 soils will be excavated, packaged, disposed of, backfilled, and re-vegetated. WRRTF-01 Burn Pits will be covered with 2 ft of soil, compacted, re-vegetated, and monuments positioned therein.

1.8.1 Sampling, Soil Excavation/Backfilling, Packaging and Disposal, and Site Restoration

Sampling will be accomplished using hand tools or heavy equipment (as required) and can occur both before and after site area excavation in accordance with work control documentation. The hazards associated with these operations are discussed in Sections 2.2.

Soil excavation, packaging and disposal at ICDF, and site backfilling and restoration will be accomplished using heavy equipment in accordance with work control documentation. Hazards associated with these operations are discussed in Section 2.2.10, "Heavy Equipment and Moving Machinery." In the unlikely event that a utility or other underground obstacle is struck while excavating, TAN operations must be immediately contacted and excavating safely stopped. A recovery plan can then be developed.

1.8.2 PM-2A Tank Excavation and Removal

Tank excavation will be accomplished using heavy equipment in accordance with work control documentation. Hazards associated with these operations are discussed in Section 2.2.10, "Heavy Equipment and Moving Machinery." In the unlikely event that a utility or other underground obstacle is struck while excavating, TAN operations must be immediately contacted and excavating safely stopped. A recovery plan can then be developed

Tank and line cutting operations required for tank removal will be accomplished using mechanical means and/or torch methods. The use of a torch requires a Hot Work Permit as outlined in PRD-5110, "Welding, Cutting and Other Hot Work." Hazards associated with these operations are discussed in Section 2.2.7, "Fire and Flammable Materials Hazards." It is likely that hearing protection will be required during cutting operations. Associated piping will be excavated, isolated, and removed/packaged for disposal. Piping removal will be performed via "pulling" if it is deemed suitable after a review of project and as-built drawings.

Contamination control will be accomplished using a combination of engineering and administrative controls. Lifting fixtures and/or slings will be employed to lift and remove the tanks. Hazards associated with these operations are discussed in Section 2.2.12, "Hoisting and Rigging of Equipment." The tanks will be cleaned of debris, decontaminated and packaged (as required) for transport to the TAN 607A High Bay. Decontamination methods are documented in Section 11.

1.8.3 Soil Excavation/Backfilling, Packaging, Shipment, and Revegetation of TSF-03

Soil excavation/backfilling, packaging, shipment to INEEL CERCLA Disposal Facility (ICDF), and revegetation of TSF-03 will be accomplished using heavy equipment in accordance with work control documentation. Hazards associated with these operations are discussed in Section 2, "Hazard Identification and Mitigation." In the unlikely event that a utility or other underground obstacle is struck while drilling, TAN operations must be immediately contacted and excavating safely stopped. A recovery plan can then be developed. Soil will be loaded into burrito bags inside roll-offs or dump trucks. The bags will be sealed and the containers hauled to ICDF for storage and/or disposal.

1.8.4 Apply Soil Covering, Compact, Revegetate, and Set Monuments at WRRTF-01, Burn Pits II and IV

Soil covering, compaction, re-vegetation, and monument placement will be accomplished using heavy equipment in accordance with work control documentation. Hazards associated with these operations are discussed in Section 2, "Hazard Identification and Mitigation."

2. HAZARD IDENTIFICATION AND MITIGATION

The overall objective of this section is to identify existing and anticipated hazards based on the Group 3 remedial design/remedial action sampling, excavation, backfilling, packaging, and shipment of soil at WAG 1, OU 1-10 scope of work, and to provide controls to eliminate or mitigate these hazards. These include the following:

- Evaluation of each project task to determine the safety hazards, radiological, chemical, and biological exposure potential to project personnel by all routes of entry
- Establishment of the necessary monitoring and sampling required to evaluate exposure and contamination levels, determine action levels to prevent exposures, and provide specific actions to be followed if action levels are reached
- Determination of necessary engineering controls, isolation methods, administrative controls, work practices, and (where these measures will not adequately control hazards) personal protective equipment (PPE) to further protect project personnel from hazards.

The purpose of this hazard identification section is to lead the user to an understanding of the occupational safety and health hazards associated with project tasks. This will enable project management and safety and health professionals to make effective and efficient decisions related to the equipment, processes, procedures, and the allocation of resources to protect the safety and health of project personnel.

The magnitude of danger presented by these hazards to personnel entering work zones is dependent on both the nature of tasks being performed and the proximity of personnel to the hazards. Engineering controls will be implemented (whenever possible) along with administrative controls, work practices, and PPE to further mitigate potential exposures and hazards. This section describes the chemical, radiological, safety, and environmental hazards that personnel may encounter while conducting project tasks. Hazard mitigation provided in this section in combination with other work controls (e.g., technical procedures, work orders, job safety analysis, and Guide [GDE] –6212, "Hazard Mitigation Guide for Integrated Work Control Process") will also be used where applicable to eliminate or mitigate project hazards.

Note: Subcontractor flow-down requirements such as those listed on the completed INEEL Form 540.10, "Safety Checklist of Subcontractor Requirements for On-Site Nonconstruction Work"; *Subcontractor Requirements Manual (TOC-59)*; and contract general and special conditions. Additionally, subcontractors are expected to take a proactive role in hazard identification and mitigation while conducting project tasks and report unmitigated hazards to the appropriate project point of contact. Subcontractors are responsible for meeting all applicable INEEL management control procedure (MCP), program requirement document (PRD), Voluntary Protection Program (VPP), and Integrated Safety Management System (ISMS) mitigative actions within the documented work controls.

2.1 Chemical and Radiological Hazards and Mitigation

Personnel may be exposed to chemical and radiological hazards while conducting the Group 3 remedial design/remedial action sampling, excavation, backfilling, packaging, and shipment of soil at WAG 1, OU 1-10.

Table 2-1 lists the worker health-based chemical contaminants of concern that may be encountered while conducting project tasks.

Table 2-1. Evaluation of health-based contaminants of concern for Group 3 RD/RA Tasks.

Material or Chemical (CAS No., Vapor Density, and Ionization Energy)	Exposure Limit[a] (Permissible Exposure Limit and Threshold Limit Value)	Routes of Exposure	Symptoms of Overexposure[b] (Acute and Chronic)	Target Organs and System	Carcinogen? (Source)[c]	Matrix or Source at Project Site
Aroclor-1260 (11096-82-5)	Not Available (nearly identical product – Aroclor-1254 [chlorodiphenyl 54%Cl]): 0.5 mg/m^3 – TLV 0.5 mg/m^3 – PEL	Inhalation, ingestion, contact hazard, skin	Eye irritation, chloroacne, liver damage, reproductive effects	Skin, eyes, liver, reproductive organs	Not available Aroclor-1254[c] (chlorodiphenyl 54% Cl) ACGIH – A3[c] IARC – 2A[c] NTP - R[c]	Low potential Maximum concentration detected = 310 mg/kg (sludge)
Asbestos (12001-29-5)	TLV – 0.1 fiber/cc PEL – 0.1 fiber/cc (29 CFR 1910.1101)	Ih, Ig, Con	Irritation of eyes and skin, chronic asbestosis, restricted pulmonary function	Eyes/respiratory tract	Yes – ACGIH Yes – NTP Yes – IARC Yes – OSHA	Moderate
Carbon Monoxide (6308-0) Vapor density 0.789	50 PPM – PEL 25 PPM – TLV	Inhalation	Headache, confusion, nausea, dizziness, excessive exposure may be fatal	Blood oxygen carrying capacity	No	Low-moderate potential associated with equipment operation and cutting operations
Chromium (7440-47-3)	0.5 mg/m^3 – TLV (Cr III) 0.01 mg/m^3 – TLV (Cr VI) 1 mg/m^3 – PEL (Cr metal) 0.5 mg/m^3 – PEL (Cr III)	Inhalation, ingestion, contact hazard, skin	Eye and skin irritation, lung fibrosis	Eyes, skin, respiratory system	Chromium V1[c] ACGIH - A1[c] IARC - 1[c] NTP - K[c]	Low-moderate potential Maximum concentration detected = 1100 mg/kg (sludge)
Lead (7439-92-1)	0.05 mg/m^3 – TLV 0.05 mg/m^3 – PEL	Inhalation, ingestion, contact hazard	Weakness, weight loss, anemia, nausea, vomiting, paralysis, constipation, insomnia, abdominal pain, kidney disease, eye irritation	GI tract, CNS, kidneys, blood, gingival tissue, eyes	ACGIH – A3[c] IARC – 2B[c]	Low potential Maximum concentration detected = 592 mg/kg (sludge)

Table 2-1. (continued).

Material or Chemical (CAS No., Vapor Density, and Ionization Energy)	Exposure Limit[a] (Permissible Exposure Limit and Threshold Limit Value)	Routes of Exposure	Symptoms of Overexposure[b] (Acute and Chronic)	Target Organs and System	Carcinogen? (Source)[c]	Matrix or Source at Project Site
Mercury (7439-97-6)	0.025 mg/m^3 – TLV 0.1 mg/m^3 Ceiling – PEL	Inhalation, ingestion, contact hazard, skin	Eye and skin irritation, chest pain, breathing difficulty, tremor, insomnia, headache, fatigue, gastrointestinal disturbance, weight loss	Eyes, skin, respiratory system, CNS, kidneys	ACGIH – A4[c] IARC – 3[c]	Low-moderate potential Maximum concentration detected = 2110 mg/kg (sludge)
Silica (14808-60-7)	0-05 mg/m^3 – TLV	Inhalation	Cough, difficulty breathing, decreased pulmonary function, irritated eyes	Eyes, respiratory system	ACGIH – A2 IARC – 1 NTP - K[c]	
PCE	25 ppm (or 169.5 mg/m$^{3)}$ – TLV 100 ppm – PEL	Inhalation, Skin adsorption, ingestion, skin and/or eye contact	Irritation of eyes, skin, nose, throat, respiratory system, flush face, neck, dizziness, incoordination, headache, drowsiness, skin erythema (skin redness), liver damage, (potential occupational carcinogen)	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Yes – Possible carcinogen IARC 2b	Low potential for soil handling activities Detected at 130 ppm 95% UCL in Tank V-14 sludge only.

Table 2-1. (continued).

Material or Chemical (CAS No., Vapor Density, and Ionization Energy)	Exposure Limit[a] (Permissible Exposure Limit and Threshold Limit Value)	Routes of Exposure	Symptoms of Overexposure[b] (Acute and Chronic)	Target Organs and System	Carcinogen? (Source)[c]	Matrix or Source at Project Site
Radionuclides—Cs-137 (dominant radioisotopes)						
Radionuclides (whole-body exposure)	As per *INEEL Radiation Control Manual*	Whole body	Acute gastrointestinal disorders, bacterial infections, hemorrhaging, anemia, loss of body fluids, cataracts, temporary sterility Chronic cancer, pre-cancerous lesions, benign tumors, cataracts, skin changes, congenital defects	Blood-forming cells, gastrointestinal tract, and rapidly dividing cells	Yes	Low levels detected in soil samples Low exposure potential

a. Sources: *Threshold Limit Values Booklet* (American Conference of Government Industrial Hygienists [ACGIH 2002]) and substance-specific standards (29 CFR 1910.1000, Tables 2-1 and 2-2).

b. These include (1) nervous system: dizziness, nausea, and lightheadedness; (2) dermis: rashes, itching, and redness; (3) respiratory system: respiratory effects; and, (4) eyes: tearing and irritation.

c. If yes, identify agency and appropriate designation (i.e., ACGIH A1 or A2; National Institute of Occupational Safety and Health; Occupational Safety and Health Administration; International Agency for Research on Cancer (IARC); National Toxicology Program (NTP).

2.1.1 Routes of Exposure

Chemical and radiological hazards will be eliminated, isolated, or mitigated to the extent possible during all project tasks. Where they cannot be eliminated or isolated, monitoring for chemical and radiological hazards will be conducted (as described in Section 3) to detect and quantify exposures. Additionally, administrative controls, training, work procedures, and protective equipment will be used to further reduce the likelihood of exposure to these hazards. Table 2-2 summarizes each primary project task, associated hazards, and mitigation procedures.

The Job Safety Analyses (JSAs), Industrial Hygiene Exposure Assessments (EAs), and radiological work permits (RWPs) may be used in conjunction with this HASP to address specific hazardous operations (e.g., hot work) and radiological conditions at the project site. If used, these permits will further detail specialized PPE and dosimetry requirements.

2.1.2 Specific Project Controls

The primary control on the site during excavation, backfilling, and packaging, will be wetting and misting methods, if required, to keep dust and contaminants from becoming airborne. A combination of engineering and administrative controls will be used during tank cutting for contamination control. Personal protective equipment will also be worn as required by task-specific JSAs and this HASP.

2.2 Safety and Physical Hazards and Mitigation

Industrial safety and physical hazards will be encountered while performing Group 3 remedial design/remedial action sampling, soil excavation, packaging and disposal at ICDF, removal of abandoned utility (water, air, etc.) and tank feed lines, removal of the PM-2A tanks intact, removal of tank troughs (as required), and site backfilling and restoration. Section 4.2 provides general safe-work practices that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel.

2.2.1 Material Handling and Back Strain

Material handling and maneuvering of various pieces of equipment may result in employee injury. All lifting and material-handling tasks will be performed in accordance with Management Control Procedure (MCP) -2692, "Preventing Ergonomic and Back Disorders." Personnel will not physically lift objects weighing more than 22 kg (50 lb) or 33% of their body weight (whichever is less) alone. Additionally, back strain and ergonomic considerations must be given to material handling and equipment usage. Mechanical and hydraulic lifting devices should be used to move materials whenever possible. The industrial hygienist (IH) will conduct ergonomic evaluations of various project tasks to determine the potential ergonomic hazards and provide recommendations to mitigate these hazards. Applicable requirements from MCP-2739, "Material Handling, Storage, and Disposal," also will be followed.

2.2.2 Repetitive Motion and Musculoskeletal Disorders

Tasks to be conducted may expose personnel to repetitive-motion hazards, undue physical stress, overexertion, awkward postures, or other ergonomic risk factors that may lead to musculoskeletal disorders. Musculoskeletal disorders can cause a number of conditions including pain, numbness, tingling, stiff joints, difficulty moving, muscle loss, and sometimes paralysis. The assigned project industrial hygienist will evaluate project tasks and provide recommendations to reduce the potential for musculoskeletal disorders in accordance with MCP-2692, "Preventing Ergonomic and Back Disorders."

Table 2-2. Summary of Remedial Action Sampling and Field Screening of Group 3 activities associated hazards, and mitigation.

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
Mobilization and Site Preparation (Support Equipment)	Radioactive contamination—subsurface soils. Radiation exposure.	Radiological control technician surveys, radiological work permit (RWP) (as required), dosimetry, direct-reading instruments, and compliance with posted entry and exit requirements.
	Chemical and inorganic contaminants.	Controlled areas, qualified operators, job safety analyses (JSAs), safe work permits (SWPs), technical procedures (TPRs), or work packages.
	Equipment movement and vehicle traffic—trailers, pinch points; ergonomic concerns; and struck-by or caught-between potential.	Trained operators, JSAs, SWPs, TPRs, qualified heavy equipment operator (hoisting and rigging), designated traffic lanes and areas, watch body position, and wear personal protective equipment (PPE).
	Lifting and back strain.	Mechanical equipment movement, proper lifting techniques, and two-person lifts.
	Subsidence of soil from heavy equipment.	Inspect areas before driving equipment on pit surfaces.
	Heat and cold stress.	Industrial hygienist (IH) monitoring and work-rest cycles as required.
	Tripping hazards and working-walking surfaces—ice- and snow-covered surfaces, and drill rig truck deck and ladders.	Salt and sand icy areas, and use nonskid or high-friction materials on walking surfaces.
	Stored energy sources—electrical lines and panels, elevated materials, hoisting and rigging, gas cylinders.	Identify and mark all utilities, ensure all lines and cords are checked for damage and continuity, use ground-fault circuit interrupter (GFCI) on outdoor equipment, comply with minimum clearances for overhead lines, and secure cylinders, caps, and bottles before movement.

Table 2-2. (continued).

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
Sampling, Excavation, Backfilling, Packaging, Shipment, Soil Covering, Compaction, Re-vegetation, and Monument Placement	Radioactive contaminants. Radiation exposure.	Radiological control technician surveys, dosimetry. Engineering controls.
	Chemical and inorganic contaminants.	Material safety data sheets for chemicals onsite, IH monitoring, and PPE.
	Heavy equipment movement and vehicle traffic—truck, loader, grader, compactor, water truck, forklift, pinch points, ergonomic concerns, and struck-by or caught-between potential.	Controlled work areas, qualified operators, JSAs, SWPs, TPRs or work package, proper body position, and PPE.
	Lifting and back strain.	Proper lifting techniques, two- or three-person lifts (probe casing).
	Hazardous noise levels.	Noise surveys and hearing protection (as required).
	Heat and cold stress.	IH monitoring, work-rest cycles (as required).
	Tripping hazards and working-walking surfaces—ice- and snow-covered surfaces.	Salt and sand icy areas, and use nonskid or high friction footwear on walking surfaces.
	Working at elevated levels	Qualified operators, fall protection plan as required.
PM-2A Tanks, Lines and Trough(s) Dismantlement, Decontamination, Packaging and Disposal	Radioactive contaminants. Radiation exposure.	Radiological control technician surveys, dosimetry. Engineering controls.
	Chemical and inorganic contaminants.	Material safety data sheets for chemicals onsite, IH monitoring, and PPE.
	Heavy equipment movement and vehicle traffic—truck, loader, grader, compactor, water truck, forklift, pinch points, ergonomic concerns, and struck-by or caught-between potential.	Controlled work areas, qualified operators, JSAs, SWPs, TPRs or work package, proper body position, and PPE.
	Lifting and back strain.	Proper lifting techniques, two- or three-person lifts (probe casing).
	Hazardous noise levels.	Noise surveys and hearing protection (as required).

Table 2-2. (continued).

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
	Heat and cold stress.	IH monitoring, work-rest cycles (as required).
	Tripping hazards and working-walking surfaces—ice- and snow-covered surfaces.	Salt and sand icy areas, and use nonskid or high-friction footwear on walking surfaces.
	Working at elevated levels.	Qualified operators, fall protection plan (as required).
	Fire hazard.	Hot work permit, fire watch.

2.2.3 Working and Walking Surfaces

Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. Group 3 at WAG 1, OU 1-10, presents inherent tripping hazards. Additionally, the potential for slip, trip, and fall hazards will increase during winter months because of ice- and snow-covered surfaces combined with objects beneath the snow. During the prejob briefing, all personnel will be made aware of tripping hazards that cannot be eliminated. Tripping and slip hazards will be evaluated during the course of the project in accordance with program requirements document (PRD)-2005 or PRD-5103, "Walking and Working Surfaces."

2.2.4 Elevated Work Areas

Personnel may sometimes be required to work on elevated equipment or at heights above 1.8 m (6 ft). During such work, employees will comply with requirements from PRD-2002 or PRD-5096, "Fall Protection"; and applicable requirements from PRD-2006 or MCP-2709, "Aerial Lifts and Elevating Work Platforms"; PRD-2003, "Ladders"; PRD-2004 or PRD-5098, "Scaffolding"; and PRD-2005 or PRD-5103, "Walking and Working Surfaces." Where required, a fall protection plan will be written.

2.2.5 Powered Equipment and Tools

Powered equipment and tools present potential physical hazards (e.g., pinch points, electrical hazards, flying debris, struck-by, and caught-between) to personnel operating them. All portable equipment and tools will be properly maintained and used by qualified individuals and in accordance with the manufacturer's specifications. At no time will safety guards be removed. Requirements from PRD-2015, "Hand and Portable Power Tools," or PRD-5101, "Portable Equipment and Handheld Power Tools," will be followed for all work performed with powered equipment including hand tools. The user will inspect all tools before use.

2.2.6 Electrical Hazards and Energized Systems

Electrical equipment and tools, as well as overhead and underground lines associated with remedial design/remedial action sampling, excavation and removal of tanks and support piping, backfilling, packaging, and shipment of soil at Group 3, WAG 1, OU 1-10, may pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform to the requirements in PRD-2011 or PRD-5099, "Electrical Safety"; MCP-3650, "Chapter IX Level I Lockout and Tagouts"; MCP-3651, "Chapter IX Level II Lockouts and Tagouts"; and Parts I through III of the National Fire Protection Act 70E. In addition, all electrical work will be reviewed and completed under the appropriate work controls (e.g., technical procedures [TPRs] and work orders). When working around overhead lines, clearances will be maintained at all times. Additionally, all underground utilities and installations will be identified before conducting excavation activities in accordance with PRD-2014, "Excavation and Surface Penetrations."

2.2.7 Fire and Flammable Materials Hazards

Fuel will be required for equipment use during remedial design/remedial action sampling, excavation and removal of tanks and support piping, backfilling, packaging, and shipment of soil at Group 3, WAG 1, OU 1-10. Flammable hazards may include transfer and storage of flammable or combustible liquids. Portable fire extinguishers with a minimum rating of 10A/60BC will be strategically located at the project site to combat Class ABC fires. They will be located in all active areas, on or near all facility equipment that have exhaust heat sources, and on or near all equipment capable of generating

ignition or having the potential to spark. Guidance from MCP-2707, "Compatible Chemical Storage," will be consulted when storing chemicals.

2.2.7.1 Combustible Materials. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. A fire protection engineer should be contacted if questions arise about potential ignition sources. The accumulation of combustible materials will be strictly controlled. Disposal of combustible materials will be assessed at the end of each shift. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly disposed of in appropriate waste containers. The fire protection engineer also may conduct periodic site inspections to ensure all fire protection requirements are being met.

2.2.7.2 Flammable and Combustible Liquids. Fuel used at the site for fueling must be safely stored, handled, and used. Only flammable liquid containers approved by the Factory Mutual and Underwriters Laboratories, and labeled with the contents, will be used to store fuel. All fuel containers will be stored at least 15 m (50 ft) from any facilities and ignition sources or they will be stored inside an approved flammable storage cabinet. Additional requirements are provided in PRD-308, "Handling and Use of Flammable and Combustible Liquids." Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions before being refueled to minimize the potential for a fuel fire.

2.2.7.3 Welding, Cutting, or Grinding. Personnel conducting welding, cutting, or grinding tasks may be exposed to molten metal, slag, and flying debris. Additionally, a fire potential exists if combustible materials are not cleared from the work area. Requirements from PRD-2010 or -5110, "Welding, Cutting, and Other Hot Work," will be followed whenever these types of activities are conducted.

2.2.8 Pressurized Systems

The hazards presented to personnel, equipment, facilities, or the environment because of inadequately designed or improperly operated pressure (or vacuum) systems include blast effects, shrapnel, fluid jets, release of toxic or asphyxiant materials, contamination, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, vacuum, or compressed gas systems. The requirements of PRD-2009, "Compressed Gases," PRD-5, "Boilers and Unfired Pressure Vessels," and the manufacturer's operating and maintenance instructions must be followed. This includes inspection, maintenance, and testing of systems and components in conformance with American National Standards Institute (ANSI) requirements.

All pressure systems will be operated in the designed operating pressure range, which is typically 10 to 20% less than the maximum allowable working pressure. Additionally, all hoses, fittings, lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure (generally the relief set point). The project safety professional should be consulted about any questions of pressure systems in use at the project site.

2.2.9 Compressed Gases

All cylinders will be used, stored, handled, and labeled in accordance with PRD-2009, "Compressed Gases." Additionally, the safety professional should be consulted about any compressed gas cylinder storage, transport, and usage issues.

2.2.10 Heavy Equipment and Moving Machinery

Hazards associated with the operation of heavy equipment include injury to personnel (e.g., struck-by and caught-between hazards) and equipment and property damage. All heavy equipment will be operated in the manner in which it was intended and in accordance with manufacturer's instructions. Only authorized qualified personnel will be allowed to operate equipment, and personnel near operating heavy equipment must maintain visual communication with the operator. Personnel will comply with MCP-2745, "Heavy Industrial Vehicles," and PRD-5123, "Motor Vehicle Safety." All ground personnel will wear highly reflective vests.

Personnel working around or near cranes or boom trucks will also comply with PRD-600, "Hoisting and Rigging." Additional safe practices will include the following:

- All heavy equipment will have backup alarms.
- Walking directly behind or to the side of heavy equipment without the operator's knowledge is prohibited. All precautions will be taken before moving heavy equipment.
- While operating heavy equipment in the work area, the equipment operator will maintain communication with a designated person who will be responsible for providing direct voice contact or approved standard hand signals. In addition, all facility personnel in the immediate work area will be made aware of the equipment operations.
- All equipment will be kept out of traffic lanes and access ways and will be stored so as not to endanger personnel at any time.
- All unattended equipment will have appropriate reflectors or be barricaded if left on roadways.
- All parked equipment will have the parking brake set and chocks will be used when equipment is parked on inclines.
- The swing radius of heavy equipment will be adequately barricaded or marked to prevent personnel from entering into the swing radius.

2.2.11 Excavation, Surface Penetrations, and Outages

With the exception of certain soil sampling, all surface penetrations and related outages will be coordinated through the TAN utilities and will require submittal of an outage request (i.e., Form 433.1, "Outage Request") for outages (e.g., road, electrical, and water). The submission of an outage request will not be considered an approval to start the work. Other specific outage requirements are addressed in the special conditions section of the management and operating contract. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented.

All excavation activities will be conducted and monitored in accordance with PRD-2014 or PRD-22, "Excavation and Surface Penetrations," and 29 CFR 1926, Subpart P, "Excavations." The following are some key elements from these requirements:

- Structural ramps that are used solely by employees as a means of access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design and will be constructed in

accordance with the design. Structural ramps will be inspected in accordance with Form 432.57, "Excavation Checklist."

- Employees exposed to public vehicular traffic will be provided with and will wear warning vests or other suitable garments marked with or made of reflecting or high-visibility material.

- Daily inspections of excavations, areas adjacent to the excavations, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted by the competent person before the start of work and as needed throughout the shift. Inspections also will be made after every rainstorm or other hazard-increasing occurrence.

- Sloping or benching will be constructed and maintained in accordance with the requirements set forth in 29 CFR 1926, Subpart B, Appendix B, for the soil type as classified by the competent person. This classification of the soil deposits will be made based on the results of at least one visual inspection and at least one manual analysis.

2.2.12 Hoisting and Rigging of Equipment

All hoisting and rigging will be performed in accordance with PRD-2007 or PRD-600, "Hoisting and Rigging," and DOE-STD-1090-01, "Hoisting and Rigging." Hoisting and rigging equipment will show evidence of a current inspection (e.g., tag) and be inspected before use by qualified personnel. Additionally, the operator or designated person for mobile cranes or boom trucks will perform a visual inspection each day or before use (if the crane has not been in regular service) of items such as, but not limited to, the following:

- All control mechanisms for maladjustment that would interfere with proper operation

- Crane hooks and latches for deformation, cracks, and wear

- Hydraulic systems for proper oil level

- Lines, tanks, valves, pumps, and other parts of air or hydraulic systems for leakage

- Hoist ropes for kinking, crushing, birdcaging, and corrosion

- All anti-two-block, two-block warning, and two-block damage prevention systems for proper operation.

2.2.12.1 Material Handling. The most common type of accident that occurs during material handling is when a load is being handled and a finger or toe is caught between two objects. Rolling stock can shift or fall from a pipe rack or truck bed. Fingers and hands can be caught between sampling barrels, breakout vices, and tools. Proper gloves and footwear will be supplemented with awareness training to mitigate material handling accidents.

2.2.12.2 High-Pressure Lines. A high-pressure diversion system will be used to carry cuttings away from the borehole. All high-pressure lines will be equipped with positive locking connectors (e.g., cams) and be secured with properly rated whip checks in case of a connection failure. The project safety professional will be consulted about the rating and proper placements of whip checks or equivalent restraining devices.

2.2.13 Overhead Objects

Personnel may be exposed to falling overhead objects, debris, or equipment or impact hazards during the course of the project. Sources for these hazards will be identified and mitigated in accordance with PRD-2005 or PRD-5103, "Walking and Working Surfaces." Overhead impact hazards will be marked by using engineering-controls protective systems where there is a potential for falling debris, in combination with head protection PPE.

2.2.14 Personal Protective Equipment

Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. In addition, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with PRD-5121, "Personal Protective Equipment," and MCP-432, "Radiological Personal Protective Equipment." All personnel who wear PPE will be trained in its use and limitations in accordance with PRD-5121.

2.2.15 Decontamination

Decontamination procedures for personnel and equipment are detailed in Section 11. Potential hazards to personnel conducting decontamination tasks include back strain; slip, trip, and fall hazards; and cross-contamination from contaminated surfaces. Additionally, electrical hazards may be present if powered equipment (e.g., a powered pressure washer) is used. Mitigation of these walking-working surfaces and electrical hazards are addressed in other prior subsections. If a power washer or heated power washer is used, units will be operated in accordance with manufacturer's operating instructions, personnel will wear appropriate PPE to prevent high-pressure spray injuries, and ground-fault circuit protection will be used. These tasks will only be conducted in approved areas. Personnel will wear required PPE at all times during decontamination tasks as listed in Section 5.

2.3 Environmental Hazards and Mitigation

Potential environmental hazards will present potential hazards to personnel during project tasks. These hazards will be identified and mitigated to the extent possible. This section describes these environmental hazards and states what procedures and work practices will be followed to mitigate them.

2.3.1 Noise

Personnel involved in project activities may be exposed to noise levels that exceed 85 decibel A-weighted (dBA) for an 8-hour, time-weighted average (TWA) or 83 dBA for a 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear and pain and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Where noise levels are suspected of exceeding 80 dBA, noise measurements will be performed in accordance with MCP-2720, "Controlling and Monitoring Exposures to Noise," to determine if personnel are routinely exposed to noise levels in excess of the applicable TWA (85 dBA for 8 hours of exposure or 83 dBA for 10-hour exposures).

Personnel whose noise exposure routinely meets or exceeds the allowable TWA will be enrolled in the INEEL Occupational Medical Program (OMP), or subcontractor hearing conservation program as applicable. Personnel working on jobs that have noise exposures greater than 85 dBA (83 dBA for a 10-hour TWA) will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the industrial hygienist until directed otherwise. Hearing protection devices will be selected and worn in accordance with MCP-2720, "Controlling and Monitoring Exposures to Noise."

2.3.2 Temperature and Ultraviolet Light Hazards

Project tasks will be conducted during times when there is a potential for heat or cold stress and ultraviolet light hazards that could present a potential hazard to personnel. The industrial hygienist and HSO will be responsible for obtaining meteorological information to determine if additional heat or cold stress administrative controls are required. All project personnel must understand the hazards associated with heat/cold stress and ultraviolet light hazards, and take preventive measures to minimize the effects. "Heat and Cold Stress" MCP-2704 guidelines will be followed when determining work-rest schedules or when to halt work activities because of temperature extremes.

2.3.2.1 Heat Stress. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. In addition, tasks requiring the use of protective equipment or respiratory protection prevent the body from cooling. Personnel must inform the field team leader (FTL) or HSO when experiencing any signs or symptoms of heat stress or when observing a fellow employee (i.e., buddy) experiencing them. Heat stress stay times will be documented on the appropriate work control document(s) (i.e., an SWP, Pre-Job Briefing Form, or other) by the HSO in conjunction with the IH (as required) when personnel wear PPE that may increase heat body burden. These stay times will take into account the amount of time spent on a task, the nature of the work (i.e., light, moderate, or heavy), type of PPE worn, and ambient work temperatures. Table 2-3 lists heat stress signs and symptoms of exposure.

Table 2-3. Heat stress signs and symptoms of exposure.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating.	Keep the skin clean. Change all clothing daily. Cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps and exhaustion, sometimes with dizziness or periods of faintness.	Move the patient to a nearby cool place. Give the patient half-strength electrolytic fluids. If cramps persist, or if signs that are more serious develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; cold, clammy skin; heavy perspiration; total body weakness; dizziness that sometimes leads to unconsciousness.	Move the patient to a nearby cool place. Keep the patient at rest. Give the patient half-strength electrolytic fluids. Treat for shock. Seek medical attention. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.

Table 2-3. (continued).

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; dry, hot skin; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching.	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

2.3.2.2 Low Temperatures and Cold Stress. Personnel will be exposed to low temperatures during fall and winter months or at other times of the year if relatively cool ambient temperatures combined with wet or windy conditions exist.

Additional cold weather hazards may exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure walking surfaces are kept clear of ice. The FTL or HSO should be notified immediately if slip or fall hazards are identified at the project locations.

2.3.2.3 Ultraviolet Light Exposure. Personnel may be exposed to ultraviolet light (UV) (i.e., sunlight) when conducting project tasks. Sunlight is the main source of UV known to damage the skin and to cause skin cancer. The amount of UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. No UV rays or suntans are safe. The following are mitigative actions that may be taken to minimize UV exposure:

- Wear clothing to cover the skin (long pants [no shorts] and long sleeve or short sleeve shirt [no tank tops])
- Use a sunscreen with a sun protection factor of at least 15
- Wear a hat (hard hat where required)
- Wear UV-absorbing safety glasses
- Limit exposure during peak intensity hours of 10 a.m. to 4 p.m. whenever possible.

Note: Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. The field team leader (FTL), or designee, should immediately request an ambulance to be dispatched from the Test Area North (TAN) (777 or 526-6263), or Central Facilities Area (CFA) -1612 medical facility (777 or 526-1515), and the individual cooled as described above in Table 2-3 based on the nature of the heat stress illness.

2.3.3 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to persons or property at the project site (e.g., sustained strong winds 25 mph or greater, electrical storms, heavy precipitation, or extreme heat or cold), conditions will be evaluated and a decision made by the HSO with input from other personnel to halt work, employ compensatory measures, or proceed. The FTL and HSO

will comply with INEEL MCPs and facility work control documents that specify limits for inclement weather.

2.3.4 Biological Hazards

The INEEL is located in an area that provides habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The potential exists for encountering nesting materials or other biological hazards and vectors. The hantavirus may be present in the nesting and fecal matter of deer mice. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Contact and improper removal of these materials may provide additional inhalation exposure risks.

If suspected rodent nesting or excrement material is encountered, the industrial hygienist will be notified immediately and no attempt will be made to remove or clean the area. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with MCP-2750, "Preventing Hantavirus Infection."

Snakes, insects, and arachnids (e.g., spiders, ticks, and mosquitoes) also may be encountered. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear, and contact the industrial hygienist or HSO for additional guidance as required.

Insect repellant (DEET or equivalent) may be required. Areas where standing water has accumulated (e.g., evaporation ponds) provide breeding grounds for mosquitoes and should be avoided. In cases where a large area of standing water is encountered, it may be necessary to pump the water out of the declivity (areas other than the evaporation ponds).

2.3.5 Confined Spaces

Work in confined spaces may subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. If entry into a confined space(s) is required, then all requirements of MCP-2749, "Confined Spaces," will be followed.

2.4 Other Task-Site Hazards

Task-site personnel should continually look for potential hazards and immediately inform the FTL or HSO of the hazards so that action can be taken to correct the condition. All personnel have the authority to initiate STOP WORK actions in accordance with MCP-553, "Stop Work Authority," if it is perceived that an imminent safety or health hazard exists, or they can take corrective actions within the scope of the work control authorization documents to correct minor safety of health hazards and then inform the FTL.

Personnel working at the task site are responsible to use safe-work practices, report unsafe working conditions or acts, and exercise good housekeeping habits with respect to tools, equipment, and waste throughout the course of the project.

2.5 Site Inspections

Project personnel may participate in site inspections during the work control preparation stage (such as the hazard identification and verification walk-downs), conduct self-assessments or other inspections. Additionally, periodic safety inspections will be performed by the HSO, project manager, or FTL in accordance with MCP-3449, "Safety and Health Inspections."

Targeted or required self-assessments may be performed during the performance of project activities in accordance with MCP-8, "Self-Assessment Process for Continuous Improvement." All inspections and assessments will be documented and available for review by the FTL. These inspections will be noted in the FLT logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL. However, all changes that may affect the work control documents must have concurrence from the appropriate project technical representatives and a data analysis report prepared when required.

3. EXPOSURE MONITORING AND SAMPLING

A potential for exposure to radiological, chemical, or physical hazards exists during project tasks. Refinement of work control zones (see Section 7), use of engineering and administrative controls, worker training, and wearing PPE provides the mitigation strategy for these hazards. Monitoring and sampling will be used during project tasks to (1) assess the effectiveness of these controls, (2) determine the type of PPE needed for individual tasks, and (3) determine the need for upgrading and downgrading of PPE as described in Section 5. Monitoring will be conducted in and around the active work location(s) on a periodic basis and as determined necessary based on site-specific conditions. Exposure monitoring regimes are outlined in an Industrial Hygiene Exposure Assessment document contained electronically within the INEEL Hazard Assessment and Sampling System.

3.1 Exposure Limits

Exposure limits identified in Table 3-1 serve as the initial action limits for specific project tasks. Project tasks will be continually assessed in accordance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control," and evaluated by Radiological Control (RadCon) and Industrial Hygiene personnel to ensure engineering control effectiveness. Action limits should be adjusted as required based on changing site conditions, exposure mitigation practices, and PPE levels. In any case, all potential exposures will be kept as low as reasonably achievable.

3.2 Environmental and Personnel Monitoring

Industrial Hygiene and RadCon personnel will conduct initial, periodic, continuous monitoring with direct reading instrumentation, collect swipes, and conduct full- and partial-period air sampling, as deemed appropriate in accordance with the applicable MCPs, OSHA substance-specific standards, and as stated on the RWP and Exposure Assessment. Instrumentation listed on Table 3-2 will be selected based on the site-specific conditions and contaminants associated with project tasks. The radiological control technician (RCT) and industrial hygienist (IH) will be responsible for determining the best monitoring technique for nonradioactive contaminants (respectively). Safety hazards and other physical hazards will be monitored and mitigated as outlined in Section 2.

3.2.1 Industrial Hygiene Area and Personal Monitoring and Instrument Calibration

The project industrial hygienist will conduct full- and partial-period sampling of airborne contaminants and monitoring of physical agents at a frequency deemed appropriate based on direct-reading instrument readings and changing site conditions. All air sampling will be conducted using applicable National Institute of Occupational Safety and Health (NIOSH), OSHA, or other validated method. Both personal and area sampling and monitoring may be performed.

Various direct-reading instruments may be used to determine the presence of nonradioactive and other physical agents. The frequency and type of sampling and monitoring will be determined by changing site conditions, direct-reading instrument results, observation, professional judgment, and in accordance with the MCP-153, "Industrial Hygiene Exposure Assessment."

Table 3-1. Action levels and associated responses for identified hazard

Contaminant/Agent Monitored	Action Level		Response Taken If Action Levels Are Exceeded	
Nuisance particulates (not otherwise classified)	>10 mg/m^3 (inhalable fraction) >3 mg/m^3 (respirable fraction)		Move personnel to upwind position of source and close equipment cab windows and doors. Use wetting or misting methods to minimize dust and particulate matter. **IF** wetting or misting methods prove ineffective, **THEN** don respiratory	
Hazardous noise levels	<85 decibel A-weighted (dBA) 8-hr time-weighted average (TWA), <83dBA 10-hr TWA		No action.	
	85 to 114 dBA			
	(a) >115 dBA	(b) >140 dBA	(a) Isolate source, evaluate NRR for single device, double protection as needed.	(b) Control entry, isolate source, only approved double protection worn.
Radiation field	<5 mrem/h			
	5 to 100 mrem/h @ 30 cm (10 CFR 835.603b)			
	>100 mrem to 500 Rad @ 100 cm (10 CFR 835.603b)			
Radioactive contamination	1 to 100 times Radiological Control Manual[b] Table 2-2 values (10 CFR 835.603d)		Post as "Contamination Area"—Required items: RW II training, personal dosimetry, RWP, don personal protective equipment (PPE), and bioassay submittal (as required).	
	>100 x Radiological Control Manual[b] Table 2-2 values (10 CFR 835.603d)		Post as "High Contamination Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, and bioassay submittal (as required).	
Airborne radioactivity	Concentrations (μCi/cc) >30% of one derived air concentration value (10 CFR 835.603d)		Post as "Airborne Radioactivity Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, and bioassay submittal (as required).	

a. Level C respiratory protection will consist of a full-face respirator equipped with a high-efficiency particulate air filter cartridge as prescribed by the project Industrial Hygiene and Radiological Control personnel (based on contaminant of concern). See Section 5 for additional Level C requirements.

b. *Manual 15 - Radiation Protection – INEEL Radiological Control* (PRD-183).

Table 3-2. Hazards to be monitored and monitoring instruments.

Hazard to be Monitored	Monitoring Instrument Description[a,b]
Hazardous noise	ANSI Type S2A sound level meter or ANSI S1.25-1991 dosimeter (A-weighted average dosimetry, C-weighted for impact dominant sound environments).
Heat stress	Heat stress—wet-bulb globe temperature, body weight, fluid intake.
Dust	• Direct-reading instrument (miniram or DustTrak) • Personal sampling pumps with appropriate media for partial- and full-period sampling using NIOSH or OSHA-validated methods.
Ionizing radiation	(ALPHA) count rate—Bicron/NE Electra (DP-5 or AP-5 probe) or equivalent. Stationary—Eberline RM-25 (HP-380AB or HP-380A probe) or equivalent. (Beta-gamma) Count rate—Bicron/NE Electra (DP-6, BP-17 probes) or equivalent. Stationary—Eberline RM-25 (HP-360AB probe) or equivalent.
Radioactive contamination	CAM—ALPHA 6-A-1 (in-line and radial sample heads, pump, RS-485) or equivalent (as required). CAM (beta)—AMS-4 (in-line and radial head, pump, RS-485) or equivalent (as required). Grab sampler—SAIC H-810 or equivalent.
Mercury	Mercury vapor analyzer (Jerome or equivalent)

a. Monitoring and sampling will be conducted as deemed appropriate by project Industrial Hygiene and Radiological Control personnel based on specific tasks and site conditions.

b. Equivalent instrumentation other than those listed may be used.

ANSI=American National Standards Institute

CAM=continuous air monitor

When RWPs are required for project tasks, the Radiological Control and Information Management System (RCIMS) will be used to track external radiation exposures to personnel. Individuals are responsible for ensuring all required personal information is provided to RadCon personnel for entry into RCIMS and logging into RCIMS when electronic dosimeters are used.

3.2.1.1 Internal Monitoring. The purpose of internal dose monitoring is to demonstrate the effectiveness of contamination control practices and to document the nature and extent of any internal uptakes that may occur. Internal dose evaluation programs will be adequate to demonstrate compliance with 10 CFR 835, "Occupational Radiation Protection." The requirement for whole body counts and bioassays will be based on specific project tasks or activities and will be the determination of the radiological engineer. Bioassay requirements will be specified on the RWP. Project personnel will be responsible for submitting required bioassay samples upon request.

4. ACCIDENT AND EXPOSURE PREVENTION

Project activities will present numerous hazards to personnel conducting these tasks. It is critical that all personnel understand and follow the site-specific requirements of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will all be implemented to eliminate or mitigate all potential hazards and exposures where feasible. However, all personnel are responsible for the identification and control of hazards in their work area in accordance with Integrated Safety Management System (ISMS) principals and practices. At no time will hazards be left unmitigated without implementing some manner of controls, (e.g., engineering controls, administrative controls or the use of PPE). Project personnel should use stop work authority in accordance with MCP-553, "Stop Work Authority," where it is perceived that imminent danger to personnel, equipment, or the environment exists.

This HASP is to be used in conjunction with INEEL PRD-25, "Activity Level Hazard Identification, Analysis, and Control," and work authorization and control documents such as STD-101, "Integrated Work Control Process," work orders, JSAs, MCP-3562, "Hazard Identification, Analysis, and Control of Operational Activities," and operational technical procedures. Where appropriate, MCP-3562 and GDE-6212, "Hazard Mitigation Guide for Integrated Work Control Process," mitigation guidance, JSAs, and RWPs will be incorporated into applicable sections of the HASP.

4.1 Voluntary Protection Program and Integrated Safety Management

The INEEL safety processes embrace the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The ISMS is focused on the system side of conducting operations. The Voluntary Protection Program concentrates on the people aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. Additional information on these programs is available on the INEEL Intranet. Bechtel BWXT Idaho, LLC (current primary management and operating contractor) and its subcontractors participate in VPP and ISMS for the safety of their employees. This document includes all elements of both systems.

4.2 General Safe-Work Practices

Sections 1 and 2 defined the project scope of work and associated project-specific hazards and mitigation. The following practices are mandatory for all project personnel to further reduce the likelihood of accidents and injuries. All visitors permitted to enter work areas must follow these requirements. Failure to follow these practices may result in permanent removal from the project and other disciplinary actions. The project FTL and HSO will be responsible for ensuring the following safe-work practices are adhered to at the project site:

- Limit work area access to authorized personnel only, in accordance with PRD-1007, "Work Coordination and Hazard Control," and Section 7.

- All personnel have the authority to initiate STOP WORK actions in accordance with MCP-553, "Stop Work Authority."

- Personnel will not eat, drink, chew gum or tobacco, smoke, apply sunscreen, or perform any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials in work areas, except within designated areas.

- Be aware of and comply with all safety signs, tags, barriers, and color codes as identified in accordance with PRD-2022, "Safety Signs, Color Codes, and Barriers," or PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes."

- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and spills that may be present. Report all potentially dangerous situations to the FTL or HSO.

- Avoid direct contact with hazardous materials and waste. Personnel will not walk through spills or other areas of contamination and will avoid kneeling, leaning, or sitting on equipment or surfaces that may be contaminated.

- Be familiar with the physical characteristics of the project site, including, but not limited to:

  - Prevailing wind direction

  - Location of fellow personnel, equipment, and vehicles

  - Communications at the project site and with nearest facility

  - Area and the type of hazardous materials stored and waste disposed of

  - Major roads and means of access to and from the project site

  - Location of emergency equipment

  - Warning devices and alarms for area or facility

  - Capabilities and location of nearest emergency assistance.

- Report all broken skin or open wounds to the operations manager, FTL, or HSO. An OMP physician must examine all wounds to determine the nature and extent of the injury. If required to enter into a radioactive contamination area, a RadCon supervisor will determine whether the wound can be bandaged adequately in accordance with Article 542 of the INEEL Radiological Control Manual (Manual 15A).

- Prevent releases of hazardous materials. If a spill occurs, personnel must try to isolate the source (if possible, and if this does not create a greater exposure potential) and then report it to the FTL, or HSO. The Warning Communications Center (WCC) will be notified and additional actions will be taken, as described in Section 10. Appropriate spill response kits or other containment and absorbent materials will be maintained at the project site.

- Illumination levels during project tasks will be in accordance with 29 CFR 1910.120 (Table H-120.1, "Minimum Illumination Intensities in Foot-Candles").

- Ground-fault protection will be provided whenever electrical equipment is used outdoors.
- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use nonsparking, explosion-proof equipment, if advised to do so by safety professionals.
- Follow all safety and radiological precautions, limitation of technical procedures, and requirements identified in work packages.

4.3 Radiological and Chemical Exposure Prevention

Exposure to potential chemical, radiological, and physical hazards will be mitigated by using engineering controls, administrative controls, or PPE to prevent exposures where possible or minimize them where engineering controls are not feasible. All project personnel are responsible for understanding the hazard identification and mitigation measures necessary to prevent exposures.

4.3.1 Radiological Exposure Prevention – ALARA Principles

Radiation exposure of project personnel will be controlled such that radiation exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit. **Unplanned and preventable exposures are considered unacceptable.** All project tasks will be evaluated with the goal of eliminating or minimizing exposures. All project personnel have the responsibility for following as-low-as reasonably achievable (ALARA) principles and practices. Personnel working at the site must strive to keep both external and internal radiation doses ALARA.

Radiological work permits will be written, as required, for project tasks that will define hold points, required dosimetry, RCT coverage, radiological controlled areas, and radiological limiting conditions in accordance with MCP-7, "Radiological Work Permit." Radiological Control personnel will participate in the prejob briefing required by MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews," to ensure that all personnel understand the dose rate limits and limiting conditions on the RWP. All personnel will be required to read and acknowledge the RWP requirements before being allowed to sign the RWP (or scan the RWP bar code) and obtain electronic dosimetry.

Monitoring for radiation and contamination during project tasks will be conducted in accordance with the RWP; PRD-183, *Manual 15A—Radiation Protection—INEEL Radiological Controls; Manual 15B—Radiation Protection Procedures; Manual 15C—Radiological Control Procedures*; and as deemed appropriate by RadCon personnel.

4.3.2 Chemical and Physical Hazard Exposure Avoidance

Note: Identification and control of exposures to carcinogens will be conducted in accordance with MCP-2703, "Carcinogens."

Threshold limit values (TLVs) or other occupation exposure limits have been established for numerous chemicals and physical agents (e.g., noise, heat, or cold stress) that may be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects. The TLV time-weighted average (TLV-TWA) is a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Action limits (instantaneous concentrations for short time periods) have been established (Section 3) to further reduce the likelihood of exceeding TLVs.

Controls will be employed to eliminate or mitigate chemical and physical hazards wherever feasible. The hierarchy of controls in order are (1) engineering controls, (2) administrative controls, and (3) PPE. In addition to these controls, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used as appropriate to reduce exposure potential. Some methods of exposure avoidance include:

- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing PPE if it becomes damaged or shows signs of degrading
- Minimizing time in direct contact with hazardous material and waste
- Doff PPE following standard practices (i.e., rolling outer surfaces in and down) and follow doffing sequence
- Wash hands and face before eating, drinking, smoking, or engaging in other activities that may provide a pathway for contaminants.

4.4 Buddy System

The two-person, or "buddy" system, will be used during project tasks. The buddy system is most often used during project activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards may impede a person's ability to self-rescue. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well-being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The buddy system will be administered by the FTL in conjunction with the HSO.

5. PERSONAL PROTECTIVE EQUIPMENT

This section provides guidance for the selection and use of PPE to be worn for project tasks and contingencies for upgrading and downgrading PPE. Types of PPE are generally divided into two broad categories: (1) respiratory protective equipment and (2) PPE. Both of these categories are incorporated into the standard two levels of protection (Levels C and D). See Sections 5.2.1 and 5.2.2.

The purpose of personal protective clothing and equipment is to shield or isolate individuals from the chemical, physical, radiological, and safety hazards that may be encountered during project tasks when engineering and other controls are not feasible or cannot provide adequate protection. It is important to realize that no one PPE ensemble can protect against all hazards under all conditions and that proper work practices and adequate training will serve to augment PPE to provide the greatest level of protection to workers.

The Idaho Completion Project (ICP) PPE policy requires that field workers wear, as a minimum, sturdy leather boots above the ankles, safety glass with side shields, and hard hats. The HSO or Safety Professional will determine where and when this requirement will be invoked for each project.

The type of PPE will be selected, issued, used, and maintained in accordance with PRD-2001 or PRD-5121, "Personal Protective Equipment." Selection of the proper PPE is based on the following considerations:

- Specific conditions and nature of the tasks
- Potential contaminant routes of entry
- Physical form and chemical characteristics of hazardous materials, chemicals, and waste
- Toxicity of hazardous materials, chemicals, or waste that may be encountered
- Duration and intensity of exposure (acute or chronic)
- Compatibility of chemical(s) with PPE materials and potential for degradation or breakthrough
- Environmental conditions (e.g., humidity, heat, cold, rain)
- The hazard analysis (Section 2) evaluation of this HASP.

If radioactive contamination is encountered at levels requiring the use of anti-contamination (anti-C) clothing, a task-specific RWP will be developed and MCP-432, "Radiological Personal Protective Equipment," will be followed.

5.1 Respiratory Protection

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be selected and used.

Respirators will be required for specific project tasks. All personnel required to wear respirators will complete training and be fit-tested before being assigned a respirator in accordance with the training and documentation requirements in Section 6. Requirements for respirator use, emergency use, storage, cleaning, and maintenance, as stated in the MCP-2726, "Respiratory Protection," will be followed.

5.2 Personal Protective Equipment Levels

Table 5-1 lists PPE requirements for the two levels of PPE that may be worn during the course of the project. Applicable PPE levels (Level D) will be required for conducting project tasks. Modifications to these levels will be made under the direction of the HSO in consultation with the project Industrial Hygiene and RadCon personnel, as appropriate. Such modifications are routinely employed during HAZWOPER site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health.

Table 5-1. Levels and options of personal protective equipment.

Personal Protective Equipment Level	Personal Protective Equipment Required	Optional Personal Protective Equipment or Modifications
D	Coveralls or standard work clothes (coverall material type based on IH determination) Hard hat (unless working indoors with no overhead or falling debris hazards) meeting ANSI Z89.1 requirements Eye protection (safety glasses meeting ANSI Z87.1 requirements as a minimum) Hand protection (material based on type of work and hazardous materials being handled) Safety footwear (steel or protective toe and shank) meeting ANSI Z41 requirements or sturdy leather above the ankle for construction tasks.	Chemical or radiological protective clothing (Tyvek or Saranex) by the IH or RCT Chemically resistant hand and foot protection (e.g., inner and outer gloves and boot liners) Radiological modesty garments under outer protective clothing (as required by the RWP) Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, and aprons).
C	Level D ensemble with the following respiratory and whole-body protection upgrades:[a] • Full facepiece air purifying respirator equipped with a National Institute of Occupational Safety and Health-approved high-efficiency particulate air (HEPA) filter or chemical combination cartridge (IH to specify cartridge type) **OR** • An air hood operating at a minimum pressure of 6 cfm or a full facepiece supplied air respirator with a 10-minute escape bottle, a self-contained breathing apparatus (SCBA) or an escape air-purifying combination HEPA or chemical cartridge (supplied	Chemical-resistant outer shoe or boot cover (IH or RCT to specify material) Inner chemical-resistant gloves with cotton liners (as determined by the IH and RWP) Outer chemical-resistant gloves (as determined by the IH) Radiological modesty garments under outer protective clothing (as required by RWP) Any specialized protective

Table 5-1. (continued).

Personal Protective Equipment Level	Personal Protective Equipment Required	Optional Personal Protective Equipment or Modifications
	air respirator hose length no more than manufacturer's specification and, under no circumstances, greater than 91m [300 ft])	equipment (e.g., hearing protection, welding lens, and aprons).
	• Standard Tyvek (or equivalent) coverall	
	OR	
	• Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) (IH to specify material).	

a. Upgrades are determined by the industrial hygienist (IH) in conjunction with other environment, safety, and health professionals.

5.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not on a site with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards.

5.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site (chemical or radioactive) contaminants have been well-characterized indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5% at sea level), and that there are no conditions that pose immediate danger to life or health (IDLH).

5.3 Personal Protective Clothing Upgrading and Downgrading

The project HSO, in consultation with the project IH (and RadCon personnel), will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading of PPE based on changing site conditions or activities is a normal occurrence. Action levels listed in Table 3-1 serve as the initial basis for making such decisions. Additional reasons for upgrading or downgrading are listed in the following subsections.

Note: Personnel must inspect all PPE before donning and entry into any work zone. Items found to be defective or that become unserviceable during use, will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. The PPE inspection guidance is provided in Table 5-2.

5.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded for the following reasons and work will halt until PPE upgrading has been completed:

- Identification of new, unstable, or unpredictable site hazards
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Identified source or potential source of respiratory hazard(s) not anticipated
- Change in the task procedure that may result in an increased contact with contaminants or meeting any of the criteria listed above.

5.3.2 Downgrading Criteria

The level of PPE will be downgraded under the following conditions:

- Elimination of hazard or completion of task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate hazard
- Sampling information or monitoring data that show the contaminant levels to be stable and lower than established action limits
- Elimination of potential skin absorption or contact hazards.

Note: The PPE requirement for specific project tasks is identified in Table 5-3. This list may be augmented by an SWP or RWP. Potential exposures and hazards will be monitored (as discussed in Section 3) during the course of the project to evaluate changing conditions and to determine PPE level adequacy and modifications.

5.4 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected before use and when in use within project work zones. Self-inspection and the use of the buddy system, once PPE is donned, will serve as the principle forms of inspection. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable PPE. (In addition, all PPE that becomes grossly contaminated or presents a potential source for the spread of such contamination will be required to be decontaminated or replaced). Table 5-2 provides an inspection checklist for common PPE items. Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. Consult the project IH, safety professional, and RCT about PPE inspection criteria.

Table 5-2. Inspection checklist for personal protective equipment.

Personal Protection Equipment Item	Inspection
Respirators (full facepiece air-purifying)	**Before use:** Check condition of the facepiece, head straps, valves, fittings, and all connections for tightness. Check cartridge to ensure proper type or combination are being used for atmospheric hazards to be encountered, and inspect threads and O-rings for pliability, deterioration, and distortion.
Level D and C clothing	**Before use:** Visually inspect for imperfect seams, nonuniform coatings, and tears Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks. **While wearing in the work zone:** Inspect for evidence of chemical attack such as discoloration, swelling, softening, and material degradation Inspect for tears, punctures, and zipper or seam damage Check all taped areas to ensure they are still intact.
Gloves	**Before use:** Pressurize rubber gloves to check for pinholes: blow in the glove then roll until air is trapped and inspect. No air should escape. **Leather gloves:** Inspect seams and glove surface for tears and splitting and verify no permeation has taken place.

Table 5-3. Task-based personal protective equipment requirements and modifications.

Task	Initial Level of Personal Protective Equipment	Upgrade Contingency	Downgrade Contingency	Upgrade or Downgrade Criteria	Personal Protective Equipment Modifications and Comments
Waste loading	D+	C	D	Upgrade to Level C if airborne concentrations exceed action limits. Downgrade to Level D if contact with waste containers can be avoided or surveys show no detectable contamination on surfaces.	Level C respiratory protection defined by the IH, based on airborne contaminant. Leather gloves for all material handling tasks.
Waste transport at task site	D	D+	N/A	Upgrade to Level D+ when attaching or removing straps if contamination is detected on the outside of waste containers.	D+ protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves.
Heavy equipment operations	D	D+	N/A	Upgrade to Level D+ if contact with waste material cannot be avoided.	D+ protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves.
Equipment decontamination	C	C+	D+	Upgrade to Level C+ if splashing during decontamination of lead, cadmium, radioactively contaminated equipment cannot be avoided. Downgrade to Level D+ for decontamination of small items using spray and wipe decontamination methods.	Level C respiratory protection defined by the IH and RadCon, based on airborne contaminant. Level C protective clothing consists of Tyvek (or equivalent) hooded coverall. Level C+ protective clothing consists of Saranex (or equivalent coated, hooded coverall). Leather gloves over nitrile for equipment and material handling before or after decontamination tasks. Double pair nitrile gloves during decontamination tasks.

Table 5-3. (continued).

Task	Initial Level of Personal Protective Equipment	Upgrade Contingency	Downgrade Contingency	Upgrade or Downgrade Criteria	Personal Protective Equipment Modifications and Comments
Waste feed lines isolation and removal	D+	C	D	Upgrade to Level C if airborne concentrations exceed action limits.	Level C respiratory protection defined by IH and Radcon, based on airborne contaminant.
				Downgrade to Level D if contact with waste containers can be avoided or surveys show no detectable contamination on surfaces.	Leather gloves for all material handling tasks.
Drilling, Sampling, Field Screening	D+	C	D	Upgrade to Level C if airborne concentrations exceed action limits.	Level C respiratory protection defined by IH and Radcon, based on airborne contaminant.
				Downgrade to Level D if contact with waste containers can be avoided or surveys show no detectable contamination on surfaces.	Leather gloves for all material handling tasks.

6. PERSONNEL TRAINING

All INEEL personnel will receive training, as specified in 29 CFR 1910.120 and INEEL company wide manuals as applicable. Table 6-1 summarizes the project-specific training requirements for personnel-based access requirements, responsibilities at the project site, potential hazards, and training level requirements.

Modifications (e.g., additions to or elimination of) to training requirements listed in Table 6-1 may be necessary based on changing field conditions. Any changes to the requirements listed in Table 6-1 must be approved by the HSO, with concurrence from the FTL, project manager, RCT, and IH, as applicable. These changes should be based on site-specific conditions and will generally be considered a minor change to the HASP, as defined by instructions from Form 412.11, "Document Management Control Systems (DMCS) Document Action Request (DAR)," because they are administrative in nature.

6.1 General Training

All project personnel are responsible for meeting training requirements including applicable refresher training. Evidence of training will be maintained at the project site, field administrative location, or electronically (e.g., Training Records and Information Network [TRAIN] [INEEL 2001a]). Nonfield team personnel and visitors must be able to provide evidence of meeting required training for the area of the site they wish to access before being allowed into a project area. As a minimum, all personnel who access project locations must receive a site-specific briefing, are required to wear PPE, and must provide objective evidence of having completed INEEL computer-based PPE training (00TRN 288, "Personal Protective Equipment") or equivalent, in accordance with 29 CFR 1910.132, "Personal Protective Equipment."

6.2 Project-Specific Training

Before beginning work at the project site, field team members will receive project-specific HASP training that will be conducted by the HSO (or designee). This training will consist of a complete review of (1) a controlled copy of the project HASP, attachments, and document action requests, (2) applicable job safety analyses (JSAs) and SWPs (if required), (3) work orders, and (4) other applicable work control and work authorization documents, with time for discussion and questions. Project-specific training can be conducted in conjunction with, or separately from, the required formal prejob briefing (MCP-3003).

At the time of project-specific HASP training, personnel training records will be checked and verified to be current and complete for all the training requirements shown in Table 6-1. After the HSO (or designee) has completed the site-specific training, personnel will sign Form 361.25, "Group Read and Sign Training Roster," or equivalent, indicating that they have (1) received this training, (2) understand the project tasks, associated hazards and mitigations, and (3) agree to follow all HASP and other applicable work control and safety requirements. Form 361.25 (or equivalent) training forms are available on the INEEL Intranet under "Forms."

A trained HAZWOPER 8-hour supervisor (FTL or other person who has been trained by the HAZWOPER supervisor) will monitor the performance of each newly 24-hour or 40-hour trained worker to meet the 1 or 3 days of supervised field experience, respectively, in accordance with 29 CFR 1910.120(e). Following the supervised field experience period, the supervisor will complete Form 361.47, "HAZWOPER Supervised Field Experience Verification," or equivalent, to document the supervised field experience.

Table 6-1. Required project-specific training.

Required Training	Field Team Leader, Health and Safety Officer, and Samplers	Other Field Team Members	Access into the Designated or Controlled Work Area	Access to Project Areas **Outside** Designated or Controlled Work Area
40-hour hazardous waste operations (HAZWOPER)[a]	Yes	b	b	
24-hour HAZWOPER[a]		b	b	
Project-specific health and safety plan training[c]	Yes	Yes	Yes	
Project-site orientation briefing[d]				Yes
Fire extinguisher training (or equivalent)	e	e		
Cardiopulmonary resuscitation, medic first-aid	e	e		
Respirator training (contingency only)	f	f		
Lead and cadmium awareness training	g	g	g	
Radworker II	Yes	Yes	Yes	

Note: Shaded fields indicate specific training is not required or applicable.

a. Includes 8-hour hazardous waste operations (HAZWOPER) refresher training as applicable, and supervised field experience as follows: 40-hour HAZWOPER = 24-hour supervised field experience and 24-hour HAZWOPER = 8-hour supervised field experience.

b. 40-hour or 24-hour HAZWOPER training requirement will be determined by the HSO based on the nature of the project tasks and potential for exposure to contaminants or safety hazards.

c. Includes project-specific hazards communications (29 CFR 1910.120), site-access and security, decontamination and emergency response actions, as required by 29 CFR 1910.120(e).

d. Orientation includes briefing of site hazards, designated work areas, emergency response actions, and PPE requirements. Personnel receiving project-site orientation briefing only are limited to the areas outside designated work areas and must be escorted by a project supervisor or designee who is fully trained on the requirements of the health and safety plan.

e. At least one trained person onsite when field team is working and the health and safety officer will determine appropriate number of personnel requiring training.

f. Only required if entering area requiring respiratory protection (e.g., action levels exceeded or the industrial hygienist sampling shows respirators required).

g. Only if entering areas where initial exposure determination indicates exposure above the action limit is possible.

Note 1: Supervised field experience is only required if personnel have not previously completed this training at another Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) (42 USC § 9601) site (documented), or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the project site as evidence of training or be available electronically.

Note 2: Completed training project forms (Form 361.47, or equivalent) should be submitted to the ICP Program training coordinator for inclusion in the Training Records and Information Network system within 5 working days of completion.

6.3 Plan of the Day Briefing, Feedback, and Lessons Learned

A daily plan-of-the-day (POD) meeting, or equivalent, will be conducted by the FTL or designee. During this meeting, daily tasks are to be outlined; hazards identified; hazard controls, mitigation, and work zones established; PPE requirements discussed; and feedback from personnel solicited. At the completion of this meeting, any new work control documents will be reviewed and signed (e.g., SWP, JSA, or RWP).

Note: If a formal MCP-3003 prejob briefing is conducted during the work shift, a POD is not required.

Particular emphasis will be placed on lessons learned from the previous workday's activities and how tasks can be completed in the safest, most efficient manner. All personnel are encouraged to contribute ideas to enhance worker safety and mitigate potential exposures at the project sites. This POD will be conducted as an informal meeting and the only required record will be to document the completion of the POD in the FTL or construction engineer or subcontractor technical representative logbook.

Safety and health topic-specific training or safety meetings may also be conducted during the course of the project to reinforce key safety topics. They may be conducted by project safety and the industrial hygienist or any field team member and should be performed in conjunction with the POD. Credit for a safety meeting can be received for such topic-specific training if a tailgate training form (INEEL Form 361.24, "Tailgate Attendance Roster," or equivalent) is completed and submitted to the appropriate training coordinator for Training Records and Information Network.

7. SITE CONTROL AND SECURITY

Site control and security will be maintained at the project site during all activities to prevent unauthorized personnel from entering the work area. Entry into and exit out of these areas will be controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-2022, "Safety Signs, Color Codes, and Barriers," or PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color codes."

The HSO and Safety Professional should be consulted regarding equipment layout at the project site (in conjunction with the Subcontractor Superintendent for subcontractor-owned equipment) to minimize personnel hazards from equipment. The focus should be on equipment with stored energy (electrical, pressurized systems, elevated materials/equipment, chemical), moving and rotating parts (equipment that is guarded and that has open rotating parts such as a drill rig), and other equipment with the potential to result in personnel injuries from being struck-by, caught-between, or entangled in such equipment. The layout at the project site of equipment should reflect the nature of the hazard presented and should be mitigated through the use of engineering controls (barriers, guards, isolation), administrative controls (roped off restricted areas or controlled entry access), and qualifications of operators and those assisting in the operation of the equipment, when required.

Good housekeeping will be maintained at all times during the course of the project to include maintaining working and walking surfaces to minimize tripping hazards, stacking or storing materials and equipment in a centralized location when not in use, and regular cleanup of debris and trash that may accumulate at the project site.

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial work zone size, configuration, and location. Figure 7-1 illustrates an example of work zones that may be established at the project task site, based on HSO/RCT/IH recommendations. Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted in accordance with both sets of requirements (29 CFR 1910.120 and 10 CFR 835), using appropriately colored rope and postings. These zones may change in size and location as project tasks evolve, based on project monitoring data, and as wind direction changes. Additionally, entrance and egress points will change based on these same factors. Work zones may include:

- Support Zone (SZ) (controlled area)
- Contamination Reduction Zone (CRZ), Radiological Buffer Area (RBA), including a contamination reduction corridor (CRC) if radiological hazards are present
- Exclusion Zone (EZ), Radiation Area (RA), High Radiation Area (HRA), Contamination Area (CA), High Contamination Area (HCA), or Very High Radiation Area (VHRA).

Visitors may be admitted into work areas provided they (1) are on official business; (2) have received site-specific training or orientation by the FTL or designee; (3) have met all the site-specific training requirements for the area they have a demonstrated need to access (including PPE training), as listed on 6-1; and (4) wear all required PPE.

Note: Visitors may not be allowed into controlled work areas during certain tasks in order to minimize risks to workers and visitors. The determination as to any visitor's need for access into the controlled work area will be made by the FTL in consultation with the HSO.

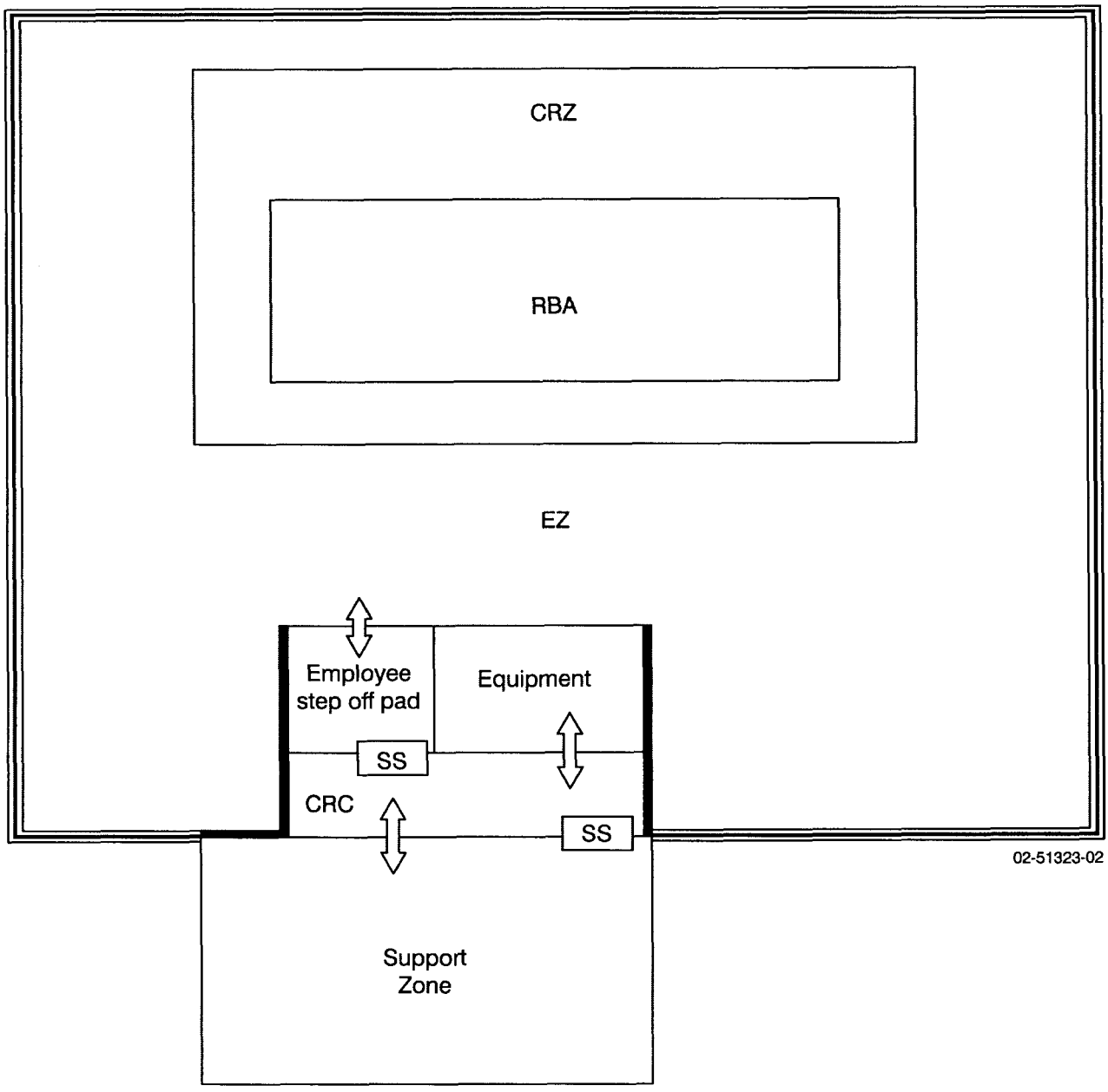

Figure 7-1. Work zone example.

7.1 Exclusion Zone

The exclusion zone (EZ) will be large enough to encompass the primary task area for work and to allow equipment and personnel to move about freely and conduct necessary tasks. The minimum number of personnel required to safely perform project tasks will be allowed into the EZ. If the EZ will be relocated to another site or reconfigured, it will be delineated in a configuration large enough to prevent nonfield team personnel in the support zone (SZ) from being exposed to potential safety and health hazards. The EZ shape and size will be based on the tasks being conducted, existing structures and facilities, and potential for impact to adjacent areas from project tasks or contaminants.

The EZ is a controlled access zone at all times. An entry and exit point will be established at the periphery of the EZ and the contamination reduction corridor (CRC) to regulate the flow of personnel and equipment. The EZ boundary will be delineated with rope or printed hazard ribbon and posted with signs in accordance with PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes," or PRD-2022, "Safety Signs, Color Codes, and Barriers."

Factors that will be considered when establishing the EZ boundary include (1) tasks being conducted, (2) air monitoring data, (3) radioactive contamination data, (4) radiation fields, (5) equipment in use, (6) the physical area necessary to conduct site operations, and (7) the potential for contaminants to be blown from the area. The boundary may be expanded or contracted as these factors change or additional monitoring information becomes available. All personnel who enter the EZ will wear the appropriate level of PPE for the hazards present and have required training as listed in Sections 5 and 6 of this HASP, respectively.

7.2 Contamination Reduction Zone and Corridor

The contamination reduction zone (CRZ) and the contamination reduction corridor (CRC) are transition areas surrounding the EZ and are located between the EZ and SZ. The CRC may not be formally delineated, but will be designated by the travel path from the established CRZ-controlled entry and exit point and the EZ entry and exit point. The CRZ and CRC will serve to buffer the SZ from potentially contaminated EZ areas. The CRZ and CRC may serve as staging areas for equipment and as temporary rest areas for personnel.

7.3 Support Zone

The support zone (SZ) will be considered a "clean" area. The location of the SZ will be in a prevailing upwind direction from the EZ (where possible) and readily accessible from the nearest road. The SZ is a designated area or building outside the CRZ and does not have to be delineated. Support trailers, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment may be located in the SZ. Visitors who do not have appropriate training to enter other project areas will be restricted to this zone.

7.4 Radiological Control and Release of Materials

Potential radioactively contaminated items or equipment will not be released until required radiological surveys have been completed (e.g., hand-held instruments and swipes) in accordance with MCP-139, "Radiological Surveys," MCP-425, "Radiological Release Surveys, and the Disposition of Contaminated Materials," as stated in the RWP, and as directed by RadCon personnel.

7.5 Site Security

All project site areas will be secured and controlled during normal work hours as described in the previous sections. During nonworking hours, the general project sites located inside INEEL facilities are controlled by the facility fence and normal security access requirements. However, additional project site security and control will be required to prevent unauthorized personnel from entering the project area and being exposed to potential safety or health hazards. This will be accomplished by delineating project areas with rope boundaries and posting where hazards are left unmitigated (e.g., open trenches, exposed contaminated soils, or equipment left onsite). Signage will be left in place during off hours and weekends to prevent personnel from inadvertently entering the area.

The FTL has the primary responsibility for ensuring that the project area is secured. The HSO and RadCon (where required) will ensure that all health and safety and radiological postings of the area are intact when leaving the site and will be responsible for maintaining them for the duration of the project. Project personnel are trained about site access and control requirements during project-specific HASP training and will not cross roped areas without the proper training and authorization, regardless of whether a sign is in place or not.

Note: Signs are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.

7.6 Wash Facilities and Designated Eating Areas

Ingestion of hazardous substances is possible when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. For project personnel, designated eating areas and wash facilities will be provided.

7.7 Designated Smoking Area

Smoking areas will be designated and personnel will comply with all INEEL smoking polices including disposing of smoking materials in the proper receptacle. Smoking will not be permitted outside facilities without establishing a designated smoking area. The project safety professional in consultation with the designated fire protection engineer will be the single point of contact for establishing any smoking area outside facilities, and such areas may not be permitted at certain times of the year because of high or extreme fire danger.

8. OCCUPATIONAL MEDICAL SURVEILLANCE

Task-site personnel will participate in the INEEL occupational medical surveillance program (or equivalent subcontractor program), as required by DOE Order 440.1, "Worker Protection Management for DOE Federal and Contractor Employees," and 29 CFR 1910.120. Medical surveillance examinations will be provided before assignment, annually, and after termination of HAZWOPER duties or employment. This includes:

- Personnel who are, or may be, exposed to hazardous substances at or above the OSHA permissible exposure limit (PEL), or published exposure limits, without regard to respirator use for 30 or more days per year

- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation

- All employees who wear a respirator for 30 days or more a year or as required by "Respiratory Protection (29 CFR 1910.134)."

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by MCP-2726, "Respiratory Protection."

A single copy of the project HASP, job hazard analysis requirements, required PPE, confined space entry requirements (as applicable), and other exposure-related information will be made available, upon request, to the INEEL OMP physician (and subcontractor physician) conducting medical surveillance for employees participating in this project. Exposure monitoring results and hazard information furnished to the OMP physician will be supplemented or updated annually (as stated in Section 12) as long as the employee is required to maintain a hazardous waste and material employee medical clearance. The OMP physician will then evaluate the physical ability of an employee to perform the work assigned.

A documented medical clearance (e.g., a physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from working in hazardous waste operations, emergency response operations, respirator use areas, and confined space areas, as applicable. The physician may impose restrictions on the employee by limiting the amount and type of work performed.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the MCP-3003 prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the employee's responsibility to inform the supervisor of any work or medical restrictions.

8.1 Subcontractor Workers

Subcontractor project personnel will participate in a subcontractor medical surveillance program that satisfies the applicable requirements of 29 CFR 1910.120. This program must make medical examinations available before assignment, annually, and after termination of hazardous waste duties as stated above. The physician's written opinion, as defined by 29 CFR 1910.120(f)(7) (or equivalent), will serve as documentation that subcontractor personnel are fit for duty or will list work restrictions.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, will be made available to the INEEL OMP physician on request.

8.2 Injuries on the Site

It is the policy of the INEEL that an INEEL OMP physician examines all injured personnel for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

Note: In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility, or whether to immediately request an ambulance and continue to stabilize and provide first aid, should be based on the nature of the injury or illness and the likelihood that transporting the individual may cause further injury or harm. Most likely, the person making this decision will only be trained to the medic first/CPR level and should contact the Test Area North (TAN) medical facility at 777 or 526-6263, or the Central Facilities Area (CFA) medical facility (777 or 526-1515), for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.

In the event of a known or suspected injury or illness caused by exposure to a hazardous substance or physical or radiological agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The HSO and FTL are responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and phone number
- Substance, physical or radioactive agent exposed to (known or suspected), and material safety data sheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120.

Note: In the event of an illness or injury, subcontractor employees will be taken to the closest INEEL medical facility (if doing so will not cause further injury or harm) or be transported by INEEL ambulance to have an injury stabilized before transport to the subcontractor's treating physician or off-Site medical facility.

The TAN shift supervisor will be contacted if any injury or illness occurs at a project site. As soon as possible after an injured employee has been transported to the INEEL medical facility, the FTL, or designee, will make notifications as indicated in Section 10.

9. PROJECT ORGANIZATION AND RESPONSIBILITIES

The organizational structure illustrated in Figure 9-1 presents an overview of the general resources and expertise required to perform the work while minimizing risks to worker health and safety. The following sections outline responsibilities of key site personnel.

9.1 Key Personnel Responsibilities

Responsibilities for key personnel associated with the field activities described in this HASP are described in the following sections and the organizational chart (Figure 9-1).

9.1.1 TAN Closure Completion Project Director (or designee)

The TAN Closure Completion Project Director has ultimate responsibility for the technical quality of all projects, the maintenance of a safe environment, and the safety and health of all personnel during field activities performed by or for the ICP program. The project director provides technical coordination and interfaces with DOE-ID. The project director ensures the following:

- Project/program activities are conducted in accordance with the Occupational Safety and Health Administration (OSHA), DOE, EPA, and IDEQ requirements and agreements
- Program budgets and schedules are approved and monitored to be within budgetary guidelines
- Personnel, equipment, subcontractors, and services are available
- Direction is provided for tasks development, findings evaluation, conclusions and recommendations development, and reports production.

The TAN site Project Director (or designee) is responsible for several functions and processes in the TAN area, including the following:

- Overseeing all work processes and work packages performed at TAN
- Establishing and executing a monthly, weekly, and daily operating plan for TAN
- Executing the Environmental, Safety, Health, and Quality Assurance program for TAN
- Executing the Integrated Safety Management System for TAN
- Executing the Voluntary Protection Program at TAN
- Ensuring environmental compliance within TAN
- Executing the portion of the voluntary compliance order that pertains to TAN
- Correcting the root cause functions of accident investigations at TAN
- Correcting the root cause functions of the voluntary compliance order for TAN.

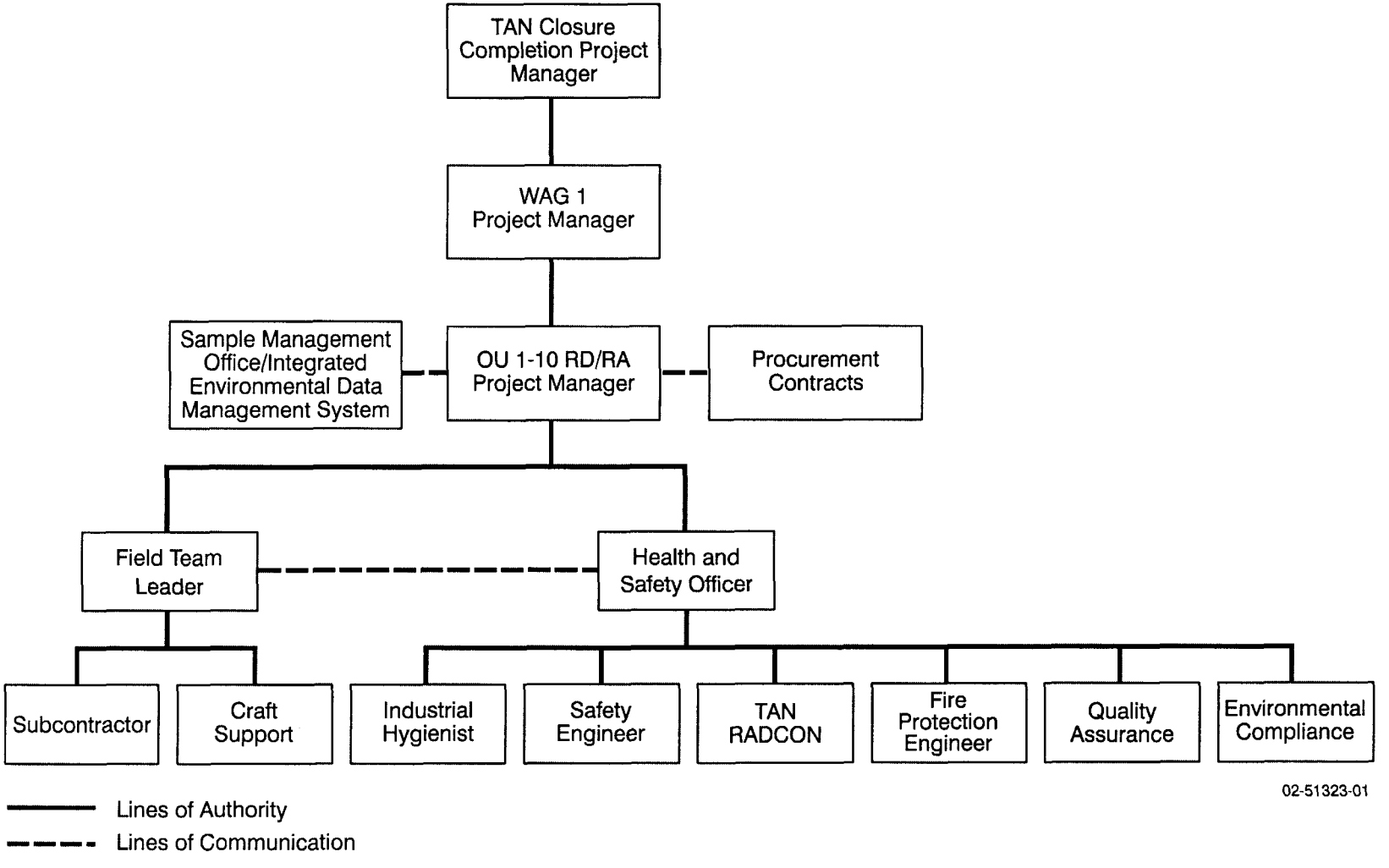

Figure 9-1. Organizational chart.

9.1.2 Project Manager

The WAG 1 project manager (PM) or designee (e.g., OU 1-10 RD/RA PM) will ensure that all project activities are in compliance with the following guidelines and regulations:

- INEEL MCPs and program requirements directives (PRDs)
- The Quality Assurance Project Plan (QAPjP) (DOE-ID 2002), and the project HASP
- All applicable OSHA, EPA, DOE, DOT, and State of Idaho requirements.

The PM is responsible for the overall work scope, schedule, and budget, including such tasks as the following:

- Developing resource-loaded, time-phased control account plans based on the project's technical requirements, budgets, schedules, and project tasks
- Coordinating all document preparation, field, laboratory, and modeling activities
- Implementing the project requirements and ensuring that work is performed as planned.

The PM will ensure that employee job function evaluations (INEEL Form 340.02) are completed for all project employees, reviewed by the project industrial hygienist (IH) for validation, and submitted to the Occupational Medical Program (OMP) for determination of necessary medical evaluations.

Other functions and responsibilities of the PM include:

- Developing the documentation required to support the project
- Ensuring the technical review and acceptance of all project documentation
- Developing the site-specific plans required by the ICP program, such as work plans, environmental, safety, and health (ES&H) plans, and sampling and analysis plans (SAPs)
- Ensuring that project activities and deliverables meet schedule and scope requirements, as described in the FFA/CO, Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order," (DOE-ID 1991) and applicable guidance
- Supporting the CERCLA and National Environmental Policy Act (NEPA) public review and comment processes by identifying their requirements and scheduling and organizing required review and comment activities
- Identifying the subproject technology needs
- Coordinating and interfacing with the units within the program support organization on issues relating to quality assurance, ES&H, and NEPA support for the project
- Coordinating site-specific data collection, review for technical adequacy, and data input to an approved database
- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

9.1.3 Health and Safety Officer

The health and safety officer (HSO) assigned to the task site serves as the primary contact for all health and safety issues. The HSO advises the FTL on all aspects of health and safety, and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. As appropriate, the HSO is authorized to verify compliance to the HASP to conduct conformance inspections and self-assessments, require and monitor corrective actions, and monitor decontamination procedures. The HSO may be assigned other specific responsibilities, as stated in other sections of the project HASP, as long as they do not interfere with the primary responsibilities.

Other ES&H professionals at the task site, such as the safety engineer (SE), IH, RCT, environmental coordinator, and facility representative, support the HSO as necessary.

Personnel assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SE, or, in some cases, the FTL (depending on the hazards, complexity, and size of the activity involved, and required concurrence from the ICP safety and health compliance officer), other task-site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the task site.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, and the identity of the acting HSO will be recorded in the FTL logbook and communicated to task-site personnel.

Note: The HSO will ensure the appropriate Environmental, Safety, Health, and Quality Assurance personnel participate in the development and verification of the hazards screening profile checklist in accordance with relevant INEEL work control processes.

9.1.4 Industrial Hygienist

The industrial hygienist (IH) is the primary source of information regarding nonradiological hazardous and toxic agents at the work site. The IH will be present at the task site during any work operations involving either existing or anticipated chemical hazards to operations personnel.

The IH assesses the potential for worker exposure to hazardous agents in accordance with INEEL procedures and the project HASP, assesses and recommends appropriate hazard controls for protection of work site personnel, reviews the effectiveness of monitoring and PPE required in the project HASP, and recommends changes as appropriate.

Following an evacuation, the IH will assist in determining whether conditions at the task site are safe for reentry. Personnel showing health effects as a result of possible exposure to hazardous agents will be referred to the OMP by the IH, their supervisor, or the HSO. The IH may have other duties at the task site, as specified in other sections of the project HASP, or company procedures and manuals. During emergencies involving hazardous material, members of the Emergency Response Organization will perform IH measurements.

9.1.5 Safety Engineer

The assigned safety engineer (SE) reviews work packages, observes work site activity, assesses compliance with the project HASP, signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the task site. The SE may conduct periodic inspections, and have other duties at

the task site as specified in other sections of the project HASP, or in PRDs and/or MCPs. Copies of inspections will be kept in the project field file.

9.1.6 Fire Protection Engineer

The assigned fire protection engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and is responsible for providing technical guidance to site personnel regarding all fire protection issues.

9.1.7 Radiological Control Technician

The radiological control technician (RCT) is the primary source of information and guidance on radiological hazards that may be encountered during drilling and sampling tasks. The RCT will be present at the task site during any work operations when a radiological hazard to operations personnel may exist or is anticipated. In addition to other possible duties at the site specified in other sections of the project HASP, the PRDs, and/or MCPs, RCT responsibilities include radiological surveying of the work site, equipment, and samples; providing guidance for radiological decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radioactive contamination occurs.

The RCT must notify the HSO and FTL of any radiological occurrence that must be reported as directed by the INEEL *Radiological Control Manual* (PRD-183).

9.1.8 TAN Facility Authority/Operations Manager

The TAN Facility Authority/Operations Manager, or designee, is responsible for maintaining the assigned facility and must be cognizant of work being conducted in the facility. The TAN facility manager is responsible for the safety of personnel and the safe completion of all project activities conducted within the area in accordance with the area director concept.

- The facility manager and TAN site project director will be kept informed of all activities performed in the area. The facility manager and FTL will agree on a schedule for reporting work progress and plans for work. The facility manager may also serve as an advisor to task-site personnel with regard to TAN operations.

9.1.9 Quality Assurance Engineer

The quality assurance (QA) engineer provides guidance on task-site quality issues, when requested. The QA engineer observes task site activities, verifies that these operations comply with quality requirements pertaining to these activities, identifies activities that do not comply or have the potential for not complying with quality requirements, and suggests corrective actions.

9.1.10 Waste Generator Services

Waste Generator Services will perform waste disposition for this project.

9.1.11 Field Team Leader

The field team leader (FTL) has ultimate responsibility for the safe and successful completion of the sampling project, and all health and safety issues at the work site must be brought to the FTL's attention. In addition to managing field operations, executing the field sampling plan (FSP), enforcing site control, documenting work site activities, and conducting daily safety briefings, the FTL's responsibilities include, but are not limited to, the following:

- Performing the technical and operational requirements of the sampling activities
- Conducting field analysis and decontamination activities
- Complying with equipment removal procedures
- Packaging and shipping samples
- Determining, in conjunction with the site IH and RCT, the level of PPE necessary for the task being performed
- Ensuring compliance with field documentation, sampling methods, and chain-of-custody requirements
- Ensuring the safety of personnel conducting the activities associated with the HASP
- Ensuring the "fit for duty" medical evaluation forms are completed for all project employees, reviewed by the project IH for validation, and then incorporated into the project field file.

The FTL may be a member of the sampling team and FTL responsibilities may be transferred to a designated representative who satisfies all FTL training requirements.

9.1.12 Field Team Members

All field team members, including field team, sampling team, and subcontractor personnel, will understand and comply with the requirements of the project HASP. The FTL or HSO will conduct a plan of the day (POD) briefing at the start of each shift. During the POD briefing, all daily tasks, associated hazards, hazard mitigation (engineering and administrative controls, required PPE, work control documents), and emergency conditions and actions will be discussed. The project HSO, IH, and RCT personnel will provide input to clarify task health and safety requirements, as deemed appropriate. All personnel are encouraged to ask questions regarding site tasks and to provide suggestions for performing required tasks in a more safe and effective manner based on the lesson learned from the previous day's activities.

Once at the site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. **If it is perceived that an unsafe condition poses an imminent danger, site personnel are authorized to stop work immediately, then notify the FTL or HSO of the unsafe condition.**

9.1.13 Sampling Team Leader

The sampling team leader (STL) reports to the FTL and has ultimate responsibility for the safe and successful completion of assigned project tasks, including:

- Overseeing the sampling team
- Ensuring that the samples are collected from appropriate locations
- Ensuring that proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met.

If the STL leaves the task site, an alternate individual will be appointed to act in this capacity. An acting STL on the task site must meet all the same training requirements as the FTL, as outlined in the project HASP. The identity of the acting STL shall be conveyed to task-site personnel, recorded in the

daily force report, and communicated to the FTL and TAN site Area Director, or designee, when appropriate. The STL may also be the FTL for the sampling event.

9.1.14 Sampling Team

The sampling team will consist of a minimum of two members (including the STL) who will perform the on-Site tasks necessary to collect the samples. The buddy system will be implemented for all tasks, and no team member will enter the contamination zone alone. The members of the sampling team will be led by a FTL, who may also serve as the project STL. The IH and RCT will support the sampling team, as warranted, based on sight-specific hazards and task evolutions.

9.1.15 Nonfield Team Members/Visitors

All persons on the work site who are not part of the field team (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project) are considered nonfield team members or visitors for the purposes of this project. A person will be considered onsite when they are present in or beyond the designated support zone. Under 29 CFR 1910.120 and 29 CFR 1926.65, nonfield team members are considered occasional site workers and must comply with the following:

- Receive any additional site-specific training identified in the HASP before entering beyond the support zone of the project site
- Meet all required training based on the tasks taking place, as identified in the HASP
- Meet minimum training requirements for such workers as described in the OSHA standard
- Meet the same training requirements as the workers if the nonworker's tasks require entry into the work control zone.

Training must be documented and a copy of the documentation must be incorporated into the project field file. A site supervisor (e.g., HSO or FTL) will supervise all nonfield team personnel who have not completed their three days of supervised field experience, in accordance with the hazardous waste operations standard.

Note: Visitors may not be allowed beyond the support zone during certain project site tasks (drilling) to minimize safety and health hazards. The determination as to any visitor's "need" for access beyond the support zone at the project site will be made by the HSO in consultation with TAN RadCon personnel (as appropriate). Training requirements in Table 6-1 continue to apply.

9.2 Points of Contact

Table 9-1 lists the key points of contact for the Group 3, WAG 1, OU 1-10 remediation field activities. The points of contact listed in the table are those who are expected to be contacted as a part of sampling operations. An exhaustive contact list of all personnel with responsibilities listed in Section 9.1 is not provided.

Table 9-1. Points of contact.

Name	Title	Telephone Number
Al Jantz	WAG 1 Project Manager	(208) 526-8517
Dave Eaton	WAG 1 Environmental Compliance	(208) 526-7002
Gary McDannel	WAG 1 Project Engineer	(208) 526-5076
Alvah Bingham	OU 1-10 RD/RA Project Manager	(208) 526-3033
TBD	Health and Safety Officer	TBD
TBD	Field Team Leader	TBD
TBD	Industrial Hygienist	TBD
TBD	Safety Engineer	TBD
John Harris	Waste Generator Services	(208) 526-3461
TBD	Fire Protection Engineer	TBD
TBD	Radiological Control Technician	TBD
Larry Evens	TAN Facility Contact	(208) 526-3098
Jim Rider	QA Engineer	(208) 526-6952
Donna Kirchner	Sample Management Office Contact	(208) 526-9873

TBD = to be determined

10. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of project personnel during an emergency. Such an emergency could be at the project site, on a tenant facility or collocated facility, or a Sitewide emergency. This section provides details of the INEEL Emergency Response Organization (ERO) and "INEEL Emergency Plan RCRA Contingency Plan" (PLN-114) information. Plan-114 describes the overall process developed to respond to and mitigate consequences of emergencies that might arise at the INEEL.

Plan-114 may be activated in response to events occurring at the project site, at the INEEL, or at the discretion of the emergency coordinator or emergency action manager. Once the INEEL plan is activated, project personnel will follow the direction and guidance communicated by the emergency coordinator.

Note: The OSHA HAZWOPER definition of an emergency is not defined the same as classified by DOE Orders 151.1A, "Comprehensive Emergency Management System," and 232.1, "Occurrence Reporting and Processing of Operations Information." For this reason, the term "event" will be used in this section when referring to project HAZWOPER emergencies.

10.1 Pre-Emergency Planning

The "INEEL Emergency Plan RCRA Contingency Plan" (PLN-114) provides the basis for preplanning all INEEL emergency events. This base plan is supplemented with INEEL facility-specific addendums. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that the project emergency response program is integrated with that of the INEEL. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency implementing procedures. Finally, the HASP addresses project-specific hazards, potential emergency events, and the actions to take following such events.

10.2 Emergency Preparation and Recognition

The sections for hazards identification and mitigation and accident prevention provide the strategy that will be followed at the project site to prevent accidents. Similarly, emergency preparation and recognition also will require project personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All field personnel should be familiar with the techniques for hazard recognition and the assigned action levels and associated actions to be taken as identified in Section 3.

Management control procedure (MCP) -2725, "Field Work at the INEEL," requirements for training, emergency actions, and notifications will be followed for all projects conducted outside facility boundaries as described in MCP-2725.

Preparation and training on emergencies will include proper site access and egress procedures in response to project events and INEEL emergencies as part of the project-specific HASP training and facility access training where applicable. Visitors also will receive this training on a graded approach based on their site access requirements. Visitor training will include alarm identification, location and use of communication equipment, location of site emergency equipment, and evacuation. Emergency phone numbers and evacuation route maps will be located in the field file at the job site.

On-scene response to and mitigation of site emergencies could require the response from both project personnel and INEEL fire department personnel. Emergencies could include the following scenarios:

- Accidents resulting in injury
- Fires
- Spills of hazardous or radioactive materials
- Tornadoes, earthquakes, or other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

10.3 Emergency Alerting, Responses, and Sheltering

10.3.1 Alarms

Alarms and signals are used at the project site and the INEEL to notify personnel of abnormal conditions that require a specific response. Responses to these alarms are addressed in general employee training. Emergency sirens located throughout the INEEL serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions. To signal site personnel of a project-initiated emergency event, a separate set of emergency signals has been established based on horn blasts (e.g., vehicle or air horn).

Depending on the field location (inside or outside a facility), facility alarms may not be able to be heard at the project site. If the project site is outside the audible range of the facility alarms, then the notification to take cover or evacuate should be received on the field radio. The project signals will then be used to alert personnel of the emergency actions.

10.3.1.1 Take Cover—Continuous Siren. Radioactive or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN.

STEADY = STAY

However, the order to take cover also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, project personnel will place the site and equipment in a safe configuration (as appropriate) and then seek shelter inside TAN 607, or the project trailer or vehicle (if outside the facility). Eating, drinking, and smoking are not permitted during take-cover conditions.

10.3.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the project site and the entire facility area. The evacuation signal is an

ALTERNATING SIREN. When ordered to EVACUATE, project personnel will place equipment and the site in a safe configuration (as appropriate) and then proceed along the specified evacuation route to the designated assembly area or as directed by the emergency coordinator.

ALTERNATE = EVACUATE

For total area evacuations, the facility command post is activated and all personnel will gather at the primary facility evacuation assembly area, or the location designated by the emergency coordinator (EC) or FTL if outside a facility. The FTL or trained alternate will then complete the personnel accountability using the attendance log. In this situation, the project area warden will report the result of the accountability process to the facility emergency coordinator.

10.3.1.3 Local Area Evacuation—Vehicle Horn Blast. A local area evacuation is the complete withdrawal of personnel from the project site but it does not require the complete evacuation of the entire facility or INEEL area. A single long horn blast (e.g., vehicle) will serve as the project's primary emergency evacuation signal (as listed on Table 10-1). However, the order to evacuate also can be given by word of mouth, radio, or voice paging system. When ordered to evacuate the project site, personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations or as directed by the FTL. Eating, drinking, and smoking are not permitted during emergency evacuations.

Table 10-1. Project internal emergency signals.

Device or Communication Method	Signal and Associated Response
Vehicle horn blasts	**One long blast**—Emergency evacuation. Evacuate project site immediately. Proceed in an upwind direction to designated assembly area as specified by the field team leader (FTL).
	Two short blasts—Nonemergency evacuation of immediate work area. Proceed to designated assembly area as specified by the FTL.
	Three long blasts or verbally communicated—All clear. Return to project site.

10.4 Personnel Roles, Lines of Authority, and Training

10.4.1 The Idaho National Engineering and Environmental Laboratory Emergency Response Organization

The INEEL ERO structures are based on the incident command system and are described in PLN-114 and facility-specific addendums to that plan.

10.4.2 Role of Project Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. The FTL and project personnel responsibilities are described below. Personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel are trained to the facility-specific emergency actions as part of the access training or will be escorted by someone who has been trained. Emergency response actions will also be covered as part of the HASP briefing as stated in Table 6-1.

10.4.2.1 Field Team Leader. The FTL (or designated alternate) is responsible for initiating all requests for emergency services (e.g., fire and medical) and for notifying the TAN shift supervisor of abnormal (or potential emergency) events that may occur during the project. The FTL may also serve as the area warden (or designate that responsibility to another person who has been trained as area warden) and conduct personnel accountability. Personnel accountability will then be reported to the shift supervisor. Additionally, the FTL will control the scene until a higher-tiered incident command system authority arrives at the scene to take control. When relinquishing this role, the FTL (or designated alternate) will provide all information about the nature of the event, potential hazards, and other information requested.

10.4.2.2 Project Personnel. Every person at the project site has a role to play during a project event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpected hazardous situations and immediately report these situations to the FTL. All personnel are expected to watch out for their fellow workers, to report their concerns to the FTL, and to take emergency actions as described in this section. Roles and responsibilities are further detailed in Table 10-2.

Table 10-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Field team leader (or designee)	Signal evacuation.
	Report spill to shift supervisor and take mitigative actions.[a]
	Contact shift supervisor or Warning Communications Center (if the shift supervisor cannot be contacted).
Field team leader (or trained designee)	Serve as area warden, conduct accountability, and report to shift supervisor.
Health and safety officer, medic, and first-aid trained personnel	Administer first aid to victims (voluntary basis only).

a. The environmental affairs spill response categorization and the notification team will be contacted by the shift supervisor or emergency coordinator.

10.4.2.3 Personnel Accountability and Area Warden. Project personnel are required to evacuate the site in response to TAKE COVER, EVACUATION, and local evacuation alarms. In all cases, the FTL (or trained designee) will account for the people present on the project site. The FTL (or trained alternate) will serve as the area warden for the project and will complete the personnel accountability (following positive sweeps of the project site) based on the attendance log. The results of this accountability will then be communicated to the FTL for reporting to the shift supervisor or emergency coordinator (if the command post has been formed).

10.4.2.4 Spills. If the material spilled is known and is small enough to be safely contained at the task site, task-site personnel will handle spill control using spill supplies at the site and immediately report the incident to the shift supervisor or Warning Communications Center (WCC) if the shift supervisor cannot be contacted. Reporting requirements will be determined by the facility emergency coordinator in accordance with MCP-190, "Event Investigation and Occurrence Reporting." If any release of a hazardous material occurs, task site personnel will comply with the following immediate spill response actions.

10.4.2.4.1 Untrained Initial Responder—The requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration
- **Evacuate** and **isolate** the immediate area
- Notify and then **seek help** from and **warn** others in the area
- Notify the FTL.

10.4.2.5 Trained Responder. The requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:

- Place all equipment in a secure configuration
- **Seek help** from and **warn** others in the area
- **Stop** the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- **Provide** pertinent information to the FTL
- **Secure** any release paths if safe to do so.

10.5 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 8.2. Decontamination of personnel and equipment is described in Section 11.2.

10.6 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources to immediately notify site personnel and inform others of site emergencies is required. Communications equipment at the task site will be a combination of radios, telephones (e.g., mobile, cellular, or facility), and pagers. Communication methods described below will be used during emergency situations.

10.6.1 Notifications

During emergency situations, the facility shift supervisor will be notified of any project emergency event. The shift supervisor will then make the required ERO notification. The following information should be communicated, as available, to the shift supervisor:

> **Note:** If the shift supervisor cannot be contacted then the WCC will be notified of the event and the information listed below communicated. The WCC also must be told that notification to the facility shift supervisor and emergency coordinator has not been made.

- The caller's name, title (e.g., FTL or HSO), telephone number, and pager number

- Exact location of the emergency
- Nature of the emergency including time of occurrence, current site conditions, and special hazards in the area
- Injuries, if any, including numbers of injured, types of injuries, and conditions of injured
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

10.7 Emergency Facilities and Equipment

Emergency response equipment maintained at the project site includes the items listed in Table 10-3. The TAN facility-specific addendum to PLN-114 lists emergency equipment available at the facility. This includes the command post, self-contained breathing apparatus, dosimeters, air samplers, decontamination and first-aid equipment, and an emergency response trailer. The INEEL fire department maintains an emergency hazardous material response van that can be used to respond to an event or emergency at the project. Fire department personnel also are trained to provide immediate hazardous material spills and medical services. Additionally, the TAN and CFA-1612 medical facilities are manned by medical personnel to evaluate and stabilize injured personnel, or those experiencing signs and symptoms of exposure.

Table 10-3. Emergency response equipment to be maintained at the project site during operations.

Equipment Name and Quantity Required	Location at Task Site	Responsible Person	Frequency of Inspection or Verification[a]
First-aid kit	Project vehicle or near designated work area (DWA) or controlled work area (CWA)	Health and safety officer (HSO)	Monthly: check seal only unless broken
Eyewash bottles[b] Eyewash station[b]	In or near DWA or CWA	HSO	Monthly
Hazardous materials spill kit	At Project Site	HSO	Daily verification
Extra personal protective equipment	Project vehicle or support trailer	HSO	Daily verification
Communication equipment (operational)	Onsite	Field team leader	Daily radio check
Fire extinguishers[c]	In or near DWA or CWA	HSO	Monthly

a. This is verification that equipment is present at the project location before starting tasks and no inspection tag is required.
b. An eyewash bottle will be used to provide an immediate eye flush if required. The location of the eyewash station will be identified by the HSO during the prejob briefing.
c. A minimum of one 10A/60BC extinguisher is required. If it is discharged, it will be returned for servicing and recharging.

10.8 Evacuation Assembly Areas and Test Area North Medical Facility

Test Area North maintains primary and secondary evacuation routes, assembly areas, and a medical facility route. These routes may be used in response to a total facility area evacuation as directed by the emergency coordinator. Copies of the evacuation assembly areas and the TAN medical facility route will be available at the project site.

Note: If the project is conducted outside of a facility then the INEEL evacuation routes listed in PLN-114 will be used.

10.9 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general site security and control requirements identified in Section 7 unless conducted as part of an emergency response action. All entries to the project site performed in support of emergency actions will be controlled by the on-scene commander.

10.9.1 Reentry

During an emergency response it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radioactive or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event.

10.9.2 Recovery

After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of assessing post-event and post-emergency conditions and developing a plan for returning to pre-event and pre-emergency conditions, when possible, and following the plan to completion. The emergency coordinator and emergency action manager are responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The project manager, with concurrence from the TAN Facility Authority/Operations Manager, will appoint the recovery manager.

10.10 Critique of Response and Follow up

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation may be required before commencing recovery actions. For this reason, care should be exercised to preserve evidence when appropriate.

10.11 Telephone and Radio Contact Reference List

Table 10-4 lists the points of contact for the project. A copy of this list will be kept in the FTL logbook. Because personnel listed may change frequently, working copies of this list will be generated as required to note new positions and changes of personnel assigned. This HASP should not be revised with a document action request to note these changes.

Table 10-4. Project emergency contact list.

Name	Title	Telephone Number
Al Jantz	WAG 1 Project Manager	(208) 526-8517
Dave Eaton	WAG 1 Environmental Compliance	(208) 526-7002
Gary McDannel	WAG 1 Project Engineer	(208) 526-5076
Alvah Bingham	OU 1-10 RD/RA Project Manager	(208) 526-3033
TBD	Health and Safety Officer	TBD
TBD	Field Team Leader	TBD
TBD	Industrial Hygienist	TBD
TBD	Safety Engineer	TBD
John Harris	Waste Generator Services	(208) 526-3461
TBD	Fire Protection Engineer	TBD
TBD	Radiological Control Technician	TBD
Larry Evens	TAN Facility Contact	(208) 526-3098
Jim Rider	QA Engineer	(208) 526-6952
Donna Kirchner	Sample Management Office Contact	(208) 526-9873

TBD = to be determined

11. DECONTAMINATION PROCEDURES

Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls, in combination with PPE upgrades, may be necessary to control the contact hazard. However, if chemical or radiological contamination is encountered at levels requiring decontamination, this section provides guidance on how it will be performed.

11.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize personnel contact with contaminated surfaces if such surfaces are encountered or may be contacted during project tasks. The following contamination control and prevention measures will be employed if contamination is encountered or anticipated:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Implement immediate decontamination procedures to prevent the spread of contamination (if contamination is found on the outer surfaces of equipment)
- Use only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination control surveys
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated.

11.2 Equipment and Personnel Decontamination

Personnel and equipment decontamination procedures are necessary to control contamination and to protect personnel should contamination be encountered. Both chemical and radionuclide contamination will be decontaminated from surfaces of a contaminated area at the exit and other designated work area boundaries.

If radioactive material decontamination operations are required for equipment or areas, they will be performed in accordance with Chapter 4 of the INEEL Radiological Control Manual. Nonradioactive material decontamination will be evaluated by the HSO and project industrial hygienist on a case-by-case basis to determine the most appropriate level of PPE to be worn. An RWP will be generated if radioactive contamination is encountered. Specific equipment and personnel decontamination methods are provided in the following subsections.

11.2.1 Equipment Decontamination

Decontamination of sampling equipment will be conducted in accordance with GDE-140, "Decontamination of Sampling Equipment," and TPR-6575, "Decontamination of Sampling Equipment in the Field." If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls in combination with PPE upgrades may be necessary to control the contact hazard. Equipment will be decontaminated based on the source of contamination.

If radioactive material decontamination operations are required for equipment or areas, they will be performed in accordance with Chapter 4 of INEEL Radiological Control Manual. Nonradioactive material decontamination will be evaluated on a case-by-case basis by the HSO and project industrial hygienist to determine the most appropriate PPE (Level C protective clothing will initially be selected if airborne contaminants may be generated until site monitoring can demonstrate downgrading is warranted).

Small equipment with only the possibility of external contamination will be decontaminated using a wipe-down method. Wipe-down consists of wiping the accessible surfaces of the item with a terrycloth wipe, or similar material, to remove any water or soils adhering to the surface. If necessary, the wipe may be soaked with a non-phosphate detergent and then used to wipe the equipment down. Subsequent to this, a wipe soaked with clean water will be used to complete the cleaning. Wipes, after use, are managed as waste in accordance with the project WMP.

A graded decontamination approach will be utilized for decontamination of heavy equipment. This approach employs dry decontamination methods first (e.g., brushing, sweeping, wiping). If it is deemed necessary and appropriate by the project industrial hygienist that further decontamination is necessary, then wet wiping with an amended water solution (e.g., amended with a nonphosphate detergent such as Alconox) or a potential steam cleaning of this equipment may be conducted. A drainage system that allows for a single collection point will be established if steam cleaning is performed. Decontamination wastewater will be collected using a submergible pump and characterized in accordance with companywide *Manual 17—Waste Management*, and relevant MCPs.

11.2.2 Personnel Decontamination

Project activities will be conducted in Level D PPE unless upgrading is warranted. Engineering controls in conjunction with work controls and proper handling of samples will serve as the primary means to eliminate the need for personnel decontamination. If modified Level D protective clothing is required, all items will be inspected following the list in Section 5.

11.2.3 Decontamination in Medical Emergencies

If a person is injured or becomes ill, that person will be immediately evaluated by first-aid trained personnel (on a voluntary basis) at the project task site. If the injury or illness is serious, then the FTL will contact the TAN shift supervisor or WCC (if the shift supervisor cannot be reached) to summon emergency services (i.e., fire department and TAN or CFA medical services) to the project site.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas may be contained with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), the individual will be wrapped in plastic, blankets, or other available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The industrial hygienist or the RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE then will be removed at the medical facility and carefully handled to prevent the spread of contamination. The INEEL Radiation Protection Manual, Chapter 5, and MCP-148, "Personnel Decontamination," contains information on proper handling of radioactive material contaminated wounds.

11.3 Doffing Personal Protective Equipment and Decontamination

As stated earlier, no personnel decontamination beyond doffing of PPE is anticipated for this project. Careful removal of the outer PPE will serve as the primary decontamination method.

The specific doffing sequence of modified Level D or C PPE, and associated decontamination procedures, will be based on the nature of the contamination. A general approach for doffing modified Level D or C PPE is described below. However, no one doffing strategy works for all circumstances. Modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO in consultation with the project industrial hygienist and RCT.

If contamination is detected on outer PPE layers, careful removal of these outer PPE layers will generally eliminate more than 99% of contamination and will serve as the primary decontamination method for protective clothing that is contaminated. Removal of contaminated protective clothing using standard radiological-doffing techniques (i.e., rolling outer surfaces inward while being removed) provides the most effective method for containing and isolating the contaminants and greatly reduces the potential for exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing and brushing).

Some preliminary surface decontamination of protective clothing may be required if the clothing is grossly contaminated and the potential exists for the generation of airborne radioactivity or organic vapor emissions. This will involve assistance from other personnel inside the contamination area and at the doffing station, as described below. The ultimate goal of all decontamination methods is to effectively and efficiently isolate the source of contamination through the removal of protective clothing and by containing the contaminant in a sealed bag or waste container.

The specific doffing sequence of modified Level D or C PPE, and any other required decontamination-doffing procedures, will be based on the nature of the contamination and specific site configuration. A general approach for doffing modified Level D or C PPE is described below. However, no one doffing strategy works for all circumstances, and modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO, in consultation with the project industrial hygienist and RadCon personnel. Both radiological and nonradiological (chemical) hazards will be evaluated.

11.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination (if required)

Modified Level D protective clothing (e.g., disposable coveralls), if required to be worn, will be doffed following standard radiological removal techniques (rolling outside surface inward and down) and will constitute the initial decontamination step. All PPE will be placed in the appropriately labeled containers.

11.3.2 Level C Personal Protective Equipment Doffing and Decontamination (if required)

If respiratory protection is worn in conjunction with protective clothing (e.g., Level C PPE), then the modified Level D sequence will be followed with one additional step. That additional step is to remove the respirator and place it in a separate container from the discarded protective clothing. Depending on the type of contamination encountered, this step will be followed by a radiological survey or industrial hygienist evaluation.

11.4 Personnel Radiological Contamination Monitoring

An automated whole-body radiological survey may be required before exiting the affected area of project site, as determined appropriate by RadCon personnel or as stated in the RWP. If required, this survey will be conducted using an existing personnel contamination monitor or other available hand-held instrument as directed by RadCon personnel.

11.4.1 Storage and Disposal of Investigative Derived Waste Materials

Waste also will include PPE and miscellaneous sampling materials (e.g., paper towels, plastic bags, and gloves). If contaminated, the waste will be bagged, secured with duct tape, and labeled in accordance with instructions from the RCT and WGS representative. The waste can be stored in the WAG 1 CERCLA storage area, pending laboratory analyses if necessary. It is expected that the waste will be handled as conditional industrial waste to comply with the waste disposal and disposition form. Free release surveys of suspected radioactively contaminated waste will be conducted in compliance with MCP-425, "Radiological Release Surveys and the Disposition of Contaminated Materials."

Cold (nonradioactive) waste is sent to the Central Facilities Area (CFA) landfill or another INEEL-designated solid-waste landfill. Low-level radioactive waste is stored in the WAG 1 CERCLA storage area inside a radioactive material area in accordance with MCP-3475, "Temporary Storage of CERCLA-Generated Waste at the INEEL," and MCP-121, "Areas Containing Radioactive Materials." The waste will be evaluated for additional characterization and managed as low-level radioactive waste. Final disposition will be coordinated with Waste Generator Services.

11.4.2 Site Sanitation and Waste Minimization

Site personnel will use the portable toilet facilities provided in the TAN area.

Waste materials will not be allowed to accumulate at routine monitoring sites. Appropriately labeled containers for industrial waste and CERCLA waste (as required) will be maintained at the project site. Personnel should make every attempt to minimize waste through the judicious use of consumable materials. All site personnel are expected to make good housekeeping a priority at the job site.

12. RECORDKEEPING REQUIREMENTS

12.1 Industrial Hygiene and Radiological Monitoring Records

When Industrial Hygiene support is required, the industrial hygienist will record airborne monitoring and sampling data (both area and personal) collected for exposure assessments in the INEEL Hazards Assessment and Sampling System database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and manufacturer specifications. Industrial hygiene airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the industrial hygienist in accordance with INEEL companywide safety and health manual procedures.

The RCT maintains a logbook of radiological monitoring, daily project operational activities, and instrument calibrations. Radiological monitoring records are maintained in accordance with companywide *Manual 15B—Radiation Protection Procedures.*

Project personnel, or their representatives, have a right to the monitoring and sampling data (both area and personal) from both the industrial hygienist and the RCT. Results from monitoring data also will be communicated to all field personnel during daily POD meetings and formal prejob briefings in accordance with MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews."

12.2 Field Team Leader and Sampling Logbooks

Logbooks will be maintained in accordance with MCP-1194, "Logbook Practices for ER and D&D&D Projects." The FTL will keep a record of daily site events in the FTL logbook and will maintain an accurate site attendance logbook of all personnel (e.g., workers and nonworkers) who are onsite each day. Logbooks must be obtained from the field data coordinator for the INEEL Sample Management Office. The completed logbooks must be returned to the INEEL Sample Management Office within 6 weeks of project completion. The logbooks are then submitted to ICP Document Control.

12.3 Idaho Completion Project Document Control

The Idaho Completion Project (ICP) Document Control organizes and maintains data and reports generated by ICP Program field activities. The ICP Document Control maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the project plans for ICP, this HASP, the ICP Project Management Plan (PLN-694), the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* (DOE-ID 2002), and other project-specific documents are maintained in the project file by ICP Document Control.

Completed sample logbooks are submitted to the Sample Management Office within 6 weeks of project completion. All other project records and logbooks, except Industrial Hygiene logbooks, must be forwarded to the Administrative Record and Document Control within 30 days after completion of field activities.

12.4 Site Attendance Record

If required to be maintained separately, the site attendance record will be used to keep a record of all personnel (i.e., field team members and nonfield team members) onsite each day, and to assist the area warden with conducting personnel accountability should an evacuation take place (see Section 10 for emergency evacuation conditions). Personnel will only be required to sign in and out of the attendance

record once each day. The FTL is responsible for maintaining the site attendance record and for ensuring that all personnel on the project site sign in (if required).

12.5 Administrative Record and Document Control Office

Administrative Record and Document Control (ARDC) will organize and maintain data and reports generated by ICP Program field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the management plans for the ICP Program, this HASP, the ICP Project Management Plan (PLN-694), the quality assurance project plan, and other documents pertaining to this work are maintained in the project file by the ARDC.

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