

9. PERSONAL PROTECTIVE EQUIPMENT

The OU 7-13/14 integrated probing project poses potential hazards to personnel who conduct drilling, logging, sampling, and support activities. These hazards include the SDA buried waste material (TRU mixed waste), industrial safety hazards, and chemicals used at project sites (e.g., nitric acid, fuel). Engineering controls, proceduralized operations, specialized training, and administrative controls will eliminate or mitigate many hazards, but personnel must augment these controls with PPE to further reduce the potential hazards. The purpose of PPE is to shield or isolate personnel from chemical, radiological, physical, or biological hazards that cannot be eliminated through engineering or other controls and may be encountered at the project site. It is important to realize that no PPE ensemble can protect against all hazards under all conditions and that work practices and adequate training will also provide a greater level of protection to workers.

Selection of the proper PPE to protect OU 7-13/14 integrated probing project personnel is based on the following:

- Project tasks to be conducted (e.g., mobilization, drilling/probing, logging, Type-B probe sampling)
- Physical hazards at project sites (e.g., equipment, tools, energy sources)
- Known or suspected radiological and nonradiological materials and agents expected to be found at SDA task sites
- Potential contaminant routes of entry
- Physical form and chemical characteristics of contaminants
- Acute and chronic effects from exposure to contaminants
- Local and systemic toxicity of contaminants
- Anticipated exposure levels
- Hazard analysis (Section 8) evaluation of this HASP.

Personal protective equipment is generally divided into two broad categories: (1) respiratory protective equipment, and (2) personal protective clothing. Both of these categories are incorporated into the four, standard levels of protection (Levels A, B, C, and D). Table 9-1 provides guidance in the selection process for respiratory and protective clothing. Site-specific hazards and contaminants will continually be evaluated when determining the most appropriate PPE level and modifications. Based on the known and anticipated hazards at OU 7-13/14 integrated probing project sites and exposure monitoring conducted, Level D or modified Level D will serve as the primary PPE level.

Anti-contamination (anti-C) requirements are dictated by RWP, in conformance with MCP-432, "Personal Protective Equipment."

Table 9-1 . Respiratory and protective clothing selection.

Respiratory Personal Protective Equipment Selection"	
Hazard	Level of Protection
Not immediately dangerous to life or health (IDLH) or oxygen-deficient atmospheric conditions. Gaseous, vapor, particulate or aerosol chemicals or radionuclides.	Level C—full facepiece Level B—full facepiece supplied air respirator or airhood HEPA and chemical combination cartridge or airhood for concentrations up to the protection factor of an air-purifying full-facepiece respirator and within the assigned DAC ^a value
IDLH or oxygen deficient-atmospheric conditions. Gaseous, vapor, particulate or aerosol chemicals or radionuclides.	Level B—full facepiece, supplied air respirator with an escape-only SCBA" or Level A—SCBA HEPA and chemical combination cartridge for concentrations up to the protection factor of an air-purifying full-facepiece respirator and within the assigned DAC" value

a. A multichemical and HEPA combination cartridge to be selected by IH and RadCon personnel based on specific task hazards.

Protective Clothing Selection	
Low-atmospheric contaminant levels that are present under stable conditions. No anticipated immersion, splashes, or potential for unexpected contact with chemical or radiological contaminants.	Level D (primary level of PPE for OU 7-13/14 tasks)
Moderate-atmospheric contaminants under relatively stable conditions, liquid splashes, or other direct contacts that do not have corrosive characteristics or can be absorbed by exposed skin. Low radiological contamination and airborne radioactivity levels.'	Level C (upgrade contingency only)
Moderate-to-high atmospheric contaminants under unstable conditions, potential for contact with wet, contaminated surfaces and material that can saturate or permeate Level C protective clothing. Moderate radiological contamination and airborne radioactivity levels.'	Level B (not anticipated to be used)
High- and unknown-atmospheric contaminants, potential for contact with substances that pose a high hazard potential to the skin, high potential for splash, immersion or exposure to unexpected vapors, gases, aerosols, or dusts that may present an IDLH situation and is readily absorbed through the skin. High radiological contamination and airborne radioactivity levels.'	Level A (will not be required)

a. Derived air concentration, based on specific radionuclides.
b. SCBA = self-contained breathing apparatus.
c. Contamination levels and airborne radioactivity as defined by 10 CFR 835.603.d.

9.1 Respiratory Protection

Several of the radiological and nonradiological contaminants of the buried waste present a significant potential respiratory hazard if released in an airborne respirable form. Table 8-4 and Section 8 of this HASP presented (1) the contaminants and exposure potential based on the tasks to be completed, (2) amount and form of hazardous constituents, and (3) engineering controls that will be implemented. The only time buried waste constituents will be brought to the surface is during Type-B probe sampling. Water and vapor samples will be collected from an instrumented Type-B probe after it has passed through the porous, stainless steel segment of the probes. Samples will be collected inside a glove bag that serves as a barrier to prevent personnel from direct contact with potential waste contaminants. Therefore, using respiratory protection is anticipated as a contingency only.

The level and type of respiratory protection are task-specific and relate directly to the airborne hazards for each given task or activity. Task-based respiratory protection and protective clothing required are listed on Table 9-2. Required levels of respiratory protection will vary based on specific tasks. Personnel will not exceed the assigned protection factors (APFs) of the respiratory devices listed on Table 9-3.

All personnel required to wear tight fitting respirators shall complete training and be fit-tested before being assigned a respirator, per the training and documentation requirements in Section 4 of this HASP. Requirements for respirator use, emergency use, storage, cleaning, and maintenance, as stated in the MCP-2726, "Respiratory Protection," shall be followed.

9.2 Personal Protective Equipment Levels

This subsection provides detail and explanation of the two levels of PPE anticipated for use during OU 7-13/14 integrated probing project tasks (i.e., Level D and C [with Level C being a contingency only]). Modifications to these levels shall be made under the direction of the HSO in consultation with the project IH and RadCon personnel, as appropriate. Such modifications are routinely employed during HAZWOPER site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health. Due to the TRU mixed waste contamination that will be encountered at the project site, special attention will be given to both respiratory and protective clothing modifications to meet specific task requirements. The HSO, IH, and RadCon will determine what modifications are appropriate to the PPE levels listed on Table 9-2.

9.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected as a work uniform and not on a site with respiratory or skin absorption hazards requiring whole body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against nuisance contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized or are known to have never been contaminated. At the OU 7-13/14 integrated probing project site, Level D PPE or modified Level D, will serve as the primary level of PPE during all tasks. The basic Level D PPE ensemble may be modified to provide protection from skin and physical hazards, but not respiratory protection.

Basic Level D PPE consists of the following:

- Standard work clothes or coveralls (as determined by the IH or RCT)
- Hard hat (as required by safety engineer and type of work being performed)

- Eye protection (safety glasses with side shields as a minimum, [see MCP-2716, “Personal Protective Equipment”])
- Safety footwear (steel or protective toe and shank, as determined by the safety engineer).

Table 9-2. Operable Unit 7-13/14 integrated probing project task-based personal protective equipment requirements and modifications.

Task or Assignment	Level of Personal Protective Equipment	Modifications and Comments
<ul style="list-style-type: none"> • Mobilization and site preparation, • Probehole installation (Type A and B) 	Level D (primary)	All tasks will be conducted in Level D PPE with some modification for hand and head protection, as warranted.
<ul style="list-style-type: none"> • Downhole logging • Type-B probe sampling 	Modified Level D (contingency only)	Upgrade to modified Level D (protective clothing) for sampling or probehole installation tasks, if surface contamination is detected above RWP limits and no airborne contamination or other tasks require modified Level D PPE.
<ul style="list-style-type: none"> • Support activities (surface mapping, surveying, soil gas sample collections) • CTP activities 	Level C (contingency only)	If atmospheric contaminants increase to concentrations above designated action limit, Level C air-purifying respiratory protection (chemical or radiological) will be worn in conjunction with chemical protective clothing (Tyvek coveralls or equivalent).

Note: Personnel must inspect all PPE before donning and entry into any work zone. Items found to be defective, or that become unserviceable during use, will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. Personal protective equipment inspection guidance is provided in Section 9.4 of this HASP.

Table 9-3. Assigned respiratory protection factors.^a

Type of Respirator	Respiratory Inlet Covering (Full Facepiece)	
	Chemical Assigned Protection Factor	Radiological Assigned Protection Factor
Air-purifying	100	50 ^{b,c}

a. “Respiratory Protection, ANSI Z88.2-1980.
b. Particulates only. When HEPA filters are used in atmospheres not containing radioactive gas.
c. MCP-432, “Radiological Personal Protective Equipment.”

Optional Level D modifications consist of the following:

- Chemical or radiological protective clothing (e.g., Tyvek, Saranex) as prescribed in task-specific RWP or SWP
- Chemically resistant hand and foot protection (e.g., inner/outer gloves, boot liners)
- Radiological modesty garments under outer protective clothing
- Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, aprons).

9.2.2 Level C Personal Protective Equipment

Level C PPE shall be worn when the task site chemical or radiological contaminants have been well characterized, indicating that (1) personnel are protected from airborne exposures by wearing air-purifying respirators (APRs) with the appropriate cartridges, (2) no oxygen-deficient environments exist (<19.5% at sea level), and (3) there are no conditions posing IDLH.

Basic Level C PPE shall include Level D ensemble with the following respiratory and whole-body protection upgrades:

- Full-facepiece APR equipped with a NIOSH-approved HEPA and chemical combination cartridge (IH to specify chemical combination cartridge)
- Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) as prescribed in task-specific RWP or SWP (IH to specify material)
- Chemical-resistant outer shoe or boot cover (IH or RCT to specify material)
- Inner chemical-resistant nitrile rubber gloves with cotton liners (as determined by the IH or RCT)
- Outer chemical-resistant Viton or polyvinyl alcohol gloves (as determined by the IH)

Optional Level C modifications consist of the following:

- Radiological modesty garments under outer protective clothing
- Any specialized protective equipment (e.g., hearing protection, welding lens, aprons).

9.2.3 Level B and Level A Personal Protective Equipment

Level B PPE is not anticipated to be required for any OU 7-13/14 integrated probing project tasks, based on the nature of the project tasks, engineering controls, and hold points in the procedures. If Level B respiratory protection or skin protection requirements are identified, the specific tasks shall be halted and the HSO in consultation with the FTL, RadCon, IH, SP shall meet with the OU 7-13/14 PM and determine if work should continue at the location or whether it should be abandoned. Level B PPE will only be used after exposure levels have been documented and procedures, JSAs, and RWPs amended to include additional hold points and limiting conditions. Level A PPE will not be worn for this project.

9.3 Protective Clothing Upgrading and Downgrading

The OU 7-13/14 integrated probing project HSO, in consultation with the project IH and RadCon personnel, will be responsible to determine when to upgrade or downgrade PPE requirements. Upgrading or downgrading PPE requirements based on current conditions is a normal occurrence. Action levels, listed on Table 8-7 in Section 8, provide the basis for determining such decisions.

The following are reasons to upgrade or downgrade PPE:

- Upgrading criteria (work will stop immediately if PPE upgrading is required)
 - Unstable or unpredictable site radiological or nonradiological hazards
 - Contaminants that are difficult to monitor or detect
 - Known or suspected presence of skin absorption hazards
 - Temporary loss or failure of any engineering controls
 - Identified source or potential source of respiratory hazards
 - Change in the task procedure that may result in increased contact with contaminants or increased difficulty in meeting any of the criteria listed above.
- Downgrading criteria
 - New monitoring data information that shows the contaminant levels to be lower than established action limits
 - Implementation of new engineering or administrative controls that eliminate or significantly mitigate hazards
 - Elimination of potential skin absorption or contact hazards
 - Change in site conditions that results in the removal of physical hazards or reduces or isolates them to a controlled area
 - Completion or change in tasks that results in the elimination of key hazards that require higher levels of PPE.

9.4 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected prior to use and when in use within the OU 7-13/14 project work zones. Self-inspection and the use of the buddy system, once PPE is donned, will serve as the principal forms of inspection. If at any time PPE should become damaged or degradation/permeation is suspected, an individual will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable equipment. Table 9-4 provides an inspection checklist for common PPE items.

Table 9-4. Personal protective equipment inspection checklist.

Personal Protective Equipment Item	Inspection
Gloves	<p><u>Before use:</u></p> <p>Pressurize gloves to check for pinholes: blow in the glove, roll until air is trapped, and inspect. No air should escape. For leather gloves, inspect for deterioration, damage, or excessive soiling.</p>
Respirators (full-facepiece)	<p><u>Before use:</u></p> <p>Check condition of the facepiece, head straps, valves, connecting lines, fittings, and all connections for tightness.</p> <p>Check cartridge to ensure proper type and combination for atmospheric hazards to be encountered, inspect threads and O-rings for pliability, deterioration, and distortion.</p>
Modified Level D and C clothing	<p><u>Before use:</u></p> <p>Visually inspect for imperfect seams, nonuniform coatings, tears, and other problems. Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks.</p> <p><u>While wearing in the work zone:</u></p> <p>Look for evidence of chemical attack, such as discoloration, swelling, softening, and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure they are still intact.</p>

10. DECONTAMINATION PROCEDURES

Decontamination of equipment, materials, and sample containers is anticipated to be minimal (or not required at all) based on contaminant sampling and surveys conducted during probehole installation tasks in Pits 4, 9, and 10. Sample containers used for the collection of Type-B water or vapor samples inside the glove bag would have the highest chance for encountering contamination. Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, continuous site monitoring and surveying, personnel training, and by following all contaminated-material-handling requirements and procedures. This section provides contingencies for decontamination if contamination is encountered.

10.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented throughout this project to minimize personnel contact with contaminated surfaces. At OU 7-13/14 integrated probing project sites in the SDA, the following contamination control and prevention measures will be employed:

- Identify potential sources of contamination by conducting frequent surveys and collecting swipes.
- Design confinement, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of known sources of contamination
- If contamination is found on inner surfaces of the glove bag confinement, immediate decontamination procedures will be implemented to prevent the spread of contamination (see Subsection 10.2.2 of this HASP)
- Use geomembrane around the drilling point in the SDA to provide a better surface to conduct required radiological surveying and swiping, reduce contaminant migration, and hasten decontamination, if contamination is noted on the geocomposite surface
- Use remote drill operational controls to reduce the number of personnel in the immediate area (within 15 m [50 ft]) during drill string advancement
- Wear disposable outer garments and use disposable equipment (where required).

Note: Any radiological contamination detected above those levels listed in the “Limiting Conditions That Void the RWP” Section of the RWP will immediately result in a **stop work action** and void the RWP. Any decontamination required will be performed under a separate RWP.

10.2 Personnel and Equipment Decontamination

Decontamination procedures for personnel and equipment would be necessary to control contamination and protect personnel if it is encountered. Both chemical and radiological contamination will be decontaminated from surfaces. Due to the nature of the contamination source material at OU 7-13/14 integrated probing project sites (TRU mixed waste), and limitations of direct-reading organic-vapor instrumentation, radiological contamination will serve as the best proxy for detecting both radiological and nonradiological surface contamination. Industrial hygiene instrumentation will also be used to detect off-gassing of VOCs from surface contamination, along with other qualitative methods (e.g., pH paper, as appropriate).

All radiological decontamination operations for equipment and areas shall be performed in accordance with Chapter 4 of Manual 15A, *Radiation Protection-INEEL Radiological Control Manual*. Nonradiological decontamination will be evaluated on a case-by-case basis by the HSO and project IH to determine the most appropriate PPE (Level C protective clothing will initially be selected until site monitoring can demonstrate downgrading is warranted). Nonradiological contamination is not expected to be present without some detectable radiological contaminants, given the nature of the waste materials disposed in the SDA over the years. Specific personnel and equipment decontamination methods are provided below.

10.2.1 Personnel Decontamination

Engineering controls, in conjunction with project contamination prevention and control practices, and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. Procedures for donning and doffing protective clothing (if required to be worn) will be posted at all established radiological contamination area entrances and exits. All PPE items will be inspected prior to being donned. Table 9-4 in Section 9 describes how to inspect PPE items. After donning protective clothing, your buddy (or the HSO or RCT) will check to verify proper donning technique.

Gross contamination of surfaces also increases the probability of personal contact and cross-contamination. If cross-contamination is found on glove bag surfaces, it will be immediately decontaminated to prevent transfer to sample containers and gloves.

If contamination is encountered and decontamination of equipment is required, then anti-C PPE will be worn to conduct these tasks. Careful removal of PPE will be the primary decontamination method at OU 7-13/14 integrated probing project sites, if protective clothing is contaminated. Section 10.3 of this HASP provides additional information of PPE doffing sequence and decontamination techniques.

Removal of contaminated PPE, using standard radiological doffing techniques (rolling outer surfaces inward while being removed), provides the most effective method to contain and isolate the contaminants and greatly reduces the potential for exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing, brushing). Contamination on the upper areas of the protective clothing poses a greater risk to workers because volatile or radiological substances may become airborne closer to the breathing zone and create an inhalation hazard for both the individual and others in the immediate vicinity. Any excessive motion (ripping off tape, snapping gloves or booties) will greatly increase the chance of generating airborne contamination. A wipe-down with maslins may be required prior to doffing anti-Cs. This will be based on surveys and work activities in conjunction with onsite RadCon support personnel.

10.2.2 Decontamination in Medical Emergencies

An injured or ill person will immediately be evaluated by first-aid trained personnel at the OU 7-13/14 integrated probing project task site (on a voluntary basis). If the person's condition is serious, then the FTL will contact the RWMC SS or Warning Communications Center (WCC) to summon emergency services (i.e., Fire Department, CFA medical).

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

inside of the ambulance, medical equipment, and medical personnel. The IH or RCT (depending on the type of contamination) shall accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE will then be removed at the CFA medical facility and carefully handled to prevent the spread of contamination. Manual 15A, *Radiation Protection-INEEL Radiological Control Manual*, Chapter 5, and MCP-148, "Personnel Decontamination," contains information on proper handling of radiologically contaminated wounds.

Based on the TRU mixed waste at SDA pits, chemical contamination only is unlikely. However, the same decontamination procedure for injured personnel with radiological contamination will be followed for chemically contaminated personnel. This includes removing the outer layer of protective clothing and evaluating the individual for other surface contamination. If the remaining contamination appears to be corrosive, the affected area will be wiped with a dampened Teriwipe saturated with the premixed amended water solution (described in Section 10.2.1 of this HASP). This solution will bind particulate radiological contamination and chemically buffer acidic or basic substances. This process may need to be repeated. The affected areas will then be covered during transport to the medical facility.

10.2.3 Equipment Decontamination

The sampling glove bag confinement has been designed as an engineering control to isolate contamination, if encountered, and to prevent migrating outside the glove bag. Project IH and RadCon personnel will conduct surveys and collect swipes throughout project tasks, in accordance with the technical procedures to evaluate engineering controls, material handling methods, and confinement integrity.

Both real-time instrumentation and visual observation will be used to detect contamination within and beyond the immediate project area. Equipment and personnel decontamination will use both instrumentation and visual methods for contamination detection and to minimize the potential spread and airborne generation of contamination. Where radiological and IH concerns do not prohibit their use, TPR-51, "Decontamination of Heavy Equipment in the Field," and TPR-52, "Decontamination of Sampling Equipment in the Field," will be followed. If contamination is encountered, RadCon and IH personnel will evaluate any Contaminated equipment to determine the most appropriate decontamination method based on the (1) nature of the contaminated item, (2) degree of contamination, (3) level of effort to decontaminate the item, and (4) importance in decontaminating versus disposing of such items. In some cases, the level of effort and potential to spread contamination from conducting decontamination tasks far outweigh the benefit from engaging in extensive decontamination efforts to return an item to service. A cost-ALARA versus benefit evaluation will be done on items that have extensive contamination or are relatively inexpensive. Low-cost, consumable items will be discarded if initial decontamination efforts fail, or extensive decontamination is required that is not in accordance with ALARA principles.

A decontamination pad may be established in the CRC for decontamination of previously (radiological) free-released equipment. If it is deemed necessary and appropriate by OU 7-13/14 integrated probing project IH, then a wet wiping with the aforementioned amended water solution or potentially steam cleaning of this equipment prior to leaving the CRC may be conducted.

10.3 Doffing Personal Protective Equipment and Decontamination

As stated earlier, no personnel decontamination beyond doffing of PPE is anticipated for this project. **If contamination is detected on outer PPE layers, careful removal of these outer PPE layers will generally eliminate over 99% of contamination** and this will serve as the primary decontamination method if protective clothing is contaminated. Removal of contaminated protective clothing using

standard radiological doffing techniques (rolling outer surfaces inward while being removed) provides the most effective method for containing and isolating the contaminants and greatly reduces the potential for exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing, brushing).

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

Removal of respiratory protective devices will be the most critical element of the doffing procedure to prevent potential uptake through inhalation of contaminants. This is a demonstrated skill that has been performed as part of passing the DOE Core Radiological Worker II practical exam qualification.

Since any personnel contamination event would likely involve a TRU-mixed-waste residue, decontamination of personnel shall follow the general procedures of the Manual 15A, *Radiation Protection-INEEL Radiological Control Manual*, Chapter 5, and MCP-148, "Personnel Decontamination," with some modifications for nonradiological constituents based on recommendations from the project IH. The primary difference in standard radiological and chemical decontamination is the use of water or other decontamination solutions with the chemical decontamination. Due to the TRU (alpha) components of the waste residue, the use of such solutions will be kept to a minimum. All decontamination tasks will be conducted under the direct supervision of INEEL RadCon REs or RCTs and INEEL IH personnel.

Dry, capture-type decontamination methods will be used whenever possible to decontaminate small areas of surface contamination. These include the use of a HEPA vacuum, adhesive tape, or similar technique. Contaminated surfaces will then be resurveyed to confirm the contamination was removed. The next progressive approach for removal of surface contamination will include the use of a spray bottle filled with amended water (amended with nonphosphate detergent and sodium bicarbonate) to make an aqueous solution used to mist the contaminated surface, followed by a wiping with a Teriwipe towel (or equivalent). Decontamination methods may be altered by the RCT or M. Confirmation surveys will be conducted following these decontamination techniques. Personnel and personal property decontamination procedures that may be used include taping, vacuuming (vacuum equipped with a HEPA filter), spray and wipe techniques, or other approved techniques. One of the primary objectives will be to avoid creating any free liquids. All waste generated from decontamination will be handled, stored, and managed in accordance with Section 10.4 of this HASP.

The specific doffing sequence of modified Level-D or -C PPE, and any required decontamination, will be based on the nature of the contamination and specific OU 7-13/14 project site configuration. A general approach for doffing modified Level-D or -C PPE is described below. However, there is no one doffing strategy that works for all circumstances and modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO in consultation with the project M and RWMC RadCon personnel. Both radiological and non-radiological (chemical) hazards will be evaluated.

10.3.1 Modified Level-D Personal Protective Equipment Doffing and Decontamination

Personnel may be required to wear modified Level-D protective clothing for some OU 7-13/14 project tasks. Doffing sequence and technique will follow standard radiological removal techniques and will constitute the initial decontamination step. If the protective clothing is also being worn as an anti-C

layer, then tape, gloves, booties, and any required dosimetry will be removed following the posted sequence. All PPE will be placed in the appropriately labeled waste disposal container(s). Doffing and any required decontamination will take place at the designated work area boundary or in a contamination RBA step-off pad (if a radiological contamination area is established). If exiting a radiological contamination area, personnel will conduct the proper personal survey, as stated in the RWP (if written).

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

If respiratory protection is worn in conjunction with protective clothing (Level-C PPE), the modified Level-D sequence will be followed with one additional step. Following protective clothing doffing, respirators will be removed and placed in a separate container. Doffing and any required decontamination will take place at the designated work area boundary or in a contamination RBA step-off pad if a radiological contamination area is established. If exiting a radiological contamination area, personnel will conduct the proper personal survey as stated in the RWP.

10.3.3 Personnel Radiological Contamination Monitoring

A whole body radiological contamination survey may be required immediately following the doffing procedure listed above. Radiological control personnel may perform this survey or a self-survey may be required. The RadCon personnel will determine the specific model and type of monitoring instruments, based on the type and level of contamination. The following are guidelines for conducting a personal contamination survey using hand-held instruments.

Survey instructions will be posted and include the following:

- Verify that the instrument is in service, set to the proper scale, and the audio output can be heard during frisking
- Hold probe less than ½ in. from surface being surveyed for beta and gamma contamination, and approximately ¼ in. for alpha contamination (without touching surface)
- Move probe slowly over surface, approximately 2 in. per second for beta-gamma probe and 1 in. per second for alpha probe
- If the count increases during frisking, pause 5 to 10 seconds over the area to provide adequate time for instrument response
- If the count rate increases to a value greater than **100cpm above background with a beta-gamma instrument or any detectable contamination with an alpha detection instrument**, remain in TA-2 and notify (or have someone notify) RadCon personnel
- Whole-body survey should take approximately 2 to 3 minutes to complete; remember to frisk hands before picking up probe, and perform the survey in order posted.
- Following personal contamination survey, immediately proceed to the PCM station located inside the RadCon trailer or WMF-601 for an automated whole-body survey.

10.4 Disposal of Contaminated Personal Protective Equipment and Equipment

10.4.1 Storage and Disposal of Contaminated Materials

Sampling activities will likely be the source for investigation-derived waste (IDW) generated from the OU 7-13/14 integrated probing project. Sources of IDW may include:

- Used PPE (e.g., protective clothing, gloves, booties, respirators)
- Small tools and equipment that cannot or will not be decontaminated or released
- Radiologically controlled area materials (e.g., step-off pads, bags, swipes, plastic, sheeting)
- Decontamination waste (e.g., wipes, bags)

Equipment that cannot be decontaminated will be bagged, labeled, and containerized in accordance with: 10CFR 835.601(a) (radiological), RCRA and CERCLA requirements, and the *DOE Radiological Control Manual*, Chapter 4, and placed in an appropriately posted radiological or CERCLA storage area at the OU 7-13/14 subsurface contamination project site (area of contamination). All IDW generated from sampling in the decontamination process (if required) must be handled and disposed of in accordance with requirements from (1) MCPs, (2) Chapter 4 of Manual 15A, *Radiation Protection-INEEL Radiological Control Manual*, (3) receiving-facility waste acceptance criteria (WAC) (offsite), and (4) *Idaho National Engineering and Environmental Laboratory Reusable Property, Recyclable Materials, and Waste Acceptance Criteria* (DOE-ID 2000a).

10.4.2 Site Sanitation and Waste Minimization

Operable Unit 7-13/14 integrated probing project personnel will use toilet facilities located inside the RWMC. Potable water and soap will also be available at the site for personnel to wash their hands and face in the RWMC operations area (WMF-657).

Note: It is important to note that any required radiological contamination surveys must be performed **before** washing face and hands to prevent accidental spread of contamination.

Waste materials will not be allowed to accumulate at the task site. Appropriate containers for contaminated and noncontaminated waste will be maintained at appropriate locations at the task site. The RCT will survey waste before it is removed from the task site in accordance with standard SDA practices. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All task-site personnel are expected to make good housekeeping a priority at the job site.