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**SUBJECT: THE ENVIRONMENTAL RESTORATION (ER) PROJECT HEALTH AND SAFETY PLAN (HASP) AND SITE-SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)**

## STATEMENT OF ISSUE

Because potential hazards are inherent to the performance of ER field operations, Los Alamos National Laboratory (the Laboratory) expects that work conducted under the ER Project be performed in a safe and healthful manner which minimizes the threat and occurrence of hazards to health, property, and the environment to levels as low as reasonably achievable.

## SUMMARY OF POLICY

The HASP establishes the generic health and safety (HS) information and requirements applicable to ER field operations. The SSHASPs supplement this document and provide additional, specific HS information required at individual project sites.

The primary objectives of the ER Project's two plans are to ensure that health and safety criteria are followed consistently, project-wide, during investigation, remediation, or decommissioning activities to promote a safe and healthful workplace for ER Project personnel. The Project Consistency Team (PCT) policy requires that all ER Project personnel are responsible for conducting work in accordance with applicable regulations and must follow the Project's HASP and utilize the SSHASP on all site-specific field activities. These two documents must be signed by participating employees indicating that they have read and understood them.

## DISCUSSION

The ER Project HASP and SSHASP were developed for the ER Project in compliance with applicable federal and state occupational safety and health requirements, including those of the US Department of Energy (DOE). The DOE requires the Laboratory to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at the Laboratory are not subject to the jurisdiction of OSHA.

The two documents are maintained by the Site Safety Officer (SSO) and kept on-site, accessible for reference by individuals performing ER field operations. The HASP is a stand-alone document included in the ER Project Installation Work Plan (IWP). It is reviewed by appropriate technical groups and subsequently changed only with approval from the PCT.

The development and implementation of the SSHASP is the responsibility of the Field Project Leader (FPL) who has the authority to delegate its preparation. It can be obtained electronically from the health and safety representative assigned to each field unit.

Prior to initiation of work, SSHASP documentation shall be submitted to the Field Unit HS Representative for review and approval by Laboratory representatives. It must be signed by an authorized representative of each ER participant-employer having an employee subject to the terms of the SSHASP. The signature serves as certification of conformance to stated requirements in the HASP and SSHASP. Upon approval, a copy of the SSHASP shall be returned to each employer with the signature of the FPL.

Annual updates to the HASP will incorporate new HS information as it becomes available or as requirements change. Minor revisions that could make a SSHASP more responsive to the implementation of ER activities at a particular site can be accommodated as necessary using appropriate forms. Broader modification involving scope or contract requires notification of the Contract Administrator and Field Unit HS Representative.

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Environmental Restoration

LOS ALAMOS NATIONAL LABORATORY (LANL)
ENVIRONMENTAL RESTORATION (ER) PROJECT

# HEALTH AND SAFETY PLAN

# (HASP)

| | | | | |
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|---|---|
| JS | Job Superintendent |
| LAMC | Los Alamos Medical Center |
| LANL | Los Alamos National Laboratory |
| LP | Laboratory Procedure |
| MPH | Miles Per Hour |
| MSHA | Mine Safety and Health Administration |
| MSDS | Material Safety Data Sheet |
| NIOSH | National Institute for Occupational Safety and Health |
| OSHA | Occupational Safety and Health Administration |
| PEL | Permissible Exposure Limit (OSHA) |
| PPE | Personal Protective Equipment |
| PRS | Potential Release Site |
| RCA | Radiological Control Area |
| RCRA | Resource Conservation and Recovery Act |
| RCT | Radiological Control Technician |
| RPF | Records Processing Facility |
| RSP | Radiological Screening Personnel |
| RWP | Radiological Work Permit |
| SOP | Standard Operating Procedures |
| SPCC | Spill Prevention Control and Countermeasures |
| SSHASP | Site-Specific Health and Safety Plan |
| SSO | Site Safety Officer |
| SWP | Special Work Permit |
| SZ | Support Zone |
| TA | Technical Area (LANL) |
| TLV | Threshold Limit Value (ACGIH) |

## LIST OF ACRONYMS AND ABBREVIATIONS

ABHP ..... American Board of Health Physics
ABIH ..... American Board of Industrial Hygiene
ACGIH ..... American Conference of Governmental Industrial Hygienists
AIHA ..... American Industrial Hygiene Association
ALARA ..... As Low As Reasonably Achievable
AL ..... Action Level
ANSI ..... American National Standard Institute
AR ..... Administrative Requirements
ASL ..... Above Sea Level
CFR ..... Code of Federal Regulations
CPR ..... Cardiopulmonary Resuscitation
CRZ ..... Contamination Reduction Zone
dBA ..... Decibels (A-Weighted Scale)
DOE ..... U.S. Department of Energy
DOL ..... U.S. Department of Labor
DOT ..... U.S. Department of Transportation
DPL ..... Decommissioning Project Leader
EPA ..... U.S. Environmental Protection Agency
ER ..... Environmental Restoration
ER/HS ..... Environmental Restoration Health and Safety
ESH ..... Environmental, Safety and Health
ESH-1 ..... Health Physics Operations Group
ESH-2 ..... Occupational Medicine Group
ESH-4 ..... Health Physics Measurements Group
ESH-5 ..... Industrial Hygiene and Safety Group
ESH-10 ..... Emergency Management and Response Group
ESH-12 ..... Policy and Program Analysis Group
ESH-13 ..... ES&H Training Group
EZ ..... Exclusion Zone
FPL ..... Field Project Leader
FTL ..... Field Team Leader
FTM ..... Field Team Manager
GET ..... General Employee Training
HASP ..... Health and Safety Plan
HAZMAT TEAM ..... Hazardous Materials Response Team
HAZWOPER ..... Hazardous Waste Operations and Emergency Response
HPT ..... Health Protection Technician
HS ..... Health and Safety
IDLH ..... Immediately Dangerous to Life or Health
IWP ..... Installation Workplan

ER participant-employer having an employee subject to the terms of the SSHASP by reason of his/her performance of work at a covered site. Such signature, which shall be affixed to the signature page, shall serve as a certification that the employer(s) have reviewed, concur with and will conform their employees' conduct to requirements stated in the HASP and SSHASP. Upon approval, a copy of the SSHASP shall be returned to each employer with the signature of the FPL.

Additionally, each individual, who will enter an area of a site where access has been limited in accordance with the SSHASP, shall sign an acknowledgment form (Appendix A) to acknowledge that he/she has read or been briefed on, and understands the contents of, the HASP and applicable SSHASP and agrees to abide by terms of these documents.

### 1.3 Updating and Numbering Health and Safety Documents

Evolutionary changes in HS information or requirements, which apply projectwide, will be incorporated in the annual updates of this document. Any exceptions or deviations from this document must be described along with the rationale in the applicable SSHASP.

SSHASPs may be revised at any time to include new information and changes that make the SSHASP more useful (e.g., new site data based on contaminant sampling and monitoring, recent survey information, and changes in site conditions or work practices). Once the SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix B). Modifications to a SSHASP may require a change to the terms or scope of a subcontract. Completion of a SSHASP modification form is not the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative (Section 3.3.2) under the changes clause and shall not proceed with the change until a change order has been mutually agreed between the parties, or unless unilateral direction is given by the Contract Administrator.

Generally, SSHASP modifications are completed by the Site Safety Officer (SSO). Modifications to the SSHASP must be signed by a duly authorized representative of each party (including subcontractors, and lower-tier subcontractors, consultants or agents) affected by the modification(s) having authority to approve of or concur with the terms of the modification(s). Changes to the SSHASP shall be communicated to affected individuals prior to implementation during tailgate HS meetings (Section 10.1.4).

When a draft SSHASP is submitted for LANL review, ESH-5 will issue a unique document control number, which shall appear on the title page and in the footer of each page of the final document. Each modification form shall be consecutively numbered using the SSHASP number (X), followed by a decimal point and a numeric suffix (e.g., X.01 or X.02) indicating the modification number sequentially.

## 2 Background Information

Background information specific to the project is provided in the SSHASP (Section 2), including the project scope of work and descriptions of the PRS(s). In accordance with requirements of 29 CFR 1926.65(l)(3)(i)(A), included in this section is general information about the location and climate of Los Alamos. Information about the location and climate of Los Alamos was provided by the LANL's Environmental Management Air Quality and Meteorology Section (Bowen).

### 2.1 Location

LANL and the communities of Los Alamos and White Rock are located in the County of Los Alamos in north-central New Mexico. The population of Los Alamos County according to the 1990 U.S. Census was 18,115 (University of New Mexico). By air LANL is located approximately 60 miles north-northeast of the City of Albuquerque and 25 miles northwest of the City of Santa Fe. Much of Los Alamos is located on the Pajarito Plateau on the eastern flanks of the Jemez Mountains. The plateau slopes downward to the eas' southeast, covering a distance of more than 15 miles from the base of the Jemez Mountain. (approximately 7,800 feet above sea level [ASL]) to a location just above the Rio Grande River Valley

# 1 Introduction

## 1.1 Purpose and Applicability

This health and safety plan (HASP) has been developed by the University of California (herein "LANL") for the Environmental Restoration (ER) Project at the Los Alamos National Laboratory to comply with applicable federal and state occupational safety and health requirements, including those of the U.S. Department of Energy (DOE). The DOE requires LANL to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at LANL are not subject to the jurisdiction of OSHA. This HASP establishes generic health and safety (HS) information and requirements applicable to ER field operations projectwide. In addition to the generic guidance published in this document, a Site-Specific Health and Safety Plan (SSHASP) shall be prepared for each field project. The Field Project Leader (FPL), who is the LANL representative having authority and responsibility for SSHASP development and implementation, will delegate the responsibility for preparation of the SSHASP. As used in this document, "field project" refers to investigation or cleanup of a potential release site (PRS) or group of PRSs and decommissioning projects. Each SSHASP supplements this document by providing additional HS information and requirements indicated by the operations and conditions at individual project sites.

LANL acknowledges that potential hazards are inherent to the performance of ER field operations. Accordingly, LANL expects that work conducted under the ER Project will be performed in a safe and healthful manner, that minimizes the threat and occurrence of hazards to health, property, and the environment to levels as low as reasonably achievable (ALARA). In the interest of protecting health and property (LANL's personnel and property, the local public and their interests, and the personnel and equipment involved in conducting ER work); programs, plans, and procedures associated with the performance of ER field projects are subject to approval by designated LANL representatives prior to implementation. However, such approval in no way relieves ER participants from compliance with specific regulatory requirements pertaining to HS programs, plans, procedures, or work practices; nor does such approval relieve ER participants from their responsibility to maintain a safe and healthful work environment. The term "ER participants" refers to anyone performing ER work, including LANL, subcontractors to LANL and their lower-tier contractors, consultants, and agents.

Furthermore, ER participants are responsible for conducting work in accordance with applicable federal, state, and local regulations. In some cases, in this document and as indicated in the SSHASP, LANL has chosen to invoke OSHA and LANL requirements which ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with LANL's ALARA policy and to clarify LANL's expectations with regard to interpretable requirements of the multiple agencies governing ER work.

Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or could unreasonably compromise the safety or health of an individual or the environment, such concerns should be brought to the attention of the Contract Administrator and the Field Unit HS Representative (Section 3.3.2) immediately. Failure to comply with terms of HS plans may constitute cause to stop activity or for issuance of a stop work order as specified in Section 3.4.2 without cost or penalty to LANL.

The ER Project has provided this document and a model SSHASP to ER participants. It also has incorporated this document without the appendices into the ER Project Installation Workplan (IWP) as Appendix 6. Both this document and the completed SSHASP for each project shall be kept readily available for reference by individuals performing ER field operations and shall govern the conduct of work at the applicable site(s).

## 1.2 Review and Approval of Health and Safety Documents

Prior to initiation of any work, a completed SSHASP document shall be submitted to the Field Unit HS Representative, in draft form, for review and approval by LANL representatives. Each SSHASP submitted (or provided where a SSHASP document exists) must be signed by an authorized representative of each

are common during the spring. The strongest winds are generally southwesterly through northwesterly and occur in the afternoon or evening.

During days with sunshine, upslope winds develop over the Pajarito Plateau, which are generally less than 6 mph and usually more south-southwesterly and southerly. When the sky is clear and upper-level winds are light, local winds reverse at night. A shallow drainage, west-northwesterly wind often forms and flows down the plateau, reaching speeds of 6 to 8 mph.

### 2.2.4 Insolation (Sunshine)

Sunshine is plentiful in Los Alamos, where more than 75% of possible incoming solar radiation is received annually. (100% insolation assumes a perfectly cloud-free sky.) Sunshine is especially prevalent during January and February, when more than 80% of possible insolation is received, and almost as high in April and June with 79% occurring. Frequent thundershowers and clouds during the monsoon season decrease the percentage of insolation, with a minimum of 71% occurring during August. Although cloudiness is greater during July and August than during January and February, Los Alamos receives twice as much insolation during the summer because of the higher sun angle and longer periods of daylight.

### 2.2.5 Atmospheric Pressure

The atmospheric pressure at 7,380 feet ASL averages 22.91 inches of mercury, or 76% to 77% of the standard sea-level pressure. Similarly, the air density is about 75% of the standard sea-level air density. Pressure reaches a minimum during March, averaging 22.77 inches, and a maximum during the monsoon season, July and August, averaging 23.04 inches.

### 2.2.6 Humidity

Atmospheric humidity (moisture content) is relatively low in Los Alamos. The air is driest in the winter and wettest during the monsoon season (July and August). The months from August through March have nearly the same relative humidity, ranging between 52% and 57%. The late spring and early summer months have the lowest relative humidity, with the minimum of 39% occurring during June and occasionally dipping to 5% or less during warm afternoons. Relative humidities approaching 100% occur frequently on cold winter mornings and also in the summer during showers and during mornings following showers. Fog seldom occurs in Los Alamos. Over a 27-year period ending in 1988 the highest monthly mean number of fog days was 1.6 days, occurring during December.

### 2.2.7 Precipitation

Normal annual precipitation, including rainfall and water-equivalent snowfall, totals nearly 18 inches. Annual precipitation falls off rapidly toward the valley, with normal White Rock precipitation at 13 inches and more than 20 inches in the adjacent Jemez Mountains. Variations in precipitation from year to year are quite large in Los Alamos. For instance, the annual precipitation extremes range from 6.80 to 30.34 inches over a 69-year period.

Forty percent of the annual precipitation falls in July and August. Thundershowers develop over the Jemez Mountains during the afternoons and early evenings and drift out over the plateau causing brief, but frequently intense, rains. The rainfall is often accompanied by small hailstones.

Winter precipitation falls primarily as snow, with accumulations of about 51 inches seasonally. Rainfall occurs occasionally during the winter, but freezing rain rarely occurs. Snowfall varies considerably from season-to-season, with extremes ranging from 9.3 inches to the record 153.2 inches that fell in 1986-1987. Snowfall is greatest in December, followed by January and March. Snowstorms with accumulations exceeding 4 inches are common in Los Alamos. However, heavy snow cover seldom remains in exposed areas for lengthy periods because of strong sunshine and relatively mild temperatures. Some storms are associated with strong winds, frigid air, and dangerous wind chills, especially in the mountains. Many of the large snowstorms that have occurred in Los Alamos were caused by a persistent upslope (southerly or

(approximately 6,200 feet ASL). Numerous alternating "finger" mesas and canyons run along the plateau slope line. The canyons are 150 to 300 feet deep and 300 to 600 feet wide. The Sangre de Cristo Mountains lie nearly 40 miles to the east. The Rio Grande Valley runs north-northeast to south-southwest between the two mountain ranges.

## 2.2 Prevailing Weather Conditions

Los Alamos has a semiarid, temperate mountain climate that is characterized by the prevailing weather conditions described in the subsections below.

### 2.2.1 Large-Scale Atmospheric Flow

Moisture is transported to north-central New Mexico from the Gulf of Mexico (800 miles to the southeast) and from the Pacific Ocean (800 miles west). Los Alamos is located on the southern edge of the usual storm track or jet stream. During the cold season (autumn through spring), west-to-east moving storms often bring clouds and precipitation. Occasionally, the jet stream is directed due southward toward New Mexico during winter, bringing frigid arctic or even Siberian air masses to the state. The jet stream is displaced to the extreme northern United States during the summer, resulting in a weak southeasterly flow (monsoon pattern) from the Gulf of Mexico toward New Mexico. This provides Los Alamos with frequent thundershowers during the summer, especially during July and August.

### 2.2.2 Temperature

Mean temperatures vary with altitude, averaging 5°F higher in and near the Rio Grande Valley (6,500 feet ASL) and 5°F to 10°F lower in the nearby Jemez Mountains (8,500 to 10,00 feet ASL). The elevation of central Los Alamos is nearly 7,400 feet ASL.

Summers have moderately warm days and cool nights. Afternoon temperatures are in the 70s and 80s (°F) and infrequently reach 90°F. Temperatures usually drop to the 50s (°F) at night. Extreme heat in Los Alamos is very rare. Los Alamos averages only 2 days per year with temperatures exceeding 90°F. Temperatures at White Rock reach 90°F more often than at Los Alamos and occasionally climb above 95°F.

Winter temperatures typically range from 15°F to 25°F during the night and from 30°F to 50°F during the day. Occasionally, Los Alamos temperatures drop to 0°F or below. Cold-air drainage gives more sub-0°F days and lower temperatures at White Rock than at Los Alamos. However, when clouds or moderate winds are present, temperatures are colder at Los Alamos than at White Rock. The coldest nights occur with a cold-air mass over the area, fresh snow on the ground, light winds, and clear skies. During these conditions, temperatures are even lower in the canyons and toward the valley. Extremely low wind chills are rare because strong winds usually do not occur at the same time as very cold temperatures. A table of wind chill factors is provided in the cold stress subsection under the physical agents section of the *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* (American Conference of Governmental Industrial Hygienists), which is published annually. Probably the most severe cold wave occurred during January 1971 when morning temperatures at Los Alamos plunged to -16°F, with highs only reaching 9°F, while low temperatures at White Rock reached -29°F.

Daily temperature ranges vary between 25°F in June and 21°F in December and January. A switch in wind direction can cause the temperature to rise or fall 5°F to 10°F, as southerly or easterly winds cool the air as it rises over the plateau, and westerly winds warm the air as the air descends.

### 2.2.3 Surface Winds

Los Alamos surface winds often vary dramatically with time of day, location, and height above ground because of the complex terrain. Surface winds are quite light in Los Alamos, averaging 7 miles per hour (mph). Wind speeds are strongest from March through June and weakest in December and January. Sustained winds exceeding 25 mph and peak gusts exceeding 50 mph (77 mph highest recorded mph)

# 3 Organization, Responsibilities, and Authority

The policies and personnel roles and responsibilities provided in this section have been established by LANL to clarify expectations of ER participants and to comply with requirements of 29 CFR 1926.65(b)(2).

## 3.1 Visitor Policy

A visitor (e.g., regulatory personnel, private property owners, field auditors, and the public) is anyone who arrives at the work site who is not identified as a field team member or in Table 3-1 of the SSHASP. When a visitor arrives, the SSO, Field Team Leader (FTL) or Job Superintendent (JS), or his/her delegate, should meet with him/her to ascertain the purpose of the visit.

Visitors are not permitted to enter controlled work zones where access has been limited unless absolutely necessary. In such cases, the visitor shall be briefed per Section 10.1.3, shall meet all applicable requirements of the HASP and SSHASP, and may need to be accompanied by an escort at the discretion of the FTL or JS. If a visitor does not comply with these requirements, the FTL or JS, or his/her delegate, shall request the visitor to leave the controlled zone immediately or shall limit site operations to minimize threat of harm to the visitor (e.g., have the field team take a break, reset the zone boundaries if appropriate, or temporarily discontinue any threatening task). Alternatively, if a visitor needs to observe work being performed in a controlled zone which is not readily visible from outside the zone(s), consider video taping or photographing the work.

## 3.2 Project Team Personnel

### 3.2.1 Line Managers

#### 3.2.1.1 Field Project Leader

The Field Project Leader (FPL) is a member of LANL's staff and reports to the ER Project Manager. The FPL is the project manager as defined by *Construction Project Safety and Health Management* (DOE Order 5480.9A). The FPL is the line manager for his/her field unit and may direct one or more Field Team Managers (Section 3.2.1.2) or Field Team Leaders (Section 3.2.1.3).

The FPL is responsible for ensuring that provisions of the HASP, SSHASP, and other applicable HS regulations are observed for field operations under his/her management. In addition, specific HS responsibilities of the FPL, or his/her delegate, include:

- managing HS activities of his/her field unit;
- serving as the final authority for resolving HS issues concerning his/her field unit;
- ensuring that the necessary SSHASPs for his/her field unit are developed and that the comments of the Field Unit HS Representative and any other appropriate parties have been incorporated;
- ensuring that personnel performing ER work at his/her field unit are qualified in accordance with applicable HS requirements;
- ensuring that onsite personnel abide by applicable HS programs, procedures, plans, and applicable regulations;
- having the authority to ban personnel who do not abide by applicable HS requirements from performing field operations;
- conducting inspections as required by Section 12.1; and

southeasterly) wind, frequently over the top of a shallow arctic air mass. The preceding conditions were responsible for the largest single snowfall on record, 48 inches during January 15-17, 1987, with up to 70 inches falling in Los Alamos.

Extended periods of extreme dryness are uncommon in Los Alamos. The worst drought occurred during 1956 when only 6.80 inches fell during the entire year. More recently, very dry weather occurred during the summer of 1980 when rainfall totaled only 2.32 inches during the entire summer.

### 2.2.8 Severe Storms

Severe winter storms can cause heavy snows, strong winds, and dangerous wind chills. Heavy snow accumulations occasionally make roadways impassable. Heavy snowfall and strong winds also severely reduce visibility. Snowstorms can quickly develop over mountain areas, even when the weather is relatively clear over valley areas.

Lightning is very common over the Pajarito Plateau. Los Alamos is known to have the second highest number of lightning strike occurrences in the continental United States. During an average year there are 57 thunderstorm days, with most occurring during the summer. Brief downpours can cause local flash flooding, especially in canyons, streams, and other low spots.

Hail falls frequently during the summer, occasionally causing damage. Hailstones with diameters up to 0.25 inches are common, but hailstones larger than that fall less frequently.

No tornadoes have been reported to touch down in Los Alamos in recent history; however, funnel clouds have been spotted in nearby White Rock and Santa Fe. Only weak tornadoes are possible in Los Alamos, but strong dust devils can produce winds up to 75 mph at isolated spots in the county, especially at lower elevations.

### 2.2.9 Atmospheric Dispersion

The irregular terrain at Los Alamos favorably and unfavorably affects the consequences of an air-pollution release. Favorable effects occur because increased dispersion promotes greater dilution of contaminants released into the atmosphere. The complex terrain and forests create an aerodynamically rough surface, forcing increased horizontal and vertical turbulence and dispersion. The frequent clear skies and light winds cause good daytime vertical dispersion, especially during the warm season. Unfavorable effects occur because the generally light winds are limited in diluting contaminants horizontally. The same clear skies and light winds have a negative effect on dispersion at night, causing strong, shallow surface inversions to form. These inversions severely restrict near-surface vertical and, to a lesser extent, horizontal dispersion. The inversions are especially strong during the winter. Canyons also limit dispersion by channeling air flow.

Overall dispersion is generally the greatest in the spring when winds are the strongest. However, deep vertical mixing is the greatest during summer afternoons when the atmosphere is unstable up to 5,000 feet above ground level. Low-level dispersion is generally the least during summer and autumn evenings when winds are light. However, even though low-level dispersion is generally greater during the winter, intense surface inversions can cause low-level dispersive conditions during winter nights and early mornings.

- coordinates with the FTM or DPL, and/or FPL to ensure that the necessary preventative planning and employee training for emergency situations has occurred before beginning field operations (Section 9);

- coordinates with the FTM or DPL, and/or FPL to ensure that site control measures and hazard prevention and mitigation controls are implemented accordingly (Sections 4.2 and 5);

- ensures that a log of field activities is maintained, especially noting site personnel and visitors who enter and exit the site;

- notifies appropriate parties when action levels are reached and when personnel exposures exceed occupational exposure levels (Section 6);

- in the event of an incident or emergency, functions as site incident/emergency coordinator; as necessary, arranges for immediate notification of LANL emergency response personnel to take control of the scene and/or arranges for immediate notification of appropriate authorities (Section 9); and

- coordinates with the FTM or DPL, and/or FPL to ensure that modifications to the SSHASP have been prepared and approved per Section 1.3 before initiating any operational changes.

#### 3.2.1.4 Other Onsite Supervisory Personnel

For field teams involving multiple employers, each employer's onsite supervisory representative is responsible for ensuring that provisions of the HASP, SSHASP, and other applicable HS requirements are observed by his/her employees during field operations. These supervisors are responsible for cooperating with the FTL or JS and SSO, or as necessary the FTM or DPL or the FPL, to resolve HS matters that affect his/her site personnel and/or operations.

### 3.2.2 Field Team Members

Field team members are responsible for performing their work in a safe and healthful manner. They also are responsible for abiding by requirements of the HASP, SSHASP, and other applicable HS regulations and procedures, and for fulfilling and maintaining their individual training and medical surveillance requirements. If there is concern that implementation of work orders or HS requirements would unreasonably compromise the safety or health of an individual or the environment, such a concern should be brought to the attention of an immediate supervisor, the SSO, or the FTL or JS. When a HS concern is not resolved adequately by field supervisors, the matter should be brought to the attention of the FTM or DPL or the Field Unit HS Representative, and subsequently, the FPL if necessary. If adequate resolution still has not been achieved, team members are encouraged to call LANL's ESH hotline at 665-5010 or to contact the Los Alamos DOE Area Office at 667-5105 where they may file a complaint form (DOE F 5480.4). DOE has a policy that employees who report a health and safety problem are protected from reprisal.

### 3.2.3 HS Personnel

#### 3.2.3.1 Site Safety Officer

The SSO assists the FTL or JS to see that provisions of the HASP, SSHASP, and other applicable HS requirements are observed in the field and serves as the primary contact in the field for HS matters. The SSO shall be qualified, on a project-specific basis, to recognize and evaluate hazards and to minimize and mitigate occupational HS hazards. The SSO may perform other duties on the field team, provided that these duties do not compromise performance of his/her SSO duties. The specific responsibilities of the SSO are to

- ensuring the submittal of appropriate field project HS records to LANL's Records-Processing Facility (RPF).

#### 3.2.1.2 Field Team Manager or Decommissioning Project Leader

Field Team Manager (FTM) is the title of this position for ER site investigation and cleanup activities. Decommissioning Project Leader (DPL) is the title for this position for decommissioning projects. The FTM or DPL, who may be either a LANL staff member or subcontractor, reports to the FPL and is the line manager of one or more field teams. This person is the construction manager as defined by *Construction Project Safety and Health Management* (DOE Order 5480.9A). Specific HS responsibilities of the FTM and DPL, or his/her delegate, include

- coordinating with the FPL to ensure that provisions of the HASP, SSHASP, and other applicable HS regulations are implemented for assigned field operations;
- ensuring that all known tasks and personnel have been identified sufficiently in the SSHASP;
- coordinating with the FPL to ensure that each concerned party has reviewed the SSHASP for accuracy and adequacy in accordance with Section 1.2; also ensuring that review comments are resolved and that the SSHASP is signed before any field activities are begun;
- coordinating with the FPL to ensure that only field team members and support personnel qualified in accordance with applicable HS requirements are used to perform ER Project work;
- coordinating with the FPL and the Field Unit HS Representative to select qualified HS and health physics personnel;
- coordinating with the FPL to ensure that necessary permits have been obtained before commencing field operations;
- conducting inspections as required by Section 12.1;
- coordinating with the FPL to ensure that necessary HS records are produced and kept in accordance with the SSHASP; and
- coordinating with the FPL to provide necessary HS records to the FPL at the close of the project.

#### 3.2.1.3 Field Team Leader or Job Superintendent

Field Team Leader (FTL) is the title of this position for ER site investigation and cleanup activities. Job Superintendent (JS) is the title for this position for decommissioning projects. The FTL or JS, who may be either a LANL staff member or a Subcontractor, reports to the FTM or DPL (or in some cases directly to the FPL, in which case, responsibilities of the FTM or DPL should be delegated to the FTL or JS by and at the discretion of the FPL). This person is the line manager for his/her field team. He/she oversees the work of one or more supervisors assigned to the field teams, the field team members and the SSO. The FTL or JS and JS, or his/her delegate,

- coordinates with the FTM or DPL, and/or FPL to ensure that provisions of the HASP, SSHASP, and other applicable HS regulations are implemented for assigned field operations;
- coordinates with the FTM or DPL, and/or FPL to ensure that only field team members and support personnel qualified in accordance with applicable HS requirements are allowed to perform field operations;
- coordinates with the FTM or DPL, and/or FPL to ensure that field team members attend HS briefings and daily HS tailgate meetings before beginning field operations;

#### 3.2.3.4 Confined-Space Entry Supervisor

The confined-space entry supervisor is a designated team member or support person who is responsible for determining whether acceptable entry conditions exist at a confined-space where entry is planned, for authorizing and overseeing entry operations, and for terminating entry in accordance with regulatory and permit requirements (29 CFR 1910.146 [b]).

#### 3.2.3.5 Other Competent or Qualified HS Personnel

Throughout 29 CFR 1926, and applicable standards of 29 CFR 1910 evoked by LANL, OSHA uses the terms "competent" and "qualified" to denote specially trained and knowledgeable individuals who are required to perform certain job functions. These specific standards are cited as applicable throughout the HASP and SSHASP. Wherever requirements exist in these standards for participation of a competent or qualified person, the person shall be trained and knowledgeable of the particular regulated subject matter in accordance with 29 CFR 1926.32(f) or (m), the applicable regulatory standard, and Section 10.3.

### 3.2.4 Health Physics Personnel

Health physics personnel include radiological screening personnel (RSPs), Health Protection Technicians (HPTs), and radiological control technicians (RCTs). These field team members are the primary source of information and guidance about radiation protection. They shall ensure compliance with the radiological requirements of the SSHASP and shall conduct monitoring per the radiological surveillance authorization agreement issued by ESH-1 and terms of the SSHASP. If non-ESH-1 personnel perform these roles, ESH-1 must preapprove personnel and issue a radiological surveillance authorization agreement before any work is performed.

#### 3.2.4.1 Radiological Screening Personnel

RSPs are responsible for providing health physics monitoring support for the field team. Each RSP is responsible for performing health physics monitoring support in accordance with his/her radiological surveillance authorization agreement. Specific responsibilities include

- performing and documenting radiological surveys;
- performing conditional equipment release surveys;
- performing daily instrument response checks;
- ensuring that all radiation-monitoring equipment is in good working order;
- ensuring that radiological postings are maintained;
- immediately notifying ESH-1 when an employee has been contaminated above action levels;
- providing ESH-1 personnel who oversee the ER Project with a daily verbal summary of the radiological conditions and copies of all radiological survey documentation; and
- notifying ESH-1 when action levels defined in the SSHASP have been reached.

#### 3.2.4.2 Health Protection Technician and Radiological Control Technician

In addition to the responsibilities of the RSP, the responsibilities of the HPT and the RCT include

- preparing, ensuring compliance with, and closing out radiological work permits (RWPs);
- stopping work activity and revising the site RWP when the radiological controls required do not provide adequate worker protection or contamination control;

- assist with development of the SSHASP;
- verify that onsite personnel have current certification of the applicable training and medical surveillance requirements of Sections 10 and 11 of the HASP and SSHASP;
- assist the FTL or JS in effectively implementing the HASP and SSHASP in accordance with applicable federal, state, and local HS regulatory requirements;
- notify the FTL or JS of any onsite personnel who are not abiding by applicable HS requirements and of potential or actual hazardous situations needing to be rectified in accordance with applicable HS requirements;
- notify the FTM or DPL and, subsequently, the Field Unit HS Representative when elements of the HASP and SSHASP are not being met and when HS hazards are not being minimized or mitigated sufficiently;
- watch for changes in site operations and conditions that warrant hazard mitigation and/or modifications to the SSHASP;
- ensure that copies of the HASP, SSHASP, and any modification forms are current and that these documents are readily accessible onsite and as needed for ER work occurring elsewhere;
- assess the necessity, and arrange, for monitoring of employee exposures to HS hazards and convey results and known implications to FTL or JS;
- notify the FTL or JS, the Field Unit HS Representative, and affected employee(s)' supervisors of results of employee exposure monitoring (Section 13.3);
- monitor levels and effectiveness of personal protective equipment (PPE) and verify proper storage and maintenance of equipment;
- perform and document inspections of site operations per Section 12.1; and
- maintain HS-related field project records, including a daily log of HS-related matters concerning site operations, and provide these records to the FTM or DPL as necessary before close-out of the project.

#### 3.2.3.2 Industrial Hygiene Technician

The industrial hygiene technician is a designated team member who is capable of monitoring employee exposures to hazardous substances; and, to the extent necessary for the site-specific work, is capable of evaluating exposure monitoring results to determine actions necessary to protect individuals onsite. This person may be someone who is training to become an SSO, and, with approval of the FPL, someone to whom the SSO may delegate his/her responsibilities as this person is trained and qualified to perform such duties.

#### 3.2.3.3 Trenching/Excavation Competent Person

This individual is a designated team member or support person, in accordance with 29 CFR 1910.146, who is capable of identifying existing and predictable hazards in the surroundings or working conditions involved in trenching or excavation that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them (29 CFR 1926.650 [b]). This person shall have had specific training in and be knowledgeable about soils analysis, the use of protective systems, and the requirements of 29 CFR 1926 Subpart P - Excavations (29 CFR 1926.650 *et seq*).

- performing reviews to ensure that the radiological safety program is in compliance with LANL's Radiological Control Manual (LANL, LM 107-01.1) and applicable LANL requirements;

- ensuring that survey methods and equipment are appropriate for the type of radiological contamination expected and for current site conditions;

- providing direct support to field health physics personnel, when requested;

- ensuring that radiological controls are implemented in accordance with the RWP (if any), the SSHASP, LANL's Radiological Control Manual (LANL, LM 107-01.1), and any other applicable LANL requirements;

- ensuring that radiological surveys are performed and documented in accordance with required procedures;

- performing radiological surveys before the start and at the completion of field activities;

- providing guidance for radiological decontamination of equipment and personnel;

- taking the actions indicated in Tables 4-3 and Section 6 of the SSHASP upon notification that the action levels given in the table have been reached;

- reviewing RWPs for the site;

- determining, and in some cases providing, appropriate radiological postings; and

- meeting notification and reporting requirements as specified in "Occurrence Reporting and Processing of Operations Information" (DOE Order 5000.3B).

These responsibilities may be performed by designated contract personnel, provided ESH-1 has approved the Subcontractor's radiological safety program to perform this work, which must be submitted to LANL for approval during the pre-bid qualification or contract negotiation period, as required, or according to applicable requirements of Section 4.2.2

### 3.4 Stop-Activity and Stop-Work Orders

Any individual observing an operation that presents a clear and imminent danger to the environment or to the HS of site personnel, visitors, or the public has the authority to immediately notify the individuals involved and the SSO, or the FTL or JS. In accordance with LANL's Radiological Control Manual (LANL, LM 107-01.1), RCTs have the responsibility and authority to stop work or to mitigate the effect of an activity if they suspect that the initiation or continued performance of the activity will result in a violation of radiological control standards or result in imminent danger or unacceptable risk.

#### 3.4.1 Stop-Activity

The SSO, or the FTL or JS shall verbally notify supervisors and individuals on the site of the danger. Once it has been concluded that conditions or practices exist that pose a threat to personnel or environmental safety or health, the FTL or JS or other onsite supervisors or managers shall take action to diminish the immediate threat of harm. Operations shall be altered or discontinued to eliminate the immediate threat of harm, and individuals shall be directed to immediately leave an area of imminent danger. Authorization to begin the activity again shall be given by the FTL or JS only when it has been determined that the hazard(s) has/have been sufficiently abated and there is no further threat of harm. For example, a single activity, such as removing defective equipment or removing site personnel from a section of scaffolding that is defective, may be stopped without stopping the entire field operation. The FTL or JS is responsible for notifying the FPL and Field Unit HS Representative of any activity stoppage and to determine whether the incident is reportable per Section 9.4.

- providing guidance on radiological decontamination of equipment and personnel; and
- performing "unconditional release" surveys for equipment (RCT only).

## 3.3 Project Support Personnel

### 3.3.1 Subcontractor Representative

A Subcontractor representative is a management or HS professional representing an employer affected by terms of the SSHASP. This individual must have the authority to approve the terms of the SSHASP and any modification forms and to see that employees of his/her employer abide by these terms. Additional responsibilities include

- interfacing with field project line managers, other employers' supervisory personnel, and support professionals, as necessary, to coordinate implementation of HASP, SSHASP and other applicable HS requirements; and
- assisting with resolving HS issues involving his/her employees performing ER work, particularly those involving discrepancies between policies of multiple employers represented onsite and site-specific HS requirements.

### 3.3.2 Field Unit HS Representative

The Field Unit HS Representative may be either a LANL employee or a contract employee who is assigned to one or two FPLs as a technical advisor. This person provides HS support to personnel performing ER work involving the assigned field unit(s). This person serves as liaison between the field unit personnel and the ESH Division of LANL and arranges for provision of technical assistance by ESH personnel concerning industrial hygiene, operational safety, and health physics matters. This person may also be responsible on behalf of LANL for implementing the ER/HS Oversight Program (Section 12.2) for field unit(s) as assigned by ESH-5 management. In addition to the responsibilities of the Subcontractor Representative, the Field Unit HS Representative has responsibilities that include

- ensuring that SSHASPs for his/her field unit(s) are reviewed by appropriate ESH groups;
- verifying that known hazards, preventive measures, and mitigation controls associated with the project scope of work and tasks have been adequately incorporated in the SSHASP;
- reviewing and approving SSHASPs and modification forms for ER work at his/her assigned field unit(s); and
- verifying that field operations associated with his/her field unit(s) are conducted in accordance with applicable HS programs, plans, and regulatory requirements.

### 3.3.3 Registered Professional Engineer

A registered professional engineer is a person who is registered as a professional engineer in the state where the excavation or trenching work is to be performed (29 CFR 1926.650 [b]).

### 3.3.4 ESH-1 Personnel

ESH-1 personnel will be designated to provide radiological control support to the ER Project and to conduct ER/HS oversight duties (Section 12.2). The Field Unit HS Representative will arrange for participation of ESH-1 personnel to support field operations. In cases requiring immediate involvement by ESH-1 personnel, the FTL or JS, or his/her delegate, may request ESH-1 participation directly. Such participation may include site visitation, the frequency of which will depend upon the specific operations and radiological conditions occurring at the site. The responsibilities of the ESH-1 representative include

- conditions under which exposure to the substance(s) may occur; and

- specific hazards associated with the substance(s).

Details of the site-specific hazard assessment of each known site contaminant and chemical product to be used shall be included in Appendix B of the SSHASP, unless there are none. Of the wide variety of potential chemicals of concern at each site, Table 4-2 of the SSHASP must include only the substances expected to pose an occupational health threat together with the resulting hazard assessment rating. The signs and symptoms of chemical exposure, if any, shall be provided in Appendix C of the SSHASP. Corresponding detection methods, protective measures, and response actions shall be provided in Section 6 of the SSHASP.

Assessment of site-specific hazards that could result from the unpredictable detonation of high explosives, exposure to radiological and safety hazards, and to chemical hazards by class of chemical shall be included in Table 4-3 of the SSHASP. This table also shall include the administrative and engineering controls to be implemented to prevent and/or mitigate occurrence of these hazards.

The likelihood of exposure to biological and physical hazards is fairly uniform for performance of ER tasks in and around Los Alamos. General biological hazards of concern include: tick bites, rodent flea bites, poison ivy, poisonous snake bites, insect bites or stings, and transmission of bloodborne pathogens when first-aid or cardiopulmonary resuscitation (CPR) are rendered. General physical hazards of concern include: lightning strikes; slips, trips, and falls from less than 4-foot elevations; heat and cold stress; altitude sickness; and animal attacks. These hazards have been assessed by ESH-5, with input from ESH-2, assuming variable exposure conditions on an ER Projectwide basis. Results of this assessment, together with the symptoms of exposure, detection methods, protective measures, and response actions are provided in Table 1.

## 4.2 Administrative and Engineering Controls

As a first line of defense, DOE and OSHA (DOE, *Health and Safety Plan [HASP] Guidelines*; DOL, 29 CFR 1910.100[e]) require that employers implement administrative and/or engineering controls to prevent and/or mitigate hazards and protect site personnel. Secondarily, employers may require employees to use personal protective equipment (Section 7). This section addresses the basic administrative and engineering control requirements with which ER participants are required to comply. Site-specific administrative and engineering requirements shall be included in Table 4-3 of the SSHASP.

### 4.2.1 General Administrative Controls

The general work practices and administrative controls in this section are to be implemented as applicable during ER field operations.

#### 4.2.1.1 Drug and Alcohol Policy

- Personnel who are taking medications that may diminish their ability to perform their duties in a safe and healthful manner (e.g., medication that causes drowsiness or affects mental alertness or coordination), are encouraged to inform the SSO, or the FTL or JS so that alternate job duties may be assigned until the employee is no longer affected by the medication.

- Personnel who arrive at the field site intoxicated are not allowed to perform their job duties. The SSO, or the FTL or JS should be notified of such an event so that the person's supervisor may be notified and appropriate disciplinary action may be taken by the person's employer.

### 3.4.2 Stop-Work Order

A formal ("contractual") stop-work order can be issued only by a LANL Contract Administrator. Experts from ESH Division may provide recommendations regarding the need to issue a stop-work order by notifying the Field Unit HS Representative or the FPL, who will contact the Contract Administrator to arrange for review of the matter, and will proceed in accordance with applicable internal LANL procedures.

## 4. Task Hazard Analysis

DOE and OSHA (DOE Order 5480.9A and *Health and Safety Plan [HASP] Guidelines*; DOL, 29 CFR 1926.65[b][4][ii][A]) require that a hazard analysis be prepared for each task to be performed during the ER field project. The task hazard analysis must identify the likely radiological, safety, chemical, physical, and biological hazards and the affected personnel; so that determination can be made of the corresponding administrative and engineering controls (Section 4.2), site control measures (Section 5), exposure monitoring and response plans (Section 6), PPE (Section 7), decontamination (Section 8), emergency/incident response (Section 9), training (Section 10), and medical surveillance (Section 11) requirements to be implemented to minimize or mitigate the anticipated site hazards. Because of the configuration of the SSHASP, where administrative and engineering controls are identified within the same section as the hazards to which the controls correspond, required administrative and engineering controls are included within this task hazard analysis section of the HASP.

Each SSHASP shall include a task hazard analysis (Section 4 of the SSHASP) for each of the tasks described in the project scope of work (Table 2-2 of the SSHASP). Field team participants and key HS support personnel shall be identified in Table 4-1 of the SSHASP by the role (job title) and task(s) they are expected to perform. Then each anticipated task-specific hazard shall be assessed, as described in greater detail in this section, to determine the associated qualitative probability of occurrence of the hazard and the severity of injury/illness expected to result.

### 4.1 Hazard Assessment

According to DOE (DOE, *Health and Safety Plan [HASP] Guidelines*), hazard assessment is the process of identifying and evaluating the hazards associated with operational activities. Evaluation and identification of hazards should occur

- during pre-operational planning of ER field work;
- immediately after initiation of and during performance of tasks with potential hazards;
- prior to changes in tasks and/or operations;
- as required by changing site conditions; and
- continually as appropriate.

LANL has provided a method for evaluating and rating hazards (Appendix C). A list of several assessment methods are provided by DOE (DOE, *Health and Safety Plan [HASP] Guidelines*). It should be clearly stated in the SSHASP which hazard assessment method is being used.

Not all contaminants at a particular site or chemical products used during field operations pose an occupational health threat. The determination of which substances would be expected to pose an occupational health threat is made by the process of hazard assessment. DOE suggests that the following criteria be used to identify hazardous substances to be assessed:

- type, nature, form, quantity, and concentration of the hazardous substance(s)
- location of the substance(s);

| Hazard | Hazard Severity | Mechanisms of Exposure Or Transmission Methods | Response Actions & Protective Measures |
|---|---|---|---|
| **BLOODBORNE PATHOGENS & INFECTIOUS BODY FLUIDS** | | | |
| Hepatitis B virus (HBV) | Serious | Hepatitis B is a viral infection, which can cause death in 1 to 2% of patients. Most people with Hepatitis B recover completely while others may become chronic carriers of the virus. Most carriers have no symptoms, while others may develop chronic active hepatitis and cirrhosis. HBV may also be a causative factor in development of liver cancer. | Anyone rendering first aid or CPR to someone may be at risk of exposure to Hepatitis B Virus (HBV), Human Immunodeficiency Virus (HIV), and other less common illnesses. These viruses (pathogens) are transmitted when blood or body fluid of an infected individual comes in direct contact with the aid provider by needle skin puncture, (e.g., needle stick) or by contact through an opening in the skin - eyes, nose, ears, mouth, skin lesion, or cracked, cut or abrased skin.<br>Personnel should avoid contact with another person's blood or body fluids, unless they have been trained according to Section 4.2.2.2 and 9.3.1 **Report any occupational exposure incident to the SSO, or the FTL or JS, immediately, and seek medical attention per Section 9.3.1.** |
| Human Immunodeficiency Virus (HIV) | Serious | HIV attacks the body's immune system, causing Acquired Immune Deficiency Syndrome (AIDS). A person infected with HIV may carry the virus without developing symptoms for several years but will eventually develop AIDS. Some carriers may suffer from flu-like symptoms, fever, diarrhea, and fatigue and may develop AIDS-related illnesses including neurological problems, cancer and other opportunistic infections. | |
| **INSECT OR SNAKE (e.g., spider) BITES or STINGS** | Negligible to Moderate | To the extent possible, avoid contact with snakes and insects. Do not hike alone or at night. Walk on cleared trails. Avoid stepping or reaching into poorly visible or dark areas. Wear boots.<br>If bitten or stung, stay calm. . . the majority of snake or insect bites are not life-threatening. Keep bitten extremity below heart level and avoid unnecessary movement of extremity. Provide victim with first aid and transport for medial attention immediately per Section 9.3.1.2. Have the victim avoid strenuous exertion which might increase spread of venom. Do not apply ice directly to wound. Do not apply tourniquet or construction bandage to extremity. **Report occupational exposure to bites to SSO, or the FTL or JS, and to employer within 24 hours of development of symptoms, and seek medical attention per Section 9.3.1.2.** | |
| **POISON IVY** | Negligible to Minor | A few hours to several days after exposure symptoms develop such as burning, itching skin rash, characterized by redness, blistering and swelling | To the extent possible, avoid contact with poison ivy. Keep skin covered (e.g., wear long pants and long sleeved shirts). If rash develops, the primary treatment is aimed at relief of itchiness; more harm is done by scratching irritated skin than by the actual rash. **Report occupational exposure to poison ivy to SSO, or the FTL or JS, and to employer within 24 hours of development of symptoms, and seek medical attention per Section 9.3.1.2.** |

## TABLE 1
## GENERAL FIELD OPERATION HAZARDS

| Hazard | Hazard Assessment[1] | Symptoms of Exposure | Response Actions & Protective Measures |
|---|---|---|---|
| **BIOLOGICAL HAZARDS** | | | |
| **RODENT FLEA BITES** | | | |
| Plague | Minor to Imminent | 2 to 6 days after flea bite symptoms develop such as: fever, headache, muscle aches and possibly enlarged lymph nodes in armpit(s) or groin; death may occur unless early treatment with antibiotic medicine is obtained. | Plague is spread by infected fleas living on rodents (e.g., chipmunks, field mice, prairie dogs, ground squirrels, etc.) Avoid contact with wild rodents and their nests or burrows. Spray skin with insect repellent containing DEET.<br>Seek medical attention if flea bite is detected during or immediately following field work or when symptoms are noticed, especially if a fever develops. **Report occupational exposure to flea bites to SSO, or the FTL or JS, and to employer within 24 hours of development of symptoms, and seek medical attention per Section 9.3.1.** |
| Hanta Virus | Minor to Imminent | Within 24 hours of exposure symptoms develop such as: fever, muscle aches and at least one of the following: cough, headache or pink-eye; and eventually difficulty breathing - which progressively gets worse. Death occurs soon after onset of pneumonia unless emergency treatment by a physician is obtained. | Hanta Virus is spread by contact with urine, saliva or feces of infected field mice (deer mice and possibly other types). Avoid contact with field mice and their nests, bedding, urine, saliva or feces.<br>Seek medical attention if flea bite is detected during or immediately following field work or when symptoms are noticed, especially if a fever develops **Report occupational exposure to flea bites to SSO, or the FTL or JS, and to employer within 24 hours of development of symptoms, and seek medical attention per Section 9.3.1.** |

[1] Key to hazard assessment ratings:

| Hazard Severity | Mishap Probability | | | |
|---|---|---|---|---|
| | Likely to Occur | Probably will Occur | Possibly could Occur | Unlikely to Occur |
| Catastrophic (i.e., death or life-threatening injury from a single encounter) | Imminent | Imminent | Serious | Minor |
| Major (i.e., significant, injury/illness - resulting in irreversible harm) | Imminent | Serious | Moderate | Minor |
| Minor (i.e., injury/illness resulting in reversible harm and not likely to threaten mobility or vision) | Serious | Moderate | Minor | Negligible |
| Negligible | Minor | Minor | Negligible | Negligible |

| Hazard | Hazard Assessment | Symptoms of Exposure / Detection Methods | Response Actions & Protective Measures |
|---|---|---|---|
| **PHYSICAL HAZARDS** | | | |
| **LIGHTNING STRIKES** | Serious to Potentially Imminent | In canyons, listen for thunder.<br><br>Elsewhere, watch for lightning and listen for thunder; count the number of seconds between seeing lightning and hearing thunder | The occurrence of lightning strikes in Los Alamos is a very real likelihood, especially during summer months (Section 2.2.8). Plan to work earlier in the day during monsoon season, since most storms occur during the afternoon. If electrical storm is visible/audible within 3 miles (15 seconds) begin shutting down operations; within 2 miles (10 seconds) discontinue site operations, get away from any metal objects and grounding system components (e.g., electrical power substations and large buildings) and take cover in a vehicle or small dwelling. **Do not remain upright in an open area or seek shelter near a tall upright object, e.g., a tree. If someone is injured by lightning notify the SSO, or the FTL or JS, and take appropriate action per Section 9.3.** |
| **HEAT STRESS**<br>Heat disorders are potentially significant hazards during the summer months. Each individual's capacity to deal with heat is very different; conditions that may be very tolerable for one person may not be tolerable to another. The high altitude and semiarid climate of Los Alamos places additional stress on a worker's body (Section 2.2.2), especially when impervious protective clothing and/or respirators are worn. People can pass from a minor stage of heat stress to a life-threatening stage without much notice of symptoms of interim stages of heat stress. Take steps to reduce the potential for heat disorders (e.g., allowing for acclimation, replacing lost body fluids, implementing work schedules with built-in rest periods, implementing buddy monitoring, and carefully selecting protective clothing). Administrative and engineering controls and monitoring methods shall be indicated in Table 4-3 and Section 6 of the SSHASP. Refer to the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" or the "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (Section 14) for further guidance. | | | |
| Heat Rash | Negligible to Minor | Reddish rash on skin surface | Limit exposure to heat or humid air |
| Heat Cramps | Minor to Moderate | Muscle spasms, pain in hands, feet, and/or abdomen | Limit exposure to heat or humid air, replace electrolytes by drinking Gatorade® or equivalent |
| Heat Exhaustion | Moderate to Serious | Pale, cool, moist skin, heavy sweating, dizziness, nausea, and fainting | Take shelter from sunlight and heat (e.g., in a cooler vehicle or structure, or under a tarp or canopy located in the SZ, or as needed in the EZ and/or CRZ). Loosen clothing, place victim in seated position with head between legs, and have victim drink cool (not cold) water (~8 oz. every 15-20 min); **notify the SSO, or the FTL or JS, immediately and seek medical attention per Section 9.3.1.2.** |
| Heat Stroke | Serious to Potentially Imminent | Red hot, usually dry skin, lack of or reduced perspiration, nausea, dizziness and confusion, strong, rapid pulse, and coma THIS IS A LIFE-THREATENING ILLNESS. | Take shelter from sunlight and heat (e.g., in a cooler vehicle or structure, or under a tarp or canopy located in the SZ, or as needed in the EZ and/or CRZ). Loosen constrictive clothing, and immediately cool victim's body by drenching in cool (not cold) water and fan the victim, since evaporation is the best means of cooling; **notify the SSO, or the FTL or JS, immediately and seek medical attention for life-threatening illness immediately per Section 9.3.1.1.** |

| Hazard | Hazard Assessment | Symptoms of Exposure | Response Actions & Protective Measures |
|---|---|---|---|
| **TICK BITES** | | | |
| Ticks are plentiful in the forests of Northern New Mexico and many may carry infectious bacteria/disease. Tick bites can result in human infection which could lead to the development of diseases such as those listed below. These diseases may be fatal or severely debilitating without proper antibiotic therapy. | | | |
| Lyme Disease | Minor (uncommon in NM) | Onset: rash (can appear several days to weeks after tick bite) appearing like a "bull's eye" - an expanding red circle around a light area, frequently with a small welt in the center; flulike chills, fever, headache, dizziness, fatigue, stiff neck, joint, or bone pain; can ultimately result in chronic debilitating illness | Wear clothing to cover skin. Ticks tend to crawl upwards. To make skin contact difficult - tuck pant legs into socks or boots, and tuck shirt into pants. Spray clothing with insect repellent containing permethrin or permanone; spray skin with insect repellent containing DEET.<br>Tick-borne diseases can be avoided by searching body (especially joint areas) for ticks every 3 to 4 hours (after each shift) while moving through tick infested areas (areas with vegetation such as bushes, tall grass or brush). Shower as soon as possible after field work has concluded for the day. |
| Rocky Mountain Spotted Fever | Minor (uncommon in NM) | Onset of symptoms is abrupt appearing 3 to 10 days after bite, including inflammation/rash appearing like many red spots under the skin, severe headache, chills, exhaustion, and muscular pains; fever reaches 103°F to 104°F within several days and remains high, though morning remissions may occur; and unproductive, harassing cough develops<br>Without early antibiotic therapy could result in death | Remove a tick using tweezers to gently and steadily pull it out of the skin so that its mouth/pincers do not remain in the skin. AVOID CRUSHING THE TICK WHILE REMOVING IT; DO NOT USE A MATCH OR CHEMICAL SUBSTANCE TO GET THE TICK TO BACK OUT OF THE SKIN OR TO KILL IT IN PLACE - THIS MAY CAUSE IT TO RELEASE THE TOXIC BACTERIA INTO THE SKIN. After removing tick, wash hands thoroughly with soap and water. Disinfect wound with antiseptic and bandage. Save the tick by placing in a sample jar; provide to physician if medical attention needed.<br>Seek medical attention per Section 9.3.1.2 if tick observed imbedded in skin and symptoms occur such as: a peculiar rash, fever, muscle aches, flulike chills, headache, dizziness, fatigue, stiff neck, and/or bone pain; and in advanced cases may include: arthritis, heart rhythm problems and nervous system problems. **Report occupational exposure to tick bites to SSO, or the FTL or JS, and to employer within 24 hours of noticing bite or symptoms.** |

| Hazard | Hazard Assessment | Signs/Symptoms of Exposure & Detection Methods | Response Actions & Protective Measures |
|---|---|---|---|
| ALTITUDE SICKNESS | Negligible to Serious | Symptoms such as headache (mild to severe), fatigue, insomnia, drowsiness, and loss of appetite may occur usually within 2 to 3 days following rapid ascent to high altitude (e.g., Los Alamos @ ~7,400') | Prevent sickness by gradual acclimatization to altitude; this may take 3 weeks or more. Individuals from lower altitudes should spend a few days at 5,000 to 7,000 ft. before ascending to higher altitudes, and further ascent should not exceed 1,000' per day.<br>Do not ascend to higher altitude until all symptoms have subsided.<br>**Notify the SSO, or the FTL or JS, immediately of occurrence of symptoms of occupational exposure to altitude sickness; if appropriate, seek medical attention per Section 9.3.1.2.** Treatment may include: rest, increased fluid intake to avoid dehydration and use of pain reliever. |
| SUNBURN | Moderate to Imminent | Pink or red, warm or hot skin; in severe cases blistering may also occur; eyes may become swollen and/or blood-shot; corneal or retinal burns could result in blindness ("snowblindness") | Excessive solar ultraviolet radiation can be encountered, especially at higher altitudes. Use sunscreen with protection factor (SPF) of ≥15 on exposed skin. Reapply sunscreen every 4 hours and after experiencing heavy perspiration or wiping skin with a towel.<br>Treatment may include: application of gel or cream containing aloe vera to burned skin; taking 2 aspirin initially and every 6 hours as needed; drinking fluids and rest. **If eyes are swollen blood-shot or burned, or if blistering of skin occurs, notify the SSO, or the FTL or JS, and immediately seek medical attention per Section 9.3.1.2.** |
| ANIMAL ATTACKS | Minor to Serious | Avoid contact with wild or stray animals. **If bitten or scratched and skin surface is broken, notify the SSO, or the FTL or JS, immediately and seek/provide appropriate medical attention per Section 9.3.** | |

| Hazard | Hazard Assessment | Signs/Symptoms of Exposure & Detection Methods | Response Actions & Protective Measures |
|---|---|---|---|
| **COLD STRESS** Cold injuries are significant hazards during the winter months. The cold ambient temperatures and wind chill are significant risk factors during the winter months (Section 2.2.2 and 2.2.8), which place field workers at a high risk of exposure to cold injuries. Worker susceptibility to cold injuries is increased by dehydration, exhaustion, hunger, impaired consciousness, anemia, impaired circulation due to cardiovascular disease, and wet or inadequate clothing Several steps can be taken to reduce the potential for cold injuries such as, careful selection of protective clothing i.e. insulated body covers, boots, gloves and head covering, keep protective clothing dry, protect workers against wetting and wind, consumption of ample fluids and food, implementing work schedules with built-in rest periods, and implementing buddy monitoring. Administrative and engineering controls and monitoring methods shall be indicated in Table 4-3 and Section 6 of the SSHASP. Refer to the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" or the "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (Section 14) for further guidance. | | | |
| Frostnip | Negligible to Minor | Frostnip occurs with exposures to damp cold temperatures (around freezing). Symptoms are firm, cold, white areas on face, ears or extremities. Peeling or blistering may occur in 24-72 hours, and occasionally mild hypersensitivity to cold persists. | Limit exposure to damp cold temperatures. Warm affected area with an unaffected hand or a warm object. **Notify the SSO, or the FTL or JS, of occupational occurrence of frostnip, and if appropriate, seek medical attention per Section 9.3.1.2.** |
| Immersion Foot ("Trench foot") | Minor to Moderate | Trench foot occurs with exposures to damp cold temperatures near freezing. Symptoms are pale swollen, clammy, cold, and numb extremity; tissue infection is likely. Increased sweating, pain and hypersensitivity to temperature change may persist for years. | Limit exposure to damp cold temperatures (e.g., put on dry socks when socks become damp). Warm affected area with an unaffected hand or a warm object. **Notify the SSO, or the FTL or JS, and immediately seek medical attention per Section 9.3.1.2.** |
| Frost bite | Moderate to Serious | Frost bite occurs with exposures to dry cold temperatures well below freezing. Symptoms are cold, hard, white, and numb areas, which on warming become blotchy red, swollen, and painful. Areas may recover normally or deteriorate to soft wet gangrene or black dry gangrene. | Take shelter from cold temperatures (e.g., in a heated vehicle or structure). Frostbitten extremities should be warmed rapidly by using warm not hot water (102°F - 108°F), snuggling with a warm companion, or warming hand or feet against a warm abdomen or armpit. Give victim warm drinks. **Notify the SSO, or the FTL or JS, and immediately seek medical attention per Section 9.3.1.2.** |
| Hypothermia | Serious to Potentially Imminent | Hypothermia occurs with exposures to dry cold temperatures well below freezing. The body cannot sustain normal temperature causing symptoms of lethargy, clumsiness, mental confusion, irritability, slowed or arrested respiration, and slowed, irregular, or stopped heartbeat. THIS IS A LIFE-THREATENING CONDITION. | Take shelter from cold temperatures (e.g., in a heated vehicle or structure). When shivering stops and lethargy and other symptoms increase, a major emergency is imminent. Further heat loss should be prevented by any means possible (E.G., wrap the victim in a blanket with a warm companion); **Notify the SSO, or the FTL or JS, and immediately seek medical attention for life-threatening illness per Section 9.3.1.1.** |

#### 4.2.1.2 Housekeeping and Sanitation

- An adequate supply of potable water shall be provided in labeled container(s) that are equipped with a tap and capable of being tightly closed. Nonpotable water outlets shall be identified to indicate that the water is unsafe for drinking, washing, or cooking.

- No food, beverage, gum, cosmetic, or tobacco products shall be present, consumed, or used in the exclusion zone (EZ), contamination reduction zone (CRZ), or in any work zone where contamination is suspected; such products shall be used only in an appropriate break area (e.g., the support zone [SZ]) designated by the SSO, or the FTL or JS.

- Site personnel should be alert for dangerous situations, unusual odors, airborne dusts or vapors, and broken containers, and should report any potentially dangerous situations to the SSO, or the FTL or JS immediately.

#### 4.2.1.3 Site Controls

Site personnel shall implement the following site controls as applicable:

- Eliminate hazards to the extent possible before actual field work at the site begins (e.g., removing unnecessary debris, guarding exposed electrical wiring or protruding objects, and appropriately securing combustible materials and objects situated on elevated surfaces ).

- Minimize contact with material that is or may be contaminated.

- Minimize dust generation.

- As practical, avoid or minimize exposure to contamination and work upwind of intrusive activities.

- Plan and review procedures before entering controlled work zones.

- Minimize the number of personnel and amount of equipment in the controlled work zones.

- Sign the exclusion entry/exit log upon entry to and exit from the EZ.

- Remain in line-of-sight or direct communication with the FTL or JS at all times, to the extent possible, while performing duties in the EZ.

- Use the "buddy system" so that rapid assistance can be provided in the event of an emergency.

- Keep ignition sources ≥50 ft from explosive or flammable environments and ≥35 ft from combustible liquids; use only nonsparking, explosion-proof equipment in the EZ when the potential for a flammable or explosive environment exists.

- Do not remove contamination from clothing or equipment by blowing, shaking, or any other means that disperses contaminants into the air.

- Be alert for potential hazards associated with moving equipment and to traffic patterns of support vehicles.

- Do not allow personnel underneath or immediately adjacent to suspended loads handled by digging or lifting equipment.

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- Do not allow personnel underneath or immediately adjacent to suspended loads handled by digging or lifting equipment.

- a description of the specific procedures adopted by the employer for compliance;
- designation of one or more competent persons to implement the program;
- requirement of visual inspection of equipment covered by this program before each day's use and disallowance of damaged or defective equipment until it is repaired;
- testing of equipment covered by this program according to 29 CFR 1926.404(b)(1)(iii)(D) ;
- commitment that only equipment meeting the requirements of 1926.404 shall be made available or used; and
- recordkeeping of the required tests performed under the program.

#### 4.2.2.2 Bloodborne Pathogens Exposure Control Program

OSHA Standard 29 CFR 1910.1030 was enacted to protect workers who, during the course of performing their duties, could be exposed to hepatitis B virus, human immunodeficiency virus (HIV), and other blood-borne pathogens. Anyone rendering first aid or CPR may be at risk of exposure to illnesses transmitted by contact with another person's blood or body fluids. DOE and OSHA require employers covered by this regulation to establish a written exposure control program in compliance with this standard, which includes

- determining potential for exposure by identifying job titles and tasks that involve or may involve occupational exposure to blood or other potentially infectious materials;
- offering hepatitis B vaccination to employees at risk of exposure;
- defining schedule(s) and method(s) of employee training and implementation of required universal precautions, using associated PPE to prevent contact with infectious material, providing post exposure evaluation and follow-up including offering hepatitis B vaccination (at no cost to employees), communicating hazards to employees, and maintaining the required records;
- developing and implementing a procedure for evaluating circumstances of exposure incidents per (f)(3)(i) of the standard;
- ensuring that affected employees have access to the employer's program; and
- reviewing and updating the program at least annually or whenever necessary to reflect new or modified job titles, tasks, or procedures effected by the program.

#### 4.2.2.3 Chemical Hazard Communication Program

In accordance with 29 CFR 1926.59(e), employers of employees who are occupationally exposed to hazardous chemicals are required to develop, implement, and maintain at the job site a written hazard communication program, which includes

- a list of the hazardous chemicals (excluding hazardous wastes) known to be present;
- a material safety data sheet (MSDS) for each hazardous chemical used by employees;
- means for ensuring that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the identity of the chemical(s) contained therein and appropriate hazard warnings;

Most of these standards have a requirement that employers of employees who may be occupationally exposed to these chemicals above their permissible exposure limits (PELs) must establish and implement a written compliance program before commencing a task involving exposure to the chemical. These programs must be revised and updated at a certain frequency indicated in the respective standard. Each compliance program must include the information required by the respective standard, which may include all or part of the following chemical-specific information:

- a description of each activity in which the chemical is emitted, which includes the equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices;
- a description of the specific means that will be employed to achieve compliance with the applicable OSHA standard;
- a report of the technology considered in meeting the PEL;
- air monitoring data that documents the source of emissions of the hazardous chemical;
- a detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction, contracts, etc.;
- a work practice program which includes PPE training and use, housekeeping, and medical surveillance;
- a description of required work practices;
- an administrative control schedule as required by paragraph (e)(4) of the standard; and
- a description of arrangements made among employers on multi-employer sites with respect to informing affected individuals of potential exposure and means for preventing and protecting such individuals from over exposure.

#### 4.2.2.5 Confined-Space Entry Program (Permit-Required)

Employers of employees who will enter a confined-space shall maintain and implement a written confined-space entry program, which complies with 29 CFR 1910.146. A task-specific permit shall be prepared and approval signatures obtained (per Section 4.2.2) before a confined-space is entered. This program must include

- the necessary measures to prevent unauthorized entry;
- a system for the preparation, issuance, use, and cancellation of confined-space entry permits;
- definition of responsibilities of persons who are to have active roles (e.g., authorized entrants, attendants, entry supervisors, and atmosphere-monitoring personnel) in entry operations and provision of such personnel;
- provision and definition of responsibilities of an attendant who will remain outside the confined-space into which entry is authorized for the duration of entry operations;
- provision of training required by 29 CFR 1910.146(g) for persons having active roles in entry operations;
- means for identifying and evaluating hazards of confined-spaces before employees enter them;
- means, procedures, and practices necessary for safe confined-space entry operations;

- procedures to coordinate entry operations when employees of more than one employer are performing entry operations simultaneously so that employees of one employer do not endanger employees of another;

- provision and maintenance of equipment specified in paragraphs (d)(4)(i) through (d)(4)(ix) of 29 CFR 1910.146 at no cost to employees;

- means for ensuring that employees use the equipment properly;

- means and methods for evaluating (testing and monitoring) environmental conditions of confined-spaces;

- procedures for summoning rescue and emergency services for rescuing and providing emergency services to entrants of confined-spaces, and for preventing unauthorized personnel from attempting rescue;

- procedures for canceling the permit and for concluding entry operations; and

- provisions for review and revision of the program, including review of canceled permits within one year after each entry and revision as necessary to ensure that employees participating in entry operations are protected from confined-space entry hazards.

#### 4.2.2.8 Hazardous Waste Operations (HAZWOPER) Program

Employers of employees who perform ER Project work must maintain and implement a written HAZWOPER program, which complies with the requirements of 29 CFR 1926.65(b). This program does not have to repeat portions of the employer's program that are documented elsewhere, but the information should be sufficiently cross-referenced. This program must include

- an organizational structure establishing chain of command and overall responsibilities of supervisors and employees (per 1926.65[b][2]);

- a comprehensive workplan addressing the tasks and objectives of the site operations and the necessary logistics and resources to accomplish the tasks and objectives (per 1926.65[b][3]);

- a SSHASP (per 1926.65[b][4] and the HASP);

- the employer's medical surveillance program (Section 4.2.2.9);

- the employer's PPE program (Section 4.2.2.10);

- the employer's respiratory protection program (Section 4.2.2.11);

- the employer's HAZWOPER training program (Section 4.2.2.13);

- the employer's HS standard operating procedures;

- any necessary interface between the general and site-specific HAZWOPER programs, plans, and activities; and

- means and methods for notifying others employers at multi-employer work sites of HS hazards associated with their activities and the corresponding emergency response procedures, and for making available the employer's HAZWOPER program to other such employer's.

#### 4.2.2.7 Hearing Conservation Program

DOE and OSHA, under 29 CFR 1910.95(c), require an employer to implement a hearing conservation program whenever employees are potentially or actually exposed to occupational noise levels at or exceeding the 8-hour time-weighted action level of 85 decibels measured on the A-weighted scale (85 dBA). The employer's program must address

- training of employees concerning the hazards of excessive noise exposure, occupational exposure limits, and the topics listed below; training shall be conducted at least annually for employees with the potential for exposure to noise at or above 85 dBA;
- means and methods for monitoring and reducing noise exposure (e.g., administrative and engineering controls);
- means for posting work areas where the occurrence of excessive noise levels necessitates the use of hearing protection;
- selection, fitting, use, care, and determination of effectiveness of hearing protection; and
- audiometric [hearing] testing performed at least annually by a licensed or certified audiologicst, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, and at no cost to the employee.

#### 4.2.2.8 Lockout/Tagout for Control of Hazardous Energy Sources for Personnel Safety (Red Lock Procedure) Program

Employers of employees who perform ER work and perform servicing or maintenance of machines or equipment in which the unexpected energization or start up of the machine or equipment, or release of stored energy could cause injury to employees, must establish a written lockout/tagout program. This program shall include procedures that comply with the requirements of 29 CFR 1910.147 and with LANL's procedure for "Lockout/Tagout for Control of Hazardous Energy Sources for Personnel Safety (Red Lock Procedure)," LP 106-01.2. This program shall provide for:

- training to ensure that the purpose and function of the energy control program are understood by employees;
- at least annual inspection of the energy control procedure to ensure that it is being properly implemented; and
- provision of appropriate hardware and protective materials (e.g., locks, tags, and chains) by the employer for isolating, securing, or blocking of machines or equipment from energy sources.

The procedures shall cover elements and actions (in the stated sequence) including

- preparation for shutdown, including workers being knowledgeable of the type and magnitude of energy, the hazards of the energy to be controlled, and the method or means to control the energy;
- machine or equipment shutdown;
- machine or equipment isolation from the energy source(s);
- lockout/tagout device application;

- relief, disconnection, or restraint from stored energy, and the control of accumulated stored energy;

- machine verification of isolation from the energy source(s);

#### 4.2.2.9 Medical Surveillance Program

Employers of employees who perform ER Project work must maintain and implement a written medical surveillance program, which complies with applicable OSHA and LANL requirements (Section 11).

#### 4.2.2.10 Personal Protective Equipment

Employers of employees who perform ER Project work while using PPE must maintain and implement a written PPE program, which complies with applicable OSHA requirements (Section 7).

#### 4.2.2.11 Respiratory Protection Program

Employers of employees who perform ER Project work while using respiratory protective equipment must maintain and implement a written respiratory protection program, which complies with applicable requirements (Section 7.1).

#### 4.2.2.12 Spark/Flame-Producing Operations (Hot Work/Burn Permit)

The DOE Order for "General Operations Quality Assurance" (DOE AL5700.6C) requires process controls for special processes such as welding, heat treating, and steel welding. Accordingly, LANL's administrative requirement AR 8-4, "Welding, Cutting, and Other Spark/Flame-Producing Operations," requires a Special Work Permit for Spark/Flame-Producing Operations (Form ES&H 8-4A) for spark/flame-producing operations that constitute a fire hazard, unless such operations are covered by a LANL SOP or are conducted in areas designed for such operations (e.g., designated welding areas). To initiate LANL's permit process, the Field Unit HS Representative should be notified as soon as it is known that a spark or flame-producing operation will occur. This permit shall be prepared and approval signatures obtained before any spark or flame-producing activity is performed.

#### 4.2.2.13 Training Program

Employers of employees who perform ER Project work must maintain and implement a written employee training program, which complies with applicable OSHA and LANL requirements (Section 10).

## 5 Site Control Measures

The primary site control measures include controlled zones (e.g., EZ, CRZ, and SZ) and support facilities (e.g., equipment-staging area, support trailer(s), equipment decontamination pad, temporary drum storage area, mobile laboratory, and wash facility). The primary objectives of site control measures during field operations are

- to prevent and limit employee exposures during ER field operations;

- to ensure that only trained and fully informed persons are able to enter controlled areas of the work site where operational hazards are of potential concern;

- to reduce the likelihood of spread of contamination by workers or equipment into uncontrolled areas of the site;

- to confine work activities to appropriate areas, thereby minimizing the likelihood of accidental exposures; and

- to facilitate the location and evacuation of personnel in case of an emergency.

For purposes of ER work, the DOE has identified the general equivalency of radiologically contaminated areas and hazardous substance contamination zones as shown in Table 3.

**Table 3**
**General Equivalency of Work Zones**

| Radiological Contamination Areas | Hazardous Substance Contamination Zones |
|---|---|
| Controlled Area | Support Zone |
| Radiological Buffer Area | Contamination Reduction Zone |
| Radiological Area | Exclusion Zone or Regulated Area[1] |

[1] The term, "regulated area", is used by OSHA in the chemical-specific standards in Subparts D and Z of 29 CFR 1926 (refer to Section 4.2.2.4).

The necessary site-specific control measures, some of which are required by applicable DOE and OSHA requirements, shall be provided in Section 5 of the SSHASP. Site maps required by OSHA shall be included in Appendix A of the SSHASP to show the intended locations of the specified controlled zones and support facilities. DOE states (DOE, *Health and Safety Plan [HASP] Guidelines*) that, among other items, site maps should include

- site perimeter;

- prevailing wind direction;

- site drainage points;

- natural and man-made features such as buildings, containers, impoundments, pits, ponds, and tanks; and

- locations of work zones.

Since some zone or facility locations may change as site work progresses, the SSO must explain current locations of zones and decontamination stations to field team members during daily HS tailgate meetings and shall document these locations in his/her daily logbook.

Section 5 of the SSHASP also shall indicate whether each zone or facility is restricted as a radiological control area, a radioactive materials management area, or a regulated area, and whether postings giving this information are required. Furthermore, whether the location of a facility is centralized onsite or localized at multiple work areas onsite, the means for demarcating each zone, and other posting requirements (per 29 CFR 1926.200 and 1910.145) shall be specified.

## 6 Exposure Monitoring and Responses

Guidance for monitoring and assessing occupational exposure to chemical, biological, physical, and radiological hazards has been provided by the DOE (DOE, *Health and Safety Plan [HASP] Guidelines*, *Handbook for Occupational Safety and Health*, and *Occupational Exposure Assessment Handbook*). According to the DOE, the exposure monitoring strategy should be developed cooperatively by the following professionals:

- an industrial hygienist who is certified by the American Board of Industrial Hygiene (ABIH), or otherwise Board-eligible, or who has a minimum of three years experience developing such strategies; and
- a health physicist who is certified by the American Board of Health Physics (ABHP), or otherwise Board-eligible, or who has a minimum of three years experience developing such strategies.

Site-specific exposure monitoring strategies, including action levels, that meet applicable DOE and OSHA requirements shall be specified in Section 6 of the SSHASP for each project task having different requirements. Exposure monitoring strategies, including establishment of action levels, should be determined based upon the hazards that can be monitored using analytical instrumentation and the published exposure limits and physical, chemical, and toxicological properties of the chemical and/or radioactive substances of concern. This information shall be included in Appendix C of the SSHASP for the chemical substances of occupational concern included in Table 4-2 of the SSHASP, and is included in LANL's Radiological Control Manual (LANL, LM 107-01.1) for radiological substances of concern. Guidance for setting action levels for exposure to chemical substances is provided by the DOE (DOE, *Handbook for Occupational Safety and Health*, and *Occupational Exposure Assessment Handbook*) and in a publication developed by the Chairman of the American Industrial Hygiene Association (AIHA) Hazardous Waste Committee (Marlowe). Action levels in Section 6 of the SSHASP for exposure monitoring of radiological hazards have been set by ESH-1, unless otherwise indicated, and approved by ESH-1.

Exposure monitoring shall include use of direct-reading instruments, personal dosimetry, and personal and area sampling, as necessary to evaluate the hazardous conditions posed by the chemical and radiological substances onsite. DOE and OSHA (DOE, *Health and Safety Plan [HASP] Guidelines*; *DOL, 29 CFR 1926.65[b][4][ii][E]*) require that the following information be specified in the SSHASP for each type of monitoring instrument to be used for exposure monitoring:

- procedure for calibration, maintenance, and use
- locations and frequencies of monitoring
- corresponding action level(s), response actions, and rationales

To promote greater consistency among the various ER Subcontractors and field teams, ESH-5 has developed exposure monitoring methods for the chemical exposure monitoring instruments most commonly used during ER field operations, which are included in the LANL ER Project *Manual for Site Health and Safety Activities*. These methods include procedures and forms for calibration, maintenance, and use of chemical exposure monitoring instruments. Where OSHA has mandated methods in the chemical-specific regulatory standards included in Subparts D and Z of 29 CFR 1926 (Section 4.2.2.4), such methods shall be specified in Section 6 of the SSHASP. Project managers choosing to use alternative methods must provide a copy of the methods with the SSHASP for review and approval per Section 1.2.

Site health physics personnel shall monitor for alpha and/or beta/gamma radiation as specified in the SSHASP and in accordance with their individual radiological surveillance authorization agreement and LANL's Radiological Control Manual (LANL, LM 107-01.1). Health physics personnel shall use radiological instrumentation calibrated and maintained by ESH-4, or by an alternative means approved by ESH-4.

Subcontractors shall abide by this requirement, unless the Subcontractor's radiological safety program, which includes identification of instruments and corresponding procedures, has been submitted to LANL for approval during the pre-bid qualification or contract negotiation period, as required, or according to applicable requirements of Section 4.2.2. All equipment leaving the site shall be monitored for release in accordance with the health physic person's radiological surveillance authorization agreement.

The results of exposure monitoring must be documented and affected personnel must be informed of these results in accordance with the requirements of Section 13.3. Forms for recording chemical exposure monitoring results are included with the respective monitoring instrument method in the LANL ER Project *Manual for Site Health and Safety Activities*.. Forms for recording radiological exposure monitoring results are provided in LANL's Radiological Control Manual (LANL, LM 107-01.1).

Analytical laboratories analyzing samples for chemical contamination should be accredited by the EPA and/or the AIHA. (Accreditation by the AIHA is necessary for samples collected using OSHA or National Institute for Occupational Safety and Health [NIOSH] methods). Samples being analyzed for radiological contamination should be analyzed by LANL's health physics analytical laboratory, a mobile extension thereof, or as indicated in the Subcontractor's radiological safety program which has been approved by LANL.

### 6.1 Personal Radiological Dosimetry Program

Requirements for personal radiological dosimetry or radiation exposure shall be determined by ESH-1 and ESH-12 personnel during review of the draft SSHASP. Subcontractors shall abide by requirements of the section, unless the Subcontractor's radiological safety program, which includes personal radiological dosimetry, has been submitted to LANL for approval during the pre-bid qualification or contractor negotiation period, as required, or according to applicable requirements of Section 4.2.2. All field personnel who are directly covered by the LANL radiation safety program shall complete a Health Physics (HP) checklist. Enrollment in personal radiological dosimetry programs (In Vivo and In Vitro) will be based on Table 6-2 as completed by ESH-1. Completion of the HP checklist will proceed as follows:

- Request a HP checklist form(s) by calling the ESH-12 HP checklist office at 667-5723.
- Complete the HP checklist with input from the supervisor and/or health physics personnel assigned to the project(s). Instructions are included with the HP checklist. In the "Personal Information" section of the form, the "group or sponsor group" shall be ESH-5, and the "Supervisor or LANL Contact" shall be the Field Unit HS Representative.
- Attach Table 6-2 (Personal Dosimetry Requirements as determined by ESH-1) to the HP checklist. If the individual will be working at multiple ER sites, attach Table 6-2 for all sites.
- Attend the HP checklist orientation (schedule attached to the HP checklist). An individual needs to attend the HP checklist orientation only once, but if the individual begins work at a new ER site(s), another HP checklist must be completed to ensure correct dosimetry monitoring for that site(s).

ESH-12 Radiation Information Management Team will provide reports of dosimetry results to individuals enrolled in this program by distributing the reports to ESH-5, in a confidential manner per Section 13.3.

## 7 Personal Protective Equipment (PPE)

The purpose of PPE is to shield, isolate, or secure individuals from hazards that may be encountered when administrative or engineering controls are not feasible or cannot provide adequate protection. Accordingly, before requiring field team personnel to use PPE, appropriate administrative and engineering controls shall be implemented as the first means of defense for mitigating hazards and protecting site personnel.

In accordance with applicable OSHA regulations (Subpart E of 29 CFR 1926), personnel shall not be allowed to use PPE unless the hazards for which the PPE are intended to protect against have been

assessed and the appropriate PPE has been specified by a qualified HS professional. PPE requirements must be based on a hazard assessment (Section 4.1) that includes a comparative evaluation of site conditions, task-specific operations, potential hazards relative to the performance characteristics of the PPE items, and anticipated durations of use. Only radiological protective clothing *(ANTI-Cs)* are to be used at sites contaminated by radiation. Other disposable protective clothing (e.g., Tyvek®) may be used at sites contaminated by mixed (radiological and chemical) wastes. Task-specific PPE requirements, which meet applicable OSHA requirements of Subpart E of 29 CFR 1926, shall be provided in Section 7 of the SSHASP.

Furthermore, personnel who use PPE to perform a job shall be trained to recognize the limitations of the equipment and to properly select, fit, use, inspect, maintain, and store the equipment. Such training shall occur and be documented before the user enters an area requiring the use of the PPE. To promote greater consistency among the various ER subcontractors and field teams and to facilitate compliance with 29 CFR 1926.65(g)(5), ESH-5 has developed a procedure addressing limitations, selection, fitting, use, inspection, and maintenance of PPE, which is included in the LANL ER Project *Manual for Site Health and Safety Activities*. Where OSHA has mandated methods in the chemical-specific regulatory standards included in Subparts D and Z of 29 CFR 1926 (Section 4.2.2.4), such methods shall be specified as requirements, as applicable, in Section 7 of the SSHASP. Personnel who use ANTI-Cs shall have successfully completed Radiological Worker II training (Section 10.4.4).

The level of protective clothing and accessories selected may be upgraded or downgraded based upon new findings or change(s) in site conditions or operations. Whenever a significant change occurs, the PPE requirements shall be reassessed by the SSO, and a SSHASP modification form shall be issued, as necessary.

It is the responsibility of each user of PPE to inspect the equipment before and as necessary during each use. Furthermore, each user should make it a practice not to use PPE that shows signs of compromised integrity. The SSO shall monitor individuals in areas where PPE is required to ensure that they are properly attired.

## 7.1 Respiratory Protective Equipment

Use of respiratory protection shall occur only in accordance with requirements of 29 CFR 1910.134, *American National Standard for Respiratory Protection* (ANSI Z88.2-1992), the HASP, and SSHASP. Where respiratory protective equipment requirements are mandated by OSHA in the chemical-specific standards included in Subparts D and Z of 29 CFR 1926 (Section 4.2.2.4), such requirements shall be specified as requirements, as applicable, in Section 7 of the SSHASP. Personnel required to use respirators shall have certification of current training, medical fitness, and respirator fit-testing in accordance with these requirements, which are summarized in this section. Subontractors whose employees use respiratory protective equipment to perform ER Project work shall provide documentation to support compliance with each aspect of the mandated standards.

Employers of personnel who wear respirators to perform ER Project work shall maintain and implement a current written respiratory protection program, which addresses the requirements described below, unless the employer opts to abide by LANL's respiratory protection program. The Subcontractor's respiratory protection program shall be submitted to the Field Unit HS Representative for review and approval by appropriate ESH personnel at least 30 days before the scheduled start date of field operations involving use of the respiratory protective equipment. Whenever air-supplying (Level B) respiratory protection will be used, project-specific SOPs addressing the requirements and procedures for using the Level B equipment shall be submitted similarly for review and approval by appropriate ESH personnel.

### 7.1.1 Designated Qualified Person

The employer's program shall include designation of a qualified individual who supervises the respiratory protection program in accordance with 29 CFR 1910.134(e)(2) and (e)(4) and Section 3.2.3.5.

### 7.1.2 Implementation of Administrative and Engineering Controls

Each employer of employees who use respiratory protective equipment is required by OSHA to have a policy that describes the administrative and engineering controls to be used to prevent or minimize employee exposure to atmospheric contamination. This policy must also include a statement to the effect that when it is not feasible to implement such a policy or while the controls are being implemented, respiratory protection shall be used in accordance with applicable requirements.

### 7.1.3 Use of Approved Equipment

Respiratory protective equipment shall be selected from equipment jointly approved by the Mine Safety and Health Administration (MSHA) and the NIOSH under the provisions of 30 CFR Part 11 (Office of the Federal Registrar). The Subcontractor's program shall include identification of the type of equipment [manufacturer(s) and model(s)] to be used and the associated NIOSH/MSHA approvals.

### 7.1.4 Standard Operating Procedures

Each written respiratory protection program shall include standard operating procedures that govern selection, use, cleaning, maintenance, inspection, and emergency use of respirators; training of supervisors and respirator wearers; and recordkeeping. Respiratory protection plans prepared by subcontractors should provide enough information to allow LANL reviewers to understand the decision logic for selecting and using a particular kind of respirator. This information should include a hazard identification and evaluation process (including oxygen-deficient conditions and conditions immediately dangerous to life or health [IDLH]) and a corresponding respirator selection process. When required by other regulations (e.g., Subparts D and Z of 29 CFR 1926), these evaluations must include historical sampling data or other method(s) of assessing exposure. Selection criteria are included in Sections 4.5.4 and 7 of *American National Standard for Respiratory Protection* (ANSI Z88.2-1992). If the hazard identification and assessment evaluation process has been addressed sufficiently in the Subcontractor's HAZWOPER program (Section 4.2.2.6) and/or the SSHASP, it need not be repeated in the respiratory protection program but should be cross-referenced appropriately.

### 7.1.5 Respirator Users' Medical Status

Employees shall not be assigned to perform tasks requiring the use of a respirator unless the employee has had an annual medical exam that demonstrates his/her ability to perform work while using the respirator. The employee shall obtain the written opinion of a qualified physician (preferably one specializing in occupational medicine) verifying that he/she is able to wear a respirator (Section 11). The physician shall determine which health and physical conditions are pertinent. Criteria for conducting the medical evaluations are provided in the *American National Standard for Respiratory Protection—Respirator Use—Physical Qualification for Personnel* (ANSI Z88.6)

### 7.1.6 Training

Respirator users shall be instructed and trained in the limitations and proper use of respiratory protective equipment by a competent person (Section 3.2.3.5). The user, supervisor or SSO, and issuer of respirators shall be trained in the proper use, maintenance, and storage of respirators and their limitations. Subcontractors should outline the training provided to their employees. If respiratory protection training has been addressed sufficiently in the Subcontractor's HAZWOPER program (Section 4.2.2.6), it need not be repeated in the respiratory protection program but should be cross-referenced appropriately and supplemented (as necessary) by training that is specific to the particular type of respirator being used.

### 7.1.7 Fit-Testing

Only individuals who have been trained and quantitatively fit-tested for the specific manufacturer and model of respirator facepiece being used may use the respirator while performing ER work. Fit-Tests shall be conducted in accordance with the *American National Standard for Respiratory Protection* (ANSI Z88.2-1992). The maximum protection factor for half-face air-purifying respirators is 10 times the PEL or

threshold limit value (TLV) of the most toxic contaminant against which the respirator must protect, provided the wearer achieved a respirator fit factor of at least 100 during the fit-test. (Table 4-2 of the SSHASP identifies contaminants of occupational health concern at the site, and corresponding toxicity information and exposure limits are listed in Appendix C of the SSHASP.) Similarly, the maximum protection factor for full-facepiece air-purifying respirators is 100 times the PEL or TLV of the most toxic contaminant against which the respirator must protect.

### 7.1.8 Work Area Surveillance

Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained by a qualified person (i.e., SSO, industrial hygiene technician, RSP, HPT, and RCT). This requirement can only be satisfied by assessing hazards and monitoring exposure (Sections 4 and 6). Subcontractors can use a combination of engineering analysis and air sampling data to document conditions. If the exposure-monitoring process has been addressed sufficiently in the Subcontractor's HAZWOPER program (Section 4.2.2.6) and/or the SSHASP, it need not be repeated in the respiratory protection program but should be cross-referenced appropriately.

### 7.1.9 Cleaning and Disinfection

Respirators shall be cleaned and disinfected as frequently as necessary to ensure that the user is properly protected. Respirators used by more than one worker or intended for emergency use shall be thoroughly cleaned and disinfected after each use. The respiratory protection program should outline the cleaning and disinfection methods and frequencies used to ensure complete cleaning and disinfection.

### 7.1.10 Inspection and Repair

Respirators used routinely shall be inspected by the user before each use and after each cleaning. Respirators for emergency use shall be inspected by a qualified person at least monthly and after each use. Worn or deteriorated parts shall be replaced.

### 7.1.11 Storage

Respirators shall be stored in a convenient, clean, and sanitary location and in a manner that prevents damage during storage. A brief description of how the Subcontractor intends to handle this issue is sufficient.

### 7.1.12 Quality Assurance

There shall be regular inspections and evaluations to determine the effectiveness of the respiratory protection program. This can be accomplished through the use of documented checks by a designated knowledgeable supervisor, an outside agency, or an independent consultant.

### 7.1.13 Other Requirements

In addition to the above outlined requirements, there are other requirements identified in the OSHA standard, which may need to be addressed in the Subcontractor's respiratory protection program. Examples would include air quality where supplied-air systems (Level B) will be used; equipment associated with any atmosphere supplying respirators (e.g., hoses, compressors, air line couplings, and containers); and emergency egress for environments where the air quality may be IDLH. The type of information that must be provided by the Subcontractor is that which is necessary for LANL reviewers to verify regulatory compliance.

Furthermore, in accordance with the *American National Standard for Respiratory Protection* (ANSI Z88.2-1992) LANL requires that periodic air samples be collected from air compressors used to produce breathing air. These samples must be collected as part of acceptance testing of a compressor and periodically during use. The quality of breathing air shall meet or exceed the specifications for "Grade D"

air established by the Compressed Gas Association (ANSI and the Compressed Gas Association, *Commodity Specification for Air, ANSI/CGA G-7.1-1989).*

## 8 Decontamination

Decontamination involves physically removing contaminants from personnel and equipment and/or chemically converting them into innocuous waste substances. This section has been developed to meet applicable DOE and OSHA requirements (i.e., those included in 29 CFR 1926.65(k), Subparts D and Z of 29 CFR 1926 [Section 4.2.2.4], and/or LANL's Radiological Control Manual (LANL, LM 107-01.1). According to the DOE, the CRZ should include separate designated areas for a personnel contamination reduction corridor and an equipment contamination reduction corridor. The contamination reduction corridor boundaries should be conspicuously marked, and should have restricted entry and exit points. Personnel shall decontaminate themselves and any equipment that is contaminated or suspected of contamination according to the procedures specified in Section 8 of the SSHASP.

The SSO and health physics personnel shall monitor decontamination activities to determine their effectiveness. If procedures are found to be ineffective, these individuals shall take steps to correct any deficiencies, and any deviations from the SSHASP shall be documented using a modification form per Section 1.3. The following general requirements apply to personnel and equipment decontamination processes for ER Project work:

- Personnel, equipment, and vehicles must be decontaminated before exiting the CRZ, clothing and equipment, which cannot be decontaminated sufficiently shall be properly contained and labeled prior to being transferred beyond the controlled work zones of the site. For sites having only radiological contamination, it is appropriate to first screen for radiological contamination to determine whether decontamination is necessary.

- If any significant contamination is encountered, personnel protective equipment should be disposed rather than decontaminated for reuse (Section 8.2.2).

- Loose contaminants (dusts and vapors) that cling to clothing or equipment shall be removed according to the applicable decon procedures (e.g., using a water or water-based detergent rinse and scrub brush), except when radiation action levels are exceeded (Section 8.2.3).

- Care should be taken to avoid generation of mixed (chemical and radiological) waste during decontamination operations.

- Rinse water and waste generated onsite shall be contained and disposed according to Sections 4.2.1.4.

### 8.1 Equipment Decontamination

Samples, sampling equipment, and mechanical equipment shall be decontaminated as specified in the site-specific waste management plan and in "Field Decontamination of Drilling and Sampling Equipment," (LANL ER-SOP-1.08), or a comparable procedure specified in Section 8 of the SSHASP.

Where a centralized decontamination pad or facility will be established for decontaminating heavy equipment (e.g., rigs, augers, loaders), Section 8 of the SSHASP shall specify site-specific procedures for addressing transport of equipment from the site of investigation to the centralized decontamination facility in a manner that minimizes the potential for, or contains the spread of contamination.

### 8.2 Personnel Decontamination

This section was developed to meet the OSHA HAZWOPER requirements of 29 CFR 1926.65(k). It may be adapted in the SSHASP for use in meeting the chemical-specific decontamination requirements of the applicable OSHA standard(s) in Subparts D and Z of 29 CFR 1926 for the substance(s) included in Table 2 (Section 4.2.2.4), which appear in Table 4-2 of the SSHASP.

Provided in Appendix D are two possible strategies for personal decontamination: standard and extensive. Project managers choosing to use an alternative strategy must incorporate the strategy in the SSHASP for review and approval per Section 1.2. Both strategies provided in Appendix D include procedures, diagrams of decontamination facilities, and suggested equipment for operations involving use of Levels D, C, and B PPE. Each of the diagrams is generic because the actual positions and orientations of decontamination stations may vary, depending on day-to-day variations in site operations and conditions. Some of the stations in the standard strategy serve multiple functions, which could be allocated to separate stations, as appropriate, to adjust for day-to-day variations in site operations and conditions. The quantities of equipment listed are those that should be on hand during each day's activities at the site. Since site conditions vary, some sites have more decontamination stations than others; thus, more equipment is necessary at these sites to decontaminate personnel and environmental monitoring equipment effectively.

The following guidelines are provided for determining decontamination strategy requirements for implementation under differing site conditions:

- The standard decontamination strategy (Options 1 through 3 in Appendix D) assumes that waste minimization is practiced and should be implemented only when site contamination is relatively low.

- The extensive decontamination strategy (Options 4 through 6 in Appendix D) should be implemented on a contingency basis, at the discretion of the SSO, health physics personnel, and/or ESH-5 or ESH-1. No absolute levels have been set for triggering implementation of the extensive strategy for decontamination; rather, these personnel shall monitor the extent of contamination throughout site operations and shall determine whether the standard strategy is sufficient for existing conditions.

- If there is difficulty in successfully decontaminating personnel, PPE, or environmental monitoring equipment using the standard decontamination strategy, the extensive strategy should be implemented.

### 8.2.1 Decontaminating Environmental Monitoring Equipment

Most environmental monitoring equipment used at ER sites is not intended to be disposable and should be protected from contamination during use in the EZ and/or CRZ. When such equipment becomes contaminated it may be difficult to decontaminate without damaging electronic components. Environmental monitoring equipment that cannot be decontaminated readily by surface wiping should be wrapped or encased in a protective material (e.g., a plastic bag) to minimize contamination, provided that the protective material does not adversely affect operation of the equipment. Openings in the protective material may be necessary in some cases to accommodate probe connections and gas inlets/outlets but should be sealed using tape whenever feasible. Environmental monitoring equipment that cannot be decontaminated by field methods described in Section 8 of the SSHASP require disassembly and decontamination at a laboratory. Such equipment should be double-bagged, sealed, and properly labeled for transfer beyond controlled zones for eventual temporary storage prior to reuse or transfer off-site for decontamination.

### 8.2.2 Disposal Versus Laundering of PPE

PPE used in the EZ shall not be transferred beyond the CRZ into the clean environment of the SZ unless it has been appropriately screened for contamination, contained and labeled as necessary. Used PPE should be handled and temporarily stored pending analytical results as though it is suspect contaminated waste.

Although protective clothing may be either disposable or nondisposable, at some LANL work sites even disposable protective clothing may be reused by field team members. However, even at sites where the types and concentrations of contaminants are insignificant and work activities are nonstrenuous, disposable protective clothing should be disposed at least weekly because of wear and tear that eventually would compromise the integrity of the protective material.

Nondisposable protective clothing (e.g., cotton or insulated coveralls) should be laundered at least weekly. Such PPE must be placed in a labeled container before being transferred to a designated laundry facility for cleaning and eventual reuse. Special instructions for containing, transporting, and cleaning nondisposable PPE, if any, (including acceptance criteria for "decontamination" or "clean" classification) must be included in Section 8 of the SSHASP. Requirements for properly notifying laundry management of the potential for hazardous contamination in accordance with OSHA's hazard communication standard (29 CFR 1926.59) must also be specified in the SSHASP.

### 8.2.3 Special Procedures for Decontamination of Radiologically Contaminated PPE and Environmental Monitoring Equipment

When radiological contamination is detected above background levels, the Field Unit HS Representative or ESH-1 shall be contacted immediately, before the contaminated item is removed from the EZ. Decontamination and disposal of PPE shall be conducted in accordance with the requirements of LANL's Radiological Control Manual (LANL, LM 107-01.1) and as specified in Section 8 of the SSHASP.

### 8.2.4 Emergency Decontamination of Personnel

Decontamination of personnel in an emergency is discussed in Section 9.3.1.4.

## 9 Emergency/Incident Action Plan

This section describes generic aspects of the emergency/incident action plan, which apply to all field operations of the ER Project. Site-specific details of this plan and the necessary equipment and supplies to execute this plan shall be included in Section 9 of the SSHASP. Any deviations or exceptions to this section shall be described in Section 9 of the SSHASP.

This section has been developed to meet the requirements of 29 CFR 1926.24 and 1926.65(l), and as applicable, 29 CFR 1926.65(q) or 1926.35(b). It addresses contingency planning, response actions, and associated personnel and equipment requirements in the event of occurrence of an incident or emergency as defined in this section. DOE and OSHA require that this plan be rehearsed regularly as part of the overall training program for site operations (29 CFR 1926.65[l][3][iv]).

Explanations and definitions for determining the category of an unplanned or uncontrolled event are provided in the LANL ER Project *Manual for Site Health and Safety Activities*.. For purposes of this section, the term "emergency" is used to refer to unplanned or uncontrolled events, such as

- situations necessitating rescue and/or rendering of first-aid and/or cardiopulmonary resuscitation (CPR) by qualified onsite responders per this section;
- situations necessitating fire fighting by qualified onsite responders per this section;
- releases of hazardous substances that <u>cannot</u> be responded to and adequately dealt with by qualified onsite personnel and resources per this section; and
- incidents involving local or adjacent facility operations that may influence field operations.

For purposes of ER field work, the term "incidental release" is used to refer to unplanned or uncontrolled releases of hazardous substances that can be responded to and adequately dealt with by qualified onsite personnel and resources per this section. By this definition, incidental releases are defined as a release of insufficient quantity to pose a significant HS hazard to field personnel in the immediate vicinity, to the field personnel responding defensively, or to the surrounding environment (DOE, EH/EM Assistance Team Emergency Response Working Group) . The FTL or JS, assisted by the SSO, shall direct and coordinate responses to incidental releases. These responsibilities include: appropriately responding to the situations listed above, safely evacuating onsite personnel, gathering onsite personnel at the

designated muster area, notifying emergency contacts, documenting that onsite personnel are accounted for at the muster area, and follow-up investigation and reporting of the incident.

Releases of hazardous substances in sufficient quantity to necessitate a response either by personnel from outside the immediate release area or by other designated responders, such as the fire department or LANL's Hazardous Materials Response (HAZMAT) Team (ESH-10), are considered emergencies (DOE, EH/EM Assistance Team Emergency Response Working Group; and Smith, D., Office of Safety and Quality Assurance [EH 30] and Carnes, E., Office of Nuclear Safety [EH 11]). In such circumstances, onsite personnel are only allowed to take defensive actions for which they have been trained and are equipped in accordance with this section. For onsite personnel having had the first-responder awareness level training (Section 10.1.2.1), such defensive actions are limited to evacuating the site, identifying the nature of the release, isolating and denying entry to the site, and notifying authorities of the release. For onsite personnel having had first-responder operations level training (Section 10.1.2.2), such defensive actions are limited to those of first-responder awareness level training, plus

- preventing exposure;
- keeping the release from spreading; and
- containing the release from a safe distance.

The FTL or JS, assisted by the SSO, shall direct and coordinate responses to emergencies in accordance with this section until off-site emergency responders arrive and implement the incident command system. Onsite spills or releases of hazardous substances shall be handled in accordance with applicable requirements of this section and according to an approved site-specific spill prevention control and countermeasures plan prepared in accordance with LANL's Spill Prevention Control and Countermeasures Plan.

## 9.1 Posting Requirements

At the start of field operations, emergency contacts and phone numbers, reporting information, emergency equipment, and maps of the route(s) to the Los Alamos Medical Center and to the LANL Occupational Medicine Clinic (ESH-2) shall be posted at a location onsite where personnel may readily access the information. This site-specific information shall be included in Appendix D of the SSHASP.

## 9.2 Emergency Alerting and Site Evacuation Procedures

The FTL or JS and the SSO shall determine site-specific emergency alerting procedures, evacuation procedures and routes, and locations of muster areas. This information must be included in Section 9 of the SSHASP and shall be communicated by the SSO, or the FTL or JS to onsite personnel during the pre-job start HS briefing and/or the daily tailgate HS meetings. DOT provides information for determining the extent of and safe distances for evacuation (DOT, *1993 Emergency Response Guidebook*), which shall be referenced in Appendix C of the SSHASP for each chemical substance identified in Table 4-2 of the SSHASP. Evacuation routes and muster areas should be predominately upwind, uphill, and upstream of work areas where fire or release of chemicals or radiological contaminants might occur.

An employee alarm system shall be specified in Section 9 of the SSHASP and shall be established at the work site in accordance with 29 CFR 1926.65(l)(3)(vi) and 1926.159. Section 9 of the SSHASP shall also include means and methods for alerting contact personnel at adjacent facilities of onsite events that could pose a threat to off-site facilities, and for designated personnel at adjacent off-site facilities to alert onsite personnel of events that could pose a threat to onsite personnel or operations. The phone numbers or radio stations of contact personnel at adjacent facilities (the Facility Manager or his/her designee) shall be listed in the list of emergency contacts included in Appendix D of the SSHASP.

#### 10.1.1.4 Annual Refresher Training

Individuals who have received the initial training in accordance with previous subsections in this section shall receive 8-hours annual refresher training on

- names of personnel and alternates responsible for the employer's HAZWOPER health and safety program;
- safety, health, and other hazards related to HAZWOPER work;
- use of PPE (Section 7);
- work practices by which the employee can minimize risks of exposure to hazards;
- safe use of engineering controls and equipment onsite;
- medical surveillance requirements (Section 11);
- Sections 4 through 6 of LANL's HASP and model SSHASP; and
- applicable topics in Section 10.1.1.3.

#### 10.1.1.5 Site Safety Officer Requirements

In accordance with OSHA requirements in 29 CFR 1926.65(b)(2)(i)(B) and (e)(1)(ii), SSOs shall have the necessary training to develop and implement the applicable SSHASP and to implement HASP requirements.

#### 10.1.1.6 Industrial Hygiene Technician Requirements

In accordance with OSHA's training requirement in 29 CFR 1926.65(e)(1)(ii), industrial hygiene technicians shall have the necessary training to perform their assigned task(s) and associated responsibilities as defined in Section 3.2.3.2.

#### 10.1.1.7 Health Physics Personnel Requirements

In accordance with applicable DOE and LANL requirements and OSHA's training requirement (29 CFR 1926.65[e][1][ii]), health physics personnel shall have the necessary training to develop and implement health physics-related sections of the applicable SSHASP and to implement applicable HASP requirements. This training shall include the training required by ESH-1 for issuance of a radiological surveillance authorization agreement per Section 3.2.4.

### 10.1.2 Emergency Response Training

If a project manager chooses to have onsite personnel take any action other than immediate evacuation of the site in the event of a release or substantial threat of release of a hazardous substance, onsite personnel must receive the training described in this section, as applicable for the tasks to be performed. OSHA requires that personnel who have been trained in accordance with this section must receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate their competency at least yearly.

#### 10.1.2.1 First-Responder Awareness Level Training

DOE and OSHA require that individuals who are likely to witness or discover a hazardous substance release and who are expected to initiate an emergency response sequence by notifying proper authorities of the release, shall have completed first-responder awareness level training (29 CFR 1926.65[q][6][i]). Onsite personnel having had only the first-responder awareness level training are

In the event of an incident necessitating evacuation:

- the FTL or JS, SSO, and/or health physics personnel should alert other personnel of the emergency situation;
- onsite personnel should evacuate the site according to the procedures established during the pre-job start HS briefing or daily tailgate HS meeting, and should assemble at the designated muster area;
- the FTL or JS, or his/her delegate, is responsible for accounting for all onsite personnel at the muster area to determine whether any personnel are missing; and
- evacuated personnel shall remain at the muster area until the re-entry alarm is sounded or an authorized individual provides further instruction.

## 9.3 Procedures for Onsite Responders

Onsite personnel who are trained and equipped to respond to incidents in accordance with Section 9 shall implement the following general response procedures:

- Assess existing and potential hazards to personnel and the environment onsite, and to off-site individuals and property or facilities. Isolate the incident or emergency area and prohibit access by unauthorized people.
- As feasible, perform rescue, first-aid, and/or CPR duties as trained.
- Establish a communication center and maintain telephone or radio communication with appropriate off-site support experts. Arrange for an escort to intercept and direct off-site responders to the site.
- To the extent possible and necessary, conduct emergency decontamination (Section 9.3.1.4).
- Approach all releases of unknown substances as though a highly toxic or hazardous substance is involved (i.e., contact LANL's HAZMAT Team or include in SSHASP: use of Level A PPE, appropriate exposure monitoring, and implementation of the "buddy system").
- Stop, retard, and/or contain the source and flow of hazardous discharge to the extent possible and necessary using available onsite equipment and supplies with which response personnel have been sufficiently trained to use for emergency response purposes (Section 9). Examples of such actions may include application of absorbent materials (e.g., spill pillows, vermiculite, sand, or dirt) and/or construction of berms or dikes at a safe distance around the spill or leak source.
- Record chain of events including times of occurrence.

### 9.3.1 Emergency Medical Treatment and First-Aid/CPR

In accordance with 29 CFR 1926.50, provisions shall be made prior to commencement of field operations for prompt medical attention in case of serious injury or illness. In the absence of a hospital or clinic that is reasonably accessible in terms of time and distance to the work site (i.e., capable of rendering treatment within four minutes of occurrence of the injury or illness), a person who has a valid certificate in first-aid training from the American Red Cross, or equivalent, shall be available at the work site to render first-aid, and a vehicle shall be maintained onsite ready for use to transport the victim(s) off-site for medical treatment. A copy of the HASP and SSHASP shall be kept in the vehicle designated for emergency transport of victims and shall be given to emergency medical care providers. First-aid supplies, including

protective equipment for rendering first-aid and CPR, specified in Section 9 of the SSHASP shall be maintained accessible and ready for use in the SZ.

In the event of an incident necessitating medical care, the FTL or JS, or his/her delegate, shall arrange for notification of key contacts listed in Appendix D and Table 3 of the SSHASP (i.e., off-site emergency responders, other line managers, the Field Unit HS Representative, and the employee's manager) as soon as possible.

#### 9.3.1.1 Life-Threatening Cases

In life-threatening situations, qualified persons designated in the HASP and Section 9 of the SSHASP should

- implement appropriate first aid procedures and immediately phone for emergency medical assistance;
- take measures to prevent further damage or injury, and, if appropriate, transport to the Los Alamos Medical Center; and
- notify the FPL and/or Field Unit HS Representative as soon as possible.

#### 9.3.1.2 Other Cases

In the event of an injury or an illness with symptoms of over exposure to hazardous substances, qualified coworkers should immediately provide first-aid to the victim(s) and transport the victim(s) for initial medical evaluation and triage to LANL's Occupational Medicine Clinic (ESH-2, TA-3, SM 409, phone: 667-0660) during business hours (M-F 7:30 a.m. to 5:00 p.m.) or after hours to the Los Alamos Medical Center at the location indicated on the postings included in Appendix D of the SSHASP. At sites having radiological substances listed in Table 4-2 of the SSHASP, injuries resulting in dermal abrasions where the outer surface of the skin is broken must be evaluated by ESH-2.

#### 9.3.1.3 Exposure to Another's Blood or Body Fluids

Anyone who renders first aid involving exposure to another person's blood or body fluids may be at risk of exposure to disease that may be transmitted through contact with the other person's blood or body fluids. LANL and Non-LANL Employees who have rendered occupational first-aid or CPR and have been exposed to another person's blood or body fluids shall immediately report to LANL's Occupational Medicine Clinic (ESH-2, TA-3). In addition, Non-LANL employees who have rendered first-aid or CPR should also notify their management or company HS representative to determine appropriate follow-up action in accordance with their employer's bloodborne pathogen program (Section 4.2.2.2).

#### 9.3.1.4 Emergency Decontamination of Personnel

Victims who sustain life-threatening injuries or illness should receive life-saving care immediately without prior decontamination. If the victim has been contaminated by an extremely toxic or corrosive material that could cause severe injury or loss of life either to the victim or to the people administering first aid, then the victim should be decontaminated immediately in a manner as safe and effective as possible. Personnel experiencing a life-threatening medical crisis are to be decontaminated only if decontamination of the victim would not be expected to result in greater endangerment of the victim.

### 9.4 Reporting Emergencies/Incidents

The ER/ESH procedure for making notifications and processing reports and investigations in follow-up to an emergency or incident is provided in the LANL ER Project *Manual for Site Health and Safety Activities*. Accidents, emergencies, incidents injuries, and illnesses must be rep. ted to the FPL and/or the Fie' Unit HS Representative. In the event of an occurrence necessitating medical care, the FTL or JS sh

arrange for notification of key personnel listed in Appendix D of the SSHASP (i.e., other line managers, the Field Unit HS Representative, and the employee's manager) as soon as possible.

### 9.5 Response Critique and Follow-up

Before normal site activities are resumed, the FPL, or his/her delegate, shall evaluate the incident or emergency to determine

- the cause;
- effectiveness of emergency/incident planning, preparedness, and response;
- how the emergency or incident could have been prevented; and
- considerations for improvements of the emergency/incident response plan.

Points to be considered include whether procedures were adequate and were implemented correctly and in a timely manner. Also before resuming normal site activities, personnel must be fully trained and equipped to handle another emergency or incident. This requires restocking emergency equipment and supplies, and inspecting, testing, and resetting emergency equipment and systems.

## 10 Training

Described in this section are the DOE, OSHA, and LANL worker health and safety training requirements applicable to ER field operations. A summary of the training provided by ESH-13 is included in Table 4. In accordance with OSHA's training requirement in 29 CFR 1926.65(e)(1)(ii), field team personnel shall have the necessary training to perform their assigned task(s) and associated responsibilities. Before the FTL or JS tasks a field team member with performing an ER field duty, the SSO shall verify that the field team member has current certifications of required training.

LANL employees (including LANL contract employees) are eligible to take any LANL courses offered by ESH-13 and BUS-6. Subcontractors to the ER Project are responsible for implementing their own training programs. With the exception of LANL-specific training described under Section 10.4, training offered by ESH-13 is available to ER subcontractors for a fee, and only upon referral by an FPL. Training offered by BUS-6 is also available to ER Subcontractors for a fee.

### 10.1. HAZWOPER Requirements

#### 10.1.1 General Requirements

All employees working onsite exposed to safety hazards, health hazards, or hazardous substances and their supervisors and managers responsible for the site shall receive training meeting the requirements of this section before they are permitted to engage in HAZWOPER work. Employees are not permitted to participate in or supervise ER field activities until they have been trained to the level required by their job function and responsibility.

Employees and supervisors who have successfully completed the training and field experience requirements of this section shall be certified by their instructor, or the head instructor and trained supervisor, as having successfully completed the necessary training. OSHA requires that a written certificate shall be given to each person so certified.

## TABLE 4 - ESH-13 TRAINING

| Training Course * | Audience | Requirement Reference | Driver |
|---|---|---|---|
| Bloodborne Pathogens | workers likely to be exposed to another's blood or body fluids | HASP Sections10.2 and 4.2.2.2 | 29 CFR 1910.1030 |
| Conduct of Operations and Occurrence Reporting (Booklet) | all workers | HASP Section 10.4.2 | DOE Order 5480.19 |
| Confined Space Awareness | confined space entrants, attendants, and supervisors | HASP Section 4.2.2.5 | 29 CFR 1910.146 |
| CPR: Adult<br><br>First Aid: Standard | workers in remote areas | HASP Sections10.2 and 4.2.2.2 | 29 CFR 1926.50 |
| Cranes: Incidental Crane and Rigging Safety | workers who operate cranes for simple lifts, of low weight compared to the crane's capacity, that do not require special rigging | SSHASP Table 10 | 29 CFR 1910.<br>179–184 |
| Cranes: Qualified Crane and Rigging Safety | workers who operate cranes for complicated, heavy, or high-consequence lifts that require substantial skill | SSHASP Table 10 | 29 CFR 1910.179-184 |
| Electrical Safety Awareness | electrical and electronic engineers, electrical and electronic equipment assemblers, electrical and electronic technicians, electricians, industrial machine operators, material handling operators, mechanics, painters, riggers, roustabouts, stationery engineers, and blue-collar supervisors | HASP Section 4.2.2.8 | 29 CFR 1910.332 |
| CBT Fire Extinguisher Awareness | workers designated by line management to use on-site fire extinguishing equipment | SSHASP Table 10 | 29 CFR 1926.150 |
| Forklift Safety Fundamentals | workers who operate forklifts | SSHASP Table 10 | 29 CFR 1910.178 |

| Training Course * | Audience | Requirement Reference | Driver |
|---|---|---|---|
| General Employee Radiological Training (part of General Employee Training) | workers who require unescorted access to radiological controlled areas | HASP Section 10.4.1 | 10 CFR 835<br>DOE/LANL RADCON Manuals |
| General Employee Training | all workers on site more than 10 consecutive workdays | HASP Section 10.4.1 | DOE Order 5480.20 |
| Hazard Communication Introduction | all ER workers | HASP Section 4.2.2.3 | 29 CFR 1926.59<br>29 CFR 1910.1200 |
| HAZWOPER: General Site Worker (40 hours)<br>24-Hour Supervised Field Experience<br>HAZWOPER: Refresher for Environmental Restoration Workers | general site workers who have the potential of exposure above established permissible exposure limits | HASP Sections10.1.1.1 and 10.1.1.4 | 29 CFR 1926.65<br>29 CFR 1910.120 |
| HAZWOPER: Occasional Site Worker (24 hours)<br>HAZWOPER: 8-Hour Supervised Field Experience<br>HAZWOPER: Refresher for Environmental Restoration Workers | regular or occasional site workers who do not have the potential of exposure above established permissible exposure limits | HASP Sections 10.1.1.2 and 10.1.1.4 | 29 CFR 1926.65<br>29 CFR 1910.120 |
| HAZWOPER: Supervisor (8 hours) | supervisors/managers of general, regular, or occasional site workers | HASP Section 10.1.1.3 | 29 CFR 1926.65<br>29 CFR 1910.120 |
| HAZWOPER: First-Responder Awareness Level<br>HAZWOPER: Annual refresher or demonstrated competency | individuals who are likely to witness or discover a hazardous substance release and are trained to initiate the emergency response sequence through notification | HASP Section 10.1.2.1 | 29 CFR 1926.65 (q)(6)(i)<br>29 CFR 1910.120 (q)(6)(i) |

| Required Training Course | Audience | Requirement Reference | Driver |
|---|---|---|---|
| HAZWOPER: First-responder Operations Level ** (at least 8 hours)<br>HAZWOPER: Annual refresher or demonstrated competency | individuals who initially respond in a defensive manner to releases or potential release of hazardous substances | HASP Section 10.1.2.2 | 29 CFR 1926.65 (q)(6)(ii)<br>29 CFR 1910.120 (q)(6)(ii) |
| HAZWOPER: Occasional Site Worker (24 hours)<br>HAZWOPER: Refresher for TSD Workers | all workers at permitted and interim status TSD facilities | | 29 CFR 1926.65 (p)<br>29 CFR 1910.120 (p) |
| HMPT: Initial and general awareness and safety training ***<br>HMPT: Refresher every 2 years | hazardous material worker whose job function involves packaging and transport of hazardous materials | HASP Section 10.6 | 49 CFR Part 172.700-704 |
| Hearing Conservation | workers who may be exposed to high noise environments | HASP Section 4.2.2.7 | 29 CFR 1910.95<br>or<br>AF Noise Standard |
| Lockout/Tagout (Booklet) | all workers | HASP Section 4.2.2.8 | 29 CFR 1910.147<br>LP 106-01.2 |
| Lockout/Tagout Red Lock Procedure for Control of Hazardous Energy Sources | authorized employees who service, maintain, or modify equipment | HASP Section 4.2.2.8 | 29 CFR 1910.147<br>LP 106-01.2 |
| OSHA Rights and Responsibilities (Booklet) | all workers | SSHASP Table 10 | DOE Order 5483.1A |
| OSHA Excavating and Trenching Operations | workers designated as "competent" for excavating and trenching operations | SSHASP Table 10 | 29 CFR 1926.650<br>DOE Order 5480.9 |
| Plutonium Safety | workers who perform hands-on work with plutonium, with training specified by the radiological work permit | SSHASP Table 10 | DOE/ANL RADCON Manuals |

| Required Training Course * | Audience | Requirement Reference | Driver |
|---|---|---|---|
| Radiological Worker I Training<br><br>Health Physics Checklist Indoctrination (for personal dosimetry or bioassay programs) | workers who require unescorted access to radiological buffer areas, radiation areas, and areas posted for radioactive materials | HASP Sections10.4.3 and 10.4.4 | 10 CFR 835<br>DOE/LANL RADCON Manuals |
| Radiological Worker II Training<br><br>Health Physics Checklist Indoctrination (for personal dosimetry or bioassay programs) | workers who require unescorted access to high and very high radiation areas, contamination and high contamination areas, and airborne radioactivity areas; and/or workers who have potential contact with hot particles, or perform operations on bench tops, in fume hoods, at sample stations, in open-front boxes, or in glove boxes | HASP Sections 10.4.3 and 10.4.4 | 10 CFR 835<br>DOE/LANL RADCON Manuals |
| Radiological Control Technician Training | radiological control technicians | HASP Section 10.1.1.7 | 10 CFR 835<br>DOE/LANL RADCON Manuals |
| Respirators: Air-Purifying | workers required to wear air-purifying respirators | HASP Section 7.1.6 | 29 CFR 1910.134<br>DOE Order 5480.4 |
| Respirators: Self-Contained Breathing Apparatus | workers required to wear self-contained breathing apparatus | HASP Section 7.1.6 | 29 CFR 1910.134<br>DOE Order 5480.4 |
| Respirators: ITT Compressor/Air-Supply Systems | workers required to wear supplied-air respirators | HASP Section 7.1.6 | 29 CFR 1910.134<br>DOE Order 5480.4 |
| Tritium Safety | workers who perform hands-on work with tritium, with training specified by the radiological work permit | SSHASP Table 10 | DOE/LANL RADCON Manuals |

| Required Training Course * | Audience | Requirement Reference | Driver |
|---|---|---|---|
| Waste Generation Overview<br><br>Waste Documentation Forms (if filling out forms) | hazardous waste generators and waste management coordinators | HASP Sections10.4.5 and 10.5 | 40 CFR 260–270<br>LS 10-3 |
| Waste Generation Overview<br><br>RCRA Personnel Training<br>RCRA Refresher Training | less-than-90-day storage area or TSD facility workers | HASP Section 10.5 | 40 CFR 260–270<br>LS 10-3 |
| Site-specific training:<br>daily briefings; SOPs, ARs, HASP, and high explosives | all workers | HASP Sections10.1.3 and 10.1.4 | 29 CFR 1926.65 (e) |

* ESH-13 or BUS-6 Training course titles are listed. Equivalent courses may be taken except for GET, Radworker I and II, RCT, and Waste Documentation Forms.

** ESH-13 does not provide First-responder Operations Level Training.

*** For additional HMPT required training, for shippers and drivers of hazardous materials, contact BUS-6 at 7-1038.

Trainers shall be qualified to instruct employees about the subject matter that they are presenting. Trainers shall have the academic credentials and instructional experience necessary for teaching the subject(s), or have completed a training program for teaching the subject(s). Instructors shall demonstrate competent instructional skills and knowledge of the subject matter.

Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to requirements of this section shall not be required to provide the initial training requirements of Sections 10.1.1.1 or 10.1.1.2. They shall certify this equivalency and provide a copy of this certificate to the employee.

Anyone who has not been certified in accordance with this section is prohibited from engaging in ER field activities.

#### 10.1.1.1 Initial 40-Hour Training and 24-Hour Supervised Field Experience

Individuals engaged in HAZWOPER activities that expose or potentially expose them to hazardous substances and health hazards shall receive a minimum of 40-hours of instruction off-site and a minimum of 24-hours actual field experience under the direct supervision of a trained, experienced HAZWOPER supervisor.

#### 10.1.1.2 Initial 24-Hour Training and 8-Hour Supervised Field Experience

Training requirements of this section pertain to individuals who are unlikely to be exposed to hazardous substances at levels above published exposure limits and who are

- onsite only occasionally to perform a specific limited task (e.g., ground water monitoring, land or geo-physical surveying);
- regularly onsite working only in areas that have been monitored and fully characterized indicating that exposures are under published occupational exposure limits, and the characterization indicates that there are no health hazards or the possibility of an emergency developing.

Individuals engaged in HAZWOPER activities within these categories shall receive a minimum of 24-hours of instruction off-site and a minimum of 8-hours actual field experience under the direct supervision of a trained, experienced HAZWOPER supervisor. Individuals who have received this training and who subsequently are expected to perform work falling under the description of Section 10.1.1.1 shall complete an additional 16-hours of off-site training and 16-hours of supervised field experience to meet the requirements of Section 10.1.1.1.

#### 10.1.1.3 Management and Supervisor Training

Onsite management and supervisors directly responsible for, or who supervise employees engaged in, HAZWOPER work shall receive initial training (per 10.1.1.1 or 10.1.1.2, as applicable) and at least 8-hours of additional specialized training at the time of job assignment on such topics as, but not limited to, the employer's, and where appropriate, LANL's

- HS program and the associated training program,
- PPE program,
- spill containment program, and
- health hazard monitoring and techniques.

limited to taking no further action than that described in the fifth paragraph of Section 9. First-responders shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following:

- An understanding of what hazardous substances are and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances, if possible.
- An understanding of the role of the first-responder awareness individual in the employer's emergency response plan, including site security and control and the DOT's *Emergency Response Guidebook* (DOT).
- The ability to realize the need for additional resources and to make appropriate notifications to the communication center.

#### 10.1.2.2 First-Responder Operations Level Training

DOE and OSHA require that individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release, shall have completed first-responder operations level training (29 CFR 1926.65[q][6][ii]). Onsite personnel having had the first-responder operations level training are limited to taking no further action than that described in the fifth paragraph of Section 9. First-responders operations level shall have completed at least 8-hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those of the awareness level training:

- Knowledge of the basic hazard and risk assessment techniques.
- Knowledge of proper selection and use of PPE provided to first-responder operational level individuals.
- An understanding of basic hazardous materials terms.
- Knowledge of performing basic control, containment and/or confinement operations within the capabilities of the resources and PPE available onsite.
- Knowledge of implementing basic decontamination procedures.
- An understanding of the relevant SOPs and termination procedures.

### 10.1.3 Pre-Job Start HS Briefing

In accordance with 29 CFR 1926.65(b)(4)(iii), the SSO shall conduct training on the contents of the SSHASP before field work begins so that each field team member is informed of the site-specific information and requirements applicable to the scope of work. This HS briefing shall cover the SSHASP contents and applicable portions of the HASP.

### 10.1.4 Daily Tailgate HS Meetings

Before beginning field work each day, the SSO and the FTL or JS shall conduct a tailgate HS meeting. Field team members should be encouraged to discuss any health- or safety-related concerns during this

meeting without fear of reprisal. Topics covered and attendance shall be documented. During these tailgate meetings, field team members shall be informed of at least the following:

- Any newly identified hazards and associated monitoring and exposure control measures and results not discussed previously.
- Problems or concerns (especially HS) that have arisen since the previous tailgate meeting.

## 10.2 First-Aid Requirements

In accordance with 29 CFR 1926.50, in the absence of a hospital or clinic that is reasonably accessible in terms of time and distance to the work site (i.e., capable of rendering treatment within four minutes of occurrence of the injury or illness), a person who has a valid certificate in first-aid training from the American Red Cross, or equivalent, shall be available at the work site to render first-aid. Refer to Section 9.3.1 for more detailed information concerning first-aid.

## 10.3 Other OSHA Requirements

OSHA has numerous other standards and associated training requirements applicable to ER work. Some of these requirements apply at a programmatic level and are addressed in Section 4.2.2. Other training requirements apply to specific individuals who are either a competent person or a qualified person in the subject matter pertaining to their job function (Section 3.2.3.5), as defined by OSHA (29 CFR 1926.32[f] and [m], respectively) and/or as defined by applicable operation- or substance-specific standards (29 CFR 1926 and/or 1910), which are referred to throughout the HASP and the SSHASP. Examples of these types of training are those for confined-space entry, lockout/tagout of energized equipment, electrical safety, trenching and excavation, respiratory protection, bloodborne pathogen exposure control, etc.

Site-specific training requirements meeting requirements of this section are dictated by the operations and conditions occurring onsite, and shall be specified in Section 10 of the SSHASP or in a modification form to the SSHASP as the requirement arises.

## 10.4 LANL-Specific Requirements

There are certain LANL-specific training requirements, listed in this section, that are applicable to personnel performing particular job functions at LANL. Except for the training requirement in Section 10.4.5, ESH-13 will provide LANL-specific training referenced in this section to ER Project participants at no cost to the employer of the trainee and without prior authorization of the FPL.

### 10.4.1 General Employee Training

Anyone who will perform ER field work and will be onsite (or a combination of sites) for more than 10 consecutive work days shall have current certification of having completed LANL's General Employee Training (GET). This training is LANL-specific and is provided by ESH-13. Recertification is required every two years for personnel requiring unescorted access to DOE Order 5480.20 Nuclear Facilities.

### 10.4.2 Health and Safety Read Training

ESH-13 distributes booklets on Conduct of Operations and Occurrence Reporting, OSHA Rights and Responsibilities, and General Employee Radiological Worker Training on an annual basis to meet specific training requirements. These booklets will be provided through group, program and contracting offices. Workers shall read and document having read the booklets.

### 10.4.3 Health Physics Checklist Indoctrination

Individuals who will perform ER work at sites where radiation dosimetry is required (Table 6-2 of the SSHASP) must attend LANL's Health Physics Checklist Indoctrination in accordance with the sixth paragraph of Section 6.

### 10.4.4 Radiological Worker II

Before beginning work at a site where radiological hazards exist or may be expected, individuals must have completed LANL's Radiological Worker II training provided by ESH-13. Individuals who have completed this training at other sites in the DOE complex within the previous two years may transfer the core training and practical exercise, but must complete LANL's self-study Site-Specific Radiological Worker training provided by ESH-13. Each individual must requalify in Radiological Worker II training every two years while performing work at a site where radiological hazards exist or may be expected. On the alternate year, when requalification is not required, Radiological Worker Refresher training is required. A self-study booklet is provided by ESH-13.

### 10.4.5 Waste Generator and Waste Management Training

Waste management coordinators and generators of hazardous and mixed waste who must complete waste profile and waste disposal forms are required to complete LANL's Waste Documentation Forms Training.

## 10.5 RCRA Training

Waste management coordinators, hazardous and mixed waste generators, TSDF workers, and less than 90-day storage area workers are required to have tra ining as defined by EPA (40 CFR 260-270). These individuals must have completed a Waste Generation Overview. In addition, TSDF and less than 90-day storage area workers must complete RCRA personnel training and an annual RCRA refresher or their equivalents.

## 10.6 DOT Requirements

Individuals whose job function involves the transport of hazardous substances are required to take at a minimum, Hazardous Materials Packaging and Transportation (HMPT) Initial and General Awareness Safety training in accordance with 49 CFR 172.700-704. There are additional training requirements for shippers and drivers of hazardous substances. BUS-6 provides this training to subcontractors for a fee. Equivalency for non-LANL courses is subject to BUS-6 approval. Contact BUS-6 at 7-1038 for further information.

# 11 Medical Surveillance

Before the FTL or JS authorizes access to areas of the site where site controls have been established (e.g., EZ, CRZ, and other regulated areas), it is the responsibility of the SSO to verify that personnel entering such areas have a current certification of medical evaluation and medical clearance (Appendix E or equivalent) in accordance with this section. The site-specific medical surveillance requirements that meet applicable OSHA regulations and DOE requirements shall be specified in Section 11 of the SSHASP.

A written medical surveillance program that complies with requirements of this section shall be implemented by employers of personnel working for the ER Project. Each of the following employees shall be active participants in his/her employer's medical surveillance program:

- Employees who are or may be exposed to hazardous substances or health hazards at or above OSHA's permissible exposure limits or other published exposure limits.

- Employees who wear a respirator during performance of work.

- Employees who are injured, become ill, or show signs or symptoms of possible over exposure to hazardous substances or who may be exposed to health hazards during performance of work regulated by HAZWOPER or applicable OSHA standard(s) in Subparts D and Z of 29 CFR 1926 for the substance(s) included in Table 2 (Section 4.2.2.4), which appear in Table 4-2 of the SSHASP.

## 11.1 Cost and Frequency of Examinations

Employers shall make available to each employee participating in this program medical examinations and consultations performed by or under the supervision of a licensed physician (preferably one knowledgeable in occupational medicine) at a reasonable time and place, without cost to or loss of pay by the employee. These examinations shall be available

- at least as frequently as specified in Appendix F of the HASP or an applicable standard, unless the examining physician believes a shorter or longer duration is needed or required;

- at termination of employment or upon reassignment to non-HAZWOPER work if the employee has performed field work with the potential for exposure since his/her last exam (initial or annual); a written explanation of a decision not to provide a termination examination shall be provided in the employee's medical file;

- as necessary for evaluation and treatment of occupational injuries;

- as soon as possible after notification that the employee has incurred a puncture wound at a job site where radiological contamination exceeds background levels, has been exposed to concentrations of contaminants above permissible or published exposure limits or has developed symptoms indicating possible over exposure to hazardous substances or health hazards during performance of work; or

- at additional times for follow-up examinations or consultations as determined by the examining physician.

## 11.2 Content of Examinations

Initial (baseline) and annual medical examinations shall include at least the examinations and/or tests specified in Appendix F. The examining physician shall determine the content of periodic and termination examinations so that any changes from baseline examination results can be assessed in accordance with Appendix F.

## 11.3 Information to Be Provided to the Examining Physician

Together with the Physician Certification of Medical Evaluation Form (Appendix E or equivalent), the employer shall provide the following to the examining physician:

- a copy of the HAZWOPER standard (29 CFR 1910.120 or 1926.65), the access to employee exposure and medical records standard (29 CFR 1910.20), the respiratory protection standard (29 CFR 1910.134), the occupational noise exposure standard (29 CFR 1910.95), and/or applicable OSHA standard(s) in Subparts D and Z of 29 CFR 1926 for the substance(s) included in Table 2 (Section 4.2.2.4), which appear in Table 4-2 of the SSHASP;

- a description of the employee's duties as they relate to the employee's exposures;

records at the site as required by the HASP, SSHASP, or any applicable regulatory requirement, or as deemed necessary by the FPL or Field Unit HS Representative.

ER participants shall support an initial programmatic and periodic in-process verifications of compliance with applicable requirements. The initial programmatic verification will consist of review of the applicable SSHASP document including any necessary supplements (such as individual verification records for training, medical, etc.) and employer's program or procedure documents which verify the existence of and compliance with applicable requirements. The periodic in-process verifications, which will be conducted by LANL, will include verification of ER participants' records which demonstrate compliance with requirements of the HASP, SSHASP and applicable regulations. These inspections will be conducted primarily at the field sites, but may involve the requirement to furnish current documentation not present at the field site.

Inspections may be conducted by the FPL, his/her delegate, and/or representatives of the ESH Division. It is also anticipated that occasional verification by the LANL Audits & Assessments Branch or the DOE may be required.

ER participants are advised that the results of these inspections shall be in writing and submitted to the LANL performance fee evaluation team and to appropriate LANL management personnel. A copy of the results will also be furnished to the affected employer(s) for resolution of discrepancies, if any.

If during the course of verification a circumstance is discovered which presents a threat of serious injury or death, notice will be promptly provided to the affected onsite supervisor and to the FTL for action as directed in Section 3.4.

## 13 Recordkeeping

### 13.1 Site Records

The SSO shall keep a record of daily HS-related events in a bound logbook and shall verify employee training and medical surveillance records in accordance with Section 3.2.3.1. Health physics personnel shall keep records of health physics-related events in accordance with requirements of their radiological surveillance authorization agreement (Section 3.2.4). Records of all training must be maintained and available for oversight review. ESH-13 maintains training records of training provided by ESH-13 only. Site records shall be provided to the FTM or DPL at the close of the project, who will provide them to the FPL for storage at LANL's RPF.

### 13.2 Employee Exposure and Medical Records

Employee exposure monitoring and medical records shall be retained by the employer of the employee in accordance with OSHA's standard for access to employee exposure and medical records (29 CFR 1926.33). Medical records shall not include examination or test results, but shall include the employee's name and social security number; the physician's written opinion (per Section 11.4) and recommended limitations; any medical complaints related to exposure of hazardous substances; and a copy of the information provided to the examining physician by the employer (not including a copy of the OSHA standard).

Records shall be retained in accordance with, though not limited to, the following requirements:

- To the extent permitted by law, the employer shall maintain and keep in confidence records for each employee.
- Medical records for each employee shall be maintained by the employer for the duration of employment plus 30 years (except health insurance claims records maintained separately from the employer's medical surveillance program records, first-aid records of one-time treatments,

- the employee's actual or anticipated exposure levels;

- a description of any PPE (especially equipment for respiratory protection) actually or reasonably anticipated to be used during performance of work; and

- information from previous medical examinations of the employee not readily available to the examining physician. (This only applies to employees who are on temporary duty assignment and whose usual annual occupational medical evaluations are performed elsewhere.)

### 11.4 Information to be Obtained from the Evaluating Physician

The employer shall obtain and furnish the employee with a copy of a written opinion from the examining physician. Using the form provided in Appendix E or equivalent, this information must include

- the physician's opinion as to whether his/her examination revealed that the employee has any medical conditions that would place the employee at increased risk of impairment of the employee's health from assigned work (e.g., specifically noting compliance with applicable regulations);

- the physician's recommended limitations on the employee's assigned work, if any;

- a statement that the physician has informed the employee of the results of the medical examination and any medical conditions that require further examination or treatment.

The written opinion provided to the employer shall not reveal findings or diagnoses unrelated to occupational exposures. The confidential results of the medical examination and tests shall be kept by the examining and/or evaluating physician, not the employer (unless the employer has a physician on staff who performs the medical evaluations). The results of the medical examination and tests shall be provided to the employee by the physician when requested in writing by the employee, at no cost to the employee in accordance with Section 13.2.

## 12 Quality Control and Quality Assurance Plan

### 12.1 Site Inspections

According to *Construction Project Safety and Health Management* (DOE Order 5480.9A), the construction Subcontractor shall conduct daily inspections of the work site to identify hazards and instances of noncompliance with project HS requirements. The construction Subcontractor responsible for this duty is the prime ER Subcontractor, or where a prime is not involved, the Subcontractor performing the work. The FTM or DPL, serving as the construction manager (as defined in DOE 5480.9A and Section 3.2.1.2), shall conduct work site HS inspections on at least a weekly basis. The FPL, serving as the project manager (as defined in DOE 5480.9A and Section 3.2.1.1), shall conduct inspections of his/her ER Projects exceeding $500,000 on at least a monthly basis during periods of active construction. For projects under $500,000, the FPL shall develop and implement an inspection schedule which ensures that a representative sample of ongoing projects are inspected on at least a monthly basis.

Records of inspections noting any hazards and the corrective actions taken shall be kept. Section 12 of the SSHASP specifies the site-specific inspections to be performed by the SSO or other designated person and the frequency of inspections.

### 12.2 ER/HS Oversight Program

In accordance with recordkeeping requirements of Section 13, ER participants shall provide access to and/or furnish all documentation necessary to LANL to verify compliance with requirements of the HASP, SSHASP, or any applicable law or regulation. This support shall include maintenance of appropriate HS

and medical records of employees who have worked for the employer for less than one year and who have seen the records before termination).

- Exposure records for each employee monitored per Table 6-2 of the SSHASP shall be maintained by the employer for 30 years.

- At an employee's request, the employer shall ensure that each employee has access to his/her records.

- At an employee's written request, the employer shall ensure that representatives designated by the employee have access to his/her record(s) (A sample consent form is provided in Appendix A of 29 CFR 1926.33).

- Whenever an employee, or his/her designated representative, requests access to an employee record, the employer shall ensure that access is provided in a reasonable time and manner. If the employer cannot provide access to the record(s) within 15 working days, before the 15th working day following the request for access, the employer shall apprise the requester of the reason for the delay and the earliest date the record(s) can be made available.

- Whenever an employee, or his/her designated representative, requests a copy of a record, the employer shall ensure that either

  - a copy of the record is provided without cost to such requester,

  - the necessary copying equipment is made available without cost to such requester for the purpose of copying the record, or

  - the record is lent to such requester for a reasonable time to enable a copy to be made.

- Once a record has been provided without cost to the requester, the employer may charge a reasonable, nondiscriminatory administrative cost for subsequent copies of the record. However, an employer shall not charge for an initial request for a copy of new information that has been added to a record which was previously provided.

For purposes of follow-up investigation of an accident or incident, the employee's consent for the investigator(s) to access his/her records shall be obtained in accordance with 29 CFR 1926.33.

### 13.3 Employee Notification Procedure

In accordance with 29 CFR 1926.33, the SSO is required to provide notification of personal exposure monitoring (dosimetry) results to each employee (including another employers' employees) for whom exposure monitoring was performed using the form that is provided in the LANL ER Project *Manual for Site Health and Safety Activities*. The form must be reviewed and acknowledged by each employee for whom monitoring has been conducted and notification provided. The SSO shall provide a copy of the notification form to the subject employee and to his/her supervisor. These records are confidential and shall be dealt with as such in accordance with requirements of Section 13.2. The original form shall be retained with other original site records. Results of the exposure monitoring shall be communicated to others in a manner that does not identify the employee for whom the monitoring was performed, including other affected onsite personnel during the daily tailgate meeting following receipt and evaluation of the results.

### 13.4 Emergency/Incident Records

Records of emergency or incident reports and follow-up investigations shall be processed according to Section 9.4.

## 14 References

### 14.1 HASP


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University of New Mexico, Bureau of Business and Economic Research. *The Census in New Mexico.* Albuquerque: University of New Mexico, January 1992.

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U.S. Department of Transportation (DOT), Research and Special Programs Division, Office of Hazardous Materials Training and Initiatives (DHM-50). *1993 Emergency Response Guidebook.* Washington, DC: U.S. Government Printing Office, October 1993.

## 14.2 Model SSHASP

The following additional resources were used to develop the model SSHASP.

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American National Standards Institute. *American National Standard for Personnel Protection. - Protective Headwear for Industrial Workers - Requirements* ANSI Z89.1-1986. New York: American National Standards Institute, Inc., 1986.

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# Appendix A

## SSHASP ACKNOWLEDGMENT FORM

## SSHASP ACKNOWLEDGMENT FORM

Project Title: _____ Date: _____

TA(s): _____ SSHASP No.: _____

I acknowledge that I have read or have been briefed on the contents of this SSHASP in accordance with requirements of Sections 1.2 and 10.1.3 of the HASP.

| Name | Title | Company | Z Number (or other photo ID) | Signature/Date |
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# Appendix B

## SSHASP MODIFICATION FORM

## SSHASP MODIFICATION FORM

Project Title: _____

TA(s): _____ SSHASP No.: _____ Modification No.: _____

Modifications of the SSHASP shall be made per Section 1.3 of the HASP.
Attach to this page the SSHASP modifications.

---

Comments of the following reviewers have been incorporated as stipulated, or resolved with written record and copy to the respective reviewer.

Prepared by _____
(Print Name) (Title) (Signature) (Date)

---

**Review and Approval by:**

Field Unit HS Representative _____
(Print Name) (Title) (Signature) (Date)

FTM or DPL or FTL or JS (optional at discretion of FPL) _____
(Print Name) (Title) (Signature) (Date)

Technical Area (TA) Representative (optional at discretion of FPL) _____
(Print Name) (Title) (Signature) (Date)

FPL _____
(Print Name) (Title) (Signature) (Date)

**Concurrence by:**

Subcontractor Representative (Management or HS Rep.) _____
(Print Name) (Title/Company) (Signature) (Date)

Subcontractor Representative (Management or HS Rep.) _____
(Print Name) (Title/Company) (Signature) (Date)

Subcontractor Representative (Management or HS Rep.) _____
(Print Name) (Title/Company) (Signature) (Date)

Other _____
(Print Name) (Title/Company) (Signature) (Date)

# Appendix C

# HAZARD ASSESSMENT METHOD

# APPENDIX C: HAZARD ASSESSMENT

Determination of the hazard assessment should be made by an HS professional using the following or comparable method (e.g., the method included in the penalties section of the current *OSHA Field Operations Manual*).

**Instructions for determining the hazard assessment rating:**

Along the vertical axis, determine the hazard severity of the injury or illness which may result from the hazard. Along the horizontal axis, determine the mishap probability or likelihood of the hazard occurring. The square where the row and column meet identifies the hazard assessment.

For the particular hazard being analyzed, in Table 4-2 or 4-3 of the SSHASP include the verbal hazard definition term determined here under the "Hazard Assessment" column of that table. For example, if the hazard severity is "Major" and the mishap probability is "probably will occur", then the entry in Table 4-2 or 4-3 of the SSHASP would be: "Serious".

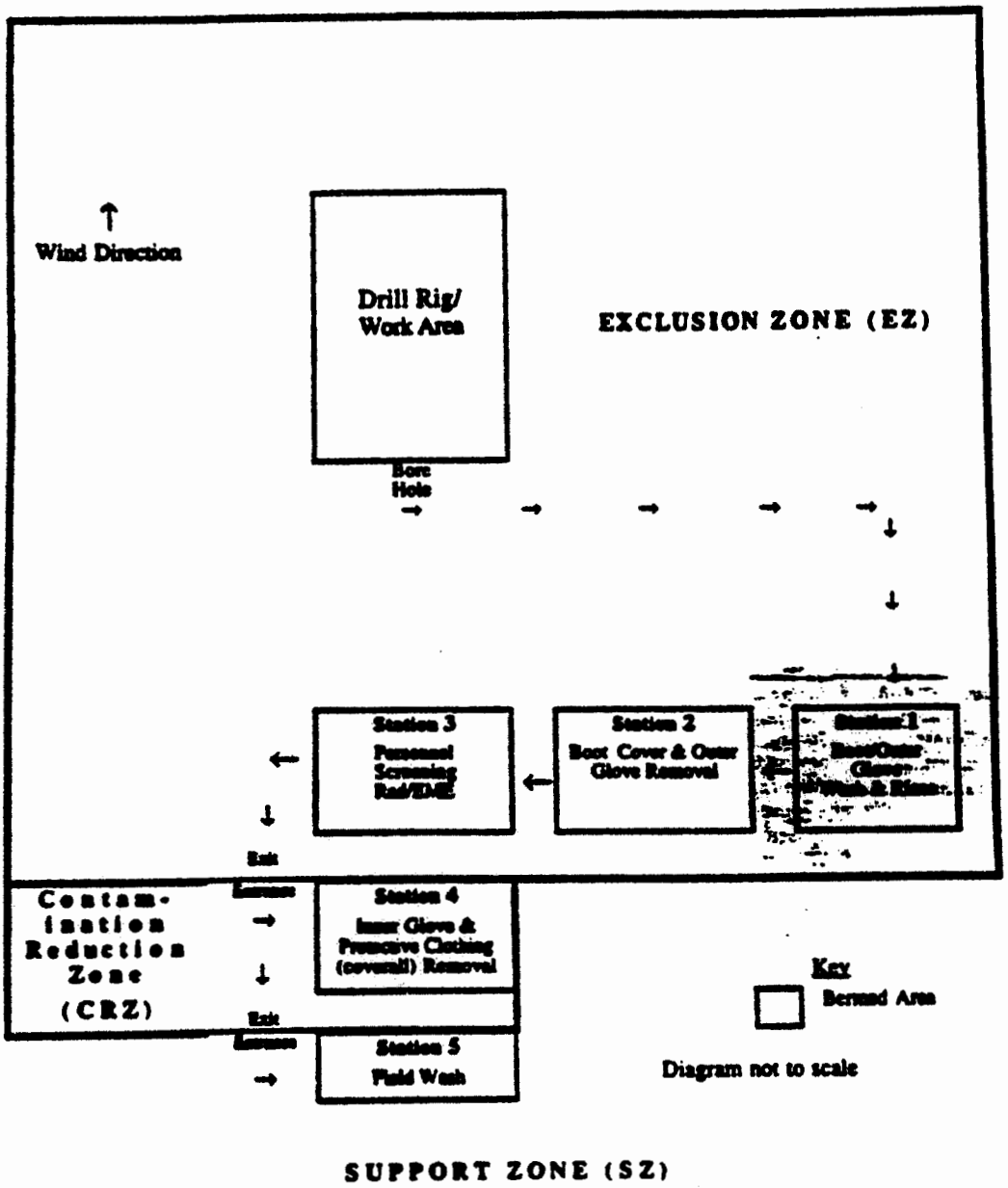
| Hazard Severity | Mishap Probability | | | |
|---|---|---|---|---|
| | Likely to Occur | Probably will Occur | Possibly could Occur | Unlikely to Occur |
| Catastrophic (i.e., death or life-threatening injury from a single encounter) | Imminent | Imminent | Serious | Minor |
| Major (i.e., significant injury/illness resulting in irreversible harm) | Imminent | Serious | Moderate | Minor |
| Minor (i.e., injury or illness not likely to threaten mobility, vision etc. - resulting in reversible harm) | Serious | Moderate | Minor | Negligible |
| Negligible | Minor | Minor | Negligible | Negligible |

# Appendix D

## PERSONNEL DECONTAMINATION

## LAYOUT, PROCEDURE, AND EQUIPMENT LIST OPTIONS

# OPTION 1
# STANDARD LEVEL-D
# DECONTAMINATION FACILITY LAYOUT




SUPPORT ZONE (SZ)

# OPTION 1
# STANDARD LEVEL-D
# DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste; the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Station No. | Decon Station Function | Procedure |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Step into container of wash detergent solution. Scrub chemical protective boots or boot covers and gloves with decon solution. Step out of wash container and into rinse container. Rinse decon solution using pressurized water sprayer; if solvent necessary, rinse with it first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 2 | Boot Cover & Outer Glove Removal | Remove boot covers (if any) and outer gloves. Deposit in lined waste container. |
| 3 | Personnel Screening Rad/EME | Screen hands and feet (and coveralls if directed by RSP/RCT) for gross $\beta/\gamma$ and $\alpha$ contamination. If any visually detectable contamination on self, wash and rinse boots, inner gloves, and/or PC until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY (See Section 8.2 of the HASP for further guidance.)<br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 4 | Inner Glove & Protective Clothing (coverall) Removal | Remove tape (if any), then field coveralls by peeling them inside out from the neck dow, while being careful not to spread contamination from external surface of PC to street clothing, skin, or other areas. Deposit coveralls in the lined waste container or neatly set them aside in a relatively clean area of the CRZ until reuse. Second, remove inner gloves by rolling them inside out carefully avoiding touching the outer surface to bare skin. Deposit the gloves in the lined waste container. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for disposable waste PC, (2) for laundry. Also, see Section 8.2.2 of the HASP.) |
| 5 | Field Wash | Wash exposed skin (e.g., hands and face); shower and redress in street clothes if such facilities are available on site. |

# OPTION 1
# STANDARD LEVEL-D DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

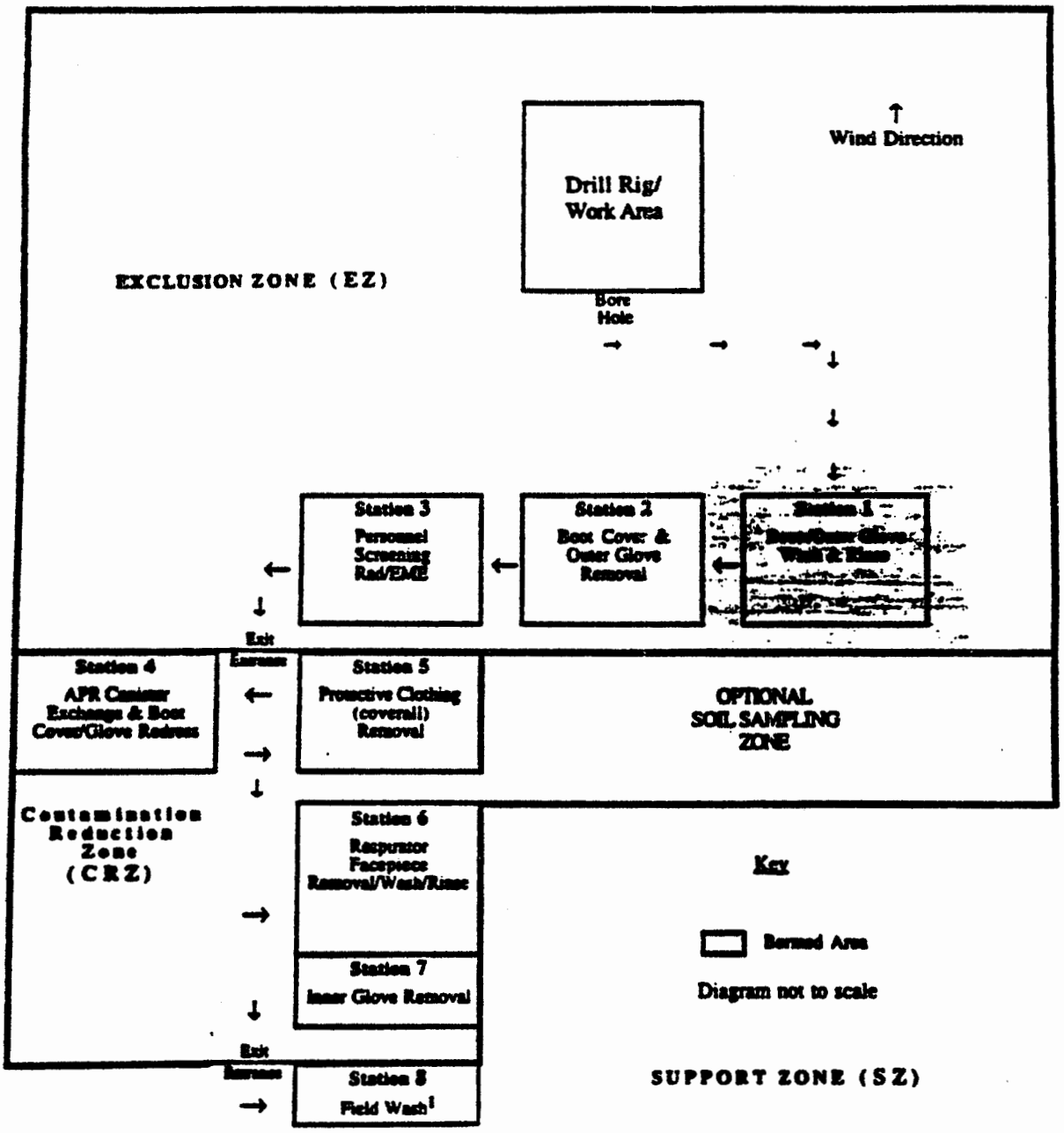
**Listed by Decon Station No.**

| Decon Stn. No. | Decon Station Function | Equipment Item(s) |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Berm Unit (e.g., 4" depth), 2 Containers (10-30 gal: shallow), Detergent Solution (≤10 gal. aqueous), 1 (2 optional) Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle), Rinse Water (≤15 gal non-potable) |
| 2 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 3 | Personnel Screening Rad/EME | Table and Plastic Sheeting (tableslip), or Plastic Drop Cloth (~3' x 3') |
| 4 | Inner Glove & Protective Clothing (Coveralls) Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 5 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Plastic Sheeting (tableslip), Table, Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |

**Listed by Equipment Item**

| Equipment Item | Quantity Per Decon station | | Total Quantity |
|---|---|---|---|
| | Decon Stn No. | Quantity | |
| Bench/Chair/Stool | 2, 4 | 1 ● each stn. (optional) | 2 (optional) |
| Berm Unit (e.g., 4" depth) | 1 | 1 | 1 |
| Bucket/Container (1-3 gal) | 5 | 1 | 1 |
| Container (10-30 gal: shallow) | 1 | 2 | 2 |
| Container/Drum (55 gal) | 2, 4 | 1 ● each stn. | 2 |
| Detergent Soln. (≤10 gal. aqueous) | 1 | 1 | 1 |
| Disposable Towels | 5 | As needed | As needed |
| Drum Liner (55 gal) | 2, 4 | 1 ● each stn. | 2 |
| Hand Soap (bar or soln) | 5 | 1 | 1 |
| Paper Towel Waste Container (non-hazardous waste) | 5 | 1 | 1 |
| Table & Plastic Sheeting (tableslip) (May substitute plastic drop cloth (~3' x 3') @ Stn. 3) | 3, 5 | 1 ● each stn. | 2 (Stn. 3 optional) |
| PPE (e.g., gloves & boot covers) | 5 | As needed per SSHASP | ← |
| Pressurized (Garden) Sprayer (3-5 gal) | 1 | 1 (2 optional) | 1 (2 optional) |
| Scrub Brush (nylon bristle) | 1 | 1 | 1 |
| Rinse Water (≤15 gal non-potable) | 1 | 1 | 1 |
| Water Container (2.5 gal ≤ x ≤10 gal ) | 5 | 1 | 1 |

# OPTION 2
# STANDARD LEVEL-C
# DECONTAMINATION FACILITY LAYOUT




[1] Note that for Level C operations (especially during hot weather), it may be advantageous and necessary to have the Field Wash Stan include a shower facility - not for decon purposes, but for field team personnel to cool down and rinse off perspiration. If a shower facility is specified in the SSHASP, a street clothing redress facility (Station 9) in sequence following Station 8 will also be necessary.

# OPTION 2
# STANDARD LEVEL-C
# DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste; the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Station No. | Decon Station Function | Procedure |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Step into container of wash detergent solution. Scrub chemical protective boots or boot covers and gloves with decon solution. Step out of wash container and into rinse container. Rinse decon solution using pressurized water sprayer; if solvent necessary, rinse with it first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 2 | Boot Cover & Outer Glove Removal | Remove boot covers (if any) and outer gloves. Deposit in lined waste container. |
| 3 | Personnel Screening Rad/EME | Screen hands, feet, and respirator (and coveralls if directed by RSP/RCT) for gross β/γ and α contamination. If any visually detectable contamination on self, wash and rinse boots, inner gloves, PC, and/or respiratory equipment until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Section 8.2 of the HASP for further guidance.) As needed, if respirator canisters get wet, exchange prior to reentering EZ.<br><br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 4 | APR Canister Exchange & Boot Cover/Glove Redress | If worker leaves EZ only to exchange APR canister or for adjustment of respirator equipment (e.g., an emergency), this is last step in decon procedure; if not, continue to Station 5 after task here is completed. Since facepiece may be contaminated and will be handled while wearing inner gloves; if facepiece is removed, decontaminate it following Station 6 instructions. After removing facepiece, remove and trash inner gloves per Station 7 instructions. After completing intended task here, don new inner/outer gloves and boot covers (and tape if in use) and return to EZ. Deposit used canisters in lined waste container located at nearby Station 8. (See note under Station 8.) |
| 5 | Protective Clothing (coverall) Removal | Remove tape (if any), then field coveralls by peeling inside out from neck down while being careful not to spread contamination from external surface of PC to street clothing, skin, or other areas. Deposit coveralls in lined waste container or neatly set them aside in relatively clean area of CRZ until reuse. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for waste PC, (2) for laundry. Also, see Section 8.2.2 of the HASP.) |
| 6 | Respirator Facepiece Removal/Wash/ Rinse | IF AT ANY TIME ANY VISABLE OR RAD CONTAMINATION WAS ON RESPIRATOR FACEPIECE, REFER TO SECTION 8.2.2 and 8.2.3 FOR FURTHER DECON INSTRUCTIONS. If no visible or rad contamination was on the facepiece, carefully remove respirator facepiece while minimizing contact between gloved hands and exposed skin/hair. Squeeze soap solution from quart size squeeze bottle onto a paper towel and use soapy towel to clean respirator appropriately. Squeeze rinse water from other quart size squeeze bottle onto paper towel or sponge and wipe respirator until rinsed sufficiently. If respirator should be sterilized, use disposable sterile wipe pads. Deposit waste items in disposable waste container at adjacent Station 5. (Note: OSHA requires respirators be cleaned and sanitized regularly by user as frequently as necessary to ensure proper protection and inspected before and after each use.) |
| 7 | Inner Glove Removal | Remove inner gloves by rolling inside out, carefully avoiding touching outer surface to skin. Deposit the gloves in the disposable waste container at nearby Station 5. |
| 8 | Field Wash | Wash exposed skin (e.g., hands and face); shower and redress in street clothes if such facilities are available on site. |

# OPTION 2
# STANDARD LEVEL-C DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

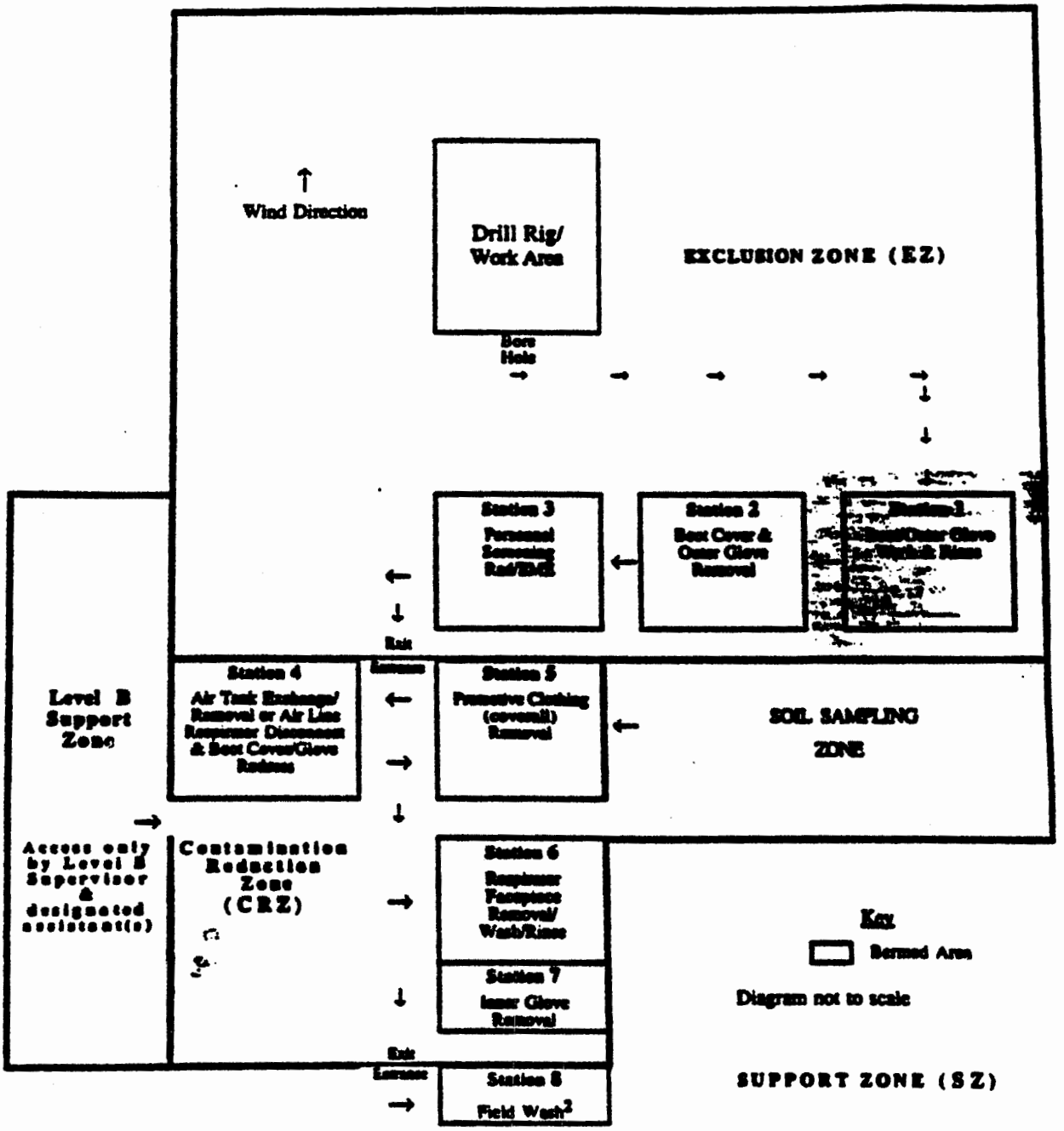
**Listed by Decon Station No.**

| Decon Stn. No. | Decon Station Function | Equipment Item(s) |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Berm Unit (e.g., 4" depth), 2 Containers (10-30 gal; shallow), Detergent Solution (≤10 gal. aqueous), 1 (2 optional) Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle), Rinse Water (≤15 gal non-potable) |
| 2 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 3 | Personnel Screening Rad/EME | Table and Plastic Sheeting (tablestip), or Plastic Drop Cloth (~3' x 3') |
| 4 | APR Canister Exchange & Boot Cover/Glove Redress | PPE (e.g., gloves & boot covers) quantity as needed per SSHASP. Plastic Drop Cloth (~ 3' x 3') or Table & Plastic Tablestip, and same supplies as Station 6 unless respirator facepiece decon step will only be done at Station 6. |
| 5 | Protective Clothing (coveralls) Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.), sealable bags for temporary storage of PC to be reused on site, indelible ink marking pen for labeling PC bag. Note: two drums are necessary if non-disposable PC will be laundered for reuse. |
| 6 | Respirator Facepiece Removal/Wash/Rinse | Disposable Towels (as needed), Disposable Sterile Wipe Pads (e.g., North Part No. 7003, as needed), Table, Plastic Sheeting (tablestip), 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water), sponge(s) |
| 7 | Inner Glove Removal | (Nothing additional necessary; used gloves can be tossed into Station 5 container/drum adjacent to table at Station 6) |
| 8 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Plastic Sheeting (tablestip), Table, Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |

**Listed by Equipment Item**

| Equipment Item | Quantity Per Decon station: Decon Stn No. | Quantity Per Decon station: Quantity | Total Quantity |
|---|---|---|---|
| Bench/Chair/Stool | 2, 5 | 1 @ each stn. (optional) | 2 (optional) |
| Berm Unit (e.g., 4" depth) | 1 | 1 | 1 |
| Bucket/Container (1-3 gal) | 8 | 1 | 1 |
| Container (10-30 gal; shallow) | 1 | 2 | 2 |
| Container/Drum (55 gal) | 2, 5 | 1 @ each stn. | 2 |
| Detergent Soln. (≤10 gal. aqueous) | 1 | 1 | 1 |
| Disposable Towels | 4, 6, 8 | As needed | As needed |
| Disposable Sterile Wipe Pads (e.g., North Part No. 7003) | 6 | As needed | As needed |
| Drum Liner (55 gal) | 2, 5 | 1 @ each stn. | 2 |
| Hand Soap (bar or soln) | 8 | 1 | 1 |
| Paper Towel Waste Container (non-hazardous waste) | 8 | 1 | 1 |
| Table & Plastic Sheeting (tablestip) (May substitute plastic drop cloth (~3' x 3') @ Stn. 3) | 3, 4, 6, 8 | 1 @ each stn. | 4 Stn. 4 optional |
| PPE (e.g., gloves & boot covers) | 4 | As needed per SSHASP | ← |
| Pressurized (Garden) Sprayer (3-5 gal) | 1 | 1 (2 optional) | 1 (2 optional) |
| Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water) | 4, 6 | 2 @ each stn. | 2 to 4 (Stn. 4 optional) |
| Scrub Brush (nylon bristle) | 1 | 1 | 1 |
| Rinse Water (≤15 gal) non-potable | 1 | 1 | 1 |
| Water Container (2.5 gal ≤ x ≤10 gal ) | 8 | 1 | 1 |

# OPTION 3
# STANDARD LEVEL-B
# DECONTAMINATION FACILITY LAYOUT




[2] Note that for Level B operations (especially during hot weather), it may be advantageous and necessary to have the Field Wash Station include a shower facility - not for decon purposes, but for field team personnel to cool down and rinse off perspiration. If a shower facility is specified in the SSHASP, a street clothing redress facility (Station 9) in sequence following Station 8 will also be necessary.

# OPTION 3
# STANDARD LEVEL-B
# DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste: the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Station No. | Decon Station Function | Procedure |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Step into container of soapy wash solution: scrub/wash chemical protective boots/boot covers & gloves. Step from wash container into rinse container. Rinse decon solution using pressurized water sprayer; if necessary, rinse with solvent first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 2 | Boot Cover/ Outer Glove Removal | Remove boot covers (if any) and outer gloves. Deposit in the waste container. |
| 3 | Personnel Screening Rad/EME | Screen hands, feet, and respirator (and coveralls if directed by RSP/RCT) for gross β/γ and α contamination. If any visually detectable contamination on suit, wash and rinse boots, inner gloves, PC, and/or respiratory equipment until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY (See Section 8.2 of the HASP for further guidance.)<br><br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 4 | Air Tank Exchange/ Removal or Air line Respirator Disconnect & Boot Cover/Glove Redoner | If worker leaves EZ only to exchange air tank, disconnect air line, or for adjustment of respirator equipment (e.g., in emergency), this is the last station in the decontamination sequence; if not, continue to Station 5 after task at this Station is completed. Level B Support Zone staff should be available to assist at this station. Doff respiratory equipment except for facepiece. Since face-piece may still be somewhat contaminated and will be handled while wearing inner gloves: if facepiece is removed, decontaminate it following Station 6 instructions. After removing facepiece, remove and trash inner gloves per Station 7 instructions. After completing intended task here, don new inner/outer gloves, boot covers, and tape; return to EZ. The Level B Supervisor or assistant(s) will decontaminate Level B equipment as needed per Level B Support Zone procedure at end of this table. |
| 5 | Protective Clothing (coveralls) Removal | Remove field coveralls by peeling inside out from neck down while being careful not to spread contamination from external surface of PC to inner clothing, skin, or other areas. Deposit coveralls in lined waste container or neatly set them aside in relatively clean area of CRZ until worn. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for waste PC, (2) for laundry. See Section 8.2.2 of the HASP.) |
| 6 | Respirator Facepiece Removal/ Wash/ Rinse | IF AT ANY TIME ANY VISIBLE OR RAD CONTAMINATION WAS ON RESPIRATOR FACEPIECE, REFER TO LEVEL B SOP FOR FURTHER DECON INSTRUCTIONS. If no visible or rad contamination was on facepiece, carefully remove facepiece while maximizing contact between gloved hands and exposed skin/hair. Squeeze soap solution from quart size squeeze bottle onto paper towel and use towel to clean respirator appropriately. Squeeze rinse water from other quart size squeeze bottle onto paper towel/sponge and wipe respirator until rinsed sufficiently. If respirator should be sterilized, use disposable sterile wipe pads. Deposit waste items in disposable waste container at Stn. 5. (Note: OSHA requires respirators be cleaned/sanitized regularly by user as frequently as necessary to ensure proper protection, and inspected before/after each use.) |
| 7 | Inner Glove Removal | Remove inner gloves by rolling inside out, carefully avoiding touching outer surface to skin. Deposit gloves in the disposable waste container at nearby Station 5. |
| 8 | Field Wash | Wash exposed skin (hands/face); shower/redress in street clothes if facilities available on site. |
| Level B Support Zone | | Level B Supervisor or designated assistant(s) will assist field team members with donning, adjusting, decon. and removal of Level B respiratory equipment. Respirator tanks, hoses, air lines, and other reusable equipment other than facepieces should be washed with detergent solution using a pressurized sprayer, scrub brush, sponge, and/or squeeze bottle. Rinse equipment using water in a pressurized sprayer or squeeze bottle. If solvent rinse necessary, subsequently rinse with water. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. Any disposable items should be deposed in the disposable waste container at Stn. 5 or a similar container located at this Station. Level B Support Zone staff shall decontaminate themselves following procedures for Stations 5 & 7 prior to exiting the CRZ. (Note respirator facepieces are screened per Stn 3 instructions and decontaminated per Stn. 6 instructions.) |

# OPTION 3
# STANDARD LEVEL-B DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

## Listed by Decon Station No.

| Decon Stn. No. | Decon Station Function | Equipment Item(s) |
|---|---|---|
| 1 | Boot/Outer Glove Wash & Rinse | Berm Unit (e.g., 4" depth), 2 Containers (10-30 gal. shallow), Detergent Solution (≤10 gal. aqueous), 1 (2 optional) Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle), Rinse Water (≤15 gal non-potable) |
| 2 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 3 | Personnel Screening Rad/EME | Table, Plastic Sheeting (tabletop). |
| 4 | Air Tank Exchange/ Removal or Air Line Disconnect & Boot Cover/Glove Redress | PPE (e.g., gloves & tape covers) quantity as needed per SSHASP, Bench/Chair/Stool (optional) |
| 5 | Protective Clothing (coveralls) Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.), sealable bags for temporary storage of PC to be reused on site, indelible ink marking pen for labeling PC bag. Note: two drums are necessary if non-disposable PC will be laundered for reuse |
| 6 | Respirator Facepiece Removal/Wash/Rinse | Disposable Towels (as needed), Disposable Sterile Wipe Pads (e.g., North Part No. 7003, as needed), Table, Plastic Sheeting (tabletop), 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water), sponge |
| 7 | Inner Glove Removal | (Nothing additional necessary, used gloves can be reused onto Station 3 container/drum adjacent to table at Station 6) |
| 8 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Plastic Sheeting (tabletop), Table, Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |
| Level B Support Zone | | Optional, to be specified in SSHASP or Level B SOP: Berm Unit (e.g., 4" depth), 2 Containers (10-30 gal. shallow), Detergent Solution (≤30 gal. aqueous), 2 Pressurized (garden) Sprayers (3-5 gal), Scrub Brush(es) (nylon bristle), Sponge(s), 2 Quart Size Squeeze Bottles, Plastic Drop Cloth (size to contain all Level B equipment/supplies), (optional) Table and Plastic Sheeting (tabletop), Container/Drum (55 gal.) & Drum Liner (optional if necessary or Station 4 sufficient for all CBZ disposable waste). |

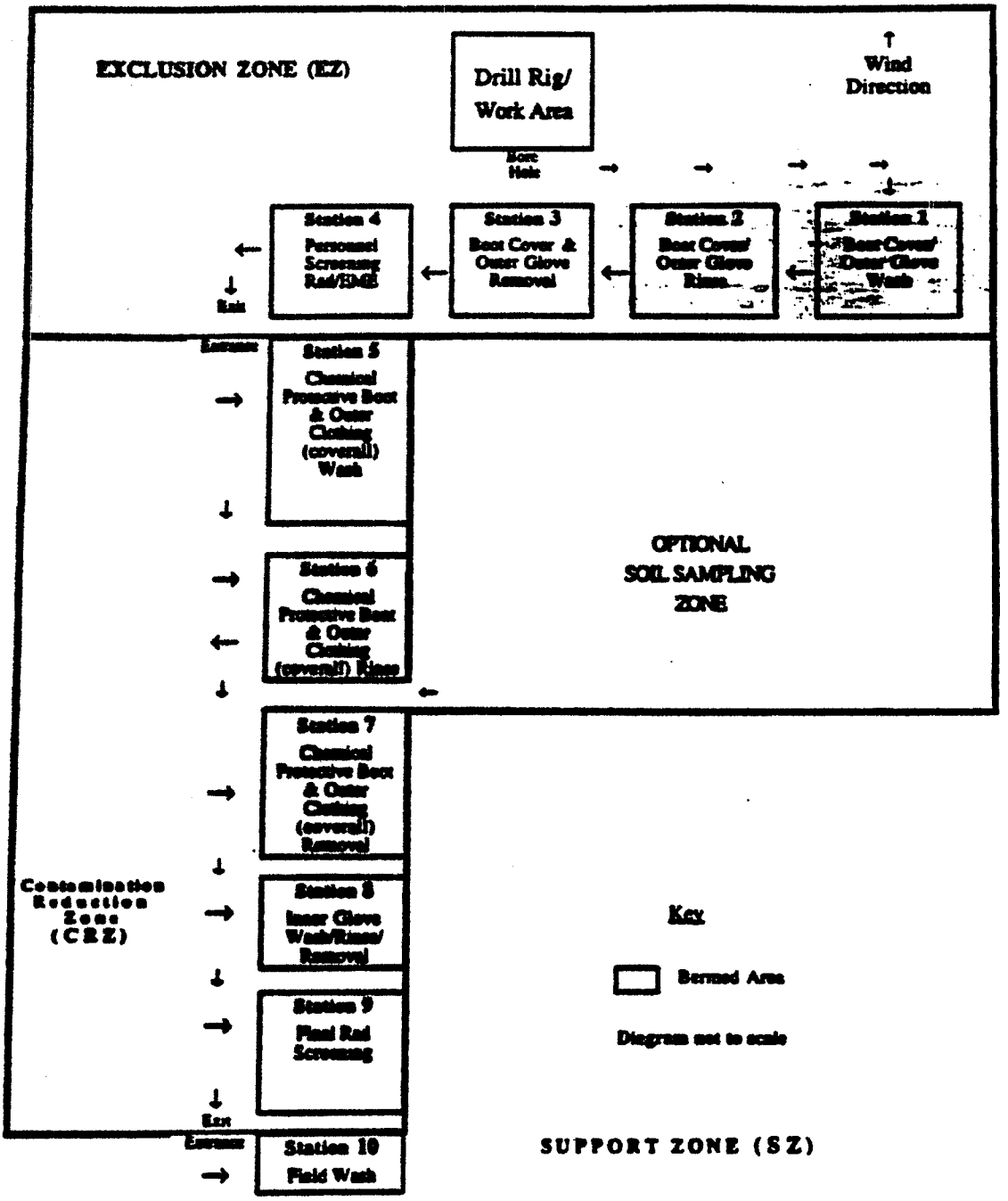
## Listed by Equipment Item

| Equipment Item | Quantity Per Decon station: Decon Stn No. | Quantity Per Decon station: Quantity | Total Quantity |
|---|---|---|---|
| Bench/Chair/Stool | 2, 4, 5, LBSZ[5] | 1 ● each stn. | 4 (optional) |
| Berm Unit (e.g., 4" depth) | 1, LBSZ | 1 ● each stn. | 2 |
| Bucket/Container (1-3 gal) | 8 | 1 | 1 |
| Container (10-30 gal; shallow) | 1, LBSZ | 2 ● each stn. | 2 to 4 (LBSZ optional) |
| Container/Drum (55 gal) | 2, 5, LBZX | 1 ● each stn. | 3 (LBSZ optional) |
| Detergent Soln. (≤10 gal. aqueous) | 1, LBSZ | 1 ● each stn. | 2 (LBSZ optional) |
| Disposable Towels | 4, 6, 8, LBSZ | As needed | As needed |
| Disposable Sterile Wipe Pads (e.g., North Part No 7003) | 4, 6 | As needed | As needed |
| Drop Cloth (plastic, size to contain all Level B equipment/supplies) | LBSZ | 1 | 1 |
| Drum Liner (55 gal) | 2, 5, LBSZ | 1 ● each stn | 3 (LBSZ optional) |
| Hand Soap (bar or soln) | 8, LBSZ | 1 ● each stn. | 1 (LBSZ optional) |
| Paper Towel Waste Container (non-hazardous waste) | 8 | 1 | 1 |
| Table & Plastic Sheeting (tabletop) | 3, 6, 8, LBSZ | 1 ● each stn | 4 (LBSZ optional) |
| PPE (e.g., gloves, tape, & boot covers) | 4 | As needed per SSHASP | As needed |
| Pressurized (Garden) Sprayer (3-5 gal) | 1, LBSZ | 1 ● each stn. max., 2 if solvent used | 2 to 4 (LBSZ optional) |
| Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water) | 6, LBSZ | 2 ● each stn. | 2 to 4 (LBSZ optional) |
| Scrub Brush (nylon bristle) | 1, LBSZ | 1 ● each stn | 2 (LBSZ optional) |
| Sponge(s) | 4 | 1 ● each stn | 1 |
| Rinse Water (≤15 gal) non-potable | 1, LBSZ | 1 ● each stn | 2 (LBSZ optional) |
| Water Container (2.5 gal ≤ x ≤10 gal non-potable) | 8 | 1 | 1 |

[5] LBSZ = Level B Support Zone

## OPTION 4

## EXTENSIVE LEVEL-D
## DECONTAMINATION FACILITY LAYOUT



# OPTION 4
# EXTENSIVE LEVEL-D
# DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste, the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Stn. No. | Decon Station Function | Procedure |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Step into container of wash detergent solution. Scrub boot covers and gloves with decon solution; if necessary, use detergent solution in pressurized sprayer to remove visible contamination. Step out of wash container and into Station 2 rinse container. |
| 2 | Boot Cover/Outer Glove Rinse | Rinse boot covers and gloves using pressurized water sprayer; if solvent necessary, rinse with it first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 3 | Boot Cover & Outer Glove Removal | Remove outer boots, tape (if any accessible), and outer gloves. Deposit in lined waste container. |
| 4 | Personnel Screening Rad/EME | Screen hands and feet (and coveralls if directed by RSP/RCT) for gross $\beta/\gamma$ and $\alpha$ contamination. If any visually detectable contamination on self, wash and rinse boots, inner gloves, and/or PC until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY (See Section 8.2 of the HASP for further guidance.)<br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 5 | Chemical Protective Boot & Outer Clothing (coverall) Wash | Wash chemical protective boots & outer clothing (coverall) using pressurized sprayer containing detergent solution. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. Be careful not to get respirator canisters wet if they will still be used. |
| 6 | Chemical Protective Boot & Outer Clothing (coverall) Rinse | Rinse chemical protective boots & outer clothing (coverall) using pressurized sprayer containing rinse water. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. Be careful not to get respirator canisters wet if they will still be used. |
| 7 | Chemical Protective Boot & Outer Clothing (coverall) Removal | Remove tape (if any), then field coveralls by peeling inside out from neck down while being careful not to spread contamination from external surface of PC to street clothing, skin, or other areas. Deposit coveralls in lined waste container or neatly set them aside in relatively clean area of CRZ until reuse. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for waste PC, (2) for laundry. Also, see Section 8.2.2 of the HASP.) |
| 8 | Inner Glove Wash/Rinse/ Removal | Wash inner gloves using soap solution, then rinse gloves using water in squeeze bottle. Remove inner gloves by rolling inside out, carefully avoiding touching outer surface to skin. Deposit the gloves in the disposable waste container at nearby Station 7. |
| 9 | Final Rad Screening | Screen hands and feet (and body if so directed by RSP/RCT) for gross $\beta/\gamma$ and $\alpha$ contamination. IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT RSP/RCT IMMEDIATELY. As needed, wash and rinse hands and/or other exposed skin until levels of detection during screening are ≤ background levels prior to exiting the CRZ. |
| 10 | Field Wash | Wash exposed skin (e.g., hands and face); shower and redress in street clothes if such facilities are available on site. |

# OPTION 4
# EXTENSIVE LEVEL-D DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

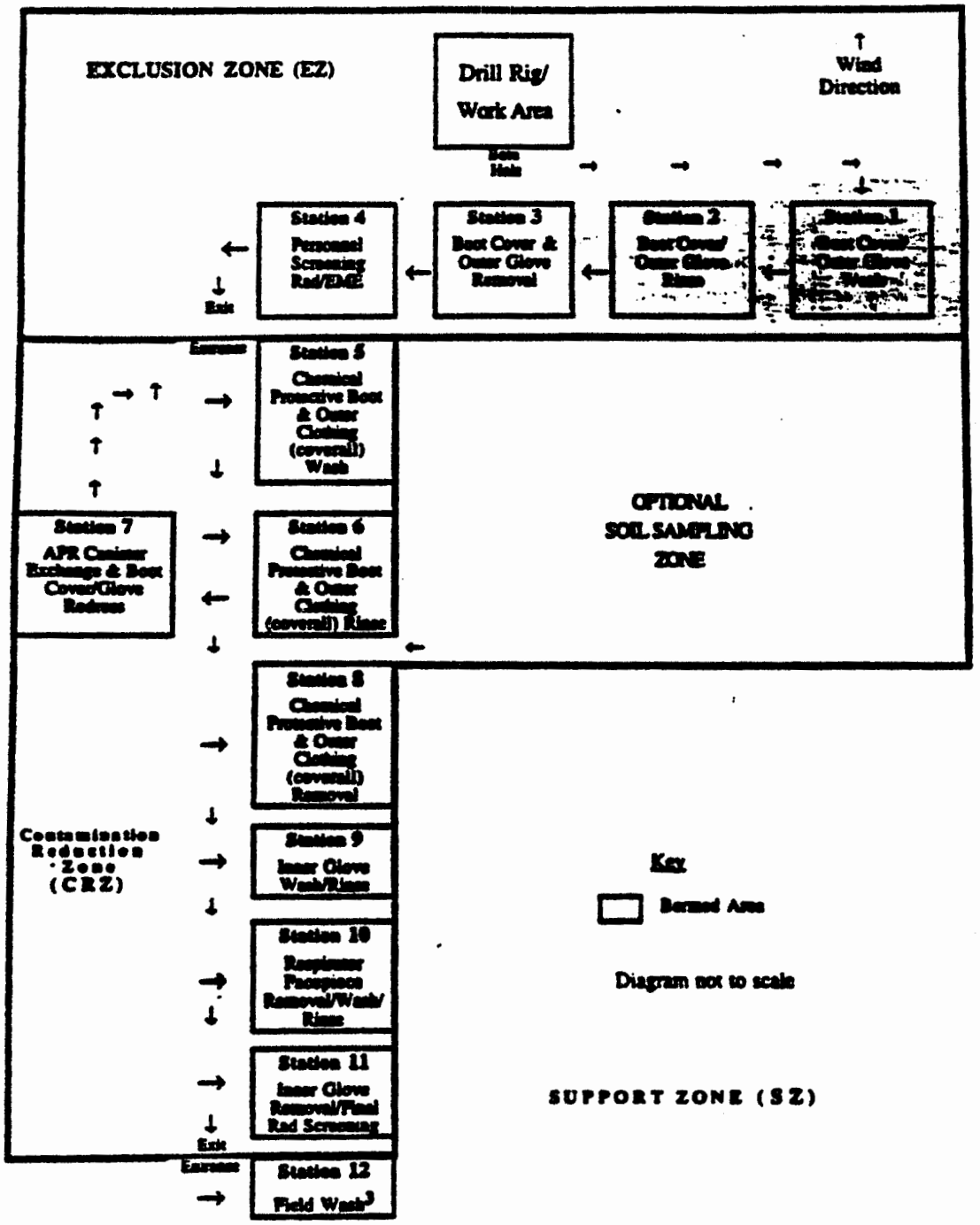
## Listed by Decon Station No.

| Decon Stn. No. | Decon Station Function | Equipment Items |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 2 | Boot Cover/Outer Glove Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal non-potable) |
| 3 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 4 | Personnel Screening Rad/EME | Table, Plastic Sheeting (tableslip), rad/EME screening instruments (dedicated to EZ) |
| 5 | Chemical Protective Boot/Clothing Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 6 | Chemical Protective Boot/Clothing Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal. non-potable) |
| 7 | Chemical Protective Boot/Clothing Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 8 | Inner Glove Removal | (Nothing additional necessary; used gloves can be tossed into Station 7 container/drum adjacent to table at Station 9) |
| 9 | Final Rad Screening | Table, Plastic Sheeting (tableslip), rad screening instruments (dedicated to CRZ) |
| 10 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Table, Plastic Sheeting (tableslip), Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |

## Listed by Equipment Item

| Equipment Item | Quantity Per Decon station: Decon Stn No. | Quantity Per Decon station: Quantity | Total Quantity |
|---|---|---|---|
| Bench/Chair/Stool | 3, 2 | 1 @ each stn. | 2 (optional) |
| Berm Unit (e.g., 4" depth) | 1, 2, 5, 6 | 1 each for stns. 1 & 2, and 5 & 6 | 2 |
| Bucket/Container (1-3 gal) | 10 | 1 | 1 |
| Container (10-30 gal; shallow) | 1, 2, 5, 6 | 1 @ each stn. | 4 |
| Container/Drum (55 gal) | 3, 7 | 1 @ each stn. | 2 |
| Detergent Soln. (≤30 gal. aqueous) | 1, 5 | 1 @ each stn. | 2 |
| Disposable Towels | 10 | As needed | As needed |
| Drum Liner (55 gal) | 3, 7 | 1 @ each stn. | 2 |
| Hand Soap (bar or soln) | 10 | 1 | 1 |
| Paper Towel Waste Container (non-hazardous waste) | 10 | 1 | 1 |
| Table & Plastic Sheeting (tableslip) | 4 8 10 | 1 @ each stn. | 3 |
| Pressurized (Garden) Sprayer (3-5 gal) | 1, 2, 5, 6 | 1 @ each stn., 2 @ Stns. 2 & 6 if solvent used | 4 to 6 |
| Scrub Brush (nylon bristle) | 1 5 | 1 @ each stn | 2 |
| Rinse Water (≤30 gal) non-potable | 2 6 | 1 @ each stn. | 2 |
| Water Container (2.5 gal ≤ x ≤10 gal non-potable) | 10 | 1 | 1 |

# OPTION 5
# EXTENSIVE LEVEL-C
# DECONTAMINATION FACILITY LAYOUT




[3] Note that for Level C operations (especially during hot weather), it may be advantageous and necessary to have the Field Wash Station include a shower facility - not for decon purposes, but for field team personnel to cool down and rinse off perspiration. If a shower facility is specified in the SSHASP, a street clothing redress facility (Station 13) in sequence following Station 12 will also be necessary.

# OPTION 5
## EXTENSIVE LEVEL-C DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste; the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Sta. No. | Decon Station Function | Procedure |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Step into container of wash detergent solution. Scrub boot covers and gloves with decon solution; if necessary, use detergent solution in pressurized sprayer to remove visible contamination. Step out of wash container and into Station 2 rinse container. |
| 2 | Boot Cover/Outer Glove Rinse | Rinse boot covers and gloves using pressurized water sprayer; if solvent necessary, rinse with it first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 3 | Boot Cover/Outer Glove Removal | Remove outer boots, tape (if any accessible), and outer gloves. Deposit in lined waste container. |
| 4 | Personnel Screening Rad/EME | Screen hands, feet, and respirator (and coveralls if directed by RSP/RCT) for gross β/γ and α contamination. If any visually detectable contamination on self, wash and rinse boots, inner gloves, PC, and/or respiratory equipment until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY (See Section 8.2 of the HASP for further guidance.)<br><br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 5 | Chemical Protective Boot & Protective Clothing Wash | Wash chemical protective boots & protective clothing using pressurized sprayer containing soap solution. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water; careful not to get respirator canisters wet if they'll be reused |
| 6 | Chemical Protective Boot & Protective Clothing Rinse | Rinse chemical protective boots & protective clothing using pressurized sprayer containing rinse water. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water; be careful not to get respirator canisters wet if they'll be reused |
| 7 | APR Canister Exchange & Boot Cover/Glove & Tape Redress | If worker leaves EZ only to exchange APR canister or for adjustment of respirator equipment (e.g., an emergency), this is last step in decon procedure; if not, continue to Station 8 after task here is completed. Since facepiece may be contaminated and will be handled while wearing inner gloves; if facepiece is removed, decontaminate it following Stations 9 & 10 instructions. After removing facepiece, remove and trash inner gloves per Station 11 instructions. After completing intended task here, don new inner/outer gloves and boot covers (and tape if in use) and return to EZ. Deposit used canisters in lined waste container located at nearby Station 8. (See note under Station 8.) |
| 8 | Chemical Protective Boot & Protective Clothing Removal | Remove tape (if any), then field coveralls by peeling inside out from neck down while being careful not to spread contamination from external surface of PC to street clothing, skin, or other areas. Deposit coveralls in lined waste container or neatly set aside in relatively clean area of CRZ until reuse. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for waste PC, (2) for laundry. Also, see Section 8.2.2 of the HASP.) |
| 9 | Inner Glove Wash/Rinse | Rinse inner gloves using water in squeeze bottle. |
| 10 | Respirator Facepiece Removal/Wash/ Rinse | IF AT ANY TIME ANY VISABLE OR RAD CONTAMINATION WAS ON RESPIRATOR FACEPIECE, REFER TO LEVEL B SOP FOR FURTHER DECON INSTRUCTIONS. If no visible or rad contamination was on the facepiece, carefully remove respirator facepiece while minimizing contact between gloved hands and exposed skin/hair. Squeeze soap solution from quart size squeeze bottle onto a paper towel and use soapy towel to clean respirator appropriately. Squeeze rinse water from other quart size squeeze bottle onto paper towel or sponge and wipe respirator until rinsed sufficiently. If respirator should be sterilized, use disposable sterile wipe pads. Deposit waste items in disposable waste container at adjacent Station 8. (Note: OSHA requires respirators be cleaned and sanitized regularly by user as frequently as necessary to ensure proper protection and inspected before and after each use.) |
| 11 | Inner Glove Removal & Final Rad Screening | Remove inner gloves by rolling inside out, carefully avoiding touching outer surface to skin. Deposit the gloves in the disposable waste container at nearby Station 8. Screen hands and feet (and body if so directed by RSP/RCT) for gross β/γ and α contamination. IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT RSP/RCT IMMEDIATELY. As needed, wash and rinse hands and/or other exposed skin until levels of detection during screening are ≤ background levels prior to exiting the CRZ. |
| 12 | Field Wash | Wash exposed skin (e.g., hands and face); shower and redress in street clothes if such facilities are available on site. |

# OPTION 5
# EXTENSIVE LEVEL-C DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

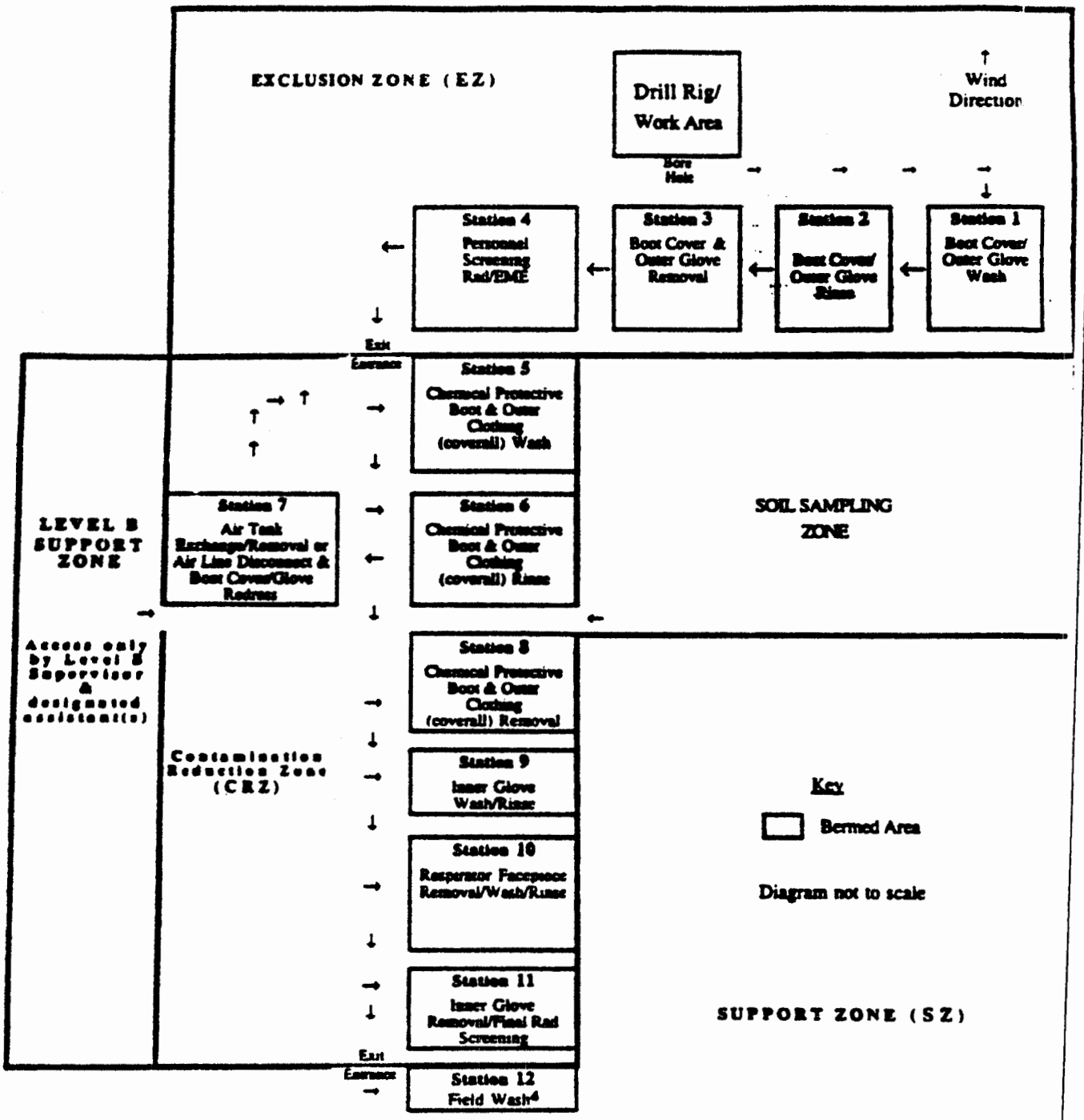
## Listed by Decon Station No.

| Decon Stn. No. | Decon Station Function | Equipment Items |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 2 | Boot Cover/Outer Glove Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal non-potable) |
| 3 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 4 | Personnel Screening Rad/EME | Table, Plastic Sheeting (tabletop), rad/EME screening instruments (dedicated to EZ) |
| 5 | Chemical Protective Boot/Clothing Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 6 | Chemical Protective Boot/Clothing Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal; shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal. non-potable) |
| 7 | APR Canister Exchange & Boot Cover/Glove Redress | PPE (e.g., gloves, tape, & boot covers) quantity as needed per SSHASP, Plastic Drop Cloth (~ 3' x 3') or Table and Plastic Sheeting (tabletop), and same supplies as Station 10 unless respirator facepiece decon step will only be done at Station 10 |
| 8 | Chemical Protective Boot/Clothing Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 9 | Inner Glove Wash/Rinse | 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water); (use same table as Station 11) |
| 10 | Respirator Facepiece Removal/Wash/Rinse | Disposable Towels (as needed), Disposable Sterile Wipe Pads (e.g., North Part No. 7003, as needed), Plastic Sheeting (tabletop), 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water), sponge; (use same table as Station 11) |
| 11 | Inner Glove Removal & Final Rad Screening | Table, Plastic Sheeting (tabletop), rad screening instruments (dedicated to CRZ), gloves can be tossed into waste container at Station 8 |
| 12 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Table and Plastic Sheeting (tabletop), Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |

## Listed by Equipment Item

| Equipment Item | Quantity Per Decon Station: Decon Stn No. | Quantity Per Decon Station: Quantity | Total Quantity |
|---|---|---|---|
| Bench/Chair/Stool | 3, 8 | 1 @ each stn. | 2 (optional) |
| Berm Unit (e.g., 4" depth) | 1, 2, 5, 6 | 1 each for stns. 1 & 2, and 5 & 6 | 2 |
| Bucket/Container (1-3 gal) | 12 | 1 | 1 |
| Container (10-30 gal. shallow) | 1, 2, 5, 6 | 1 @ each stn. | 4 |
| Container/Drum (55 gal) | 3, 8 | 1 @ each stn. | 2 |
| Detergent Soln. (≤30 gal. aqueous) | 1, 5 | 1 @ each stn. | 2 |
| Disposable Towels | 7, 10, 12 | As needed | As needed |
| Disposable Sterile Wipe Pads (e.g., North Part No. 7003) | 7, 10 | As needed | As needed |
| Drum Liner (55 gal) | 3, 8 | 1 @ each stn. | 2 |
| Hand Soap (bar or soln) | 12 | 1 | 1 |
| Paper Towel Waste Container (non-hazardous waste) | 12 | 1 | 1 |
| Table & Plastic Sheeting (tabletop) | 4, 7, 12 | 1 @ each stn. | 3 |
| PPE (e.g., gloves, tape, & boot covers) | 7 | As needed per SSHASP | As needed |
| Pressurized (Garden) Sprayer (3-5 gal) | 1, 2, 5, 6 | 1 @ each stn., 2 @ Stns. 2 & 6 if solvent used | 4 to 6 |
| Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water) | 7, 10 | 2 @ each stn. | 4 |
| Scrub Brush (nylon bristle) | 1, 5 | 1 @ each stn. | 2 |
| Rinse Water (≤30 gal) non-potable | 2, 6 | 1 @ each stn. | 2 |
| Water Container (2.5 gal ≤ x ≤ 10 gal non-potable) | 12 | 1 | 1 |

# OPTION 6
# EXTENSIVE LEVEL-B
# DECONTAMINATION FACILITY LAYOUT




[4] Note that for Level B operations (especially during hot weather), it may be advantageous and necessary to have the Field Wash Station shower facility - not for decon purposes, but for field team personnel to cool down and rinse off perspiration. If a shower facility is used, the SSHASP, a street clothing redress facility (Station 13) in sequence following Station 12 will also be necessary.

## OPTION 6

## EXTENSIVE LEVEL-B DECONTAMINATION PROCEDURES

For waste management purposes and to minimize generation of mixed waste; the RCT, HPT, or RSP should scan the boots, gloves, and soiled areas of other PPE before personnel proceed to decon station 1. If contamination is detected, initiate rad decon procedure as directed by the RCT, HPT, or RSP before proceeding to decon station 1.

| Decon Stn. No. | Decon Station [illegible] | Procedure |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Step into container of wash detergent solution. Scrub boot covers and gloves with decon solution; if necessary, use detergent solution in pressurized sprayer to remove visible contamination. Step out of wash container and into Station 2 rinse container. |
| 2 | Boot Cover/Outer Glove Rinse | Rinse boot covers and gloves using pressurized water sprayer; if solvent necessary, rinse with it first followed by water rinse. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 3 | Boot Cover & Outer Glove Removal | Remove outer boots, tape (if any accessible), and outer gloves. Deposit in lined waste container. |
| 4 | Personnel Screening Rad/EME | Screen hands, feet, and respirator (and coveralls if directed by RSP/RCT) for gross β/γ and α contamination. If any visable contamination on self, wash and rinse boots, inner gloves, PC, and/or respiratory equipment until levels detected during screening are ≤ background levels. If contamination detected still > background levels CONTACT SSO OR RSP/RCT IMMEDIATELY (See Section 8.2 of the HASP for further guidance.)<br><br>This also is station for removing EME covering prior to transport into CRZ. Screen EME first; if contamination detected ≤ background levels, remove covering and deposit in lined waste container at Station 2 prior to carrying EME into CRZ. NOTE: IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT SSO OR RSP/RCT IMMEDIATELY. (See Sections 8.2.1 and 8.2.3 of the HASP for further guidance.) |
| 5 | Chemical Protective Boot/Protective Clothing/ Respiratory Equip. Wash | Wash chemical protective boots, outer clothing (coverall), and respiratory equipment using pressurized sprayer containing detergent solution. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 6 | Chemical Protective Boot/Clothing/ Respiratory Equip. Rinse | Rinse chemical protective boots, outer clothing (coverall), and respiratory equipment using pressurized sprayer containing rinse water. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. |
| 7 | Air Tank Exchange/ Removal or Air Line Disconnect & Boot Cover/Glove & Tape Redress | If worker leaves EZ only to exchange air tank, disconnect air line, or for adjustment of respirator equipment (e.g., an emergency), this is the last station in the decontamination sequence; if not, continue to Station 8 after task at this Station is completed. Level B Support Zone staff should be available to assist at this station. Doff respiratory equipment except for facepiece. Since the facepiece may still be somewhat contaminated and will be handled while wearing inner gloves; if facepiece is removed, decontaminate it following Stations 9 & 10 instructions. After removing facepiece, remove and trash inner gloves per Station 11 instructions. After completing intended task at this Station, don new inner and outer gloves, boot covers, and tape and return to EZ. The Level B Supervisor or assistant(s) will decontaminate the Level B equipment as needed per Level B Support Zone procedure at end of this table. |
| 8 | Chemical Protective Boot & Protective Clothing Removal | Remove tape (if any), then field coveralls by peeling inside out from neck down while being careful not to spread contamination from external surface of PC to street clothing, skin, or other areas. Deposit coveralls in lined waste container or neatly set them aside in relatively clean area of CRZ until reuse. (Note: If PC will be laundered rather than disposed, there must be separate, lined, clearly labeled containers available at this station: (1) for waste PC, (2) for laundry. Also, see Section 8.2.2 of the HASP.) |
| 9 | Inner Glove Wash/Rinse | Rinse inner gloves using water in squeeze bottle. |

(continued)

## OPTION 6
## [illegible] LEVEL B DECONTAMINATION PROCEDURES (cont'd)

| Decon Sta. No. | Decon Station [illegible] | [illegible] Procedure |
|---|---|---|
| 10 | Respirator Facepiece Removal/Wash/ Rinse | IF AT ANY TIME ANY VISABLE OR RAD CONTAMINATION WAS ON RESPIRATOR FACEPIECE, REFER TO LEVEL B SOP FOR FURTHER DECON INSTRUCTIONS. If no visible or rad contamination was on the facepiece, carefully remove respirator facepiece while minimizing contact between gloved hands and exposed skin/hair. Squeeze soap solution from quart size squeeze bottle onto a paper towel and use soapy towel to clean respirator appropriately. Squeeze rinse water from other quart size squeeze bottle onto paper towel or sponge and wipe respirator until rinsed sufficiently. If respirator should be sterilized, use disposable sterile wipe pads. Deposit waste items in disposable waste container at adjacent Station 8. (Note: OSHA requires respirators be cleaned and sanitized regularly by user as frequently as necessary to ensure proper protection and inspected before and after each use.) |
| 11 | Inner Glove Removal & Final Rad Screening | Remove inner gloves by rolling inside out, carefully avoiding touching outer surface to skin. Deposit the gloves in the disposable waste container at nearby Station 8.<br><br>Screen hands and feet (and body if so directed by RSP/RCT) for gross β/γ and α contamination. IF ANY CONTAMINATION DETECTED > BACKGROUND LEVELS, CONTACT RSP/RCT IMMEDIATELY. As needed, wash and rinse hands and/or other exposed skin until levels of detection during screening are ≤ background levels prior to exiting the CRZ. |
| 12 | Field Wash | Wash exposed skin (e.g., hands and face); shower and redress in street clothes if such facilities are available on site. |
| Level B Support Zone | | Level B Supervisor or designated assistant(s) will assist field team members with donning, adjusting, decon, and removal of Level B respiratory equipment. Respirator tanks, hoses, air lines, and other reusable equipment other than facepieces should be washed with detergent solution using a pressurized sprayer, scrub brush, sponge, and/or squeeze bottle. Rinse equipment using water in a pressurized sprayer or squeeze bottle. If solvent rinse necessary, subsequently rinse with water. Rinse effectively but sparingly to minimize generation of large amounts of potentially contaminated water. Any disposable items should be disposed in the disposable waste container at Station 5 or a similar container located at this Station. Level B Support Zone staff shall decontaminate themselves following procedures for Stations 5, 6, 8, 9, &11 prior to exiting the CRZ. (Note respirator facepieces are screened per Station 4 instructions and decontaminated per Station 10 instructions.) |

# OPTION 6
# EXTENSIVE LEVEL-B DECONTAMINATION
# SUGGESTED FACILITY EQUIPMENT

## Listed by Decon Station No.

| Decon Stn. No. | Decon Station Function | Equipment Items |
|---|---|---|
| 1 | Boot Cover/Outer Glove Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 2 | Boot Cover/Outer Glove Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal. non-potable) |
| 3 | Boot Cover & Outer Glove Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 4 | Personnel Screening Rad/EME | Table, Plastic Sheeting (tabletop), rad/EME screening instruments (dedicated to EZ) |
| 5 | Chemical Protective Boot & Outer Clothing (coveralls) Wash | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), Detergent Solution (≤30 gal. aqueous), 1 Pressurized (garden) Sprayer (3-5 gal), 1 Scrub Brush (nylon bristle) |
| 6 | Chemical Protective Boot & Outer Clothing (coveralls) Rinse | Berm Unit (e.g., 4" depth), 1 Container (10-30 gal. shallow), 1 Pressurized (garden) Sprayer (3-5 gal), Rinse Water (≤30 gal. non-potable) |
| 7 | Air Tank Exchange/ Removal or Air Line Disconnect & Boot Cover/Glove Redress | PPE (e.g., gloves & boot covers) quantity as needed per SSHASP, Bench/ Chair/Stool (optional) |
| 8 | Chemical Protective Boot & Outer Clothing (coveralls) Removal | Bench/Chair/Stool (optional), Container/Drum (55 gal.), Drum Liner (55 gal.) |
| 9 | Inner Glove Wash/Rinse | 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water), (see same table as Station 11) |
| 10 | Respirator Facepiece Removal/Wash/Rinse | Disposable Towels (as needed), Disposable Sterile Wipe Pads (e.g., North Part No 7003, as needed), Plastic Sheeting (tabletop), 2 Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water), sponge, (see same table as Station 11) |
| 11 | Inner Glove Removal & Final Rad Screening | Table, Plastic Sheeting (tabletop), rad screening instruments (dedicated to CRZ), gloves can be tossed into waste container at Station 8 |
| 12 | Field Wash | Bucket/Container (1-3 gal.), Disposable Towels (as needed), Hand Soap (bar or soln.), Paper Towel Waste Container (non-hazardous waste), Table, Plastic Sheeting (tabletop), Water Container (2.5 ≤ x ≤ 10 gal. non-potable) |
| | Level B Support Zone | Optional, to be specified in SSHASP or Level B SOP: Berm Unit (e.g., 4" depth), 2 Containers (10-30 gal. shallow), Detergent Solution (≤30 gal. aqueous), 2 Pressurized (garden) Sprayers (3-5 gal), Scrub Brush(es) (nylon bristle), Sponge(s), 2 Quart Size Squeeze Bottles, Plastic Drop Cloth (size to contain all Level B equipment/supplies) (optional) Table and Plastic Sheeting (tabletop), Container/Drum (55 gal.) & Drum Liner (optional if container or Station 8 sufficient for all CRZ disposable waste) |

## Listed by Equipment Item

| Equipment Item | Quantity Per Decon station: Decon Stn No. | Quantity Per Decon station: Quantity | Total Quantity |
|---|---|---|---|
| Bench/Chair/Stool | 2, 4, 5, LBSZ | 1 ● each stn | 4 (optional) |
| Berm Unit (e.g., 4" depth) | 1, 2, 5, 6 | 1 each for stns 1 & 2, and 5 & 6 | 2 |
| Bucket/Container (1-3 gal) | 12 | 1 | 1 |
| Container (10-30 gal. shallow) | 1, 2, 5, 6, LBSZ | 1 ● each stn | 5 (LBSZ optional) |
| Container/Drum (55 gal) | 3, 8, LBZX | 1 ● each stn | 3 (LBSZ optional) |
| Detergent Soln. (≤30 gal. aqueous) | 1, 5, LBSZ | 1 ● each stn | 3 (LBSZ optional) |
| Disposable Towels | 10, 12, LBSZ | As needed | As needed |
| Disposable Sterile Wipe Pads (e.g., North Part No 7003) | 10, LBSZ | As needed | As needed |
| Drop Cloth (plastic, size to contain all Level B equipment/supplies) | LBSZ | 1 | 1 |
| Drum Liner (55 gal) | 3, 8, LBZX | 1 ● each stn | 3 (LBSZ optional) |
| Hand Soap (bar or soln) | 12, LBSZ | 1 ● each stn | 1 (LBSZ optional) |
| Paper Towel Waste Container (non-hazardous waste) | 12 | 1 | 1 |
| Table & Plastic Sheeting (tabletop) | 4, 11, 12, LBSZ | 1 ● each stn | 4 (LBSZ optional) |
| PPE (e.g., gloves, tape, & boot covers) | | As needed per SSHASP | As needed |
| Pressurized (Garden) Sprayer (3-5 gal) | 1, 2, 5, 6, LBSZ | 1 ● each stn.<br>2 ● Stns 2, 6, LBSZ if solvent used | 5 to 8 (LBSZ optional) |
| Qt.-size Squeeze Bottles (1 with liq. soap soln. & 1 with rinse water) | 10, LBSZ | 2 ● each stn | 6 (LBSZ optional) |
| Scrub Brush (nylon bristle) | 1, 5, LBSZ | 1 ● each stn | 3 (LBSZ optional) |
| Sponge(s) | 10, LBSZ | 1 ● each stn | 2 (LBSZ optional) |
| Rinse Water (≤30 gal) non-potable | 2, 6, LBSZ | ● each stn | 3 (LBSZ optional) |
| Water Container (2.5 gal ≤ x ≤ 10 gal non-potable | [illegible] | 1 | |

## Appendix E

## PHYSICIAN CERTIFICATION OF MEDICAL EVALUATION FORM

# PHYSICIAN CERTIFICATION OF MEDICAL EVALUATION

**COMPLETE PRIOR TO EMPLOYEE BEGINNING ASSIGNMENT AT LANL AND RETURN TO:**

Los Alamos National Laboratory, Occupational Medicine Group.
Mail Stop D421, Los Alamos, NM 87545
Phone: 505/667-7890
Fax: 505/665-7879

**INFORMATION PROVIDED BY REQUESTING EMPLOYER:**

| EMPLOYER: | EMPLOYEE: |
|---|---|
| Name: _____ | Name: _____ |
| Mailing Address: _____ | DOB: _____ |
| City, State, Zip: _____ | SS #: _____ |
| Phone: _____ | |
| FAX Number: _____ | |

**Description of LANL Job Assignment/Tasks:** _____

**REQUIRED MEDICAL SURVEILLANCE/CERTIFICATION (SEE APPLICABLE REGULATIONS):**

- ☐ Hazardous Waste operations (29 CFR 1926.65 or 29 CFR 1910.120)
- ☐ Use of personal protective equipment (29 CFR 1910.134 and ANSI Z 88.2)
  - O Air Purifying O half O full
  - O Supplied Air O half O full
  - O Self Contained Breath Apparatus (SCBA)
- ☐ Arsenic (29 CFR 1926.1118 (n) or 29 CFR 1910.1018)
- ☐ Asbestos/Beryllium (29 CFR 1926.1101(m) or 29 CFR 1910.1101)
- ☐ Benzene (29 CFR 1926.1128 or 29 CFR 1910.1028)
- ☐ Bloodborne Pathogens (29 CFR 1910.1030(f))
- ☐ Cadmium (29 CFR 1926.1127 or 29 CFR 1910.1027)
- ☐ Formaldehyde (29 CFR 1926.1148 or 29 CFR 1910.1048)
- ☐ High Noise Exposure - hearing protection (29 CFR 1910.95)
- ☐ Lead (29 CFR 1926.62 or 29 CFR 1910.1025)
- ☐ Vinyl Chloride (29 CFR 1926.1117 or 29 CFR 1910.1017)
- ☐ Other _____

**BE COMPLETED BY THE EVALUATING PHYSICIAN:**

Date Medical Evaluation Completed: _____

Work Restrictions Identified? ☐ No ☐ Yes (Describe) _____

☐ I have completed a medical evaluation of this employee and he/she is **MEDICALLY CLEARED** to perform the job tasks as outlined above with restrictions (if any) as noted. The employee is physically fit to wear the required protective equipment including respirators as identified above. I have explained the results of this evaluation to the employee and have advised him/her of any medical conditions that require further examination or treatment.

Examining Physician Signature: _____ Mailing Address: _____

Physician Name (typed): _____

Date: _____ Phone No. _____

FAX No. _____

**OR**

☐ I have completed a medical evaluation of this employee and I am **UNABLE TO MEDICALLY CLEAR** this employee to perform the job tasks as outlined above. I have explained the results of this evaluation to the employee and have advised him/her of any medical conditions that require further examination or treatment.

Examining Physician Signature: _____ Mailing Address: _____

Physician Name (typed): _____

Date: _____ Phone No. _____

FAX No. _____

## 13.0 RECORDKEEPING

In addition to recordkeeping requirements of Section 13 of the HASP, the HS records specified below shall be completed in accordance with Section 13 of the HASP and kept onsite as indicated below.

**TABLE 13**
**RECORDKEEPING REQUIREMENTS**

| Record/Form | Requirement Reference | Keep Onsite |
|---|---|---|
| ☐ HASP | HASP Section 1 | X |
| ☐ This SSHASP | HASP Section 1 | X |
| ☐ Completed Modification Forms | HASP Section 1 | X |
| ☐ SSOs Daily Logbook | HASP Section 13.1 | X |
| ☐ Documentation of Training Requirements | HASP Section 10 | |
| ☐ Documentation of Medical Surveillance | HASP Section 11 | |
| ☐ Exposure Monitoring Records | Section 6 of the HASP and applicable exposure monitoring methods in the ER Project *Manual for Site HS Activities* | X |
| ☐ HS Inspection Records | HASP Section 12.1 | X |
| ☐ Other (specify): | | |

# APPENDIX A

# MAP(S) OF SITE LOCATIONS, ADJACENT FACILITIES AND SITE CONTROL ZONES/FACILITIES

# APPENDIX B

# HAZARDOUS SUBSTANCE - HAZARD ASSESSMENT

## APPENDIX B

## [illegible] SUBSTANCE - HAZARD ASSESSMENT

This table includes a health hazard assessment, and associated rationales, of each chemical product and site contaminant listed in Table 2-1. This hazard assessment was completed in accordance with Section 4.1 of the HASP.

***TASKS(S):*** *[Refer to Section 4.2 of the SSHASP and/or Section 4.1 of the HASP for guidance. Enter the tasks(s) having the same data, if any, and complete this table by task for each substance listed in Table 2-1.]*

| [illegible] | [illegible] Data[1] / [illegible] Location | | Hazard Assessment Rating/Rationale |
|---|---|---|---|
| **RADIOLOGICAL SUBSTANCES** | | | |
| [illegible] Knowledge | | | |
| | | | |
| | | | |
| [illegible] Soil Sample Results | | | |
| | | | |
| | | | |
| Soil Gas Vapor Results | | | |
| | | | |
| | | | |
| [illegible] Air Particulate or Sampling Results | | | |
| | | | |
| | | | |
| [illegible] Water Sample Results | | | |
| | | | |
| | | | |

1 Reference resources where data reported, and either here or in the "location" column include a brief description of the sample location (e.g., borehole number, depth, etc).

**TASKS(S):** *[Enter the tasks(s) having the same data, if any, and complete this table by task for each substance listed in Table 2-2.]*

| Substance/ Synonym | Maximum Data[1] | | Hazard Assessment Rating/Rationale |
|---|---|---|---|
| | Value | Location | |
| **CHEMICAL SUBSTANCES** | | | |
| **Process Knowledge** | | | |
| | | | |
| | | | |
| **Soil Sample Results** | | | |
| | | | |
| | | | |
| **Soil Gas Vapor Results** | | | |
| | | | |
| | | | |
| **Air Monitoring or Sampling Results** | | | |
| | | | |
| | | | |
| **Water Sample Results** | | | |
| | | | |
| | | | |

# APPENDIX C

# CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES OF HAZARDOUS CHEMICAL SUBSTANCES

## APPENDIX C

## PHYSICAL, CHEMICAL, AND TOXICOLOGICAL PROPERTIES OF HAZARDOUS CHEMICAL SUBSTANCES

*[This table should include only the hazardous substances of occupational health concern (those listed in Table 4-2), which were assessed in Appendix B and resulted in an assessment of "possibly could occur", probably will occur", or "likely to occur" and a hazard severity of "minor", "major", or "catastrophic". This table is not all inclusive and only includes examples. Enter any missing data not already listed below.]*

| Substance/ Synonym(s) | Exposure Limit [1,2] | | | Physical [illegible] | Route(s) of Entry [1,3] | Signs/Symptoms of Toxicity [1,3] | Carcino-genicity [1,3] | Flash Point [1,3] | Vapor Press./ Density [1] | IP [1,4] | SC[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PEL or REL | TLV | [illegible] | | | | | | | | |
| **☐ CALIBRATION AND WELDING GASES** For purposes of LANL ER work, examples of calibration gases are heptane, hexane, hydrogen, isobutylene, oxygen and pentane. Common welding gases include acetylene, oxygen and propane. For the most part, these gases are flammable and pressurized and could become a mini-torpedo if not handled carefully. The primary routes of exposure into the body are inhalation and skin contact/absorption. Symptoms of exposure include light headedness, nausea, headache, numb extremities, dermatitis, loss of appetite, frostbite (propane), chemical pneumonia, and giddiness. | | | | | | | | | | | |
| Heptane | 500 | 400 | 750 | Colorless liquid with gasoline like odor | Inhalation skin contact | Headache, giddiness, loss of appetite, nausea, dermatitis | Not Applicable (NA) | 25°C | 40 mm | 9 90 eV | 27 |
| Propane | 1,000 | simple asphyxiant | 2,100 | Colorless, odorless gas | Inhalation Skin contact | Dizziness, disorientation, excitation, frostbite | N.A. | N.A. | > 1 atm | 11 07 eV | 22 |
| Other (specify) | | | | | | | | | | | |

1 *NIOSH Pocket Guide to Chemical Hazards*, U.S. Department of Health and Human Services, 1994.

2 *1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, American Conference of Governmental Industrial Hygienists, 1994.

3 *Hazardous Chemicals Desk Reference*, 3rd edition, Richard J. Lewis, Sr., Von Nostrand Reinhold, 1993.

4 HNu Photoionization Detector Guidance Information

5 Spill containment guide (page) number, *1993 Emergency Response Guidebook*, U.S. Department of Transportation, Research and Special Programs Administration, Office of Hazardous Materials Training and Initiatives (DHM-50), 1993.

| Substance/ Synonym(s) | Exposure Limit [1,2] / IDLH[1] (ppm) | | | Physical Characteristics[1] | Route(s) of Entry [1,3] | Signs/Symptoms of Toxicity [1,3] | Carcino-genicity [1,3] | Flash Point [1,3] | Vapor Press./ Density [1] | IP [1,4] | SC[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PEL or REL | TLV | [illegible] | | | | | | | | |
| **☐ CORROSIVES** | | | | | | | | | | | |
| For purposes of LANL ER work, [illegible] rally include acids, bases/caustics and inorganic metallic or halogen salts. Common acids include: acetic, citric, hydrochloric, nitric, perchloric, ph[illegible] sulfuric, and trichloroacetic (TCA). Common caustics include: ammonia, ammonium hydroxide, potassium hydroxide, sodium hydroxide and sodium h[illegible] organic metallic salts include compounds such as chromates and permanganates. Inorganic halogen salts include compounds such as sodium chlorid[illegible] bromide which can be corrosive to metals and finishes but are not significantly harmful to bodily tissues when good hygiene practices are implemented. Primary routes of entry into the body are skin contact, inhalation and ingestion. Contact with corrosives can result in severe irreversible damage to skin, eyes and respiratory system. Symptoms of exposure include tissue burns; eyes, nose and throat irritation/inflammation; and/or excessive fluid in respiratory system. | | | | | | | | | | | |
| Nitric Acid | 2<br>5 mg/m$^3$ | 2<br>5 2 mg/m$^3$ | 25 | Colorless, yellow or red fuming liquid with an acrid, suffocating odor | Inhalation<br>Ingestion<br>skin contact | Eyes, skin and mucous membrane irritant, delayed pulmonary edema, bronchitis, pneumonitis | N.A. | N.A. | 48 mm | 11.95 eV | >40%: 44<br>≤40%: 60 |
| Sulfuric acid | 1 mg/m$^3$ | 1 mg/m$^3$ | 15 mg/m$^3$ | Colorless to dark brown, oily, odorless liquid | Inhalation<br>Ingestion<br>skin contact | Eyes, throat, nose irritant, pulmonary edema, bronchitis, skin and eye burns, dermatitis | N.A. | N.A. | 5 mm | 8 40 eV | 39 |
| Other *(Specify)* | | | | | | | | | | | |
| **☐ HYDROCARBONS (Halogenated)** | | | | | | | | | | | |
| Examples of halogenated hydrocarbons associated with LANL ER work are 1,2-Dichloroethylene, 1,1,1-Trichloroethane (methyl chloroform), Trichloroethylene, Trichloro-trifluoro ethane(Freon-113), and Vinyl Chloride. Generally, these compounds are moderately to highly volatile and are non combustible. The primary routes of exposure into the body are inhalation, ingestion and/or skin contact. Symptoms of exposure include skin, eyes, and upper respiratory irritation, liver, kidney, cardiac, motor activity, and gastrointestinal changes, anesthesia, irritability, and central nervous system depression. | | | | | | | | | | | |
| 1,2-Dichloro-ethylene | 200 | 200 | 1,000 | *enter: appearance, color, odor thresh-hold* | Inhalation<br>Ingestion | General anesthesia, liver and kidney changes | N.A. | 39°F | *enter:* | 9.65 eV | 29 |
| 1,1,1-Trichloroethane (methyl chloroform) | 350 | 350 | 700 | *enter: appearance, color, odor thresh-hold* | Inhalation<br>Skin contact<br>Ingestion | Eye irritation; hallucinations motor activity changes; irritability; aggression; hypermotility; cardiac changes | Questionable Human Carcinogen (IARC) | none | | 11 00 eV | 74 |
| Trichloro-ethylene | 100 | 50 | 1,000 | *enter: appearance, color, odor thresh-hold* | Inhalation<br>Ingestion | Eye effects; sleepiness; hallucinations or distorted perceptions; gastrointestinal changes; jaundice | Questionable Human Carcinogen (IARC) | 89 6°F | | 9 45 eV | 74 |
| Trichloro-trifluoro-ethane (Freon-113) | 1,000 | 1,000 | 2,000 | *enter: appearance, color, odor thresh-hold* | Inhalation<br>Skin contact<br>Ingestion | Central nervous system depression; skin irritation | N.A. | N A | *enter* | 11 78 | Not Listed |

| Substance/ Synonym(s) | Exposure Limit [1,2] / IDLH[1] (ppm) | | | Physical Characteristics[1] | Route(s) of Entry [1,3] | Signs/Symptoms of Toxicity [1,3] | Carcinogenicity [1,3] | Flash Point [1,3] | Vapor Press./ Density [1] | IP [1,4] | SC[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PEL or REL | TLV | IDLH | | | | | | | | |
| Vinyl chloride | 1 | 5 | Not determined | enter: appearance, color, odor thresh-hold | Inhalation Skin contact Ingestion | Severe eye and skin irritant; causes skin burns by rapid evaporation and freezing; anesthetic at high concentrations | Confirmed Human Carcinogen (IARC) (liver and blood tumors) | 17.6 °F | | 9.99 eV | 17 |
| Other (Specify) | | | | | | | | | | | |
| ☐ HYDROCARBONS (Non-Halogenated) Examples of non-halogenated hydrocarbons associated with LANL ER work are acetone and methyl ethyl ketone (MEK). The primary routes of exposure into the body are inhalation, ingestion and skin absorption. Symptoms of exposure include eyes, nose and throat irritant, headache, dizziness and dermatitis. | | | | | | | | | | | |
| Acetone | 1,000 | 750 | 2,500 | Colorless, liquid with a fragrant, mint-like odor | Inhalation Ingestion Skin contact | Eyes, nose, throat irritant, headache, dizziness, dermatitis | N.A | 0°F | 180 mm | 9 69 eV | 26 |
| 2-Butanone (Methyl Ethyl Ketone (MEK)) | 200 | 200 | 3000 | Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor | Inhalation Ingestion Skin contact | Eyes, nose irritant, headache, dizziness, vomiting | N.A | 16°F | 71 mm | 9 54 eV | 26 |
| Other (Specify) | | | | | | | | | | | |
| ☐ GASES Examples of gases are hydrigen cyanide, hydrogen sulfide and methane. These gases are flammable and extremely volatile. The primary routes of exposure into the body are inhalation, ingestion and skin absorption. Symptoms of exposure include skin, eyes and respiratory system damage. | | | | | | | | | | | |
| Hydrogen Sulfide | 10 | 10 | 300 | enter: appearance, color, odor thresh-hold | Inhalation | Severe irritant to the eyes and mucous membranes; asphyxiant; chronic pulmonary edema; nervous system depression or paralysis; coma | N.A. | N.A. (gas) | enter density: | 10 46 eV | 13 |
| Methane | Asphyxiant/flammable | | | enter: appearance,. color | Inhalation | Simple asphyxiant, very dangerous fire and explosion hazard | N.A. | 368.6°F | enter density: | 12.98 eV | compressed 17 |
| Hydrogen Cyanide | 10 skin | 4.7 C skin | 50 | enter: appearance, color, odor thresh-hold | Inhalation Skin Absorbtion Ingestion Skin contact | enter: | enter: | enter: | enter: | enter: | see guide |
| Other (Specify) | | | | | | | | | | | |

| Substance/ Synonym(s) | Exposure Limit [1,2] / IDLH[1] (ppm) | | | Physical Characteristics[1] | Route(s) of Entry [1,3] | Signs/Symptoms of Toxicity [1,3] | Carcino-genicity [1,3] | Flash Point [1,3] | Vapor Press./ Density [1] | IP [1,4] | SC[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PEL or REL | TLV | [illegible] | | | | | | | | |
| **☐ METALS** | | | | | | | | | | | |
| Metals associated with LANL E[illegible]ude, though not be limited to lead, beryllium, barium, cadmium, chromium, copper, and mercury. Most metals pose a health hazard in their solid form, [illegible], with the exception of mercury vapor. The primary routes of exposure [illegible]ude inhalation, ingestion, and skin contact. Symptoms of exposure include eye, skin and, upper respiratory system irritation; headache, insomnia, m[illegible]n, abdominal pain and tremors. Cancers of the lungs and bones are associated with metal intoxication. | | | | | | | | | | | |
| Lead | 0.05 mg/m$^3$ | 0.05 mg/m$^3$ (Notice of Intended Change [NIC]) | 100 mg/m$^3$ | *enter: appearance, color* | Inhalation Skin absorption (organic forms only) Ingestion | Loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis, hallucinations, muscle weakness | dependent upon compound | N.A. | N.A. | N.A. | 53 |
| Other *(Specify)* | | | | | | | | | | | |
| **☐ MINERALS** | | | | | | | | | | | |
| For purposes of LANL ER work, examples of minerals include asbestos and silica. Most minerals pose a health hazard in their solid form, especially as dusts. The primary routes of exposure into the body are inhalation and ingestion. Symptoms of exposure include impaired pulmonary function, cough wheeze, pneumoconiosis (amorphous silica), and interstitial fibrosis, dyspnea, finger clubbing (asbestos). | | | | | | | | | | | |
| Asbestos | 0.1 fibers/cm 3 | varies by type | N.A. | *enter: appearance, color* | Inhalation Ingestion | lung fibrosis, difficulty breathing; cough | Human Carcinogen (IARC) (lung cancer, mesothelioma) | N.A. | N.A. | N.A. | 31 |
| Other *(Specify)* | | | | | | | | | | | |
| **☐ PETROLEUM-BASED HYDROCARBONS** | | | | | | | | | | | |
| Examples of petroleum-based hydrocarbons associated with LANL ER work are Benzene, Toluene and Xylenes. which are found in most oils, lubricants, fuels and gasoline. Petroleum-based hydrocarbons material generally contain metal contaminants also. The primary routes of exposure into the body are inhalation and skin absorption/contact. Symptoms of exposure include eyes, skin and upper respiratory system irritation, giddiness, headache, confusion, nausea, staggered gait, and fatigue. | | | | | | | | | | | |
| Benzene | 1 skin | 0.3 skin (NIC) | 500 | *enter: appearance, color, odor threshold* | Inhalation Skin absorption Ingestion | Increased temperature; aesthetic resulting in excitation followed by depression; severe eye and moderate skin irritant | Human Carcinogen (IARC) (leukemia, Hodgkin's disease, lymphoma) | 40°F | *enter:* | 9.24 eV | 27 |

| Substance/ Synonym(s) | Exposure Limit [1,2] / IDLH[1] (ppm) | | | Physical Characteristics[1] | Route(s) of Entry [1,3] | Signs/Symptoms of Toxicity [1,3] | Carcino-genicity [1,3] | Flash Point [1,3] | Vapor Press./ Density [1] | IP [1,4] | SC[5] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PEL or REL | TLV | | | | | | | | | |
| Toluene | 200 | 50 skin | 500 | enter: appearance, color, odor threshold | Inhalation Skin absorption/ contact Ingestion | Fatigue; dizziness; headache; motor activity changes; hallucinations; distorted perception; severe eye irritant; mild skin irritant | Teratogen - can deform embryo/ fetus | 40°F | | 8 82 eV | 27 |
| Xylenes | 100 | 100 | 900 | enter: appearance, color, odor threshold | Inhalation Skin contact Ingestion | Dizziness; excitement; drowsiness; staggering; nausea; vomiting; abdominal pain; severe eye irritant; mild skin irritant | N.A. | o - 63°F m - 84°F p - 81°F | | o - 8 56 eV m - 8 56 eV p - 8 44 eV | 27 |
| Other (Specify) | | | | | | | | | | | |
| ☐ POLYCHLORINATED BIPHENYLS (PCBs) PCB's are a series of technical mixtures consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard noncrystalline resins (e.g., PCB [42 % chlorine] and PCB [54 % chlorine]). The greater the chlorine content, the more toxic the PCB is likely to be. It is important to remember that there are other isomers of PCB's based on the chlorine content. However, for occupational exposure concerns other isomers are suspected carcinogens and have a NIOSH Recommended Exposure Limit (REL) of 0.001 mg/m$^3$. Also, toxicity is increased if exposure to carbon tetrachloride occurs at the same time. The primary routes of exposure into the body are inhalation, ingestion, and skin absorbtion or contact. Symptoms of exposure include chloracne, upper respiratory system irritation, nausea and vomiting, headache, dizziness, depression, and nervousness. | | | | | | | | | | | |
| PCB (42% Cl) | 1 mg/m$^3$ skin | 1 mg/m$^3$ skin | 5 mg/m$^3$ | Colorless to light colored, viscous liquid with a mild hydrocarbon odor | Inhalation Absorption Ingestion Skin contact | Eye irritant, chloracne, liver damage. | Suspected human carcinogen (IARC) skin and liver | | 0 001 mm | | 31 |
| PCB (54 % Cl) | 0.5 mg/m$^3$ skin | 0.5 mg/m$^3$ skin | 5 mg/m$^3$ | Colorless to pale yellow, viscous liquid or solid with a mild hydrocarbon odor | Inhalation Absorption Ingestion Skin contact | Eye and skin irritant, acne-form dermatitis, liver damage | Confirmed human carcinogen (IARC) skin and liver | | 0 00006 mm | | 31 |
| Other (specify): | | | | | | | | | | | |
| ☐ OTHER (specify): | | | | | | | | | | | |
| | | | | | | | | | | | |

# APPENDIX D

# EMERGENCY CONTACTS
# AND
# ROUTE(S) TO MEDICAL SERVICES

# EMERGENCY CONTACTS AND PHONE NUMBERS

***(post on-site in Support Zone)***

**MEDICAL EMERGENCY/FIRE:**

Los Alamos Fire Dept.....LANL phone: **911** Cellular phone: **667-7080**

**HAZARDOUS RELEASE/SPILL:**

LANL HAZMAT Team (EM&R).....**667-6211**

LANL Occupational Medicine Clinic (ESH-2).....**667-0660**
Los Alamos Medical Center Hospital.....**662-4201**
Security OS/Pro Force.....**667-6534**
Los Alamos Police.....**662-8224**
LANL Health and Safety - ESH-5.....**665-7221**
LANL Radiation - ESH-1.....**667-7137**
TA/Facility Manager: *[enter name]*.....**phone no.**
TA/Facility Operations Safety Rep.: *[enter name]*.....**phone no.**
FPL: *[enter name]*.....**phone no.**
Alternate FPL: *[enter name]*.....**phone no.**
FTM: *[enter name]*.....**emerg. phone/pager no.**
FTL: *[enter name]*.....**emerg. phone/pager no.**
Field Unit HS Rep.: *[enter name]*.....**emerg. phone/pager no.**

**Management Contacts:**

Employer *[enter business name]* Contacts: Name(s) / (Phone No(s)

Employer *[enter business name]* Contacts: Name(s) / (Phone No(s)

Employer *[enter business name]* Contacts: Name(s) / (Phone No(s)

Employer *[enter business name]* Contacts: Name(s) / (Phone No(s)

**EMERGENCY REPORTING INFORMATION:**

When calling for emergency services, have the following information available to report:

- Site name/location/phone #
- Caller ID
- Nature of emergency
- Number of personnel involved
- Name and condition of affected employees
- Actions taken and assistance required

# INSERT MAP OF ROUTE(S) TO MEDICAL SERVICES

LANL Occupational Medicine Clinic (ESH-2)

and

Los Alamos Medical Center Hospital

# Appendix F

# MEDICAL SURVEILLANCE

# REQUIREMENTS AND FREQUENCIES

# APPENDIX F

## MEDICAL SURVEILLANCE REQUIREMENTS

Medical surveillance requirements are regulated by several OSHA standards, which are identified in this table together with the corresponding action levels triggering the requirements, the required medical surveillance, and the frequencies of surveillance. In accordance with this table and Section 11 of the HASP, site-specific medical surveillance requirements shall be specified in Section 11 of the SSHASP.

- ER Project work involving hazardous waste operations regulated by OSHA under 29 CFR 1926.65
- Substance(s) included in Table 2 of the HASP (Section 4.2.2.4), which are considered of occupational health concern in the hazard assessment (Table 4-2 of the SSHASP) are regulated under applicable OSHA standard(s) in Subparts D and Z of 29 CFR 1926
- Hearing conservation program requirements per 29 CFR 1910.95 and Sections 4.2.2.7 and 11 of the HASP.
- Respiratory protection program requirements per 29 CFR 1910.134 and Sections 7.1 and 11 of the HASP.

| Hazard | Action Level | Medical Surveillance Requirements | Frequency |
|---|---|---|---|
| Hazardous Waste Operations - General | Potential for exposure to hazardous substances or health hazards ≥ PELs or published exposure limits while performing HAZWOPER work | 29 CFR 1926.65(f), 29 CFR 1910.120, and Section 11 of the HASP<br>• The physician shall be provided a copy of 29 CFR 1926.65 and Section 11 of the HASP<br>• Medical and work history (or update if already on file) especially emphasizing symptoms related to hazardous substances and health hazards<br>• Physical examination<br>• Vital signs<br>• Eye examination<br>• Audiogram<br>• EKG<br>• Urinalysis<br>• Blood chemistry<br>• Complete blood count (CBC)<br>• Pulmonary function tests (FVC and $FEV_1$)<br>• Heavy metal screen (as appropriate/req'd below)<br>• Evaluation of stresses related to repetitive motion<br>• Evaluation of ability to wear PPE under conditions anticipated at work site(s) | Refer also to *LANL ER Project HASP* Section 11.<br>• Baseline: Within first 30 days of HAZWOPER field work<br>• Annual: At least once every 12 months, unless examining physician believes shorter or longer frequency is needed or required<br>• Periodic: Per Section 11 of the *LANL ER Project HASP* |
| Arsenic (inorganic) | > 5 µg/M$^3$ | 29 CFR 1926.1118(n), 29 CFR 1910.1018, and Section 11 of the HASP<br>• Physician shall be provided copy of 29 CFR 1926.1118 and Section 11 of HASP<br>• Medical history, to include smoking history and presence and degree of respiratory symptoms (e.g., breathlessness, cough, sputum production, wheezing)<br>• General medical evaluation per requirements under hazardous waste operations, plus:<br>- 14" by 17" (35.56 x 43.18 cm) posterior-anterior chest X-ray and International Labor Office UICC/Cincinnati (ILO U/C) rating<br>- Sputum cytology examination<br>- Any other examination or test relevant to arsenic exposure deemed appropriate by examining physician to complete written medical opinion | At least annually for employees who are < 45 years of age with > 10 years of exposure to arsenic above the action level<br>At least semi-annually for other employees exposed above the action level<br>Upon termination of employment, whenever an employee covered by this requirement has not been examined within six months prior to termination of employment<br>Whenever an employee develops signs or symptoms commonly associated with exposure to inorganic arsenic |

| Hazard | Action Level | Minimum Requirements | Frequency |
|---|---|---|---|
| Asbestos<br><br>Beryllium | ≥ 0.05 fibers/cc<br><br>> 0.5 $\mu g/M^3$ | Asbestos - 29 CFR 1926.1101(m), 29 CFR 1910.1101, and Section 11 of the HASP<br>Beryllium - LANL AR 6-7 and TB 607<br>• Physician shall be provided copy of 29 CFR 1926.1101 or LANL AR-6-7, and Section 11 of HASP<br>• Medical and work history emphasizing pulmonary, cardiovascular, and gastrointestinal systems<br>• Standardized questionnaire contained in Appendix D of 29 CFR 1926.58 (Part 1 for initial/baseline exam, Part 2 for annual exam)<br>• General medical evaluation per requirements under hazardous waste operations, plus:<br>- chest X-ray administered at discretion of physician; interpretation and classification of chest X-rays according to Appendix E of 29 CFR 1926.58<br>• Any other exam or test relevant to asbestos or beryllium exposure deemed necessary by examining physician | When employee will work where asbestos may be ≥ Action Level, within first 40 days of initial job assignment and at least annually thereafter as long as such exposure continues, or more frequently if specified by examining physician |
| Benzene | ≥ 0.5 ppm | 29 CFR 1926.1128(i), 29 CFR 1910.1028, and Section 11 of the HASP<br>• Physician shall be provided copy of 29 CFR 1926.1128 and Section 11 of HASP<br>• Medical and work history, with particular attention to:<br>- Past work exposure to benzene or any other hematological toxins<br>- Family history of blood dyscrasias including hematological neoplasms<br>- History of: • renal or liver dysfunction • medications<br>• blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, and abnormal function of formed blood elements<br>• previous exposure to ionizing radiation<br>• exposure to marrow toxins outside of current work situation<br>• General medical evaluation per requirements under hazardous waste operations<br>• Any additional tests relevant to benzene exposure deemed necessary by the examining physician<br><br>NOTE: Immediately following each occasion an employee is removed from exposure to benzene because of hematological findings pursuant to paragraphs (i)(8)(i) & (ii), the employer shall provide the employee with six months of medical removal protection benefits according to paragraph (i)(9). | Prior to initial assignment and at least annually thereafter whenever employee works where benzene exposure ≥ Action Level. Initial examination not required if adequate records show employee has been examined according to requirements within past 12 months. Whenever employee develops symptoms commonly associated with toxic exposure to benzene<br><br><u>Emergency Examinations</u>:<br><br>Whenever an employee is exposed to benzene during an emergency situation; if result is ≥ 75 mg phenol per liter, complete blood count shall be done (similar to Initial Examination) at monthly intervals for a duration of three months following the emergency<br><br><u>Additional Examination and Referrals</u>:<br><br>Blood count shall be repeated within two weeks whenever:<br>• Hemoglobin level or hematocrit fall below normal limit (outside 95% confidence interval[C.I.]), as determined by the lab for the particular geographic area and/or these indices show persistent downward trend from employee's pre-exposure norms (providing findings cannot be explained by other medical reasons)<br>• Thrombocyte (platelet) count varies more than 20% below employee's most recent values or falls outside normal limit (95% C.I.) as determined by the lab<br>• Leukocyte count below 4,000 per $mm^3$ or an abnormal differential count<br><br>If abnormality persists, examining physician shall refer employee to hematologist or internist or further evaluation (per paragraphs (i)(5)(iii) & (iv)) unless examining physician has good reason to believe such referral is unnecessary. When physician makes referral to hematologist/internist, employee shall be removed from areas where exposure to benzene may exceed action level, until such time as physician determines according to (i)(8)(ii). |

| Hazard | Action Level | Minimum Requirements | Frequency |
|---|---|---|---|
| Occupational Exposure to Bloodborne Pathogens (see Section 9.3.1.3) | Any occupational exposure | 29 CFR 1910.1030(f) and Section 11 of the HASP<br>Physician shall be provided copy of 29 CFR 1910.1030 and Section 11 of HASP<br>Medical evaluations and procedures shall be provided according to recommendations of U.S. Public Health Service, Center for Disease Control and Prevention current when evaluations and procedures occur<br>Employees Having Occupational Exposure Potential:<br>Hepatitis B vaccine and vaccination series shall be offered by employer to employees who have occupational exposure potential. Employer shall assure that employees who decline to accept hepatitis B vaccination offered by employer sign statement in Appendix A of standard. | Employees Having Occupational Exposure Potential:<br>Hepatitis B vaccination shall be offered to employee within 10 working days of initial assignment; unless employee has previously received complete hepatitis B vaccination series, antibody testing has revealed employee is immune, or vaccine is contraindicated for medical reasons. If employee declines hepatitis B vaccination but later while still covered under standard decides to accept vaccination, employer shall make vaccination available (then )<br>Post-Exposure Evaluation and Follow-up:<br>Immediately following report of exposure incident |
| Cadmium | ≥ 2.5 µg/M³ and all employees performing tasks involving cadmium (e.g., brazing, burning, cutting, painting, welding) | 29 CFR 1926.1127(l), 29 CFR 1910.1027, and Section 11 of the HASP<br>• Physician shall be provided copy of 29 CFR 1926.1127 and Section 11 of HASP<br>• Medical and work history emphasizing past, present and anticipated future exposure to cadmium; any history of renal, cardiovascular, respiratory, hematopoietic, reproductive, and/or musculo-skeletal system dysfunction; current usage of medication with potential nephrotoxic side-effects; and smoking history and current status<br>• General medical evaluation per requirements under hazardous waste operations, plus:<br>· Cadmium in urine (CdU) standardized to grams of creatinine (g/Cr)<br>· Beta-2 microglobulin in urine ($\beta_2$-M) standardized to grams of creatinine (g/Cr) with pH specified per Appendix F of 29 CFR 1926.1127<br>· Cadmium in blood (CdB) standardized to liters of whole blood (lwb)<br>· 14" by 17" posterior-anterior chest X-ray (frequency to be determined by examining physician)<br>· For males > 40 years of age, prostrate palpatation or other at least as effective diagnostic test<br>• Any additional tests or procedures relevant to cadmium exposure deemed appropriate by examining physician<br>Termination of Employment Examination: Per paragraph (l)(8) of the standard<br>NOTE: Collection and handling of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine ($\beta_2$-M) taken from employees is done in a manner that assures reliability and that analyses are performed by a proficient laboratory (refer to Appendix F of standard) | Initial Examination: When employee will work where cadmium may be ≥ Action Level, within first 30 days of initial job assignment Initial exam not required if adequate records show employee has been examined according to requirements within past 12 months )<br>Action Triggered by Results of Medical Examination:<br>• Take actions according to paragraph (l)(5) of standard<br>Action Triggered by Results of Biological Monitoring:<br>CdU ≤ 3µg/g Cr, $\beta_2$-M ≤ 300µg/g Cr, and CdB ≤ 5µg/lwb :<br>• Periodic medical exam and biological monitoring within 12 months after initial exam; and thereafter, medical exam at least biennially and biological monitoring at least annually<br>CdU > 3µg/g Cr, $\beta_2$-M > 300µg/g Cr, and CdB > 5µg/lwb :<br>• Take actions according to paragraph (l)(3)(ii), possibly including medical removal from work where exposure to cadmium is excessive (per paragraphs (l)(11) & (12))<br>CdU > 15µg/g Cr, $\beta_2$-M > 1,500µg/g Cr, and CdB > 15µg/lwb through the year 1998, and CdU > 7µg/g Cr, $\beta_2$-M > 750µg/g Cr, and CdB > 10µg/lwb as of the year 1999 :<br>• Take actions according to paragraph (l)(3)(iii), possibly including medical removal from work where exposure to cadmium is excessive (per (l)(11) & (12))<br>Termination of Employment Exam: Upon termination of employment, whenever employee covered by requirement has not been examined within 6 months prior to termination of employment<br>Emergency Examination: As soon as possible for any employee who may have been acutely exposed to cadmium<br>Multiple Physician Review: If examining physician was selected by employer, employee has right to designate a 2nd physician to review any finding, determinations, or recommendations of initial examining physician; and to conduct such examinations, consultations, and laboratory tests as 2nd physician deems necessary to for review. |

March 24, 1995

| Hazard | Action Level | Minimum Requirements | Frequency |
|---|---|---|---|
| Formaldehyde | ≥ 0.5 ppm | 29 CFR 1926.1148(i), 29 CFR 1910.1048, and Section 11 of the HASP<br>• The physician shall be provided a copy of 29 CFR 1926.1148 and Section 11 of the HASP<br>• Medical and work history designed to elicit information on work history, smoking history, any evidence of eye, nose, or throat irritation; chronic airway problems or hyperactive airway disease; allergic skin conditions or dermatitis and upper or lower respiratory problems<br>• General medical evaluation per requirements under hazardous waste operations, emphasizing evidence of irritation or sensitization of skin and respiratory system, shortness of breath, or irritation of eyes<br>• Any other test relevant to formaldehyde exposure deemed necessary by examining physician to complete the written opinion | Medical Disease Questionnaire: Prior to assignment to work where action level of formaldehyde is reached and annually thereafter<br>Medical Examination: At the time of initial assignment to work where action level of formaldehyde may be met or exceeded and annually thereafter, for any employee the physician feels (based upon evaluation of the Medical Disease Questionnaire) may be at increased risk from exposure to formaldehyde<br>Emergency Exposures: Any employee who has been exposed to formaldehyde in an emergency |
| Hearing Protection | ≥ 85 dBA (nonLaboratory personnel)<br>≥ 80 dBA (Laboratory personnel) | 29 CFR 1910.95(g) and Sections 4.2.2.7 and 11 of the HASP<br>• The physician shall be provided a copy of 29 CFR 1910.95 and Section 11 of the HASP<br>Audiogram per Appendix C of 29 CFR 1910.95 | Baseline (within 6 months of initial exposure at or above Action Level) and annually thereafter |
| Lead | ≥ 30 µg/M$^3$ | 29 CFR 1926.62(j), 29 CFR 1910.1025, and Section 11 of the HASP<br>• Physician shall be provided copy of 29 CFR 1926.62 and Section 11 of HASP<br>• Medical and work history emphasizing past lead exposure, smoking, hygiene, and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and serological problems<br>• General medical evaluation per requirements under hazardous waste operations, plus:<br>. Thorough examination with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, neurological and pulmonary systems<br>. Blood sample and analyses for:<br>. Blood lead level<br>. Red cell indices<br>. Zinc protoporphyrin<br>. Examination of peripheral smear morphology<br>• Any lab or other test relevant to lead exposure deemed necessary by examining physician<br>Biological Monitoring:<br>• Blood sampling and analysis for lead and zinc protoporphyrin | Medical Examinations/Consultations:<br>When employee may be exposed ≥ Action Level: at least annually for any employee whose blood lead level at any time during the preceding 12 months was ≥ 40 µg/dl<br>As soon as possible whenever employee has developed symptoms commonly associated with lead intoxication, employee desires medical advise concerning effects of lead exposure on ability to procreate a healthy child, employee is pregnant, or has exhibited difficulty in breathing during respirator fit-test or use<br>Biological Monitoring:<br>If employee exposed ≥ Action Level, or may be exposed ≥ Action Level, and if last blood analysis indicated ≥ 40 µg/dl: at least every two months until two consecutive blood samples and analyses indicate blood lead level < 40 µg/dl<br>If employee may be exposed ≥ Action Level: at least every two months for the first 6 months and every 6 months thereafter |

| Hazard | Action Level | Minimum Requirements | Frequency |
|---|---|---|---|
| Respiratory Protection | Use of a respirator | 29 CFR 1910.134(b)(10), ANSI Z88.2, and per Sections 7.1 and 11 of the HASP<br>Physician shall be provided copy of 29 CFR 1910.134 and Section 11 of HASP<br>General medical evaluation per requirements under hazardous waste operations.<br>Any other test deemed necessary by examining physician to complete the written opinion | Annually, as applicable |
| Vinyl Chloride | > 0.5 ppm | 29 CFR 1926.1117(k), 29 CFR 1910.1017, and Section 11 of the HASP<br>• The physician shall be provided a copy of 29 CFR 1926.1117 and Section 11 of the HASP<br>• Medical and work history emphasizing:<br>. Alcohol intake<br>. Past history of hepatitis<br>. Past history of blood transfusions<br>. Past history of hospitalization<br>. Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals<br>• General medical evaluation per requirements under hazardous waste operations with specific attention to detecting enlargement of liver spleen or kidneys, or dysfunction of these organs, and for abnormalities in skin, connective tissues and pulmonary system (refer to Appendix A of this standard)<br>• Any other test relevant to vinyl chloride exposure deemed necessary by examining physician to complete the written opinion<br>Lab analyses shall be performed by laboratory licensed under 42 CFR Part 74<br>A statement of employee's suitability for continued exposure to vinyl chloride including use of PPE and respirators shall be obtained from examining physician promptly after examination; a copy shall be provided to the employee | At the time of initial assignment and<br>• Every 6 months for employees who have been employed in vinyl chloride or polyvinyl chloride manufacturing for ≥ 10 years<br>• Annually for all others<br>Each employee exposed to an emergency involving vinyl chloride exposure |

# LANL ER PROJECT
# MODEL
# SITE-SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)

Project Title _____

TA(s) _____

This plan addresses the health and safety criteria to be followed during investigation, remediation or decommissioning activities associated with the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL)

**Reviewed and Approved by:**

| Signature | Name/Title | Company | Date |
|---|---|---|---|
| Field Unit Health and Safety (HS) Representative | | | |
| Health Physics Operations (ESH-1) | | | |
| FTM/DPL or FTL/JS (optional at discretion of FPL) | | | |
| Technical Area (TA) Representative (Facility Management or HS Professional) | | | |
| Field Project Leader (FPL) | | | |

**Concurrence by:**

| Signature | Name/Title | Company | Date |
|---|---|---|---|
| Subcontractor Management or HS Representative | | | |
| Subcontractor Management or HS Representative | | | |
| *[Other specify]* | | | |

The comments of the above reviewers have been incorporated as stipulated, or resolved with written record and copy to the respective reviewer.

| Plan Preparer Name/Signature | Group | Date | Mailstop | Phone |
|---|---|---|---|---|
| | | | | |

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## LIST OF ACRONYMS and ABBREVIATIONS

ACGIH ..... American Conference of Governmental Industrial Hygienists
ALARA ..... As Low As Reasonably Achievable
AL ..... Action Level
ANSI ..... American National Standard Institute
APR ..... Air-Purifying Respirator
AR ..... Administrative Requirements
ATM ..... Atmosphere
°C ..... Degrees Centigrade
CFR ..... Code of Federal Regulations
CGI ..... Combustible Gas Indicator
CP ..... Competent Person
CPR ..... Cardiopulmonary Resescitation
CRZ ..... Contamination Reduction Zone
DAC ..... Derived Air Concentration
dBA ..... Decibels (A-Weighted Scale)
DOE ..... U.S. Department of Energy
DOT ..... U.S. Department of Transportation
DPL ..... Decommissioning Project Leader
EPA ..... U.S. Environmental Protection Agency
ER ..... Environmental Restoration
ESH ..... Environmental, Safety and Health
ESH-1 ..... Health Physics Operations Group
ESH-2 ..... Occupational Medicine Group
ESH-5 ..... Industrial Hygiene and Safety Group
ESH-12 ..... Policy and Program Analysis Group
eV ..... Electron Volts
EZ ..... Exclusion Zone
°F ..... Degrees Fahrenheit
Fibers/cc ..... Fibers Per Cubic Centimeter
FID ..... Flame Ionization Detector
FPL ..... Field Project Leader
FTL ..... Field Team Leader
FTM ..... Field Team Manager
GET ..... General Employee Training
HASP ..... Health and Safety Plan
HAZWOPER ..... Hazardous Waste Operations
HEPA ..... High Efficiency Particulate Air
HPT ..... Health Protection Technician

HS ..... Health and Safety
IARC ..... International Agency for Research on Cancer
IDLH ..... Immediately Dangerous to Life or Health
IHT ..... Industrial Hygiene Technician
IP ..... Ionization Potential
JS ..... Job Superintendent
LAMC ..... Los Alamos Medical Center
LANL ..... Los Alamos National Laboratory
LEL ..... Lower Explosive Limit
LP ..... Laboratory Procedure
mg/Kg ..... Micrograms Per Kilogram
$mg/m^3$ ..... Milligrams Per Cubic Meter
mm ..... Millimeters
MSDS ..... Material Safety Data Sheet
MUC ..... Maximum Use Concentration
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating
OSHA ..... Occupational Safety and Health Administration
PAH ..... Polycyclic Aromatic Hydrocarbons
PEL ..... Permissible Exposure Limit
PF ..... Protection Factor
PID ..... Photoionization Detector
PNA ..... Polynuclear Aromatics
PPE ..... Personal Protective Equipment
PRS ..... Potential Release Site
RCT ..... Radiological Control Technician
RMMA ..... Radioactive Materials Management Area
RSP ..... Radiological Screening Personnel
RWP ..... Radiological Work Permit
SC ..... Spill Containment
SLM ..... Sound Level Meter
SOP ..... Standard Operating Procedures
SSHASP ..... Site-Specific Health and Safety Plan
SSO ..... Site Safety Officer
SUP ..... Supervisor
SWMU ..... Solid Waste Management Unit

SWP ..... Special Work Permit

SZ ..... Support Zone

TA ..... Technical Area

TLD ..... Thermoluminescent Dosimeter

TLV ..... Threshold Limit Value

TWA ..... 8-Hour Time-Weighted Average

## 1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (SSHASP) has been developed for the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL) to comply with applicable federal and state occupational health and safety (HS) requirements, including those of the U.S. Department of Energy (DOE). The DOE requires LANL to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at LANL are not subject to the jurisdiction of OSHA. The ER Project has developed a generic Health and Safety Plan, the ER Project HASP, which establishes HS information and requirements applicable to ER field operations projectwide. In addition to the HASP, this SSHASP establishes site-specific HS information and requirements applicable to the scope of work described in Section 2.

ER participants are responsible for conducting work in accordance with applicable regulations. The term "ER participants" refers to anyone performing ER work, including LANL, subcontractors to LANL and their lower-tier contractors, consultants, and agents. In some cases in this document, LANL has chosen to invoke OSHA and LANL requirements which ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with LANL's ALARA policy and to clarify LANL's expectations with regard to interpretable requirements of the multiple agencies governing ER work. Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or could unreasonably compromise the safety or health of an individual or the environment, such concerns should be brought to the attention of the Contract Administrator and the Field Unit HS Representative immediately. Failure to comply with terms of HS plans may constitute cause to stop activity or for issuance of a stop work order as specified in Section 3.4.2 of the HASP without cost or penalty to LANL.

This SSHASP shall be reviewed and approved in accordance with Section 1.2 of the HASP. Once this SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix B of the HASP) per Section 1.3 of the HASP. Modifications to this SSHASP may require a change to the terms or scope of a subcontract. Completion of a SSHASP modification form is <u>not</u> the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative under the changes clause and shall not proceed with the change until a change order has been mutually agreed between the parties, or unless unilateral direction is given by the Contract Administrator.

## 2.0 BACKGROUND INFORMATION

| | |
|---|---|
| **Project Title:** | |
| **TA(s):** | |
| **Objective:** | |
| **Classification of Work:** | |
| ❑ NON-ENVIRONMENTAL RESTORATION | ❑ INTERIM ACTION |
| ❑ SITE CHARACTERIZATION: *(check all that apply)* | |
| ❑ Non-Intrusive (e.g., surveying) | ❑ Intrusive - Drilling |
| ❑ Limited Intrusive - Hand Augurring or Surface Sampling | ❑ Intrusive - Trenching or Excavation |
| ❑ Intrusive - Other *(specify)*: | |
| ❑ VOLUNTARY CORRECTIVE ACTION (VCA) | ❑ EXPEDITED CLEAN-UP |
| ❑ DECOMMISSIONING | |

## TABLE 2-1
## SITE DESCRIPTION(S)

*[Atop the blank columns, enter the investigational/work site ID(s); sites having the same information may be grouped in the same column. Unless otherwise instructed, enter an "X" in the corresponding box below to indicate the characteristics and/or potential contaminants of concern for each site or group of sites. As appropriate, include a general introductory description of sites or groups of sites in this box. According to Section 2 of the HASP, in Appendix A provide map(s) showing location and approx. size of each site (e.g., boundaries, distances to landmarks, and dimensions or acreage) and critical adjacent structures and/or facilities that might be influenced by field operations. For each of the chemical substances checked, include the highest known data values in Appendix B. Provided below are columns for 23 sites or group of sites. If the project involves fewer sites, delete excess columns and widen those retained. If the project involves more sites or if wider columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional sites on separate pages or use 8.5" x 14" paper).]*

| DESCRIPTOR | SITE(s) | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | | |
| | Characteristics | | | | | | | | | | | | | | | | | | | | | | |
| **Adjacent Facilities/Structures** | | | | | | | | | | | | | | | | | | | | | | | |
| Roads/Highways | | | | | | | | | | | | | | | | | | | | | | | |
| Building/Foundation | | | | | | | | | | | | | | | | | | | | | | | |
| Above Ground Storage Tank | | | | | | | | | | | | | | | | | | | | | | | |
| UST | | | | | | | | | | | | | | | | | | | | | | | |
| Below Ground Utilities: | | | | | | | | | | | | | | | | | | | | | | | |
| Electric | | | | | | | | | | | | | | | | | | | | | | | |
| Cable | | | | | | | | | | | | | | | | | | | | | | | |
| Gas | | | | | | | | | | | | | | | | | | | | | | | |
| Phone | | | | | | | | | | | | | | | | | | | | | | | |
| Water | | | | | | | | | | | | | | | | | | | | | | | |
| Sewer | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Above Ground Electric: | | | | | | | | | | | | | | | | | | | | | | | |
| ≤ 50 kV | | | | | | | | | | | | | | | | | | | | | | | |
| ≥ 50 kV | | | | | | | | | | | | | | | | | | | | | | | |
| > 345 kV | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Topography** | | | | | | | | | | | | | | | | | | | | | | | |
| Canyon Bottom | | | | | | | | | | | | | | | | | | | | | | | |
| Canyon Slopes *(enter approx. % grade)* | | | | | | | | | | | | | | | | | | | | | | | |
| Mesa Top | | | | | | | | | | | | | | | | | | | | | | | |
| Rolling Hills | | | | | | | | | | | | | | | | | | | | | | | |
| Meadow | | | | | | | | | | | | | | | | | | | | | | | |
| Streams | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **Pathways of Uncontrolled Release Dispersion** | *(for land and water indicate direction, e.g., N, NE, etc.)* | | | | | | | | | | | | | | | | | | | | | | |
| Land | | | | | | | | | | | | | | | | | | | | | | | |
| Air | | | | | | | | | | | | | | | | | | | | | | | |
| Water | | | | | | | | | | | | | | | | | | | | | | | |
| **Emergency Accessibility** | *(indicate "Y" or "N")* | | | | | | | | | | | | | | | | | | | | | | |
| Land | | | | | | | | | | | | | | | | | | | | | | | |
| Air | | | | | | | | | | | | | | | | | | | | | | | |
| Water | | | | | | | | | | | | | | | | | | | | | | | |
| **Previous Onsite Facilities/Operations** | *(where applicable indicate spatial dimensions)* | | | | | | | | | | | | | | | | | | | | | | |
| Research | | | | | | | | | | | | | | | | | | | | | | | |
| Production | | | | | | | | | | | | | | | | | | | | | | | |
| Previous Release/Spill | | | | | | | | | | | | | | | | | | | | | | | |
| UST | | | | | | | | | | | | | | | | | | | | | | | |
| Firing Site | | | | | | | | | | | | | | | | | | | | | | | |
| Plating | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill (municipal) | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill (mixed waste) | | | | | | | | | | | | | | | | | | | | | | | |
| Storage (rad. mat'ls) | | | | | | | | | | | | | | | | | | | | | | | |
| Storage (chem. mat'ls) | | | | | | | | | | | | | | | | | | | | | | | |
| Storage (chem. waste) | | | | | | | | | | | | | | | | | | | | | | | |
| Storage (rad. waste) | | | | | | | | | | | | | | | | | | | | | | | |
| Storage (mixed waste) | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **Previous ER Information and/or Data Available** | | | | | | | | | | | | | | | | | | | | | | | |
| Knowledge of Process | | | | | | | | | | | | | | | | | | | | | | | |
| Initial Scoping/ Reconnaissance | | | | | | | | | | | | | | | | | | | | | | | |
| Phase I | | | | | | | | | | | | | | | | | | | | | | | |
| Phase II | | | | | | | | | | | | | | | | | | | | | | | |
| Analytical Data (screening) | | | | | | | | | | | | | | | | | | | | | | | |
| Analytical Data (validated) | | | | | | | | | | | | | | | | | | | | | | | |
| Risk Assessment | | | | | | | | | | | | | | | | | | | | | | | |
| VCA | | | | | | | | | | | | | | | | | | | | | | | |
| Remediation | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **Previous Substances Used, Disposed, Detected or Suspected** | | | | | | | | | | | | | | | | | | | | | | | |
| **High Explosives (HE)** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **Radionuclides** | *(indicate isotopes)* | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Americium | | | | | | | | | | | | | | | | | | | | | | | |
| Cesium | | | | | | | | | | | | | | | | | | | | | | | |
| Plutonium | | | | | | | | | | | | | | | | | | | | | | | |
| Strontium | | | | | | | | | | | | | | | | | | | | | | | |
| Uranium | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **Inorganics** | | | | | | | | | | | | | | | | | | | | | | | |
| **CORROSIVE ACIDS/BASES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Ammonium Hydroxide | | | | | | | | | | | | | | | | | | | | | | | |
| Chromic Acid/Chromates | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydrochloric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Nitric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Perchloric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Permanganates | | | | | | | | | | | | | | | | | | | | | | | |
| Phosphoric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Hydroxide | | | | | | | | | | | | | | | | | | | | | | | |
| Sulfuric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **HALOGENS** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **METALS** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Arsenic | | | | | | | | | | | | | | | | | | | | | | | |
| Barium | | | | | | | | | | | | | | | | | | | | | | | |
| Beryllium | | | | | | | | | | | | | | | | | | | | | | | |
| Cadmium | | | | | | | | | | | | | | | | | | | | | | | |
| Chromium | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | |
| Mercury | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel | | | | | | | | | | | | | | | | | | | | | | | |
| Selenium | | | | | | | | | | | | | | | | | | | | | | | |
| Silver | | | | | | | | | | | | | | | | | | | | | | | |
| Thallium | | | | | | | | | | | | | | | | | | | | | | | |
| Zinc | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **MINERALS** *(indicate %)* | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (amosite) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (chrysotile) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (crocidolite) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos *(other specify)*: | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Silica/Quartz | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **OTHER** *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **Organics** | | | | | | | | | | | | | | | | | | | | | | | |
| **ACIDS** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Acetic | | | | | | | | | | | | | | | | | | | | | | | |
| Trichloroacetic (TCA) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **ALCOHOLS** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Butyl | | | | | | | | | | | | | | | | | | | | | | | |
| Ethyl | | | | | | | | | | | | | | | | | | | | | | | |
| Glycols *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Methyl | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **ALDEHYDES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **GASES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Disulfide | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen Cyanide | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen Sulfide | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROCARBONS (Halogenated)** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Tetrachloride | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorobenzenes | | | | | | | | | | | | | | | | | | | | | | | |
| Chloroform | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethane | | | | | | | | | | | | | | | | | | | | | | | |

| DESCRIPTOR | SITE(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dichloroethylene | | | | | | | | | | | | | | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | | | | | | | | | | | | | | |
| Dioxins | | | | | | | | | | | | | | | | | | | | | | | |
| Freons *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Hexachloro compounds | | | | | | | | | | | | | | | | | | | | | | | |
| Methyl Chloroform (1,1,1-Trichloroethane) | | | | | | | | | | | | | | | | | | | | | | | |
| Methylene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Perchloroethylene (1,1,2,2-Tetrachloroethylene) | | | | | | | | | | | | | | | | | | | | | | | |
| Pentachlorophenol | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1,2-Trichloroethane | | | | | | | | | | | | | | | | | | | | | | | |
| Trichloroethylene | | | | | | | | | | | | | | | | | | | | | | | |
| Trichlorophenol | | | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Vinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROCARBONS** (Non-Halogenated) | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Hexane | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROCARBONS** (Petroleum Based) | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | | | | | | | | | | | | | | | | | | | | | | | |
| Diesel | | | | | | | | | | | | | | | | | | | | | | | |
| Ethyl Benzene | | | | | | | | | | | | | | | | | | | | | | | |
| Gasoline | | | | | | | | | | | | | | | | | | | | | | | |
| Oil *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Petroleum distillate/ Stoddard solvent | | | | | | | | | | | | | | | | | | | | | | | |
| PNAs/PAHs *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Toluene | | | | | | | | | | | | | | | | | | | | | | | |
| Xylenes | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **KETONES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Acetone | | | | | | | | | | | | | | | | | | | | | | | |
| Methyl ethyl ketone (MEK) | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **PESTICIDES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **PCBs** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify % chlorine)* | | | | | | | | | | | | | | | | | | | | | | | |
| **OTHER** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |

## TABLE 2-2
## SCOPE OF WORK

*[Briefly describe tasks and enter the corresponding site ID(s) and anticipated dates/duration of work by month. Example task descriptions are given below. Note that a particular task may involve multiple subtasks. For example, the task, "Equipment Decontamination", may include the subtask of "Steam Cleaning". The reason this distinction may be necessary is that for some tasks there may be separately identifiable subtasks that have different potential hazards associated with them or may require different exposure monitoring, protective measures, PPE, and/or training. For this reason, separate tasks or subtasks should be designated to account for variations by site as well as by task.]*

| Task ID | Task Description | Site ID(s) | Anticipated Dates/Duration |
|---|---|---|---|
| Task 1 - Site Preparation | This task will involve the installation of access road(s), perimeter security fencing, mobile trailers, electrical power, telephone lines, and sanitation facilities. Associated subtasks include:<br>1-A **Heavy Equipment Operation:** Describe who, where, how this will be accomplished<br>1-B **Installation of Electrical Power:** Describe who, where, how this will be accomplished and voltage(s) involved | | |
| Task 2 - Site Characterization | This task will involve drilling outside former landfill site to further characterize types and extent of contamination present at various site locations. Associated subtasks include:<br>2-A **Mobilization/Demobilization:** Set up and removal of site control boundaries, equipment, and supplies.<br>2-B **Drilling:** to depths of approx. __ ft. using a (specify: hand auger, hollow stem auger rig, air rig, mud rig, or other)<br>2-B.1 **Equipment Maintenance and Repair:** May involve use of solvents, fuels, compressed/flammable gases during cleaning and/or welding operations.<br>2-C **Excavating:** to depths/widths of approx. __ ft. /__ ft. using a (specify: back hoe, ditch witch, or other)<br>2-D **Exposure Monitoring:** Use of real-time and integrated monitoring equipment to screen for employee exposures to radiological, chemical, physical and safety hazards, especially in the EZ<br>2-E **Soil Sampling:** Screening and sampling of soils contained in hollow-stem auger cores and preparation of samples for shipment and analysis<br>2-F **Equipment Decontamination:** Use of pressurized and/or steam cleaning solutions (aqueous), and possibly methanol (non-pressurized) to clean potentially/actually contaminated equipment in the EZ<br>2-G **Personnel Decontamination:** (only need to include this if dedicated decon team will be performing this; usually only have this for larger and/or messier tasks (e.g., remedial actions and/or Level B work)) | | |

| Task ID | Task Description | Site ID(s) | Anticipated Dates/Duration |
|---|---|---|---|
| **Task 3 - Borehole Completion** | Completion of boreholes by a crew separate from the site characterization crew. To be done using a smaller completion rig to install equipment for on-going sampling and testing of gases and liquids in boreholes. Prior to initiating this task, hazards will be reassessed using information obtained during site characterization effort. This task is expected to involve the following subtasks, several of which may occur simultaneously:<br>**3-A Mobilization/Demobilization:** Set up and removal of site control boundaries, equipment, and supplies.<br>**3-B Completing Boreholes:** Describe who, where, how this will be accomplished<br>**3-C Exposure Monitoring:** Use of real-time and integrated monitoring equipment to monitor employee exposures to radiological, chemical, physical and safety hazards<br>**3-D Equipment Decontamination:** Use of pressurized and/or steam cleaning solutions (aqueous), and possibly methanol (non-pressurized) to clean potentially/actually contaminated equipment in the EZ<br>**3-E Personnel Decontamination:** (see comment under 2-G) | | |
| **Task 4 - On-Site Waste Management** | On-site coordination of waste management, including identification, handling, transport, and disposition of non-hazardous, potentially hazardous and hazardous wastes. This task will be accomplished according to the Project-Specific Waste Management Plan and may occur simultaneous as Tasks 2 or 3 are occurring. Every effort shall be made <u>not</u> to perform this task within the EZ during operations involving use of Level B PPE. Associated subtasks include:<br>**4-A Containing and Labeling Wastes:** Describe; indicate whether drums, bags and/or dumpsters will be used and in which zone(s) this activity will occur<br>**4-B Transporting Waste Containers for Temporary/Permanent Disposal:** describe who will perform this task, where and how | | |
| **Task 5 - On-Going Monitoring** | On-going sampling and testing of borehole gases/liquids. Determination of level(s) of PPE to be used to perform this work will depend on the data collected during Tasks 2 and 3 identifying gases/liquids within the boreholes, and the extent to which the gases and liquids may be expected to build up within the boreholes. Associated subtasks include:<br>**5-A Mobilization/Demobilization:** Set up and removal of site control boundaries, equipment, and supplies.<br>**5-B Collecting Monitoring Samples/Readings:** using (specify: equipment and/or brief description of how task will be accomplished with focus on potential hazard producing actions)<br>**5-C Exposure Monitoring:** Use of real-time and integrated monitoring equipment to monitor employee exposures to radiological, chemical, physical and safety hazards<br>**5-D Equipment Decontamination:** Use of pressurized and/or steam cleaning solutions (aqueous), and possibly methanol (non-pressurized) to clean potentially/actually contaminated equipment in the EZ | | |

| Task ID | Task Description | Site ID(s) | Anticipated Dates/Duration |
|---|---|---|---|
| **Task 6 - Incident Response** | Response to an incident (i.e., rendering first-aid/CPR, hazardous substance release, fire, and spill containment) tasks will be performed as necessary and in accordance with Sections 7, 9 and 10 of the HASP and this SSHASP. This task includes the following subtasks:<br>**6-A First-aid/CPR**<br>**6-B Fire Fighting**<br>**6-C Incident Response** *(in accordance with 29 CFR 1926.65(q)(6)(ii)*<br>**6-D Spill Containment** *(in accordance with 29 CFR 1926.65(q)(6)(ii)* | | |

## 3.0 ORGANIZATION, RESPONSIBILITIES, and AUTHORITY

Definition of HS roles, responsibilities, authorities, and lines of communication for key personnel identified below are defined in Section 3 of the HASP.

**TABLE 3-1**

**KEY PERSONNEL HAVING HS RESPONSIBILITY**

| Title | Name | Organization | Phone/Pager |
|---|---|---|---|
| **Facility Contacts** | | | |
| Facility Manager | | | |
| Facility Operations Safety Personnel | | | |
| **Field Project Management** | | | |
| Field Project Leader (FPL) | | | |
| Alternate to FPL | | | |
| Field Team Manager (FTM) | | | |
| **Field Team** | | | |
| Field Team Leader (FTL) | | | |
| Alternate FTL | | | |
| Supervisor *[other, specify]* | *[Repeat this line to identify each employer's supervisor of site activities; delete if not applicable]* | Contractor X | |
| Site Safety Officer (SSO) | | | |
| IH Technician (IHT) | | | |
| Radiological Control Technician (RCT) | | | |
| Health Protection Technician (HPT) | | | |
| Radiation Screening Personnel (RSP) | | | |
| Trenching/Excavation Competent Person (CP) | | | |
| Trenching/Excavation - Registered Professional Engineer (PE) | | | |
| Confined Space Entry Supervisor | | | |
| Other *[specify]*: | | | |
| **Support Personnel** | | | |
| Field Unit HS Representative | | | |
| Subcontractor HS/Management Rep. | *[Repeat this line to identify each employer's supervisor of site activities; delete if not applicable]* | Contractor X | |
| Other *[specify]*: | | | |
| **Alternate Personnel** | | | |
| Alternate SSO | | | |
| Alternate Health Physics Support: ☐ RSP ☐ RCT ☐ HPT | | | |

# 4.0 HAZARD ANALYSIS

Provided in this section are the task-specific hazard analysis information and requirements in accordance with Section 4 of the HASP.

## 4.1 PROJECT PERSONNEL

The personnel identified below by role are expected to perform the task(s) indicated.

**TABLE 4-1**
**PROJECT PERSONNEL BY TASK**

*[Atop the blank columns, enter the ID of each task involving different personnel roles; tasks involving the same roles may be identified in the same column. Identify the personnel by role who will be performing the task(s) described in Table 2-2 by entering an "X" in the corresponding box. When there will be two or more team members performing the same role on a given task, account for this below by repeating the title (e.g., Sampler 1, Sampler 2) in separate rows. If there will be more than one team and the tasks(s) for a particular personnel role will differ, split the table into subsections identifying each field team. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).*

| PERSONNEL ROLE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ FPL (includes alternate) | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ FTM | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ FTL | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Supervisor *(specify specialty and/or company)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ SSO | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ IHT | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ RCT | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ HPT | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ RSP | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Onsite Waste Management Coordinator | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Trenching/Excavation Competent Person | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Trenching/Excavation Professional Engineer | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Confined Space Entry Supervisor | | | | | | | | | | | | | | | | | | | | | | | |

| PERSONNEL ROLE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Surveyor | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Geologist | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Sampler | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Driller | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Driller's Asst. | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Laborer | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Heavy Equipment Operator (specify equip. type) | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Competent Person (specify specialty, refer to Section 3.2.3.5 of the HASP) | | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Other (specify) | | | | | | | | | | | | | | | | | | | | | | | | |

## 4.2 HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Not all chemical products used to accomplish a task or contaminants at a particular site may pose an occupational health threat. The hazardous substances of occupational health concern are identified in this section by task and by class of substance, in accordance with Section 4.1 of the HASP. Results of a health hazard assessment of each chemical product and site contaminant identified in Table 2-1 and associated rationales are provided in Appendix B. Substances that have a hazard assessment resulting in either "possibly could occur", "probably will occur", or "likely to occur" and which are expected to result in injury or illness having a hazard severity of "minor", "major", or "catastrophic" are considered to pose an occupational health threat to personnel who may be exposed to these substances, and are included in Table 4-2. The key to the hazard assessment ratings is provided below. The chemical, physical and toxicological properties for each hazardous chemical substance of occupational health concern are provided in Appendix C. For each class of substances included in Table 4-2, the most hazardous substance is identified in Table 4-3 together with corresponding administrative and engineering controls.

Key to hazard assessment ratings:

| Hazard Severity | Mishap Probability | | | |
|---|---|---|---|---|
| | Likely to Occur | Probably will Occur | Possibly could Occur | Unlikely to Occur |
| **Catastrophic** (i.e., death or life-threatening injury/illness from a single encounter) | Imminent | Imminent | Serious | Minor |
| **Major** (i.e., significant injury/illness resulting in irreversible harm) | Imminent | Serious | Moderate | Minor |
| **Minor** (i.e., injury or illness resulting in reversible harm - not likely to threaten mobility, vision) | Serious | Moderate | Minor | Negligible |
| **Negligible** | Minor | Minor | Negligible | Negligible |

## TABLE 4-2

## HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

*[Atop the blank columns, enter the ID of the task(s) involving the same substances of occupational health concern; tasks involving the same substances may be identified in the same column. Identify the substances of occupational health concern by entering an "I", "S", "Mod", or "Min" in the corresponding box, based upon the hazard assessment in Appendix B. Substances resulting in a mishap probability of "unlikely to occur" or a hazard severity of " negligible" should not be included in this table. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).]*

### Hazardous Chemical Products to be Used During Field Operations

The chemical products listed below are likely to be used for the tasks indicated, onsite or at satellite locations where field support operations occur. MSDSs for each product shall be kept readily available to users of these products, and shall be shared with other employer's employees onsite who may be affected by the hazardous products in accordance with 29 CFR 1926.65(b)(1)(iv) and (v) and 1926.65(i) and Section 4.2.2.3 of the HASP. It is LANL's policy that whenever feasible a less toxic product should be substituted for a more toxic product, especially for products having a carcinogen constituent.

| HAZARDOUS SUBSTANCE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| **Compressed Gases** | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen (FID) | | | | | | | | | | | | | | | | | | | | | | | |
| Isobutylene (PID) | | | | | | | | | | | | | | | | | | | | | | | |
| Methane (FID or LEL/$O_2$) | | | | | | | | | | | | | | | | | | | | | | | |
| Acetylene (welding) | | | | | | | | | | | | | | | | | | | | | | | |
| Oxygen (welding) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **Fuels/Lubricants** (Petroleum-Based Hydrocarbons) | | | | | | | | | | | | | | | | | | | | | | | |
| Diesel | | | | | | | | | | | | | | | | | | | | | | | |
| Gasoline | | | | | | | | | | | | | | | | | | | | | | | |
| Oil | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **Preservatives** (Corrosives) | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrochloric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Nitric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Sodium [illegible]droxide | | | | | | | | | | | | | | | | | | | | | | | |
| Othe[illegible]cify) | | | | | | | | | | | | | | | | | | | | | | | |

| HAZARDOUS SUBSTANCE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| **Solvents** (Alcohols and Ketones) | | | | | | | | | | | | | | | | | | | | | | | |
| Acetone | | | | | | | | | | | | | | | | | | | | | | | |
| Methanol | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | |
| **Other** | | | | | | | | | | | | | | | | | | | | | | | |
| *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| | **Site Contaminants** | | | | | | | | | | | | | | | | | | | | | | |
| **High Explosives** | | | | | | | | | | | | | | | | | | | | | | | |
| *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| **Radionuclides** *[indicate isotopes]* | | | | | | | | | | | | | | | | | | | | | | | |
| Americium | | | | | | | | | | | | | | | | | | | | | | | |
| Cesium | | | | | | | | | | | | | | | | | | | | | | | |
| Plutonium | | | | | | | | | | | | | | | | | | | | | | | |
| Strontium | | | | | | | | | | | | | | | | | | | | | | | |
| Uranium | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | |
| **Inorganics** | | | | | | | | | | | | | | | | | | | | | | | |
| CORROSIVES ACIDS/BASES | | | | | | | | | | | | | | | | | | | | | | | |
| Ammonium Hydroxide | | | | | | | | | | | | | | | | | | | | | | | |
| Chromic Acid/Chromates | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrochloric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Nitric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Perchloric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Permanganates | | | | | | | | | | | | | | | | | | | | | | | |
| Phosphoric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Sodium Hydroxide | | | | | | | | | | | | | | | | | | | | | | | |
| Sulfuric Acid | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | |
| HALOGENS | | | | | | | | | | | | | | | | | | | | | | | |
| *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | |

| HAZARDOUS SUBSTANCE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METALS | | | | | | | | | | | | | | | | | | | | | | | |
| Arsenic | | | | | | | | | | | | | | | | | | | | | | | |
| Barium | | | | | | | | | | | | | | | | | | | | | | | |
| Beryllium | | | | | | | | | | | | | | | | | | | | | | | |
| Cadmium | | | | | | | | | | | | | | | | | | | | | | | |
| Chromium | | | | | | | | | | | | | | | | | | | | | | | |
| Copper | | | | | | | | | | | | | | | | | | | | | | | |
| Lead | | | | | | | | | | | | | | | | | | | | | | | |
| Mercury | | | | | | | | | | | | | | | | | | | | | | | |
| Nickel | | | | | | | | | | | | | | | | | | | | | | | |
| Selenium | | | | | | | | | | | | | | | | | | | | | | | |
| Silver | | | | | | | | | | | | | | | | | | | | | | | |
| Thallium | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| MINERALS *(indicate %)* | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (amosite) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (chrysotile) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos (crocidolite) | | | | | | | | | | | | | | | | | | | | | | | |
| Asbestos *(other specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Silica/Quartz | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| OTHER *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Organics | | | | | | | | | | | | | | | | | | | | | | | |
| ACIDS | | | | | | | | | | | | | | | | | | | | | | | |
| Acetic | | | | | | | | | | | | | | | | | | | | | | | |
| Trichloroacetic (TCA) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| ALCOHOLS | | | | | | | | | | | | | | | | | | | | | | | |
| Butyl | | | | | | | | | | | | | | | | | | | | | | | |
| Ethyl | | | | | | | | | | | | | | | | | | | | | | | |
| Glycols *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Methyl | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |

| HAZARDOUS SUBSTANCE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| **ALDEHYDES** | | | | | | | | | | | | | | | | | | | | | | | |
| Formaldehyde | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **GASES** | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Disulfide | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen Cyanide | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen Sulfide | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROCARBONS (Halogenated)** | | | | | | | | | | | | | | | | | | | | | | | |
| Carbon Tetrachloride | | | | | | | | | | | | | | | | | | | | | | | |
| Chlorobenzenes | | | | | | | | | | | | | | | | | | | | | | | |
| Chloroform | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethane | | | | | | | | | | | | | | | | | | | | | | | |
| Dichloroethylene | | | | | | | | | | | | | | | | | | | | | | | |
| Dichlorobenzene | | | | | | | | | | | | | | | | | | | | | | | |
| Freons *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Hexachloro compounds | | | | | | | | | | | | | | | | | | | | | | | |
| Methyl Chloroform (1,1,1-Trichloroethane) | | | | | | | | | | | | | | | | | | | | | | | |
| Methylene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Perchloroethylene (1,1,2,2-Tetrachloroethylene) | | | | | | | | | | | | | | | | | | | | | | | |
| Pentachlorophenol | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1,2-Trichloroethane | | | | | | | | | | | | | | | | | | | | | | | |
| Trichloroethylene) | | | | | | | | | | | | | | | | | | | | | | | |
| Trichlorophenol | | | | | | | | | | | | | | | | | | | | | | | |
| Vinyl Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Vinylidene Chloride | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| **HYDROCARBONS (Non-Halogenated)** | | | | | | | | | | | | | | | | | | | | | | | |
| Hexane | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |

| HAZARDOUS SUBSTANCE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| HYDROCARBONS (Petroleum Based) | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | | | | | | | | | | | | | | | | | | | | | | | |
| Diesel | | | | | | | | | | | | | | | | | | | | | | | |
| Gasoline | | | | | | | | | | | | | | | | | | | | | | | |
| Oil *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| PNAs/PAHs *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| Toluene | | | | | | | | | | | | | | | | | | | | | | | |
| Xylenes | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| KETONES | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| PESTICIDES | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| PCBs | | | | | | | | | | | | | | | | | | | | | | | |
| *(specify % chlorine)* | | | | | | | | | | | | | | | | | | | | | | | |
| OTHER | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

## 4.3 HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Hazards included in this section are those expected to result in one of the hazard assessment ratings defined below and could pose an occupational health threat to workers performing the associated task(s). The hazard assessments and rationales are indicated below with the corresponding administrative and engineering controls for protection from and mitigation of the hazards. *[Check the applicable hazards in the Table and fill in the corresponding blank boxes ]*

Key to hazard assessment ratings:

| | Mishap Probability | | | |
|---|---|---|---|---|
| | Likely to Occur | Probably will Occur | Possibly could Occur | Unlikely to Occur |
| **Catastrophic** (i.e., death or life-threatening injury/illness from one encounter) | Imminent | Imminent | Serious | Minor |
| **Major** (i.e., significant injury/illness resulting in irreversible harm) | Imminent | Serious | Moderate | Minor |
| **Minor** (i.e., injury or illness resulting in reversible harm - not likely to threaten mobility, vision) | Serious | Moderate | Minor | Negligible |
| **Negligible** | Minor | Minor | Negligible | Negligible |

**TABLE 4-3**

**HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS**

| Hazard | Task(s) | Hazard Assessment | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| **Safety Hazards and Health Concerns** | | | | |
| CONFINED-SPACE ENTRY | ☐ PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable confined space entry permit/program per Section 4.2.2.5 of the HASP and as specified below; contact Field Unit HS Representative to initiate permit process | | | |
| ☐ Oxygen deficiency/ hazardous atmosphere | | | | Ventilate space sufficiently in compliance with 29 CFR 1926.55(b) and 29 CFR 1926.57 or use Level B PPE (see below) |
| ☐ Fire/explosion hazards when using compressed gas cylinders for Level B air supply | | | | Handle cylinders with care (Refer to Safe Handling of Compressed Gases in Containers [CGA P-1-1984]) |
| ☐ Personnel entrapment or situation necessitating emergency egress | | | | Compliance with 29 CFR 1910.146 and Section 4.2.2.5 of the HASP |
| ☐ Limited visibility/mobility | | | | Sufficient illumination shall be provided at the discretion of the SSO and affected employees |
| ☐ Other *[specify]* | | | | |

| Hazard | Task(s) | Hazard Assessment | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| **EXCAVATION/ TRENCHING** | ☐ PERMIT REQUIRED for excavating/trenching > 1 foot; A&E controls shall be implemented in accordance with applicable LANL excavation permit (per LANL AR 1-12) and as specified below; contact Field Unit HS Representative to initiate permit process | | | |
| ☐ General | | | | ☐ No personnel entry into trench/excavation<br>☐ Inspections by a competent person shall be made prior to start of work, as needed throughout shift and after every rain storm or other hazard increasing occurrence (29 CFR 1926.651)<br>☐ Appropriate engineering controls shall be implemented in accordance with 29 CFR 1926.651 whenever the stability of a structure adjoining an excavation may be endangered<br>☐ Excavated materials (spoils) shall be kept at least 2 ft. away from edge of excavation |
| ☐ Underground utilities - elec./fire/explosion hazards | | | | ☐ Estimated locations of utilities (i.e., sewer, telephone, gas, electric, water lines, etc.) shall be determined prior to excavating. Notify utility owners of intended work and request they demarcate on ground surface location(s) of underground utilities; have a field team member accompany utility owner rep. to identify intended excavation location(s) and to find out specifics of utility location(s).<br>☐ If utility owner cannot establish exact location of utility installation(s), excavating may proceed with caution and provided detection equipment or other acceptable means to locate utility installation(s) are used.<br>☐ As excavating operations approach estimated location of underground utility, exact location of the installation shall be determined by safe and acceptable means (i.e., using hand held excavating equipment).<br>☐ While excavation is open, undergound installations shall be protected, supported or removed as necessary to safeguard site personnel |
| ☐ Buried drums/containers - fire/explosion hazard | | | | A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers; soil or covering material shall be removed with caution to prevent drum or container rupture |
| ☐ Explosive/flammable environment | | | | Adequate precaution shall be taken (e.g., ventilation in compliance with 29 CFR 1926.55(b) and 29 CFR 1926.57) to prevent personnel exposure to an atmosphere containing flammable gas ≥10% of the lower flammable limit (LEL) of the gas |
| ☐ Cave-in/personnel entrapment | | | | Trench/excavation ≥ 4 feet deep shall have a stairway, ladder, ramp, or other safe means of egress located so as to require more than 25' of lateral travel by personnel in trench/excavation (e.g., 1 ladder for 25'<xs50' long trench) (29 CFR 1926.651) |
| ☐ Oxygen deficiency/ hazardous atmosphere | | | | Where oxygen deficiency or a hazardous atmosphere could reasonably be expected to exist, the atmosphere in excavation/trench shall be tested prior to anyone entering excavation > 4 feet in depth; refer to Section 6 |
| ☐ Other: (specify) | | | | |

| Hazard | [illegible] | [illegible] | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| **DRILLING/HEAVY EQUIPMENT OPERATION** | | | | |
| ❑ General Controls | • Per DOE (Drilling Safety Manual, 1983 and Construction Safety Reference Guide, 1993), drilling rigs shall be designed, manufactured, erected, used, and maintained in accordance with appropriate American Petroleum Institute (API) Specifications and Recommended Practices, as a minimum, and with applicable sections of 29 CFR 1926.251, Subpart N of 29 CFR 1926, and Title 8 of the California Administrative Code (8 CAC).<br>• Hoists, hooks, wires, ropes, slings, and rigging accessories shall be designed, installed, operated, inspected, and tested in accordance with applicable requirements of the DOE Hoisting and Rigging Manual (April 1983, DOE/ID-10500), and with applicable sections of 29 CFR 1926.251 and Subpart N of 29 CFR 1926.<br>• There shall be no apparent damage, excessive wear, or deformation of any part of the drilling equipment. Equipment shall be inspected by a qualified person according to Section 12.1 and the frequencies indicated below. Defective equipment shall be removed from service and any defects shall be corrected or repaired before equipment is put into service. Records of each inspection shall be kept at the rig readily available for review. Reduction of original strength shall be noted and taken into account for determining when equipment shall be taken out of service.<br>- Rigs and masts shall be inspected at least weekly.<br>- Hoists, hooks, wires, ropes, slings, and rigging accessories shall be inspected at the beginning of each shift in which they are to be used and as necessary during use to ensure safety.<br>- Hoisting lines shall be inspected visually each day, and thoroughly at a minimum of 30-day intervals.<br>- Guy wires in use shall be thoroughly inspected at least once a year.<br>- Anchors shall be pull-tested along an angle approximating the wind-guy working plane within 12 months prior to use; test shall be made at poundage determined by anchor location<br>• Each derrick or mast, and hoist shall be permanently marked with its rating capacity.<br>• Drill rigs must be leveled, anchored, and guyed in accordance with manufacturer's recommendations or where there are none, with API Specification 4E.<br>• Pressure-hose connections shall be secured with safety chains or clamped to prevent whipping in the event of a break.<br>• When engaged in work at a location 10 feet or more above the derrick floor or other working surface, the worker shall wear a safety belt with attached lanyard secured to the derrick, except during rig-up/rig-down when workers other than the rig operator shall stand clear. Safety belts, lifelines, and lanyards shall be used in accordance with 29 CFR 1926.104 and Section 7. | | | |
| ❑ Overhead elec. hazard | | | | During stationary operation, minimum clearance between live lines and any part of equipment or load: 10 ft for lines rated 50 kV; 10 ft + 0.4 in. for each 1 kV over 50 kV, or twice the length of line insulator, whichever is greater. In transit with no load and boom lowered, min. clearance:<br>voltages < 50 kV: 4 ft min<br>voltages 50 kV< x ≤345 kV: 10 ft min<br>voltages 345 kV< x ≤750 kV: 16 ft min |
| ❑ Pinch points in rotating parts | | | | Heavy equipment shall be inspected for engineering controls in compliance with applicable sections of Subparts O of 29 CFR 1926 and 29 CFR 1910 |
| ❑ Vehicle operation/ vehicular traffic accident | | | | ❑ Field team personnel exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material<br>❑ Heavy equipment shall be inspected for engineering controls in compliance with applicable sections of Subparts O of 29 CFR 1926 and 29 CFR 1910 |
| ❑ Other *[specify]* | | | | |

| Hazard | Task(s) | Hazard Assessment | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| **WELDING/CUTTING/ BRAZING** | ☐ PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable LANL special work permit (SWP) per Section 4.2.2.12 of the HASP and as specified below for sparks/flame-producing operations; contact Field Unit HS Representative to initiate permit process | | | |
| ☐ Fire/explosion/burn hazards when using compressed gases | | | | Implement A&E controls per applicable permit and in accordance with Subpart J of 29 CFR 1926 |
| ☐ Toxic substances in breathing zone *(specify)* | | | | Ventilate local area (in compliance with 29 CFR 1926.55(b) and 29 CFR 1926.57); perform personal exposure sampling (dosimetry) per Section 6 and use ; use PPE per Section 7 |
| ☐ Other *(specify)* | | | | |
| **ELECTRICAL** | ☐ PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable requirements of Sections 4.2.2.1 and/or 4.2.2.8 of the HASP and as specified below for lockout/tagout of energized equipment; contact Field Unit HS Representative to initiate permit process | | | |
| ☐ Electrocution - working with energized equipment (e.g., generator) | | | | Take preventative measures and identify and correct deficiencies in accordance with Subpart K of 29 CFR 1926 and Sections 4.2.2.1 and/or 4.2.2.8 of the HASP, as applicable |
| ☐ Other *(specify)* | | | | |
| **EQUIPMENT DECONTAMINATION** | | | | |
| ☐ Steam cleaner operation - burns | | | | Operator shall use PPE as specified in Section 7 |
| ☐ Spread of contamination during equip. steam cleaning | | | | Install protective barrier(s) over/around steam cleaning decon unit to prevent migration of spray, especially on windy days |
| ☐ Other *(specify)* | | | | |
| **MISCELLANEOUS** | | | | |
| ☐ Falls from heights above 4' | | | | Compliance with 29 CFR 1926.500, and as necessary, use of PPE specified in Section 7 for fall protection |
| ☐ Fire/ explosion hazards while using compressed gas cylinders for instrument calibration | | | | Handle cylinders with care (Refer to Safe Handling of Compressed Gases in Containers [CGA P-1-1984]) |
| ☐ Sanitation | | | | ☐ Showers and change rooms shall be provided on-site in the CRZ or SZ, and used by field team members working within EZ or CRZ, whenever the duration of hazardous waste operations (under 29 CFR 1926.65) will last ≥ 6 months. Showers shall meet requirements of 29 CFR 1926.51(f)(4). Change rooms shall meet requirements of 29 CFR 1926.51(i)<br>☐ At least one toilet shall be provided on site for ≤ 20 field team personnel unless transportation is readily available to nearby off-site toilet facilities |
| ☐ Limited visibility/mobility | | | | Sufficient illumination shall be provided according to Table D-65.1 of 29 CFR 1926.65. Illumination intensities shall be verified by monitoring specified in Table 4-4.1 |
| ☐ Uneven terrain, slips, trips, falls | | | | Use caution and be observant while moving in areas of potential concern, minimize threat of slick surfaces |

| Hazard | Task(s) | Hazard Assessment | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| ☐ Other, specify: | | | | |
| **Radiological Hazards** | | | | |
| ☐ Alpha Radiation *(specify radioisotopes)* | | | | Minimize exposure and maximize distance to source<br>☐ PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable LANL Radiological Work Permit (RWP). contact Field Unit ESH Representative to initiate permit process<br>☐ Other *[specify]* |
| ☐ Beta/Gamma Radiation *(specify radioisotopes)* | | | | Minimize exposure and maximize distance to source<br>☐ PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable LANL Radiological Work Permit (RWP). contact Field Unit ESH Representative to initiate permit process<br>☐ Other *[specify]* |
| **High Explosives (HE) Hazards** | | | | |
| ☐ High Explosives (HE) | | | | *[Specify requirements; contact DX-16 to determine site specific requirements (e.g., training, remote operations, etc.)]* |
| **Biological Hazards** | | | | |
| ☐ General | | | | Refer to Table 1 of the HASP for information concerning various general hazards associated with occupational exposure to toxic and/or hazardous biological agents |
| ☐ Occupational Exposure to Bloodborne Pathogens | | | | Refer to Table 1 and Section 4.2.2.2 of the HASP |
| **Physical Health Hazards** | | | | |
| ☐ Excessive Noise | | | | Whenever voice(s) must be raised to communicate between two or more persons located ≤ 3 feet of each other noise level likely exceeding PEL; conduct noise monitoring per Section 6; also refer to Section 4.2.2.7 of HASP for additional requirements |

| Hazard | Task(s) | Hazard Assessment | Hazard Assessment Rationale | Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures) |
|---|---|---|---|---|
| | | | **Chemical Health Hazards** | |
| ❑ Chemical splashes - exposure to corrosives and/or substances toxic by skin absorption | | | | ❑ PPE (chemical protective clothing and/or eye/face protection) shall be used as specified for the corresponding task(s)/site(s) in Section 7<br>❑ Portable emergency:<br>❑ Eyewash ❑ Shower ❑ Eyewash/Shower<br>Emergency eyewashes and showers must be located within 10 seconds and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous flushing for the duration of time necessary to sufficiently flush the most hazardous substance for which the device is being specified. They also shall be inspected and flushed at least weekly by the SSO or designee Refer to ANSI Z358.1-1990 for further information.<br>❑ Field Team Personnel shall shower prior to leaving the CRZ or regulated/controlled area of contamination. Shower(s) shall be equipped with hot and cold water feeding a common discharge line. Waste water shall be captured, contained, and tested and disposed according to the site-specific Waste Management Plan (Refer to *American National Standard for Sanitation in Places of Employment - Minimum Requirements* [ANSI Z4.1-1968]) |
| ❑ Airborne Toxic Dust, Vapors, and/or Fumes - General | | | | First line of defense: Implement engineering controls [e.g., local ventilation in accordance with 29 CFR 1926.55(b), 1926.57], and/or other applicable chemical-specific standard (Table 2 of the HASP) to limit airborne levels of contaminants to below action levels set in Section 6.<br>Refer also to Section 6, 7 and Appendix C of this SSHASP and to Sections 6 and 7 of the HASP<br>❑ Other: *[specify]* |
| ❑ Airborne levels of known toxic or radioactive contaminants necessitating use of Level C personal protective equipment (PPE) | | | | First line of defense: Implement engineering controls [e.g., local ventilation in accordance with 29 CFR 1926.55(b) and 1926.57] to limit airborne levels of contaminants to below action levels set in Section 6.<br>LEVEL C Operations: Air-Purifying respiratory protective equipment shall be used by field team members only in accordance with a LANL approved Respiratory Protection Program and Section 7.1 of the HASP. |
| ❑ Airborne levels of known toxic or radioactive contaminants necessitating use of Level B PPE, or potentially hazardous levels of unknown airborne toxic or radioactive contaminants | | | | First line of defense: Implement engineering controls [e.g., local ventilation in accordance with 29 CFR 1926.55(b) and 1926.57] to limit airbime levels of contaminants to below action levels set in Section 6.<br>LEVEL B Operations: Supplied-air respiratory protective equipment shall be used by field team members only in accordance with a LANL approved Respiratory Protection Program and Section 7.1 of the HASP, and site specific SOP(s) developed for use of Level B respiratory protection which supplement this SSHASP and have been reviewed and approved by ESH-5, contact Field Unit HS Representative to arrange for preparation and review of Level B SOP(s) |
| ❑ Other *[specify]* | | | | |

## 5.0 SITE CONTROLS

In accordance with Section 5 of the HASP, the required site control measures are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from requirements of the HASP are noted below. Site map(s) are provided in Appendix A to show where the following site control measures will be located. Since some zone or facility locations may change as site work progresses due to daily variability in site conditions and/or operations (e.g., wind or access), actual locations are to be explained to field team members by the SSO, or the FTL or JS during daily HS tailgate meetings and documented in the logbook kept by the SSO.

**TABLE 5**
**SITE CONTROL MEASURES**

☐ Not applicable; rationale:

*[Atop the blank columns, enter the ID of each task where site control measures are required; tasks having the same control measures may be identified in the same column. Identify the required control measures by entering an "X" in the corresponding box below. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).]*

| CONTROL MEASURES | TASK(S) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Exclusion Zone (EZ) | Per _____ *[Specify applicable chemical-specific standard in Table 2 of the HASP; delete if not applicable. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Radiological Control Area | | | | | | | | | | | | | | | | | | | | | | | |
| Radioactive Material Management Area (RMMA) | | | | | | | | | | | | | | | | | | | | | | | |
| Regulated Area (per Table 3 of HASP) | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized location | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site | | | | | | | | | | | | | | | | | | | | | | | |
| Negatively pressurized | | | | | | | | | | | | | | | | | | | | | | | |
| Demarcated by: | | | | | | | | | | | | | | | | | | | | | | | |
| Cones | | | | | | | | | | | | | | | | | | | | | | | |
| Barrier Tape | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | |
| Enclosed structure | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |

| CONTROL MEASURES | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify:*
Description(s):

| ☐ Contamination Reduction Zone (CRZ) | Per _____ *[Specify applicable chemical-specific standard in Table 2 of the HASP; delete if not applicable. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Radiological Control Area | | | | | | | | | | | | | | | | | | | | | | | |
| Radioactive Material Management Area (RMMA) | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized location | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site | | | | | | | | | | | | | | | | | | | | | | | |
| Negatively pressurized | | | | | | | | | | | | | | | | | | | | | | | |
| Demarcated by: | | | | | | | | | | | | | | | | | | | | | | | |
| Cones | | | | | | | | | | | | | | | | | | | | | | | |
| Barrier Tape | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | |
| Enclosed Structure | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify:*
Description(s):

| ☐ Support Zone (SZ) | Per _____ *[Specify applicable chemical-specific standard in Table 2 of the HASP; delete if not applicable. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized Location | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site | | | | | | | | | | | | | | | | | | | | | | | |
| Demarcated by: | | | | | | | | | | | | | | | | | | | | | | | |
| Unnecessary | | | | | | | | | | | | | | | | | | | | | | | |
| Cones | | | | | | | | | | | | | | | | | | | | | | | |
| Barrier Tape | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |

| CONTROL MEASURES | TASK(s) |
|---|---|

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Equipment Staging Area | Per _____ *[Specify applicable chemical-specific standard in Table 2 of the HASP; delete if not applicable. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* |
|---|---|
| Not applicable | |
| Located at work site in SZ | |
| Centralized location *[specify where]* | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Equipment Staging Pad/Facility | Per _____ *[Specify applicable chemical-specific standard in Table 2 of the HASP; delete if not applicable. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* |
|---|---|
| Not applicable | |
| Radiological Control Area | |
| Radioactive Material Management Area (RMMA) | |
| Located at work site EZ | |
| Located at work site CRZ | |
| Centralized location | |
| Demarcated by: | |
| Unnecessary | |
| Cones | |
| Barrier Tape | |
| Fence | |
| Security Access | |
| Other *[specify]*: | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Temporary Waste Storage Area | *[Wherever "Not applicable" is checked below, provide the rationale in this box.]* |
|---|---|
| Not applicable | |
| Radiological Control Area | |

| CONTROL MEASURES | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radioactive Material Management Area (RMMA) | | | | | | | | | | | | | | | | | | | | | | | | |
| Located onsite | | | | | | | | | | | | | | | | | | | | | | | | |
| Located off-site | | | | | | | | | | | | | | | | | | | | | | | | |
| Demarcated by: | | | | | | | | | | | | | | | | | | | | | | | | |
| Cones | | | | | | | | | | | | | | | | | | | | | | | | |
| Barrier Tape | | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Support Trailer(s) | *(Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.)* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Located at work site in SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized location | | | | | | | | | | | | | | | | | | | | | | | | |
| Access Identified/limited by: | | | | | | | | | | | | | | | | | | | | | | | | |
| Unnecessary | | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Mobile Laboratory | *(Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.)* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Radiological Control Area | | | | | | | | | | | | | | | | | | | | | | | | |
| Radior Managen Material es (RMMA) | | | | | | | | | | | | | | | | | | | | | | | | |

| CONTROL MEASURE | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Located at work site SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Centrally located | | | | | | | | | | | | | | | | | | | | | | | | |
| Access identified/limited by: | | | | | | | | | | | | | | | | | | | | | | | | |
| Unnecessary | | | | | | | | | | | | | | | | | | | | | | | | |
| Fence | | | | | | | | | | | | | | | | | | | | | | | | |
| Security Access | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify:*
Description(s):

| ☐ Hand [illegible] | Per _____ *[Specify either 29 CFR 1926.65(n) or 1926.51 or applicable chemical-specific standard in Table 2 of the HASP. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Located onsite in SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Centrally located | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify:*
Description(s):

| ☐ Toilet [illegible] | Per _____ *[Specify either 29 CFR 1926.65(n) or 1926.51 or applicable chemical-specific standard in Table 2 of the HASP. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Portable located onsite in SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Located off-site *[specify where]* | | | | | | | | | | | | | | | | | | | | | | | | |

| ☐ [illegible] | Per _____ *[Specify either 29 CFR 1926.65(n) or 1926.51 or applicable chemical-specific standard in Table 2 of the HASP. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Required for personnel decon | | | | | | | | | | | | | | | | | | | | | | | | |
| Optional for personnel comfort | | | | | | | | | | | | | | | | | | | | | | | | |
| Radiological Control Area (RCA) | | | | | | | | | | | | | | | | | | | | | | | | |

| CONTROL MEASURES | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Located at work site CRZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Located at work site SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Centrally located | | | | | | | | | | | | | | | | | | | | | | | | |
| Access identified/limited by: | | | | | | | | | | | | | | | | | | | | | | | | |
| Unnecessary | | | | | | | | | | | | | | | | | | | | | | | | |
| Structured containment | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Clothing Change Facility | Per _____ *[Specify either 29 CFR 1926.65(n) or 1926.51 or applicable chemical-specific standard in Table 2 of the HASP. Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Required for personnel decon | | | | | | | | | | | | | | | | | | | | | | | | |
| Optional for personnel comfort | | | | | | | | | | | | | | | | | | | | | | | | |
| Located at work site SZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Centrally located | | | | | | | | | | | | | | | | | | | | | | | | |
| Access identified/limited by: | | | | | | | | | | | | | | | | | | | | | | | | |
| Unnecessary | | | | | | | | | | | | | | | | | | | | | | | | |
| Structured containment | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |

Posting(s): ☐ Per LANL LS 107-02.0 ☐ Per Subpart G of 29 CFR 1926 ☐ Other Chemical-Specific Standard (Table 2 of the HASP); *specify*:
Description(s):

| ☐ Wind Direction Indicator(s) | Shall be located onsite where readily visible to field team members (e.g., atop equipment mast/derrick). *[Wherever "Not applicable" is checked below, provide the rationale in this box. If not applicable at all sites, say so here and provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not Applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Located *(exactly where if fixed loc[illegible] vis[illegible] or indicate if [illegible]cator)* | | | | | | | | | | | | | | | | | | | | | | | | |

| CONTROL MEASURES | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Flag | | | | | | | | | | | | | | | | | | | | | | | |
| Anemometer | | | | | | | | | | | | | | | | | | | | | | | |
| Other (specify): | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Other (specify): | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

# 6.0 EXPOSURE MONITORING AND CORRESPONDING ACTIONS

In accordance with Section 6 of the HASP, personnel exposure monitoring requirements, action levels, and the corresponding actions to be taken are specified in the tables in this section (Tables 6-1, 6-2, and 6-3) for each task or group of tasks having different requirements.

## 6.1 DIRECT-READING INSTRUMENTS

Requirements for exposure monitoring using direct-reading instruments and the corresponding action levels and response actions are specified in Table 6-1 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

**TABLE 6-1**
**DIRECT-READING INSTRUMENT REQUIREMENTS**

| Hazardous Condition/ Substance | Task(s) | Instrument | Procedure | Location and Frequency of Monitoring | Action Level(s) | Response Action(s) | Action Level Rationale |
|---|---|---|---|---|---|---|---|
| HEALTH PHYSICS | | | | | | | |
| ❑ Radiation<br>Gross α and gross β/γ contamination<br>(specific radio-isotopes listed in Table 4-2) | | ❑ β/γ Eberline ESP-1 with HP-260 probe or equiv.<br>❑ α-Ludlum 139 with air proportional probe or equiv. | Per LANL RadCon Manual and training | ❑ Drilling: As sample barrel comes out of borehole; after sample barrel is opened and prior to sampling soil<br>❑ Surface Sampling/Excavations: Excavated soil, ground surface prior to disturbance, and excavated soil/material | Background | Field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.)<br>Intermittent ESH-1 coverage<br>Large area swipes for α (2000 $cm^2$) counted using field alpha screening instrument; direct link for β/γ | Standard levels set by ESH-1 |
| | | | | ❑ Non-intrusive Activities: Ground surface near source (as applicable based on potential for soil contamination)<br>❑ Personnel: Prior to exiting EZ, CRZ | > Background<br>α < 500 cpm/probe area<br>β/γ < 5,000 cpm/probe area | Notify ESH-1 of elevated readings<br>Dedicated field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.)<br>Increased intermittent ESH-1 coverage<br>α swipes counted using Ludlum 2000 tray counter or equiv.; direct link for β/γ | Standard levels set by ESH-1 |
| | | | | ❑ Equipment: Prior to decon and for release<br>❑ Other: | α > 500 cpm/probe area<br>β/γ > 5,000 cpm/probe area | Work may only proceed according to approved RWP and with full-time onsite ESH-1 technician (or equiv.) in accordance with Sections 3.2.4 and 3.3.4 of the HASP. | Standard levels set by ESH-1 |

| Hazardous Condition/ Substance | Task(s) | Instrument | Procedure | Location and Frequency of Monitoring | Action Level(s) | Response Action(s) | Action Level Rationale |
|---|---|---|---|---|---|---|---|
| **PHYSICAL CONDITIONS** | | | | | | | |
| ☐ Noise | | Noise level meter | ☐ ER Project *Manual for Site HS Activities*<br>☐ Other *[specify]* | Only monitor non-LANL employees; contact Field Unit HS Rep. if LANL employees need monitoring<br>Noise measurements required when voice must be raised to communicate between two persons located ≤ 3 feet of each other; monitor hearing zone(s) of employees affected by excessive noise<br>1st day of occurrence & whenever operations change warranting monitoring: initial measurement and at 30 minute intervals while excessive noise condition persists | ☐ 85 dBA (Non-LANL employees only)<br>☐ 80 dBA (Hearing Conservation Program - LANL employees only)<br>☐ 84 dBA (Hearing protection required - LANL employees only) | ≥ Action Level: Implement appropriate engineering control(s) per Table 4-3; if unable to lower noise levels below AL, demarcate/post zones of excessive noise and limit access only to employees having sufficient hearing protection training, medical surveillance, and hearing protection per this SSHASP | OSHA 29 CFR 1910.95 for non-LANL employees<br>Per DOE and LANL requirements for LANL employees |
| **PHYSICAL CONDITIONS (cont'd)** | | | | | | | |
| ☐ Illumination | | *[Specify instrument, mfr., model, accessories, and settings - if any]* | *[Specify]* | *[Specify]* | *[Specify]* | *[Specify]* | *[Specify]* |
| ☐ Heat/Cold Stress | | *[Specify instrument, mfr., model, accessories, and settings - if any]* | *[Specify]*<br>*[Refer to Table 1 of the HASP]* | *[Specify]* | *[Specify]* | *[Specify]*<br>*[Refer to Table 1 of the HASP]* | *[Specify]*<br>*[Refer to Table 1 of the HASP]* |
| **INDUSTRIAL HYGIENE (CHEMICALS)** | | | | | | | |
| ☐ Explosion, Oxygen Deficiency, Hydrogen Sulfide | | CGI<br>*[Specify instrument, mfr., model, accessories, and settings]* | ☐ ER Project *Manual for Site HS Activities*<br>☐ Other *[specify]* | ☐ Drilling: Continuously during drilling near borehole<br>☐ Excavation/Trenching: Continuously near point(s) of excavation<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other: | Explosivity:<br>10% LEL ≤ x ≤ UEL<br>19.5% > $O_2$ > 22% in breathing zone (BZ)<br>$H_2S$ ≥ 5 ppm in BZ | Limit access to area(s) and allow for natural ventilation or implement appropriate engineering control(s) per Table 4-3 until action level(s) no longer violated<br>Use of Level B PPE required for oxygen deficiency or exceedence of $H_2S$ action levels (ALs)<br>(NOTE: $H_2S$ desensitizes nasal receptors and sense of smell becomes unreliable warning indicator) | Explosivity. DOE<br>$O_2$: Per ANSI Z 88.2-1992<br>$H_2S$: 1/2 PEL |

| Hazardous Condition/ Substance | Task(s) | Instrument | Procedure | Location and Frequency of Monitoring | Action Level(s) | Response Action(s) | Action Level Rationale |
|---|---|---|---|---|---|---|---|
| ☐ Total Airborne Dust | | Mini-ram<br><br>*[Specify instrument, mfr., model, accessories, and settings]* | ☐ ER Project *Manual for Site HS Activities*<br><br>☐ Other *[specify]* | ☐ Drilling/Soil Sampling: Continuously near point of dust generation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other: | *[Specify]* | ≥ action level (AL) in employee breathing zone implement dust suppression methods to control dust levels below AL.<br>If unable to lower levels below AL, demarcate/post zones of excessive exposure and limit access only to employees having sufficient chemical-specific PPE, training, and medical surveillance per this SSHASP | *[Specify]*<br><br>*[Consider respirable fraction and toxicity also]* |
| ☐ Organic Vapors, (specify): | | PID/FID<br><br>*[Specify instrument, mfr., model, lamp voltage, accessories, and settings]* | ☐ ER Project *Manual for Site HS Activities*<br><br>☐ Other *[specify]* | ☐ Drilling/Soil Sampling: Continuously near point(s) of drilling/sampling, periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other: | *[Specify]* | Allow area(s) of concern to vent naturally or by implementing mechanical means per Table 4-3. If condition persists ≥ action level, further limit access to EZ to exposure monitoring personnel only<br><br>*[Devise strategy to determine class(es) or specific types of contaminant(s) of concern (e.g., use of colorimetric detector tubes or portable GC, or collection and analysis of grab samples)]* | *[Specify]* |

| Hazardous Condition/ Substance | Task(s) | Instrument | Procedure | Location and Frequency of Monitoring | Action Level(s) | Response Action(s) | Action Level Rationale |
|---|---|---|---|---|---|---|---|
| ☐ Airborne Vapors *(specify which)* | | Colorimetric Tubes<br><br>*[Specify colorimetric tube pump system and detector tube(s)]* | ☐ ER Project *Manual for Site HS Activities*<br><br>☐ Other *[specify]* | ☐ Drilling/Soil Sampling: Continuously near point(s) of drilling/sampling, periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other:<br><br>[NOTE: When action level for PID/FID is exceeded, then periodically to monitor worst case conditions and that maximum use limit (Protection Factor x PEL ) is not being exceeded while Level C or B PPE is used] | *[Specify]* | If contaminant(s) cannot be classified and/or Level C filters are not approved for contaminant(s) or maximum use concentration (MUC) may be exceeded, then work may only proceed in Level B PPE (refer to Table 4-3)<br><br>x ≤ PID/FID AL — Level D<br><br>PID/FID AL ≤ x and < PF x detector tube AL — Level C<br><br>detector tube AL ≤ x and < PF x detector tube AL — Level B<br><br>PF = Protection Factor<br><br>[NOTE: Respirators may only be used in accordance with Section 7.1 of the HASP] | *[Specify]* |
| ☐ Hydrogen Cyanide | | *[Specify instrument, mfr., model, accessories, and settings]* | *[specify]* | ☐ Drilling/Soil Sampling: Continuously near point(s) of drilling/sampling, periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other: | *[Specify]* | x ≥ AL — Level B<br><br>(Also see notes in box above) | *[Specify]* |

| Hazardous Condition/ Substance | Task(s) | Instrument | Procedure | Location and Frequency of Monitoring | Action Level(s) | Response Action(s) | Action Level Rationale |
|---|---|---|---|---|---|---|---|
| ☐ Mercury | | Mercury Vapor Analyzer<br><br>*[Specify instrument, mfr., model, accessories, and settings]* | ☐ ER Project *Manual for Site HS Activities*<br><br>☐ Other *[specify]* | ☐ Drilling/Soil Sampling: Continu-ously near point(s) of drilling/sampling, periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion<br>☐ Confined-space entry; per permit and program requirements<br>☐ Other: | *[Specify]* | *[Specify]* | *[Specify]* |
| ☐ Other *[Specify]* | | *[Specify]* | *[Specify]* | *[Specify]* | *[Specify]* | *[Specify]* | *[Specify]* |

## 6.2 PERSONAL DOSIMETRY

Requirements for personal dosimetry and the corresponding action levels and response actions are specified in Table 6-2 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP and with the chemical-specific standards listed in Table 2 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

**TABLE 6-2**
**PERSONAL DOSIMETRY REQUIREMENTS**

HEALTH PHYSICS (RADIATION) *[Refer to Section 6 of the HASP.]*

| Hazardous Substance/ Condition | [illegible] | Action Level(s) | Dosimetry Requirement | Action Level(s) Rationale |
|---|---|---|---|---|
| ☐ External Sources of Radiation Exposure | | Potential to exceed 100 mREM/year dose limit | Monthly TLD Badge | 10 CFR 835 |
| ☐ Plutonium | | Potential to exceed 100 mREM/year dose limit | Urinalysis - Baseline and Termination<br>*In Vivo* - Baseline and Termination | 10 CFR 835 |
| ☐ Uranium | | Potential to exceed 100 mREM/year dose limit | Urinalysis - Baseline and Every Two Weeks<br>*In Vivo* - Baseline and Termination | 10 CFR 835 |
| ☐ Tritium | | Potential to exceed 100 mREM/year dose limit | Urinalysis - Baseline and Every Two Weeks | 10 CFR 835 |
| ☐ Mixed Fission Products | | Potential to exceed 100 mREM/year dose limit | *In Vivo* - Baseline and Termination<br>Other: *[specify]* | 10 CFR 835 |
| ☐ Unknown (uncharacterized sites) | | Potential to exceed 100 mREM/year dose limit | *[To be determined by ESH-1 and ESH-12]* | 10 CFR 835 |
| ☐ Other: | | *[specify]* | *[To be determined by ESH-1 and ESH-12]* | *[specify]* |

| Hazardous Condition | Task(s) | Procedure | Instrument/ Supplies | Action Level(s) | Action Level Rationale | Response Action(s) |
|---|---|---|---|---|---|---|
| **PHYSICAL CONDITIONS** | | | | | | |
| ❑ Noise | In the hearing zone of employees incurring excessive noise levels per Table 6-1 monitoring | ❑ ER Project *Manual for Site HS Activities*<br>❑ Other *[specify]* | Personal noise dosimeter(s) | Refer to Table 6-1 | | |
| **INDUSTRIAL HYGIENE (CHEMICALS)** | | | | | | |
| ❑ Respirable Dust *(specify which)* | *(specify)* | *(specify)* | *(specify)* | *(specify)* | *(specify)* | If PEL/TLV is met or exceeded in BZ implement dust suppression methods specified in Table 4-3 to control dust levels below the AL; if unable to get levels below AL, use of Level C or B PPE required |
| ❑ Halogenated Hydrocarbons (e.g., chloroform, PCE, TCA, TCE) | *(specify)* | *(varies depending upon compound)* | *(specify)* | *(specify)* | *(specify)* | If contaminant(s) cannot be classified and/or Level C filters are not approved for contaminant(s) or maximum use concentration (MUC) may be exceeded, then work may only proceed in Level B PPE (refer to Table 4-3)<br>x ≤ PID/FID AL Level D<br>PID/FID AL ≤ x and<br>< PF x detector tube AL Level C<br>detector tube AL ≤ x and<br>< PF x detector tube AL Level B<br>[NOTE: Respirators may only be used in accordance with Section 7.1 of the HASP] |
| ❑ Mercury | *(specify)* | ❑ *NIOSH 6900*<br>❑ *other specify* | *(specify)* | *(specify)* | *(specify)* | *(specify)* |
| ❑ Hydrogen Cyanide | *(specify)* | ❑ *NIOSH 6010*<br>❑ *NIOSH 7904*<br>❑ *other specify* | *(specify)* | *(specify)* | *(specify)* | x ≥ AL Level B<br>Insufficient warning properties for use of Level C |
| ❑ Arsenic (Inorganic) | *(specify)* | ❑ 29 CFR 1926.1118<br>❑ *NIOSH 7900*<br>❑ *other specify* | *(specify)* | *(specify)* | *(specify)* | *(specify)* |

| Hazardous Condition | Test(s) | Procedure | Instrument/ Supplies | Action Level(s) | Action Level Rationale | Response Action(s) |
|---|---|---|---|---|---|---|
| ☐ Asbestos | (specify) | ☐ 29 CFR 1926.1101<br>☐ NIOSH 7400<br>☐ NIOSH 7401<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Benzene | (specify) | ☐ 29 CFR 1926.1128<br>☐ NIOSH 1501<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Beryllium | (specify) | ☐ LANL AR 6-7<br>☐ NIOSH 7102<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Biological Micro-organisms | (specify) | ☐ 29 CFR 1910.1030<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Cadmium | (specify) | ☐ 29 CFR 1926.63<br>☐ NIOSH 7048<br>☐ NIOSH 7300<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Formaldehyde | (specify) | ☐ 29 CFR 1926.1148<br>☐ NIOSH 3500<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Lead | (specify) | ☐ 29 CFR 1926.62<br>☐ NIOSH 7300<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Vinyl Chloride | (specify) | ☐ 29 CFR 1926.1117<br>☐ NIOSH 1007<br>☐ other specify | (specify) | (specify) | (specify) | (specify) |
| ☐ Other (specify) | (specify) | (specify) | (specify) | (specify) | (specify) | (specify) |

## 6.3 AREA SAMPLING

Requirements for area sampling and the corresponding action levels and response actions are specified in Table 6-3 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable. Note that the requirements of this table only pertain to occupational exposure monitoring. Environmental sampling requirements, if any, to evaluate spread of contamination to off-site locations should be provided in a site-specific document separate from this SSHASP.

**TABLE 6-3**
**AREA SAMPLING REQUIREMENTS**

☐ Not applicable; rationale:

| Hazardous Condition/ Task(s) | Task(s) | Instrument/ Supplies | Location and Duration of Monitoring | Sampling/ Analytical Method | Action Level(s)/ Rationale | Response Action(s) |
|---|---|---|---|---|---|---|
| **HEALTH PHYSICS (AIRBORNE RADIATION)** | | | | | | |
| ☐ Gross α and β/γ contamination (repeat row for each radioisotope listed in Table 4-2, as necessary for different requirements) | | *[specify]* | *[specify]* | Per Section 6 of the HASP and Radiological Surveillance Authorization Agreement (RSAA) | 10% DAC/ 10 CFR 835 | Stop work, institute engineering controls, respiratory protection, source containment per RWP. |
| **INDUSTRIAL HYGIENE (CHEMICALS)** | | | | | | |
| ☐ Respirable Dust *(include separate row for each of metals, coal tar, and asbestos; respirable silica/quartz)* | | *[specify]* | *[specify]* | *[specify]* | *[specify]* | *[specify]* |
| ☐ Halogenated Hydrocarbons *(include separate row for each class of chemical substances listed in Table 4-2 having different requirements)* | | *[specify]* | *[specify]* | *[specify]* | *[specify]* | *[specify]* |
| ☐ Other *[specify]* | | *[specify]* | *[specify]* | *[specify]* | *[specify]* | *[specify]* |

## 7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In accordance with Section 7 of the HASP, PPE requirements are specified below for each task or group of tasks having different requirements. Only personnel who are trained and qualified to use the equipment in accordance with Section 7 of the HASP and Section 10 of the HASP and SSHASP are allowed to use the equipment specified. Any exceptions or deviations from requirements of these sections are noted below.

**TABLE 7**
**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

☐ Not applicable; rationale:

*[Atop the blank columns, enter the ID of each task for which the PPE is required; tasks having the same PPE requirements may be identified in the same column. Identify the required PPE by entering an "X" in the corresponding box below. Don't forget PPE requirements for emergency/incident response. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).]*

| PPE REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Head** | (per 29 CFR 1910.135, ANSI Z89.1-1986, or Z89.2 for electrical shock protection) ☐ Not applicable *[provide rationale]* | | | | | | | | | | | | | | | | | | | | | | |
| Cap | | | | | | | | | | | | | | | | | | | | | | | |
| Hard Hat | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Eyes** | (per 29 CFR 1910.133, ANSI Z87.1-1989) ☐ Not applicable *[provide rationale]* | | | | | | | | | | | | | | | | | | | | | | |
| Safety Glasses (with sideshields) | | | | | | | | | | | | | | | | | | | | | | | |
| Cover Goggles *[specify Type 2 or 3]* | | | | | | | | | | | | | | | | | | | | | | | |
| Chemical Goggles | | | | | | | | | | | | | | | | | | | | | | | |
| Burning Goggles | | | | | | | | | | | | | | | | | | | | | | | |
| Lens Shade No. *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Face** | (per 29 CFR 1910.133, ANSI Z87.1-1989) ☐ Not applicable *[provide rationale]* | | | | | | | | | | | | | | | | | | | | | | |
| Faceshield - Plastic Lens | | | | | | | | | | | | | | | | | | | | | | | |
| Faceshield - Mesh Window | | | | | | | | | | | | | | | | | | | | | | | |
| Welding Helmet | | | | | | | | | | | | | | | | | | | | | | | |
| Fitted to Hard Hat | | | | | | | | | | | | | | | | | | | | | | | |

| PPE REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lens Shade No. *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Body | ☐ Not applicable *(provide rationale)* | | | | | | | | | | | | | | | | | | | | | | |
| Thermal Vest | | | | | | | | | | | | | | | | | | | | | | | |
| Apron *(specify material)* | | | | | | | | | | | | | | | | | | | | | | | |
| Coveralls | | | | | | | | | | | | | | | | | | | | | | | |
| Jacket | | | | | | | | | | | | | | | | | | | | | | | |
| Pants/Shirt | | | | | | | | | | | | | | | | | | | | | | | |
| Bibs | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **TO BE LAUNDERED:** | | | | | | | | | | | | | | | | | | | | | | | |
| Cotton | | | | | | | | | | | | | | | | | | | | | | | |
| Polyester | | | | | | | | | | | | | | | | | | | | | | | |
| Insulated | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **DISPOSABLE:** | | | | | | | | | | | | | | | | | | | | | | | |
| Breathable, Non-Woven Polypropylene (e.g., Standard Tyvek® or Kleenguard General Protection) | | | | | | | | | | | | | | | | | | | | | | | |
| Splash Protection (e.g., Tyvek® QC or Kleenguard Liquid Protection) | | | | | | | | | | | | | | | | | | | | | | | |
| Chemical Resistant (e.g., Tyvek®/SARANEX® 23-P) | | | | | | | | | | | | | | | | | | | | | | | |
| **WELDING:** | | | | | | | | | | | | | | | | | | | | | | | |
| Leather | | | | | | | | | | | | | | | | | | | | | | | |
| Flame-proof | | | | | | | | | | | | | | | | | | | | | | | |
| Apron | | | | | | | | | | | | | | | | | | | | | | | |
| Leggings | | | | | | | | | | | | | | | | | | | | | | | |
| Chaps | | | | | | | | | | | | | | | | | | | | | | | |
| Cape | | | | | | | | | | | | | | | | | | | | | | | |

| PPE REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Arm Guard | | | | | | | | | | | | | | | | | | | | | | | |
| Foot Cover | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **TRAFFIC ATTIRE:** | | | | | | | | | | | | | | | | | | | | | | | |
| Orange Vest | | | | | | | | | | | | | | | | | | | | | | | |
| **OTHER:** *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Hands** | (per 29 CFR 1910.137 and 138, ASTM D 120-87) ☐ Not applicable *(provide rationale)* | | | | | | | | | | | | | | | | | | | | | | |
| **INNER GLOVES:** | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | |
| Latex | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile ≥ 4-mil thick (e.g., BEST N-DEX® -7005) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| **OUTER GLOVES:** | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | |
| Nitrile ≥ 12" lgth & 0.01" thick | | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene | | | | | | | | | | | | | | | | | | | | | | | |
| PVC | | | | | | | | | | | | | | | | | | | | | | | |
| Cotton *(specify thickness)* | | | | | | | | | | | | | | | | | | | | | | | |
| Lineman's - Rubber insulating Class *(specify 1, 2, 3, or 4)* | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Feet** | (per 29 CFR 1910.136, ANSI Z41-1991) ☐ Not applicable *(provide rationale)* | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **SHOES** ☐ **BOOTS** | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | |
| Steel-toed | | | | | | | | | | | | | | | | | | | | | | | |
| Steel-metatarsal | | | | | | | | | | | | | | | | | | | | | | | |
| Non-conductive | | | | | | | | | | | | | | | | | | | | | | | |
| Leather | | | | | | | | | | | | | | | | | | | | | | | |

| PPE REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene | | | | | | | | | | | | | | | | | | | | | | | |
| PVC | | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ COVERS: | | | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | | | | | |
| Neoprene | | | | | | | | | | | | | | | | | | | | | | | |
| PVC | | | | | | | | | | | | | | | | | | | | | | | |
| Polyurethane | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Ears | (per 29 CFR 1910.95, ANSI Z87.1-1989) ☐ Not applicable *(provide rationale)* | | | | | | | | | | | | | | | | | | | | | | |
| Plugs *(specify NRR)* | | | | | | | | | | | | | | | | | | | | | | | |
| Muffs *(specify NRR)* | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Respiratory Protection | (per Section 7.1 of the HASP, 29 CFR 1910.134, and ANSI Z88.2-1992) ☐ Not applicable *(provide rationale)* | | | | | | | | | | | | | | | | | | | | | | |
| AIR-PURIFYING RESPIRATOR (APR) FACEPIECE: | *(In the corresponding box, specify the air-purifying elements to be used (e.g., organic vapor, HEPA, acid gas, ammonia, mercury, combination, etc.))* | | | | | | | | | | | | | | | | | | | | | | |
| Half-face | | | | | | | | | | | | | | | | | | | | | | | |
| Full-face | | | | | | | | | | | | | | | | | | | | | | | |
| Powered Air-Purifying (PAPR) | | | | | | | | | | | | | | | | | | | | | | | |
| SUPPLIED-AIR RESPIRATOR: | *(Provide supplemental site-specific standard operating procedure(s); contact Field Unit HS Representative to determine necessary content.)* | | | | | | | | | | | | | | | | | | | | | | |
| Pressure Demand | | | | | | | | | | | | | | | | | | | | | | | |
| Continuous Flow | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |

| PPE REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Fall Protection** | (per 29 CFR 1926.20, 27(d)(5), 104, 105, 250(b)2, 451(l)(6) and (p)(9), 500(g)(1-6), 951(b)) ☐ Not applicable *[provide rationale]* | | | | | | | | | | | | | | | | | | | | | | |
| Belt | | | | | | | | | | | | | | | | | | | | | | | |
| Harness | | | | | | | | | | | | | | | | | | | | | | | |
| Life Line | | | | | | | | | | | | | | | | | | | | | | | |
| Lanyard and Hooks | | | | | | | | | | | | | | | | | | | | | | | |
| Safety Nets | | | | | | | | | | | | | | | | | | | | | | | |
| Ladder-Climbing Safety Device | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Miscellaneous** | ☐ Not applicable | | | | | | | | | | | | | | | | | | | | | | |
| Protective Flotation Device (per 29 CFR 1926.106) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |

## 8.0 DECONTAMINATION

In accordance with Section 8 of the HASP, personnel and/or equipment decontamination requirements are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from Section 8 of the HASP are noted below.

**TABLE 8**
**PERSONNEL AND EQUIPMENT DECONTAMINATION**

☐ Not applicable; rationale:

*[Refer to Section 8 of the HASP and determine the approach(es) to be used for personnel and/or equipment decontamination. Atop the blank columns, enter the ID of each task for which the decontamination requirements apply; tasks having the same decontamination requirements may be grouped in the same column. Identify the requirements by entering an "X" in the corresponding box below. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).]*

**Personnel and Environmental Monitoring Equipment (EME)**

☐ Not applicable; rationale:

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Option 1 - Standard Approach Level D | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | |

Modifications to Model Decon Procedures (if any, describe and provide rationale):

1 ☐ Laundering management notified per Section 8.2.2 of the HASP

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ Option 2 - Standard Approach Level C | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify] type and %* | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | |
| Modifications to Model Decon Procedures (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Option 3 - Standard Approach Level B | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify] type and %* | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | |
| Modifications to Model Decon Procedures (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Option 4 - Extensive Approach Level D | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | |

1 ☐ Laundry Management notified per Section 8.2.2 of the HASP

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Modifications to Model Decon Procedures (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Option 5 - Extensive Approach Level C | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Modifications to Model Decon Procedures (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Option 6 - Extensive Approach Level B | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Modifications to Model Decon Procedures (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | | |

[1] ☐ [illegible] Management notified per Section 8.2.2 of the HASP.
[1] ☐ [illegible] Management notified per Section 8.2.2 of the HASP.
[1] ☐ [illegible] Management notified per Section 8.2.2 of the HASP.

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ Other | *[Provide a description of intended decon facility layout, procedures and equipment in this Section of the SSHASP and/or an Appendix Also provide rationale.]* | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Disposed | | | | | | | | | | | | | | | | | | | | | | | | |
| PPE to be Laundered[1] | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | | |

**Sampling and Heavy Equipment**

☐ Not applicable; rationale:

☐ Per LANL-ER-SOP-1.08

☐ Other Procedure: *[Provide a description of intended decon facility layout, procedures and equipment/supplies in this Section of the SSHASP and/or an Appendix Also provide rationale.]*

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Decon | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized Location | | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site ☐ In EZ ☐ In CRZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *[specify]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *[specify type and %]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]* | | | | | | | | | | | | | | | | | | | | | | | | |

Exceptions to and/or deviations from LANL-ER-SOP-1.08 (If any, describe and provide rationale):

[1] ☐ Laundry Management notified per Section 8.2.2 of the HASP.

| DECON REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| Sampling Equipment Decon | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized Location | | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site ☐ In EZ ☐ In CRZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *(specify)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |
| Exceptions to and/or deviations from LANL-ER-SOP-1.08 (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | | | |
| Heavy Equipment Decon | ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | | |
| Centralized Location | | | | | | | | | | | | | | | | | | | | | | | | |
| Localized at work site ☐ In EZ ☐ In CRZ | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Soap - *(specify)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Wash Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Aqueous Rinse | | | | | | | | | | | | | | | | | | | | | | | | |
| Rinse Solvent - *(specify type and %)* | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | | |
| Exceptions to and/or deviations from LANL-ER-SOP-1.08 (if any, describe and provide rationale): | | | | | | | | | | | | | | | | | | | | | | | | |

## 9.0 EMERGENCY/INCIDENT ACTION PLAN

Incident/emergency action requirements, equipment, and supplies are specified below for each task or group of tasks having different requirements. Response to an incident or emergency shall occur according to Section 9 of the HASP and this section. Any exceptions or deviations from requirements of the HASP are noted below.

In the event of an incident or emergency, the FTL or JS will function as the site emergency/incident coordinator, as necessary, and will arrange for immediate notification of LANL emergency response personnel to take control of the scene and/or arrange for immediate notification of appropriate authorities. Other key onsite incident/emergency response personnel are identified below. Only personnel who are trained and certified in accordance with Sections 7, 9, and 10 of the HASP and SSHASP are allowed to respond and use the equipment specified. Incident/emergency contacts and telephone numbers and a map indicating the route to the nearest hospital and medical clinic from each investigational site are included in Appendix D. Both these items shall be posted onsite where readily accessible to field team personnel. Site-specific muster areas shall be determined by the SSO prior to the start of field operations each day and shall be communicated to individuals onsite during the HS Tailgate meeting and as other individuals arrive at the site. Location(s) of muster areas may vary from day-to-day depending upon variable site operations and conditions, and shall be documented daily by the SSO or FTL.

### 9.1 ADJACENT FACILITIES OF CONCERN

*[Describe the types of incidents likely at adjacent facilities, if any, that would influence or impact site operations and/or personnel, and the related means for field team personnel to be notified of such incidents. Also identify the types of incidents that may likely occur as a result of ER Project work, if any, that would be expected to influence or impact adjacent facilities, and the associated means for personnel at the adjacent facility to be notified of such incidents. Include the name, title and phone number for contacting the Facility Manager and Facility Operations Safety Representative at each adjacent facility of concern in the list of contacts in Appendix D.]*

| TABLE 9<br>INCIDENT/EMERGENCY ACTION REQUIREMENTS |
|---|
| ☐ Not applicable; rationale: |
| *[Atop the blank columns, enter the ID of each task where the corresponding requirement applies; tasks having the same requirements may be identified in the same column. Unless otherwise specified, identify the requirements by entering an "X" in the corresponding box below. Provided below are 23 blank columns. If fewer columns are necessary, delete excess columns and widen those retained. If more columns are necessary, work with your Field Unit HS Representative to modify the table appropriately (e.g., print additional columns on separate pages or use 8.5" x 14" paper).]* |
| **Incident Responders:** *[Enter name, title, and employer of each trained and qualified person according to 29 CFR 1926.65(q) (especially paragraph (6)(ii)) who will be expected to respond to an incident per Section 9 of the HASP. If these people will vary by task, indicate this information for each different task.]*<br><br>**First-Aid/CPR Provider(s):** *[Enter name, title, and employer of each certified person. If this person will vary by task indicate this information for each different task.]* |

| REQUIREMENTS | TASK(S) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Communications** | | | | | | | | | | | | | | | | | | | | | | | |
| Two-Way Radio | | | | | | | | | | | | | | | | | | | | | | | |
| Cellular phone | | | | | | | | | | | | | | | | | | | | | | | |
| Pager | | | | | | | | | | | | | | | | | | | | | | | |
| Air Horn(S) | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| Description of Air Horn Signals: *(e.g., one, two or three blasts, short or long mean what?)* | | | | | | | | | | | | | | | | | | | | | | | |
| Hand/Body Signals | | | | | | | | | | | | | | | | | | | | | | | |
| Description of Hand/Body Signals: | | | | | | | | | | | | | | | | | | | | | | | |
| Site-Specific Restrictions: *(specify, if any)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ **Incident Response Equipment** | *(Include PPE in Table 7, not here.)* ☐ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | |
| Industrial first-aid kit[1] | | | | | | | | | | | | | | | | | | | | | | | |
| Bio. pathogen and waste disposal kit[2] | | | | | | | | | | | | | | | | | | | | | | | |
| Antiseptic | | | | | | | | | | | | | | | | | | | | | | | |
| Cold compress | | | | | | | | | | | | | | | | | | | | | | | |
| Emergency decon solutions | | | | | | | | | | | | | | | | | | | | | | | |
| Blanket | | | | | | | | | | | | | | | | | | | | | | | |
| Splint materials | | | | | | | | | | | | | | | | | | | | | | | |
| Stretcher(s) | | | | | | | | | | | | | | | | | | | | | | | |
| Wire basket litter | | | | | | | | | | | | | | | | | | | | | | | |

1 The fir[illegible]l supplies shall be approved by a consulting physician and be kept in a weatherproof container. The contents are to be checked weekly and resupplied by SSO or design[illegible] contents shall meet the *American National Standard Minimum Requirements for Industrial Unit-Type First Aid Kits* (ANSI Z308.1-1978).

2 This ki[illegible] all be kept in a weatherproof container. Contents are to be checked we[illegible]d resupplied by SSO or deligate. Contents shall include at least the follo[illegible] *(specify)*

| REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Portable emergency eyewash[3] *[specify type and capacity]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Portable emergency shower[3] *[specify type and capacity]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Portable emergency eyewash/shower[3] *[specify type and capacity]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Transport Vehicle *[Required if emergency medical attention not within 4 minutes response time]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | | |
| ❑ **Fire Fighting Equipment** | *[Include PPE in Table 7, not here. In this box, enter name, title, and employer of each trained person. If this person will vary by task or site, indicate this information for each different task/site. In the corresponding box below, indicate where the equipment will be kept (e.g. EZ, CRZ, SZ, etc.)]* ❑ Not applicable; rationale: | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| A:B C fire extinguisher *[specify capacity]*: ❑ 10 lb ❑ 12 lb ❑ 15lb ❑ 20 lb | | | | | | | | | | | | | | | | | | | | | | | | |
| Nonsparking tools | | | | | | | | | | | | | | | | | | | | | | | | |
| Other *[specify]*: | | | | | | | | | | | | | | | | | | | | | | | | |
| ❑ **Spill Containment Equipment** | *[Include PPE in Table 7, not here. In the corresponding box, indicate where the equipment will be kept (e.g. EZ, CRZ, SZ).]* ❑ Not applicable; rationale | | | | | | | | | | | | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | | | | | | | | | | | | | | |
| Absorbent *[specify type of material (e.g., vermiculite, sand, dirt, etc.) quantity, and the size/capacity]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Spill control pillows *[specify quantity]* | | | | | | | | | | | | | | | | | | | | | | | | |
| Oil booms *[specify type, quantity, and the size/capacity]* | | | | | | | | | | | | | | | | | | | | | | | | |

3 Emergency eyewashes and showers must be located within 10 seconds travel time and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous flushing for the duration of time necessary to sufficiently flush the most hazardous substance for which the device is being specified (usually minimum of 15 minutes and 16 gallon capacity). They also shall be inspected and flushed at least weekly by the SSO or designee. Refer to ANSI Z358.1-1990 for further information.

| REQUIREMENTS | TASK(s) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| Shovel(s) *(specify type, quantity and size)* | | | | | | | | | | | | | | | | | | | | | | | |
| Containers for contaminated equipment *(specify type, quantity, and the size/capacity)* | | | | | | | | | | | | | | | | | | | | | | | |
| Other *(specify)* | | | | | | | | | | | | | | | | | | | | | | | |
| ☐ Other *(specify)*: | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

## 10.0 TRAINING

Training requirements are specified below by job title for each task or group of tasks having different requirements. Personnel shall be trained in accordance with Section 10 of the HASP and as specified below. Any exceptions or deviations from requirements of the HASP are noted below. Personnel performing the roles indicated below shall have completed and have current documentation of the training specified. The SSO, or the FTL or JS, shall verify that personnel have met the training requirements prior to authorizing individuals to enter controlled zones of the work site.

**TABLE 10**
**TRAINING REQUIREMENTS**

(Sup = Supervisors; CP = Competent Person for that subject; R = Read training; C = Classroom training; F = Field training; AN = As needed per the HASP or applicable regulatory requirement depending upon the intended duties of the personnel role; ER = Employer required)

*[Othr = Other categories - stop the columns below, replace "Othr" using titles in Table 4-1 and note corresponding acronym(s) in this block. Delete extra columns and widen remaining columns. Use codes ("R", "C", "F") to specify task-specific requirements in blank boxes and boxes with "AN".]*

**Applicable Task(s):** *[Specify the training requirements for each personnel role identified in Tables 4-1 and 9 using the letter codes defined above. Repeat this row and specifications for each task or group of tasks for which different training is required. For the most part mandatory training typical of most HAZWOPER work has already been indicated below. Enter any other applicable training requirements specific to the indicated task(s).]*

| Training Requirement | Personnel Role | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FPL | FTM | FTL | Sup | SSO | IHT | RCT | HPT | RSP | CP | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr | Othr |
| HASP | R | R | R | R | R | R | R | R | R | R | AN | R | R | R | R | R | R | R | R | R | R | R | R |
| *SSHASP* | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Pre- Job Start HS Briefing | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C | F or C |
| Daily HS Tailgate Mtgs | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| ☐ TA-Specific *[Provided by TA Rep. for all personnel working on site]* | | | | | | | | | | | | | | | | | | | | | | | |
| General Employee Training (GET) - LANL provided only *[Required for anyone on site > 10 consecutive work days]* | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| Employer's Hazard Communication Program [29 CFR 1926.59(e)] | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| Conduct of Operations & Occurrence Reporting | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| OSHA Rights & Responsibilities | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |