



RFS-ERDF-002.1

0051409

Environmental Restoration Disposal Facility

Waste Disposal Operations



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Acronyms and Abbreviations

ACGIH.....	American Conference of Governmental Industrial Hygienists
ALARA	As Low As Reasonably Achievable
BHI ERC.....	Bechtel Hanford Inc. Environmental Restoration Contractor
CERCLA	Comprehensive Environmental Response, Compensation, and Liabilities Act
CFR.....	Code of Federal Regulations
CRC	contamination reduction corridor
CRZ	contamination reduction zone
Clo	clothing insulation factor
EA.....	exposure assessment
EAP.....	Exposure Assessment Plan
EH&S.....	environmental, health and safety
EPCRA	Emergency Planning and Community Right to Know
ERDF	Environmental Restoration Disposal Facility
ERO	Emergency Response Organization
GERT.....	general employee radiation training
HEHF.....	Hanford Environmental Health Foundation
HEPA.....	high efficiency particulate air
IDLH.....	immediately dangerous to life and health
MSDS	material safety data sheet
OSHA	Occupational Safety and Health Administration
PCB(s).....	Polychlorinated Biphenyls
PEL.....	permissible exposure limit
PIC.....	person in charge
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RCT	radiological controls technician
US DOE-RL.....	United States Department of Energy, Richland Operations Office
RTA	real time analysis
RWP	radiation work permit
SCBA.....	self contained breathing apparatus
SPOC.....	single point of contact
TLD	thermoluminescent dosimeter
TLV@	threshold limit value
TWA	time weighted average
VPP.....	Voluntary Protection Program
WBGT.....	wet bulb globe thermometer
WMFS	Waste Management Federal Services, Inc.

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1.0 General Information

1.1 Policy and Purpose

It is the policy of Waste Management Federal Services, Inc. (WMFS) to provide a safe and healthful workplace, free of recognized hazards, for each of its employees. At a minimum, WMFS will comply with all industry accepted work practices, health and safety regulations, standards and codes. Specific regulatory requirements applicable to the Hanford Environmental Restoration Disposal Facility (ERDF) include:

- 10 CFR 835, "Occupational Radiation Protection
- 29 CFR 1910, "Occupational Safety and Health Standards
- 29 CFR 1926, "Safety and Health Regulations for Construction
- DOE Order 5000.3B, "Occurrence Reporting and Processing of Operations Information
- DOE Order 5400.1, "General Environmental Radiation Protection Program
- DOE Order 5400.5, "Radiation Protection of Public and Environment

The purpose of this Health and Safety Plan (HASP) is to anticipate, evaluate, and control the hazards associated with handling waste during disposal operations at the ERDF.

1.2 Scope

The requirements of this HASP apply to all waste disposal operations within the ERDF facility confines and the personnel performing those operations. Personnel from WMFS, Bechtel Hanford Inc. Environmental Restoration Contractor (BHI/ERC Team), U.S. Department of Energy - Richland Operations (DOE -RL), U.S. Environmental Protection Agency - Region X (EPA), and authorized visitors must all comply with applicable portions of this HASP.

1.3 Site Relationships

The ERDF waste disposal operation is performed by WMFS under contract to BHI/ERC Team. WMFS is responsible for waste disposal operations, and safety, in compliance with applicable requirements. BHI/ERC Team is responsible for overall operation of the ERDF program for the DOE-RL and performs oversight of WMFS operations to ensure compliance. The DOE-RL is the owner of the facility and provides oversight to both BHI/ERC Team and WMFS. Finally, the regulatory body with authority over the ERDF is the EPA, with input from the Washington State Department of Ecology (Ecology).

1.4 Site Operations

The ERDF is a waste repository for Environmental Restoration (ER) wastes generated from restoration of CERCLA past-practices sites at the Hanford Site. The ERDF is authorized to

accept and adequately dispose of low-level radioactive, hazardous/dangerous, asbestos, Polychlorinated Biphenyls (PCB), and mixed wastes generated by the site restoration activities. The ERDF is a two disposal cell RCRA compliant landfill that can be expanded to continue to meet Hanford Site ER needs. Waste acceptance criteria are in place to ensure that the design criteria of the landfill are met, the landfill is protective of the environment, and worker health and safety can be ensured. Limited support systems will be required to sustain landfill operations (leachate collection, utilities, etc.).

1.4.1 Waste Receipt

Wastes transported to the ERDF by the transportation subcontractor are received in roll-off containers. The transportation contractor will make a one-way trip through the ERDF, placing a full container in the full-container holding area then obtaining an empty container from the empty-container holding area. Roll-off containers will be checked to ensure the exterior surfaces are not contaminated, consequently no radiological controls are anticipated for the waste receipt operations.

1.4.2 Waste Placement

Wastes are transported into the disposal cell by the WMFS. Trucks used for this operation are designated for use within the ERDF and will not require DOT compliance. The wastes are placed, compacted and covered with clean fill to produce an engineered monolith capable of long-term containment of the wastes. Radiological controls for the roll-off containers are required and established within the disposal cell as close as practical to the placement operations. Placement equipment on-site is standard heavy equipment used for landfill operations (compactors, bulldozers, loaders, etc.).

1.4.3 Final Closure

A final closure cap and long term monitoring will also be performed to ensure that the waste is properly maintained within the landfill structure.

WMFS has identified routine operations that will be controlled using operating procedures. These routine operations include, but are not limited to, waste material handling, maintenance, refueling, and leachate sampling. Safety controls and worker protection for these activities can be effectively established and will be communicated within the operating procedure, as integral safety requirements specific to the tasks performed.

1.5 Waste Characteristics

The ERDF will receive waste for disposal from the 100 Areas, 200 Areas, and 300 Areas of the Hanford Site. A specific Record of Decision (ROD) for each site will be pursued and wastes will only be sent to ERDF if determined in the ROD. The chemical and physical characteristics of the types of wastes that will potentially be sent to ERDF are described in the following sections:

1.5.1 100 Area Waste Physical Characteristics

Nine water-cooled, graphite-moderated plutonium reactors reside in the 100 Area of the site located along the shore of the Columbia River. The total estimated volume from the 100 Area facilities for disposal at the ERDF is approximately 532 thousand cubic yards. The distribution of waste from the ER sites in the 100 Area includes soil, soil wastes, sediments, and sludges:

- Solid waste encompasses hard waste, soft waste, demolition wastes, and pipes.
- Soft waste includes collapsed cardboard boxes, paper, rags, clothing, plastic, and miscellaneous trash.
- Hard waste includes aluminum tubes and spacers, failed steel and stainless steel equipment, timbers, and metal drums.
- Demolition waste includes concrete with and without rebar, steel plate, timbers, and pipes range from ½ inch to 24 inches in diameter.

1.5.2 200 Area Waste Physical Characteristics

The 200 Areas were used for fuel reprocessing, plutonium recovery, and waste management and disposal. The 200 Area waste includes soil and solid wastes, similar to the 100 Area waste. The total estimated volume from the 200 Area facilities for disposal at the ERDF is approximately 7.2 million cubic yards. The distribution of waste is estimated at 75% contaminated soil and 25% solid waste.

1.5.3 300 Area Waste Physical Characteristics

The 300 Areas have historically been used for fabrication of nuclear fuel elements and technical support, research, and development activities. The 300 Area waste includes soil and solid wastes of similar physical characteristics as the 100 and 200 Area wastes. The total estimated volume from the 300 Area facilities for disposal at the ERDF is approximately 1.3 million cubic yards. The distribution of waste is estimated at 47% contaminated soil and 53% solid waste.

1.5.4 Chemical Waste Characteristics

Chemical constituents in the wastes brought to the ERDF for disposal can vary widely based on the Waste Acceptance Criteria. Therefore, the chemical characteristics of each waste stream must be considered for health and safety reasons, including radionuclides, organic, and inorganic contaminants. Limited sampling data, previously gathered to support remedial investigations at individual operable units, was evaluated in developing the waste acceptance criteria. Waste stream sample data provided to ensure that the waste received is acceptable for disposal at ERDF, will provide essential information concerning chemical hazards of the waste materials handled. This data will be used to develop worker health and safety controls.

1.6 Facility Site Location and Characteristics

The ERDF site is located on the Central Plateau of the Hanford site as shown in Figure 1-1. The ERDF is approximately in the center of the site, southeast of the 200 West Area and southwest of the 200 East Area. At its nearest point, the Columbia River is located approximately 7.1 miles from the ERDF site. Other surface water bodies located near the ERDF location include West Lake, approximately 4 miles north, and Rattlesnake Springs, approximately 4 miles southwest. The ERDF site is not within the 100 Year flood plain of the Columbia River and transit times for groundwater from this area are estimated at greater than 90 years.



Figure 1-1 ERDF Location

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2.0 Key Personnel

2.1 Organization

The names and organizational relationships for key WMFS, BHI/ERC Team, and DOE-RL personnel critical to health and safety issues for ERDF are presented in Figure 2-1. This figure shows not only the significant organizations and positions involved in the site safety functions, but also the reporting relationships. A copy of this figure shall be posted on the standard safety bulletin board in the main area of the operations trailer. These personnel and appropriate contact information are also displayed in Table 2-1 and should be used to contact necessary personnel in an emergency described in the contingency plan (Section 12).

Table 2-1 ERDF Safety and Health Contact Information

Position	Primary		Alternate	
	Name	Phone No.	Name	Phone No.
DOE Project Manager	Owen Robertson	373-6295	Rich Holten	373-7277
BHI/ERC Team Project Manager	Vern Dronen	372-9075	Ashur Micheal	372-9074
BHI/ERC Team Safety Representative	Bruce Tuttle	531-0622	Mike Kenter	373-9733
WMFS Project Manager	Jeff Biagini	372-3960	Garth Stowe	372-9030
WMFS ES&H Manager	Michael Madison	372-3722	Daniel Saucedo	372-1578
WMFS Corporate ES&H Director	Travis Best	(303) 914-2805	Joel Eacker	(303) 372-8147

2.2 Responsibilities

The overall responsibilities of WMFS employees and line management are described in the WMFS administrative manual. This section of the HASP will describe specific safety responsibilities for WMFS employees, along with other normal on-site personnel and visitors. All employees have the authority to immediately stop work if a condition exists that presents immediate hazard or could cause death or serious harm.

2.2.1 WMFS Employee

In general, the WMFS policies specify that employees will take precautions to prevent injury to themselves and others. Employees are to comply with approved safety, health, and job-specific standards and procedures applicable to their work. Employees are to perform only those tasks that they are trained to perform safely. Employees are encouraged to report the following instances to the Project Manager: any condition or practice detrimental to employee safety and health; violations of applicable health and safety of radiological standards; and conditions that may impact the environment are to report any unsafe condition to their supervisors. If an employee believes there is an imminent danger or a life-threatening situation, any employee is authorized to stop the activity or operation.

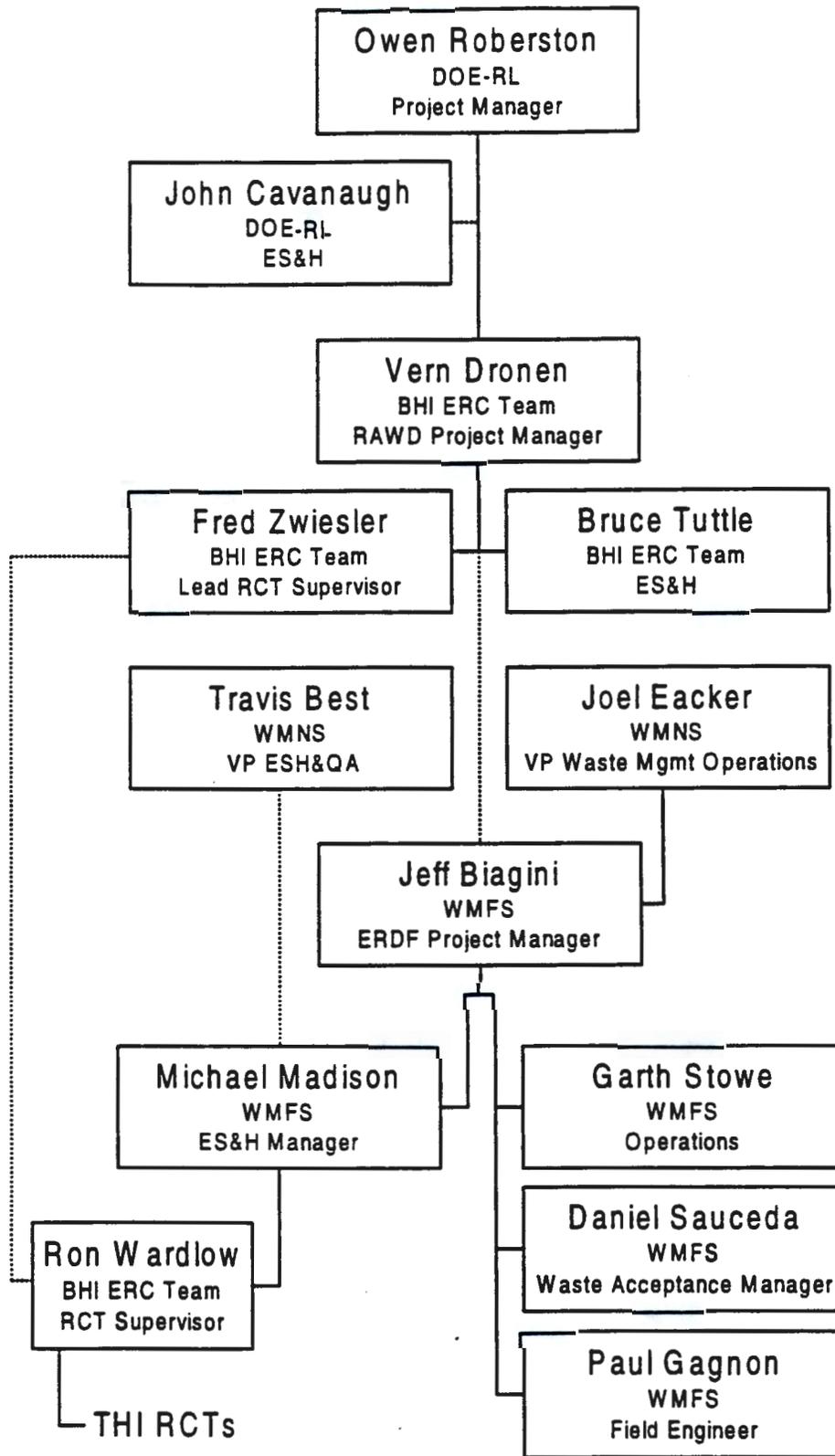


Figure 2-1 ERDF Health and Safety Organizational Structure

2.2.2 WMFS Line Management

Line management has the primary responsibility for implementing health and safety measures in the workplace. Line management shall actively seek the support and expertise of the Environment, Health, and Safety (EH&S) Manager in implementing this responsibility and shall ensure that work practices comply with the policies and procedures determined to be appropriate by the EH&S function. Line managers shall:

- Follow WMFS health and safety standards, as established in policies, procedures, hazard analyses, industrial safety risk assessments, and approved program/project health and safety planning documents,
- Correct unsafe conditions or work practices immediately or stop activities until the situation can be corrected,
- Ensure that activities are managed safely to prevent accidents and associated losses to employees, the Department of Energy (DOE), the Company, the public, or the BHI/ERC Team,
- Ensure that employees receive training commensurate with their assigned tasks, and
- Ensure that EH&S reviews have been completed and appropriate comments have been incorporated into any new or revised instructions or procedures developed for operations or processes that involve the use of any hazardous substance or agent, potential exposure to any hazardous substance or agent, or work practices that may be harmful to worker health and safety.

2.2.3 Non-WMFS Employees

Non-WMFS employees who normally work at the ERDF site are required to comply with the requirements of this HASP, including applicable activity hazard analysis (AHA), and Radiation Work Permits (RWP) controlling the tasks to be performed, along with their own corporate health and safety requirements. Should a discrepancy occur that will not allow an employee to comply with both sets of requirements, then work shall not proceed and the WMFS EH&S manager shall be notified.

2.2.4 Visitors

Visitors are required to check-in with the WMFS operations manager, sign into the Site Visitor Log Book, receive and verify understanding of training, be escorted, and comply with the applicable portions of this HASP. Any health and safety concerns or issues either with a visitor, or brought up by a visitor, shall be brought to the attention of the WMFS EH&S manager.

2.3 Key Personnel Responsibilities

Safety and health responsibilities for select key personnel are outlined in the following sections to ensure that safe operations are carried out during ERDF waste disposal operations.

2.3.1 WMFS Project Manager

The responsibilities of the Project Manager include performing the following actions:

- Management of the project to ensure compliance with safety and environmental regulations,
- Ensuring that personnel perform the waste disposal operations safely and in compliance with appropriate procedures and requirements,
- Ensuring the overall safety of all activities on the ERDF site, including parallel construction activities for areas not turned over to BHI/ERC Team or another contractor,
- Overseeing preparation and maintenance of the HASP,
- Coordination of work activities with appropriate safety and health officials, including BHI/ERC Team, DOE-RL, OSHA, etc.,
- Ensuring that personnel are properly trained to perform the work and utilize protective equipment,
- Ensuring that adequate safety equipment is available on site to perform safe operations, and
- Preparation of the final report and support files on response and investigation to safety incidents.
- Adopt the elements of, and ensure active participation in, the BHI/ERC Team Voluntary Protection Program (VPP).

2.3.2 WMFS EH&S Manager

The WMFS EH&S manager is the central point of contact for EH&S related activities/needs on the ERDF site with the following responsibilities:

- Responsible to the Project Manager to implement the ERDF HASP and ensure personnel safety on the site, and protection of the environment, ERDF equipment, and facilities.
- Management of assigned health and safety personnel and equipment on a day-to-day basis,
- Monitor HASP implementation, including field operations, conducting daily site/equipment inspections, weekly safety meetings, and periodic safety and health self-assessments,
- Ensure adequate review and approval of ERDF HASP, AHA, implementing procedures, and other health and safety documentation.

- Ensure adequate review and approval for any other subcontractor activities on the ERDF site (unless an area is turned over to BHI/ERC Team),
- Maintain records of monitoring, medical, training, and other health and safety documentation related to operations at the ERDF,
- Provide safety related technical assistance to line management and employees in the preparation of waste disposal operations planning documents,
- Confirm protective equipment and clothing is properly maintained and used,
- Assure radiological/CERCLA access zones are properly posted and required monitoring performed prior to exit,
- Ensure personnel exposures are adequately characterized and employees are monitored for signs of stress, such as cold exposure and heat stress, and
- Ensure emergency procedures, evacuation routes, and telephone numbers for emergency support organizations are properly posted and known by appropriate project personnel.
- Establish exposure goals that can be measured, tracked, and meet ALARA requirements.

2.3.3 BHI/ERC Team Radiological Controls Supervisor

The BHI/ERC Team Radiological Controls Supervisor reports to the WMFS EH&S Manager for implementation of the ERDF radiological controls program and to BHI/ERC Team line management for supervisory responsibilities. Specific ERDF safety and health responsibilities include:

- Ensuring that ERDF radiological controls field requirements can be met through interfacing with project management to provide sufficient radiological controls staffing,
- Assigning individual technicians to day-to-day areas of responsibilities in support of the ERDF waste disposal operations needs,
- Monitoring radiological controls technician performance against ERDF requirement to ensure that the HASP and implementing instructions are being properly carried out,
- Ensuring that ERDF radiological controls requirements are properly implemented as part of the overall waste disposal,
- Reviewing and approving radiological controls documentation produced by assigned technicians for appropriateness, completeness, and accuracy, and

- Managing the overall equipment needs with line management to ensure that technicians have proper numbers, types and calibrated instruments to perform their assigned work.
- Support the assessment of ALARA exposure goals.

2.3.4 BHI/ERC Team Radiological Controls Technicians

Radiological controls technicians (RCTs) assigned to the ERDF are responsible for:

- Performing radiological monitoring as assigned by their supervisor and in accordance with ERDF radiological controls program requirements,
- Monitoring the use of personal protective equipment, including respiratory protection, and the selection, donning, use, and doffing of radiological protective clothing,
- Monitoring job sites for occupational hazards for radiation, surface contamination, and airborne radioactivity. Providing measurements to characterize workplace conditions and to identify areas requiring postings,
- Ensuring that the requirements of the RWP are understood and implemented for assigned job sites, and
- Using appropriate survey instrumentation and policies to perform periodic surveys and ensuring that complete and accurate survey reports are prepared for supervisory approval.

3.0 Exposure Assessment and Hazard Characterization

3.1 Exposure Assessment and Methodology

The methodology for exposure assessment is defined by six elements:

- 1) Hazards Identification,
- 2) Scoping/Screening Activities for Exposure Potential,
- 3) Analyze and Interpret Results,
- 4) Develop Quantitative Monitoring Plan,
- 5) Monitoring,
- 6) Periodic Reevaluation.

Figure 3-1 provides a flow chart of the process. This process will be followed on a case by case basis for individual waste streams and documented for individual tasks through the exposure assessment.

3.1.1 The Iterative Nature of Exposure Assessment

As the health risks are initially examined for each waste stream, the WMFS EH&S Manager may decide that it is not necessary to complete all of the elements the exposure assessment. Throughout the ERDF project, data will be obtained from either qualitative or quantitative exposure monitoring, and the results are analyzed and interpreted. Depending on the outcome of those results, some elements of the process may need to be repeated, controls may need to be reviewed and modified, monitoring strategies adjusted, and more monitoring conducted

3.1.2 Chemical Exposure Assessment

The EA is used to gather and examine hazards data, estimate worker exposure, determine appropriate work controls, develop a monitoring plan, reevaluate the exposure data, determine medical surveillance requirements. The level of detail used in each EA will vary from task to task and waste stream to waste stream. The EA will be published with the task RWP.

3.1.3 Radiological Exposure Assessment

Radiological exposure assessments are required to estimate workers collective exposure. Radiological controls are required to determine dose rates, engineering controls, and manage worker exposure to assure the ALARA requirements of 10 CFR 835 are met.

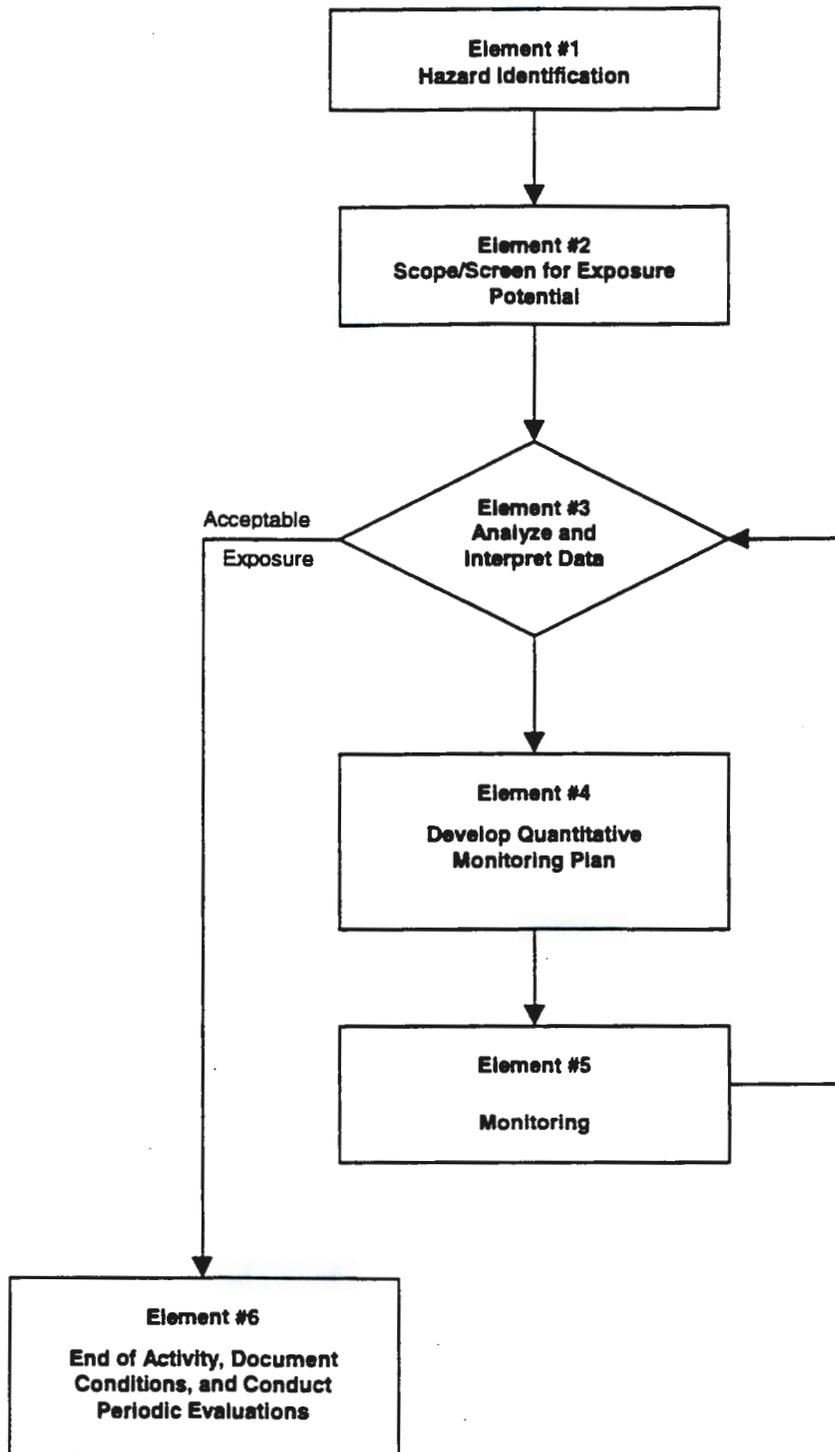


Figure 3-1 -Exposure Assessment Process

3.2 Health and Safety Hazard Characterization

3.2.1 Ionizing Radiation Hazards

The focus of the waste streams to be disposed of at ERDF is radiologically contaminated wastes with relatively trace amounts of other contaminants. There are a wide variety of radioactive isotopes potentially present in the wastes, including alpha, beta, and gamma radiation emitters. External exposure to ionizing radiation and internal deposition (leading to prolonged exposure) were characterized throughout 7/96-10/97. This characterization has shown that approved work practices are effective in maintaining exposures below the action levels listed in Table 9-1.

3.2.2 Non-Ionizing Radiation Hazards

The only non-ionizing radiation hazard at ERDF is ultraviolet radiation from sunlight while working outside.

3.2.3 Noise Hazards

Heavy equipment used in the waste disposal operations has the potential of exceeding the OSHA Action Level of 85 dB(A) for an 8-hour time weighted average. Baseline characterization of worker exposure using noise dosimeters in 1996, and subsequent annual verification in 1997 and 1998 has indicated that the maximal duration of exposure around the noise sources at the ERDF are not sufficient to cause noise dose to exceed the 85 dB(A) 8-Hr TWA. While a hearing conservation program is not required, employee training and audiometry has been conducted, noise sources are posted, and hearing protection is required to work in the noisy areas.

3.2.4 Biological Hazards

No specific wastes with known biological hazards have been identified for disposal at ERDF. Viruses and bacteria may be present in fecal matter or body fluids that were inadequately flushed from drain pipes and exposed during Remediation or leaked from septic systems into surrounding soils. Anticipated biological hazards at ERDF include insects, snakes, and small mammals on the site that potentially carry disease.

3.2.5 Personnel Stress Hazards

Operating conditions, particularly during summer and winter seasons, represent a potential hazard to employees due to both cold and heat extremes. Characterization of the WBGT Index conducted during the first and second summers of operation has shown that the TLV for 100% work is rarely exceeded. Approved work practices are effective in controlling heat related disorders.

3.2.6 Chemical Hazards

Characterization of worker exposure to chemical hazards is continuing as wastes containing the particular hazards are delivered to the ERDF. The following is a summary

of the characterization efforts completed to date for the known chemical hazards at the ERDF.

Nuisance Dusts, respirable dusts, and respirable silica

Dusts may be present in wastes, road-base, and clean cover which present a respiratory hazard to workers. Exposure to nuisance and respirable dusts has been the most prevalent at the ERDF. Baseline characterization and periodic monitoring of worker exposures throughout previous work has shown that approved work practices are effective in maintaining exposures below the action levels listed in Table 9-1.

Carbon Monoxide From Internal Combustion Engines

Internal combustion engines used in ERDF produce carbon monoxide which can accumulate in local areas outside buildings during stagnant conditions and inside of buildings that are not adequately ventilated. Exposures to carbon monoxide in confined spaces and around gas-powered equipment have been characterized to be below the action levels listed in Table 9-1.

Metals Found in Contaminated Soils and Equipment

A number of metal contaminants are potentially present in ERDF wastes due to the types of operations carried out at the Hanford Site. The concentrations of heavy metals in wastes delivered to the ERDF rarely exceed trace concentrations. Baseline characterization and periodic monitoring of breathing zone exposure to heavy metals throughout previous work has shown that approved work practices are effective in maintaining exposure below the detectable range of the monitoring method.

Asbestos

Asbestos may be present in the form of vinyl asbestos tile, mastic containing asbestos, and possible friable pipe insulation. All friable asbestos is packaged to prevent fiber release when delivered to the ERDF. Exposures to asbestos have been intermittent but sufficient to characterize. Baseline characterization and periodic monitoring throughout previous work has shown that approved work practices are effective in maintaining exposure below the action level listed in Table 9-1.

Organics Found in Contaminated Soils and Equipment

A variety of volatile and semi-volatile organic compounds at relatively low levels are potentially present in the wastes for disposal at ERDF. The wastes delivered to the ERDF to date have not represented a potential for worker exposure to organic vapors.

Pesticides and PCB's

A variety of pesticides and PCBs at relatively low levels are potentially present in the wastes for disposal at ERDF. Emissions of these chemicals bound to the soil matrix, in the form of dusts in the air represents a potential hazard to worker health. The wastes

delivered to the ERDF to date have not represented a potential for worker exposure to PCBs or pesticides.

3.2.7 Heavy Equipment and other Safety Hazards

The use of heavy equipment presents operators and maintenance personnel with slip, trip and fall hazards. Employees working around these vehicles have the potential of being caught between, struck by, or run over by the equipment. Hot work, refueling, and engine maintenance may present fire hazards, and may expose the maintenance subcontractor to contaminated materials.

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4.0 Hazard Controls

Throughout the planning and performance of work, worker health and safety control requirements shall be prescribed to ensure that workers are adequately protected against all health hazards. Appropriate selection of exposure control requirements depends upon an ongoing analysis of the exposure conditions and the potential doses to the workers. A proactive RWP system shall be used to establish exposure control requirements for all classes of occupational hazards. The Exposure Assessment (EA) shall be integrated into the work control documentation and developed concurrently with the RWP. Monitoring requirements contained in the RWP shall be used to implement the EA. Each RWP shall specify, as applicable, the following:

- Description of work
- Work area conditions. These include the presence of biological, chemical, and radiological hazards.
- Requirements for monitoring the worksite, and personnel monitoring, including radiation dosimetry and bioassay requirements, as necessary.
- Special work practices, engineering controls, or administrative controls required to control work exposures.
- Training requirements for entry, and pre-job briefing requirements.
- Protective clothing and respiratory protection requirements.
- Radiological control coverage requirements and stay time controls, as applicable.
- Limiting conditions that may void the work plan.
- Special radiation dose or contamination reduction considerations.
- Requirements for monitoring individuals when exiting the work area.
- Date of issue and expiration.

Radiological hazards, chemical hazards, construction safety and other industrial safety hazards, and physical stressors (like noise or heat stress) will be addressed in the RWP. Additional types of work permits will be required for non-routine work, covering such tasks as welding, or confined space entries.

4.1 Construction and Industrial Safety Hazards

Hazards around heavy equipment and disposal facility operations shall be addressed through qualification, ongoing training programs, and daily pre-job/safety meetings. Management walk-arounds and discussions with employees will be used to identify problems and/or employee

concerns. The WMFS EH&S Manager will resolve these issues and when necessary, hazards will be addressed through a specific RWP, revision to an RWP, AHA, or this HASP.

4.2 Heavy Equipment Maintenance

Routine maintenance, refueling, welding, and cutting on heavy equipment in-pit will be normally be conducted outside of posted CRZs. This maintenance will be performed using the manufacturers specifications and the safety aspects of the work will controlled using an AHA. The maintenance subcontractor shall be properly trained should access to an exclusion zone be needed.

5.0 Personal Protective Equipment

Personal Protective Equipment (PPE) required for each ERDF waste disposal operation task will be defined as an outcome of the AHA conducted for the waste streams to be handled. The appropriate ensemble will be specified in the RWP.

5.1 Personal Protective Equipment Program

The PPE program for ERDF is based on the following elements: training, work mission, duration, selection, fit testing, inspection and in-use monitoring, donning and doffing, use and limitations, maintenance and storage, decontamination and disposal, and evaluation of the effectiveness of the PPE program.

5.1.1 PPE Training

PPE training is covered by formal training provided as part of Radiation Worker Training and 40-Hour/24-Hour OSHA hazardous worker training. During the "plan-of-the-day" or other safety meetings, the operations supervisor and EH&S manager/radiological controls personnel shall ensure that workers are familiar and have confidence with the use of required PPE, inform the workers of the capabilities and limitations of the PPE, assist the workers in optimizing the protective ability of the PPE, and check that the workers can work as efficiently as possible in PPE.

5.1.2 Work Mission Duration

An estimate must be made of the length of time PPE will be used on a job and the overall job duration (including seasonal changes) before the work begins so that (1) self-contained breathing apparatus (SCBA) air consumption can be evaluated if it is ever used, (2) the adequacy of the protective clothing against penetration and permeation for the anticipated task duration will be assessed, and (3) the work area temperature extremes can be determined. Hot and cold temperatures can affect valve operation, durability and flexibility of chemical protective clothing (CPC), breakthrough time, and permeation rate of chemicals, etc., but heat stress is the most immediate hazard. All these factors are weighed during the selection of PPE at ERDF.

5.1.3 PPE Selection, Upgrading and Downgrading

Selection of appropriate respirators and CPC demands a thorough evaluation of all issues related to the performance of the person and the PPE. Selection of PPE will be made by the EH&S manager in consultation with appropriate resources. The process for selection of PPE is a part of developing and implementing an EAP - gather and examine hazards identification data, estimate worker exposure, determine appropriate work controls, develop a monitoring plan, reevaluate the exposure data, determine medical surveillance requirements. More specifically, the steps used for PPE selection include:

- Identify the work area, characterize the task, determine potential hazards (including chemical, radiological, physical, and mechanical), and identify physical properties of the substances.

- Determine the type of exposure for the work areas (routine, intermittent, infrequent) and specific work activities.
- Determine the level of respiratory protection for the work areas, specific work activities, and mission duration. Where optional types of equipment is available (respirator cartridges), select the appropriate type.
- Determine the level and type of CPC for the work areas and specific work activities. Evaluate the chemical resistance characteristics needed for the potential exposure and mission duration to select the clothing with appropriate characteristics.
- Evaluate both radiological and chemical PPE requirements when mixed waste is involved.
- Evaluate the potential physical hazards associated with the work areas and specific work activities and select PPE to mitigate the hazards.
- Consider the climatic conditions and select PPE or equipment to accommodate the conditions (e.g., cooling units, insulated clothing/footwear) without foregoing appropriate protection.
- Evaluate the potential biological hazards (e.g. snakes, insects) and select PPE to mitigate identified hazards.
- Evaluate the type and level of work (e.g., heavy, moderate, light) and select PPE for the work or work with project management to best coordinate work and required PPE.
- Hard hats meeting the specifications of ANSI Z89.1 (most current) shall be worn when in a construction area where hard hats are required. Additionally, hard hats will be required for work involving use of heavy or powered equipment when work is done overhead.
- Safety glasses or other appropriate eye protection meeting the specifications of ANSI Z87.1 (most current) shall be worn as required by BHI/ERC Team requirements or when there is potential for exposure to flying particles. Full face protection shall be worn when grinding, chipping, blasting, etc.
- Safety shoes meeting the specifications of ANSI Z41 (most current) shall be worn as required by BHI/ERC Team requirements or when there is potential for dropping loads on feet.

Upgrading or downgrading of PPE will be determined by the EH&S manager and shall be specified in task specific AHA or RWP.

5.1.4 Fit Testing

Respirator fit testing shall be performed in conjunction with Hanford Site requirements as part of the ongoing medical surveillance program.

5.1.5 PPE Inspection Before, During, and After Use Monitoring

Before Use

Each item of protective clothing must be inspected before use and before donning. The minimum inspection criteria are as follows:

- Visually inspect for tears, seam defects, pinholes, and non-uniform coating.
- Inspect all closure mechanisms (e.g. zippers, Velcro) for proper operation.
- Flex coated CPC, looking for evidence of surface cracks or signs of shelf life deterioration.
- Pressurize gloves and boots as appropriate, and
- Hold coated CPC to the light, looking for pinholes.

During Use

Inspection during use (in-use monitoring) involves checking one's own PPE and the PPE of the buddy. The PPE user will look for tears, seam failures, punctures, or closure (e.g. zipper) failures. Any item that is physically damaged or degraded should be removed and replaced as soon as safely possible. In the unlikely use of CPC, the clothing should also be evaluated for evidence of chemical attack: discoloration, swelling, stiffening, or softening.

After Use

PPE shall be inspected as part of the cleaning/restocking process to ensure that only intact PPE is returned to the shelf for reuse. This inspection will be performed as part of the cleaning service for equipment that is cleaned for reuse, and is the responsibility of the employee if assigned on a temporary basis.

5.1.6 PPE Use and Limitations

PPE shall be used in the manner described in the task specific RWP, AHA, or this HASP. Proper PPE use and limitations will be communicated as part of initial training, ongoing re-qualification/periodic training, and in ongoing safety meetings. The worker should understand the use and capabilities of PPE prior to use or request assistance from appropriate EH&S personnel. If the PPE does not appear to fit the intended use or properly protect workers, the EH&S manager shall be contacted so that an evaluation may occur.

5.1.7 PPE Donning and Doffing

The worker should carefully don and doff PPE in accordance with posted instructions and sequence. Improperly fitted protective clothing represents a severe potential hazard and the appropriate size should be used. Where clothing is too small, worker movement is restricted, tear potential is increased, and the potential for worker fatigue is increased.

Where clothing is too large, the possibility of a snag is increased and the dexterity and coordination of the worker may be compromised.

The major objective of doffing (removing) PPE is to restrict the transfer of potential contamination from the work area. A secondary objective is for the person doffing the garment and others in the area to avoid contact with contaminants on the outside of the garment. An appropriate decontamination setup, careful decontamination (as required) and cautious doffing will largely prevent such cross contamination.

5.1.8 PPE Maintenance and Storage

Reusable PPE shall be maintained in accordance with manufacturer's instructions and timetable. Only personnel appropriately trained shall perform required service on PPE. Only simple maintenance is planned to be performed at ERDF, with subcontracted services to perform cleaning and maintenance of radiologically contaminated PPE.

Storage is important to prevent damage that may occur due to contact with dust, moisture, sunlight, damaging chemicals, extreme temperatures, and physical abrasion. PPE will only be stored in approved locations designated by the EH&S Manager. Used PPE must also be segregated at all times from clean PPE to prevent cross contamination and inadvertent use of contaminated clothing.

5.1.9 PPE Decontamination and Disposal

PPE shall be decontaminated and radiologically released prior to off-site disposal. Reusable radiological PPE shall be properly transferred for cleaning by the Hanford Site approved subcontractor. No other decontamination or cleaning is anticipated at ERDF.

PPE that is no longer useable shall be disposed of properly. PPE that can readily be decontaminated and/or radiologically released shall have those services performed and then disposed of as commercial wastes. PPE which can no longer be used and not readily decontaminated/released shall be handled as debris and disposed of as CERCLA wastes in the ERDF.

5.2 Respiratory Protection Program

The Respiratory Protection Program is contained in RFS-ERDF-002.10(j).

5.3 PPE Level Definition

PPE at CERCLA sites is specified by a letter designation of A, B, C, or D. These designations signify a general level of protection afforded by the ensemble, with A being the highest level of protection and D being the lowest. A designation that the basic PPE ensemble has been modified may also be used to more clearly define the ensemble components. The following sections give a description of the individual pieces of equipment that makes up each PPE level and the potential uses at ERDF.

5.3.1 Level A

Level A is used during conditions requiring highest level of skin, eye, and respiratory protection. Level A is selected when the dermal exposure hazard creates or potentially creates a conditions immediately dangerous to life or health (IDLH). It can include a totally-encapsulating chemically-resistant suit, chemically-resistant gloves, chemically-resistant sturdy work shoe, coveralls, disposable gloves, shoe covers, hard hat, and a positive-pressure full-face piece self-contained breathing apparatus or positive-pressure full-face piece airline respirator.

Use at ERDF

No known conditions or activities at ERDF require the use of Level A PPE. Waste acceptance criteria and waste acceptance policies and procedures will be used to ensure that the types of materials accepted for disposal are in accordance with regulatory requirements and do not represent an IDLH condition to employees. Work should be stopped and employees removed from the area if any monitoring or indication exists that this level of protection is required to adequately protect employees. EH&S management should then be contacted to determine what response should be taken (including additional monitoring in appropriate PPE).

5.3.2 Level B

Level B is used when conditions require a high level of dermal and the highest level of respiratory protection. It can includes chemically-resistant gloves, chemically-resistant sturdy work shoe, hooded one-piece non-permeable chemically-resistant coveralls, inner coveralls, disposable inner gloves, shoe covers, and a positive-pressure full-face piece self-contained breathing apparatus or positive-pressure full-face piece airline respirator. Taping should follow these guidelines: the outer gloves taped to the outer suit, the boots taped to the inner suit, and the shoe covers taped to the outer suit.

Use at ERDF

Normal conditions or activities at ERDF will not require the use of Level B PPE during normal operations. One possible exception is the wastes from the 200 areas that could contain carbon tetrachloride that may require the use of Level B. Waste acceptance criteria and waste acceptance policies and procedures will be used to ensure that the types of materials accepted for disposal are in accordance with regulatory requirements and do not require PPE at this level. Work should be stopped and employees removed from the area if any monitoring or indication exists that this level of protection is required to adequately protect employees. EH&S management should then be contacted to determine what response should be taken (including additional monitoring in appropriate PPE).

5.3.3 Modified Level C

Modified Level C is used during conditions requiring an elevated level of dermal protection and moderate respiratory protection. It can include chemically-resistant gloves, chemically-resistant sturdy work shoes, chemically-resistant coveralls, inner

gloves, shoe covers, and a full-face air-purifying respirator with properly selected cartridges. Joints between different ensemble pieces should be taped appropriately.

Use at ERDF

No known conditions or activities at ERDF require the use of Modified Level C PPE during normal operations. Waste acceptance criteria and waste acceptance policies and procedures will be used to ensure that the types of materials accepted for disposal are in accordance with regulatory requirements and do not require PPE at this level. Work should be stopped and employees removed from the area if any monitoring or indication exists that this level of protection is required to adequately protect employees. EH&S management should then be contacted to determine what response should be taken (including additional monitoring in appropriate PPE).

5.3.4 Level C

Level C is used during conditions requiring moderate dermal protection and moderate respiratory protection. Level C dermal protection for chemical hazards can include chemically-resistant gloves, chemically-resistant sturdy-sole shoe, inner gloves, shoe covers, chemically resistant coveralls. Level C dermal protection for radiological hazards includes protective coveralls (radiological based) and protective shoe coverings. Joints between different ensemble pieces should be taped appropriately. Level C respiratory protection will consist of a full-face air-purifying respirator with properly selected cartridges. Joints between different ensemble pieces should be taped appropriately.

Use at ERDF

Level C will be not normally be used at ERDF because of the limited handling/contact with the waste. Some circumstances may arise where the volatile/semi-volatile organic contaminant levels in individual waste streams are sufficient to justify additional monitoring to determine breathing zone concentrations. Use of level C will be required only when wastes are received that exhibit sufficient vapor form contaminants to justify its use.

5.3.5 Modified Level D

Modified Level D is used during conditions requiring increased dermal protection for chemical hazards without respiratory protection. Modified Level D dermal protection can include chemically-resistant gloves, chemically-resistant sturdy shoe, inner gloves, shoe covers, chemically resistant coveralls.

Use at ERDF

Modified Level D will be a working PPE requirement for significant in-cell disposal operations and decontamination operations when contact with the waste/contamination is most likely to result in potential contamination spread onto personnel clothing and into the breathing zone.

5.3.6 Level D

Level D is used during conditions requiring increased dermal protection for radiological hazards. Level D protection can include protective coveralls (radiological based) and protective shoe coverings. Joints between different ensemble pieces should be taped appropriately.

Use at ERDF

Modified Level D will be a working PPE requirement for significant in-cell disposal operations and decontamination operations when contact with the waste/contamination is most likely to result in potential contamination spread onto personnel clothing and into the breathing zone.

5.3.7 Basic Work Clothing

The basic work clothing (street clothing) used at the ERDF site includes worker-supplied sturdy full-length work pants, sleeved shirt, and sturdy-sole, work-boot meeting ANSI Z41.1. Additional PPE such as cloth or leather gloves, face protection, hearing protection, safety glasses, or hard hat will be required as posted for specific areas.

5.4 PPE Assignments by Task

Because of the diversity of tasks and contaminants, most PPE assignments will be made as a part of the RWP, or AHA. Care must be given by personnel to read and understand the prescribed PPE ensembles, several of the general classifications for protection levels may have multiple definitions. For example, different tasks may require Modified Level D ensembles that use different types of coveralls.

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6.0 Temperature Extremes

The added burden of PPE required for hazardous waste operations in a temperature extreme condition increases the potential for worker disorders or conditions that can result in injury or illness. Disorders or conditions associated with work conducted in temperature extremes can be controlled through proper planning and effective monitoring of personnel. Factors that could affect a worker's ability to function in extreme temperatures include, but are not limited to physical fitness, acclimatization, age, obesity, alcohol consumption, drug use, infections, and disease.

6.1 Heat Stress

Increased physical demands on workers occur as a result of increased air temperature and humidity. Wearing PPE also increases the demands on workers, due to added weight of the equipment, reduced visibility, reduced mobility, loss of the body's natural cooling processes, increased energy consumption by the body, and lack of sufficient fluid replacement.

6.1.1 Monitoring

Personnel who are not required to wear PPE are not immune to the potential hazards of heat related disorders or conditions and should be included in the monitoring program.

WBGT

The guidance for workers wearing permeable clothing is specified in the current version of the American Conference of Governmental Industrial Hygienists (ACGIH) TLV for heat stress based on the wet-bulb globe temperature (WBGT). The WBGT is the first level of heat stress evaluation. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, a Clo value (insulation value of clothing) correction will be applied to the TLV and changes shall be made to the monitoring requirements and work rest period to account for these differences. The ACGIH TLV guide contains a separate table for workers wearing semi-permeable clothing. In these situations, refer to this table in the current ACGIH TLV.

Physiological Monitoring

If the WBGT is exceeded for fit and acclimatized workers, physiological monitoring should be conducted to ensure that workers core body temperature does not exceed 100.4° F. Heart rate monitoring, as measured by the radial pulse, should be conducted to establish work rest regimes that do not produce heart rate that exceeds 110 beats per minute at the end of the work period. Adjust the work-rest period lengths as necessary to maintain heart rates through the work period below 110 beats/minute.

6.1.2 Worker Recognition and Mitigating Actions

Worker recognition is an essential element of an effective temperature extreme program. Workers who are able to identify the symptoms of early heat stress and understand the

mitigating actions will be able to prevent heat related disorders or conditions to themselves and their fellow workers.

WMFS, BHI/ERC Team and DOE employees and subcontractors who will be working outside during the heat of the day shall be trained in a safety meeting at the beginning of each summer season or prior to beginning such work. This training shall identify the following symptoms and mitigating actions for heat stroke, heat exhaustion, heat cramps, and heat rash.

Heat Stroke

Heat stroke occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. The primary signs and symptoms of heat stroke are **confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating, hot, dry, red skin**. If body temperature is too high, it causes death.

Heat stroke is a medical emergency. If a worker shows signs of possible heat stroke seek professional medical treatment and notify the EH&S Manager (in that order). If the EH&S Manager is not available, notify the WMFS Project Manager. The following immediate actions should be followed:

- Call for an ambulance.
- The worker should be moved to the shower trailer and the PPE should be removed.
- The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling.
- Be prepared to administer CPR.

Regardless of the worker's protests, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Heat Exhaustion

The signs and symptoms of heat exhaustion are **profuse sweating, headache, nausea, vertigo, weakness, thirst, and giddiness**. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly. **Fainting associated with heat exhaustion can be dangerous** because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency.

If a worker shows signs of possible heat exhaustion, immediately notify the EH&S Manager. The worker should be taken to the shower trailer, PPE should be removed, and given fluid replacement. The worker should also be encouraged to get adequate rest.

Heat Cramps

Heat cramps, painful muscle spasms in the arms, legs, and abdomen, are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused by both too much and too little salt. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (+/-0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken at every opportunity in hot environments. Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

If a worker shows signs of possible heat cramps, immediately notify the EH&S Manager. The worker suffering from heat cramps should be taken to the shower trailer, PPE removed, and given fluid replacement. Wet cloths can be applied to the cramped area, do not massage the cramp. The worker should also be encouraged to get adequate rest.

Heat Rashes

Heat rashes are the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by un-evaporated sweat, and heat rash papules may become infected if they are not treated.

If a worker shows signs of possible heat rash, immediately notify the EH&S Manager. Skin rashes can also be a result of exposure to some chemical contaminants and should always be evaluated by a physician. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

6.2 Cold Exposure

Exposure to cold temperatures increases the likelihood and potential for worker disorders or conditions that could result in illness. Extreme low temperatures may not be the only element necessary to create the potential for cold exposure disorders or conditions; strong wind accompanied by cold temperatures can lead to these types of disorders or conditions.

6.2.1 Cold Exposure Potential

The wind-chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. The wind-chill index (Table 6-1) should be consulted when planning for exposure to low temperatures and wind. The wind-chill index does not take into account the specific part of the body exposed to cold, the level of activity which affects body heat production, or the amount of clothing being worn.

The generally recognized cold disorders or conditions are frostbite and hypothermia. Contributing factors to these disorders or conditions are exposure to humidity, high winds, contact with wetness, inadequate clothing, and poor worker health.

The physical conditions that effect cold exposure disorders or conditions are the same as those associated with heat disorders or conditions, such as physical fitness, alcohol or drug use, and disease.

Table 6-1 Wind-Chill Index

Wind Speed in mph	ACTUAL THERMOMETER READING (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
	EQUIVALENT TEMPERATURE (°F) (See Note a)									
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Over 40 mph (little added effect)	LITTLE DANGER (for properly clothed person)				INCREASING DANGER			GREAT DANGER		
	(Danger from freezing of exposed flesh)									

Note a - The human body senses "cold" as a result of both the air temperature and the wind velocity. Cooling of exposed flesh increases rapidly as the wind velocity goes up. Frostbite can occur at relatively mild temperatures if wind penetrates the body insulation. For example, when the actual air temperature of the wind is 40° F (4.4° C) and the velocity is 30 mph (48 km/h), the exposed skin would perceive this situation as an equivalent still air temperature of 13° F (-11° C).

6.2.2 Control Measures for Cold Stress

The presence of dead air space between the warm body and clothing and the outside air is essential. Many layers of relatively light clothing with an outer shell of windproof material maintain body temperature much better than a single heavy outer garment worn over ordinary indoor clothing. The more air cells each clothing layer has, the more efficient it insulates against body heat loss. Clothing also needs to allow some venting of perspiration. In addition to insulated dry clothing, whenever possible full use should be

made of windbreaks and heated shelters. Guidance for the evaluation and control of cold related illness, hypothermia, contained in the ACGIH TLV booklet should be followed.

6.2.3 Worker Recognition

Early recognition of the symptoms of cold exposure stress is essential in preventing serious or permanent disorders or conditions. WMFS workers, onsite managers, and subcontractors involved in cold weather operations shall be trained in a safety meeting at the beginning of each cold weather season or prior to beginning such work to recognize the conditions and symptoms for hypothermia and frostbite. These symptoms are described in the following:

Hypothermia

The first symptoms of this condition are uncontrollable shivering and the sensation of cold, irregular heart beat, weakened pulse, and change in blood pressure. Severe shaking of rigid muscles may be caused by a burst of body energy and changes in the body's chemistry. Vague or slow, slurred speech, memory lapses, incoherence, and drowsiness are some of the additional symptoms. Symptoms noticed before complete collapse are cool skin, slow and irregular breathing, low blood pressure, apparent exhaustion, and fatigue even after rest.

As the core body temperature drops, the victim may become listless and confused, and may make little or no attempt to keep warm. Pain in the extremities can be the first warning of dangerous exposure to cold. If the body core temperature drops to about 85° F, a significant and dangerous drop in the blood pressure, pulse rate, and respiration can occur. In extreme cases, death will occur. If an employee has hypothermia, medical attention shall be sought for the employee and the EH&S manager shall be notified.

Frostbite

Frostbite can occur, in absence of hypothermia, when the extremities do not receive sufficient heat from central body stores. This can occur because of inadequate circulation and/or insulation. Frostbite occurs when fluids around the cells of the body tissues freeze due to extremely low temperatures. Damage may result, including loss of tissue around the areas of the nose, cheeks, ears, fingers, and toes. This damage can be serious enough to require amputation or result in permanent loss of movement. If an employee has frostbite, medical attention shall be sought for the employee and the EH&S manager shall be notified.

6.3 Prevention

Preventive measures are the best approach to avoiding the types of disorders or conditions associated with temperature extreme conditions. Many of the measures are similar for both heat and cold extremes. Proper training and preventive measures are critical in temperature extreme conditions to avert illness, injury and potential loss of worker productivity.

WMFS will use additional appropriate administrative and engineering controls, as feasible, to protect workers from temperature extremes. The following steps are required for ensuring/protecting workers involved in temperature extreme conditions:

- Consider using a shelter during breaks so workers can be out of the sun
- Closely monitor and modify/adjust work/rest schedules
- Use the buddy system
- Rotate job tasks to reduce metabolic rate
- Encourage workers to maintain an optimal level of physical fitness and diet.
- Encourage workers to maintain normal/constant weight (significant weight loss can be a strong indication of physical problems)
- Advise workers that heavy alcohol intake may significantly increase their risk of heat stroke (i.e. dehydration)

7.0 Training Program

This section provides an overview of the hazardous waste site operations related training requirements that apply to the ERDF. The job-specific assignment of training can be found in the ERDF Training Manual, RFS-ERDF-004.

7.1 Employee Participation

Employees (either workers or visitors) shall not be permitted to participate in or supervise ERDF waste disposal operations until they have been provided training to a level required by the activities or tasks they engage in and by their job function and responsibility.

- Employees on the ERDF site engaged in hazardous substance disposal or other activities that expose or potentially expose them to hazardous substances and health hazards shall receive a minimum of 40 hours of initial health and safety training (meeting 29 CFR 1910.120). In addition, they shall receive a minimum of three days (24 hours) of field (hands-on) experience under the direct supervision of a trained, experienced supervisor.
- Employees who will be periodically onsite for specific and limited tasks and the exposure is not likely to exceed the OSHA PEL and other published exposure limits shall receive a minimum of 24 hours of initial health and safety training (meeting 29 CFR 1910.120). In addition, they shall receive a minimum of 8 hours of field (hands-on) experience under the direct supervision of a trained, experienced supervisor.
- These requirements also apply to site supervisors and onsite managers who are directly responsible for personnel engaged in hazardous waste activities, based on the type of
- Employee being supervised supervisors and managers will required either 24- or 40-Hour training. In addition, site management personnel are required to receive 8 hours of supervisory training.
- Site visitors, include senior-level managers, inspectors or auditors, reporters, public officials, technical professionals, and other interested parties, require the same level of training required for the area they will access. Visitors who will remain in the Support Zone will only require a site briefing.

7.2 ERDF Specific Training/Briefing

A briefing shall be given to all site personnel prior to entry into controlled areas on the ERDF site. For permanently assigned workers, this briefing will be part of ERDF specific training and is not required prior to each entry. A briefing shall be held, however, whenever unusual site conditions or PPE requirements are in place so that personnel adequately understand the situation and the equipment to be used, including:

- Changes to, or implementation of new AHA, unusual safety, health, and other hazards on the site,

- The capabilities, limitations and proper use of PPE and ensure workers are familiar with it so they can maximize protection and efficiency with the PPE,
- The safe use of engineering controls and equipment specific to the conditions,
- Any specific medical surveillance requirements for the site,
- An explanation of any planned exposure monitoring,
- Specific site access controls and methods of posting areas.
- Specific decontamination/egress procedures.
- Use of MSDS.

Visitors shall receive a briefing commensurate with the areas to be accessed. Support area visitors should be briefed in the emergency response procedures for the support area (i.e. staging zone), lead safety management personnel to contact in an emergency, etc. Visitors properly trained and with reason to enter the controlled areas should be briefed similar to a site worker going into unusual conditions (described above).

7.3 General Employee Radiological Training/Radiation Worker Training

All persons entering a Controlled Area shall receive General Employee Radiological Training (GERT). Radiation workers shall receive initial and refresher/retraining as required by Hanford Site policies.

7.4 Hazard Communication Training

Hazard communication training shall be coordinated by the EH&S Manager to ensure that all personnel are properly informed of the hazards present on the site from hazardous materials. The content of the training shall include:

- Requirements of 29 CFR 1910.1200 pertaining to employee information and training,
- Operations in the assigned employee work area where hazardous chemicals or physical agents are present,
- The location and availability of the written hazard communication program and material safety data sheets (MSDS),
- The methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area,
- The health hazards of the chemicals and physical agents in the work area,
- Measures workers can take to protect themselves,

- Information on the labeling system used by the employer to identify hazardous materials,
- The hearing conservation program,
- The respiratory protection program, and
- Labeling of hazardous material containers.

7.5 Safety Meetings

Safety meetings, conducted at least weekly, for all WMFS ERDF site employees will be conducted and documented. The discussion at these meetings should include:

- The health and safety considerations and necessary protective equipment for the current operations,
- Any addenda to the HASP, new or revised AHA, or RWPs,
- Any new MSDS filed on site,
- All documented or observed unsafe acts committed on the site since the previous meeting and methods to prevent recurrence, and
- Lessons learned from previous operations.
- Accidents or injuries
- VPP topics

7.6 Training Documentation

Required training must be completed and properly documented prior to entry into the ERDF controlled areas. Training should be documented in accordance with the requirements of the WMFS ERDF specific training manual.

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8.0 Medical Surveillance

8.1 First Aid and Consulting Physicians

Employees at the ERDF site will be provided first aid and consulting physician services through the Hanford Environmental Health Foundation (HEHF). The nearest first aid station is the 200 East Area first aid station located at Building 2719EA, which operates during normal Hanford Site business hours. The Hanford Fire Department will be used during off-normal working hours. Consulting physicians are provided at the HEHF main offices at 3080 George Washington Way in Richland, Washington.

8.2 Emergency Treatment Procedures and Locations

Major injuries shall be handled by the Hanford Site emergency response personnel contacted by dialing 911 from the ERDF site. Minor injuries shall be brought to the attention of the EH&S manager and, as required, the injured person shall have another employee drive them to the 200 West Area first aid station. These personnel will determine the appropriate emergency treatment procedures and the necessary location to support the employees health. Emergency calls from cellular phones dial 373-3800. Hand held radios may be used as a means for emergency calls.

8.3 Medical Examinations

All onsite personnel who may be exposed to hazardous material must have successfully completed a initial, periodic, or qualification physical examination. All examinations will be performed by HEHF at no cost to the employee.

8.3.1 Initial Examinations

The initial examination is intended to provide baseline data of the individual's physical condition and to ensure the individual's fitness is adequate for the type of work to be performed and PPE to be used. An initial examination is required for all employees, with the level of the examination determined by the employees job function, potential for being exposed to hazardous/radioactive materials, and the need for use of PPE.

8.3.1 Periodic Physicals

Periodic physicals are provided to all workers, with the frequency based upon job function, potential for being exposed to hazardous/radioactive materials, and the need for use of PPE. The physical provides the individual with periodic information on their physiologic trends, along with ensuring that they are in sufficient health status and physical condition to permit them to meet job requirements adequately. Periodic physicals for ERDF employees will be performed at the periodicity required by HEHF for their job functions.

8.3.2 Exit Physicals

At termination of employment with WMFS an exit physical is required. Content of the exit physical is based on the time elapsed from the last physical examination, the potential for exposure to hazardous/radioactive materials, and the job classification of the individual.

8.3.3 Specific Evaluations Related to Job Duties

Several types of medical evaluations may be required by individual employees according to job duties, including:

- Employees working in confined spaces or with asbestos need a medical opinion for fitness of these specialized duties.
- Employees wearing respirators require a pulmonary function test and a physician statement of respiratory fitness.

8.3.4 Injury or Illness Reexaminations

Employees shall be given another physical if they have sustained a lost-time injury or are suspected of having an overexposure to hazardous materials. If an employee is suspected of having an illness or injury as the result of an overexposure to a hazardous material, the EH&S manager shall promptly notify HEHF with information concerning the material believed to have caused the exposure.

8.3.5 Visitor/Nonworker Medical Requirements

Visitors and nonworkers require a medical opinion including a physician statement of respiratory fitness if entry is required into work areas where Levels A, B, or C PPE are being used. The visitor or non-worker must also be involved in an appropriate 29 CFR 1910.120 medical surveillance program. Visitors or nonworkers are required to notify the EH&S manager of any illness or injury that they potentially attribute to operations at the ERDF within 24 hours.

8.3.6 Subcontractor Employees

Subcontractor personnel must meet the medical requirements of OSHA (29 CFR 1910.120) and those specific to this HASP.

8.4 Medical Records

Personnel medical and exposure monitoring records are maintained by HEHF and ensure employee confidentiality. Appropriate documentation of physical readiness to perform work and exposure information will be forwarded to WMFS management and maintained at the ERDF to ensure that only qualified personnel perform work on the site and that exposure to personnel is maintained in accordance with federal standards.

8.5 Employee Responsibilities

All employees are responsible for keeping themselves physically fit to perform their job functions and maintaining compliance with the initial, periodic, and exit physical requirements outlined in this HASP.

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9.0 Exposure Monitoring/Sampling

9.1 Pre-Entry Monitoring

No pre-entry monitoring for IDLH, etc. is required at the ERDF due to the known hazards of the waste types being received for disposal. If a condition occurs that leads the EH&S manager to believe that there are unknown hazards on the site, then a specific pre-entry monitoring action plan would be developed to ensure personnel safety and allow the site status to be understood through monitoring and/or sampling.

9.2 Action Levels

A number of action levels have been identified for the ERDF site to ensure that appropriate sampling/monitoring and PPE are used to control worker exposure.

9.3 Radiological Monitoring and Sampling

A combination of air, surface contamination, external exposure, and personnel monitoring will be used at the ERDF site to ensure worker safety and prevent the spread of radiological contaminants. Table 9-23 describes the overall radiological monitoring and sampling activities that will occur at the site and individual activities are further discussed in the following sections.

9.3.1 Air Monitoring

Radiological air monitoring can be divided into three basic groups: continuous real time analysis (RTA) monitoring, area monitoring, and personnel (individual) breathing zone monitoring. The outdoor environment and dust suppression methods used in the ERDF waste disposal operations all are aimed at minimizing the potential for airborne contamination. Real time monitoring will not be used at ERDF based upon these engineering/administrative controls and historical data from similar operations indicating that this level of monitoring is not necessary. The primary method that will be used at ERDF to assess the airborne radiological hazard is the high volume air sample. These samples are taken in areas where the airborne concentration is known or suspected to exceed the allowable action levels, and when work in an area has the potential to produce such concentrations. Personnel breathing zone samples will also be used when deemed necessary by the EH&S Manager and BHI/ERC Team/ERC Team radiological controls personnel to confirm the results of other monitoring.

9.3.2 Radioactive Surface Contamination Monitoring

Surface contamination monitoring outside of the cell will be aimed at understanding any potential spread due to cell operations and to eliminate both the spread and the cause of the spread. Periodic monitoring of facilities and equipment will be performed to act as the baseline for this program and appropriate decontamination and/or clean-up activities will occur to support maintaining contamination only in controlled areas.

Table 9-1 Action Levels

Parameter	Action Level	Action Required
Cumulative Radiation Exposure	> 100 mRem/yr with expected occupancy	Post area as a Radiological Buffer Area, limit access to only radiological worker trained employees, provide personnel exposure/dose monitoring.
Radiological Surface Contamination	See Table 9-2	Free release of personnel and items shall meet criteria. Limit access to only Rad Worker II trained employees.
Airborne Radioactivity	>10% of appropriate DAC	Engineering controls and/or administrative controls shall be implemented to reduce exposures. Limit access to only Rad Worker II trained employees. Require use of respiratory protection if engineering and administrative controls cannot reduce airborne concentrations below this level.
Combustion Gas	>10% Lower Explosive Limit	Stop work and control source. Continuously monitor until LEL < 10%. Evacuate area at >25% LEL.
Oxygen	<19.5% or >23.5% Oxygen	Evacuate area. Ventilate area and continuously monitor until O ₂ is between 19.5% and 23.5%.
Metals As analyzed in closed face total dust samples	Action Level = 50% Mixture PEL, or Single Metals Action Levels (all values in mg/m ³) As >0.005 Ni >0.05 Be >0.001 Ag >0.005 Cd >0.025 Th >0.05 CrI/III >0.25 U >0.025 Pb >0.030 VO ₅ >0.025 Hg > 0.025 Zn >2.5	Respiratory protection required when the breathing zone concentration is at or above the action level until sufficient engineering controls are established to control exposure.
Acids	HCl >3.5 mg/m ₃ Ceiling	Require use of respiratory protection. May require additional PPE. Evaluate engineering controls.
Bases	Ca(OH) ₂ >2.5 mg/m ₃ CaO >1 mg/m ₃ MgO >5 mg/m ₃ NaOH >1 mg/m ₃	Require use of respiratory protection. May require additional PPE. Evaluate engineering controls
Volatile Organic Compounds	Calculated specific levels* or 5 ppm for unknowns - Real Time Analysis (RTA)	Require use of respiratory protection. May require additional PPE. Evaluate engineering controls
Carbon Monoxide	25 ppm	Evaluate hazards and engineering controls. Continuously monitor until CO <25 ppm. Ensure CO remains below 100 ppm for 5-minute average. Evacuate area if CO > 100 ppm for 5 minutes or remains above 25 ppm for more than 2 hours.
Respirable Silica	>0.05 mg/m ³ - ARDsustained for 30 minutes	Require use of respiratory protection. Evaluate engineering controls.
Total Dust	>5 mg/m ³ ARDsustained for 30 minutes	Require use of respiratory protection. Evaluate engineering controls.
Noise	85 dBA or greater	Institute engineering controls and/or use approved hearing protection.
Heat Stress Permeable Clothes	> 83° F WBGT	Initiate appropriate physiological monitoring, establish work/rest regime as necessary.
Heat Stress Impermeable Clothes	>72° F WBGT	Initiate appropriate physiological monitoring, establish work/rest regime as necessary.
Cold Stress	< 10° F Dry Bulb Temperature	Refer to HASP, Section 6.2

* 5 ppm RTA reading is instantaneous indication in the worker breathing zone.

Table 9-2 ERDF Radiological Action Levels

Nuclide(See Note 1)	Removable (dpm/100 cm ²) (See Notes 2)	Total (Fixed + Removable) (dpm/100 cm ²) (See Notes 3)
U-natural, U-235, U-238, and associated decay product.	1,000 alpha	5,000 alpha
Transuranics, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	20	500
Th-natural, Sr-90, Ra-223, Ra-224, U-232 Th-232, I-126, I-131, I-133.	200	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and other noted above. Includes mixed fission products containing Sr-90.	1,000 beta-gamma	5,000 beta-gamma
Tritium organic compounds, surfaces contaminated by HT, HTO, and metal trioxide aerosols.	10,000	10,000

Notes:

1. The values in this table apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item. Where contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for the alpha- and beta-emitting nuclides apply independently.
2. The amount of removable radioactive material per 100 cm² of surface area should be determined by swiping the area with dry filter or soft absorbent paper while applying moderate pressure and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (NOTE--The use of dry material may not be appropriate for tritium.) For objects with a surface area less than 100 cm², the entire surface should be swiped, and the activity per unit area should be based on the actual surface area. Except for transuranics, Ra-228, Ac-227, Th-228, Th-230, Pa-231, and alpha emitters, it is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual contamination levels are below the values for removable contamination.
3. The levels may be averaged over 1 square meter provided the maximum activity in any area of 100 cm² is less than three times the values Table 9-2.

Table 9-3 Routine Radiological Monitoring/Sampling Frequency

Frequency	Location or Condition	Type of Monitoring
Radiation Monitoring - Gamma Dose Rates		
Monthly	General ERDF Site Radiation and High Radiation Area Boundaries	External Radiation Exposure Rate
Initial Entry	High Radiation Areas	External Radiation Exposure Rate
Weekly	During continuing operations in High Radiation Areas	External Radiation Exposure Rate
During Operations	Whenever an operation/waste type might result in personnel being exposed to intense beams or localized areas of radiation	External Radiation Exposure Rate
Continuously	During placement and/or removal or alteration of temporary shielding	External Radiation Exposure Rate
Weekly	Temporary or portable Radiation Area boundaries	External Radiation Exposure Rate
Contamination Monitoring - Alpha/Beta-Gamma Surface Contamination		
Prior to Release from Site	Transportation equipment prior to exit of cell	Surface Cont. Meter (Frisker) and/or Surface Cont. Smears
Prior to Release from Site	Transportation equipment prior to exit of decon pad	Surface Cont. Meter (Frisker) and/or Surface Cont. Smears
Prior to Release from Site	Support equipment/heavy equipment from decon pad	Surface Cont. Meter (Frisker) and/or Surface Cont. Smears
Weekly	Office/Change Spaces in Support Zone	Surface Cont. Meter (Frisker) and/or Surface Cont. Smears
Weekly	Contamination Area Boundaries	Surface Cont. Meter (Frisker)
During Work	As specified in a RWP	As Specified
Airborne Monitoring - Particulates		
Every 4 hours during tasks	If waste contaminants/conditions indicate task is likely to produce airborne radioactivity in excess of 10% of the DAC	High Volume Air Sample
Daily	In cell during waste placement activities	High Volume Air Sample

9.3.3 External Radiation Exposure Monitoring

Exposure to high doses of external radiation is not a major concern at the ERDF site, but some of the waste streams (up to 20%) may have exposure potential that must be properly monitored. A combination of methods will be used to protect workers, based upon the knowledge of the types of wastes coming on a given day and their associated activity levels.

The methods used to assess external exposure are portable radiation monitoring instruments to measure instantaneous exposure dose rates and the placement of area thermoluminescent dosimeters (TLDs) to determine the integrated exposure over a period of time. Personnel will also be provided with individual monitoring devices, as covered in the next section.

Monitoring results will be used to ensure that radiation areas are properly posted and controlled, including radiation areas (>5 mRem/hr) and high-radiation areas (>100

mRem/hr). Monitoring results will also be used to determine the need for supplemental personnel dosimetry (i.e. cell operators working in the vicinity of higher activity wastes) These areas may potentially vary as high activity wastes are placed and covered with other materials.

9.3.4 Personnel Monitoring

Personnel monitoring devices will be used at the ERDF site to determine the extent of exposure to personnel from ERDF waste disposal operations. The methods used to assess personnel exposure will include the use of TLDs to determine the time integrated external personnel exposure and pencil dosimeters during events with higher exposure potential where a worker should periodically monitor their exposure.

9.3.5 Internal Dosimetry

WMFS will rely on the BHI/ERC Team technical basis for the methods and frequency of radiological bioassay monitoring. The following requirements shall be followed for radiological bioassay:

- Baseline bioassay monitoring of personnel who are likely to receive intakes resulting in a committed effective dose equivalent greater than 100 mRem shall be conducted before they begin work that may expose them to internal radiation exposure.
- Routine bioassay monitoring methods and frequencies shall be established for personnel who are likely to receive intakes resulting in a committed effective dose equivalent greater than 100 mRem.
- Management shall require termination bioassay monitoring when a person who participated in the bioassay program terminates employment or concludes work involving the potential for internal exposure. The number of persons failing to achieve this monitoring should be reviewed periodically and should be used to determine whether further efforts to get cooperation are warranted.

Bioassay analyses shall also be performed when any of the following occurs:

- Facial or nasal contamination is detected that indicates a potential for internal contamination
- Airborne monitoring indicates the potential for intakes exceeding 100 mRem committed effective dose equivalent
- Upon direction of the BHI/ERC Team Radiological Control Organization when an intake is suspected.

Personnel monitoring results shall be reviewed by management to ensure that workers annual exposure is maintained below the administrative control limits as shown in Table 9-4, and meet ALARA goals:

Table 9-4 ERDF Administrative Control Limits

Personnel Class	Type of Exposure	Annual Limit
Radiological Worker	Whole Body (internal + external) excluding radon and radon daughters	500 mrem
Declared Pregnant Worker	Embryo/Fetus	500 mrem per gestation period
Minors (under age 18) and Students	Whole Body (internal + external) excluding radon and radon daughters	100 mrem
Visitors and Public	Whole Body (internal + external) excluding radon and radon daughters	100 mrem

9.3.6 Frequency of Monitoring

Radiological monitoring shall be performed at a higher frequency initially to establish a baseline of operational data. Frequencies and types of monitoring may be adjusted by the EH&S Manager and BHI/ERC Team radiological controls personnel based upon the results of the baseline information and ongoing monitoring results.

9.4 Industrial Hygiene Monitoring/Sampling

The waste streams that will be disposed of at ERDF vary significantly and potentially include volatile organics, semi-volatile organics, metals, and inorganics. Although these constituents are generally present in very low concentrations, a flexible industrial hygiene program must be in place to understand the particular wastes being received on a given date and the individual constants present in those wastes.

The basis of the industrial hygiene monitoring program is a evaluation of baseline exposures level trends and subsequent period monitoring verifying the validity of the baseline. During the initial periods of exposure to any specific breathing zone hazard, monitoring will be conducted to establish a valid trend of exposure levels. Once the baseline is established, subsequent monitoring will be conducted on a periodic and less frequent basis as necessary to ensure previous trends do not change and personnel are adequately protected. Intermixed during both periods will be daily discussions between the EH&S Manager and Waste Acceptance Manager to understand the wastes being accepted for disposal and the individual constituents/concentrations in those wastes.

9.4.1 Sampling/Monitoring Methods and Instrumentation

The types of methods and equipment used for industrial hygiene sampling and monitoring vary depending upon the constituents in question. Table 9-5 describes the basic methods that will potentially be used at the ERDF site, along with a description in the following paragraphs on the intended strategy for each of these methods.

Table 9-5 Methods of Industrial Hygiene Monitoring

Type of Monitoring/ Sampling	Method of Monitoring/ Sampling	Location of Monitoring/ Sampling
Combustible Gas	RTA - MSA Passport	Work Area
Oxygen	RTA - MSA Passport	Work Area
Metals	37mm cassette sample - MCE - total metals NIOSH 7300	Breathing zone of workers subject to highest levels
Acids	Silica gel tube - 200/400mg NIOSH 7903	Breathing zone of workers subject to highest level
Bases	37mm cassette sample - MCE OSHA ID-121	Breathing zone of workers subject to highest level
Organic Vapors	1) hNu, or colorimetric tubes 2) NIOSH or OSHA integrated sampling methods	Breathing zone of workers subject to highest levels
Carbon Monoxide	RTA - MSA Passport	Breathing zone of workers subject to highest levels or work area
Respirable Dust and Silica	10 mm cyclone - 37mm cassette - PVC NIOSH 7500	Breathing zone of workers subject to highest levels
Respirable Dust	RTA - Sensidyne LD-1	Breathing zone of workers subject to highest levels
Total Dust	37mm cassette sample - MCE - total dust NIOSH 0500	Breathing zone of workers subject to highest levels
Noise	Rental Noise dosimeter	Hearing zone of workers subject to highest levels
Heat Stress	WBGT	Area
Cold Stress	Dry bulb temperature and wind speed	Area

Combustible Gas

The ERDF is an outdoor facility open to the environment with no particular combustible gas sources. Periodic monitoring for combustible gas will not be required for these reasons, although combustible gas monitoring will be utilized as necessary to support confined space entries.

Oxygen

The ERDF is an outdoor facility open to the environment and has no significant areas where an oxygen deficient environment could occur. Periodic monitoring for oxygen will not be required for these reasons, although oxygen monitoring will be utilized as necessary to support confined space entries.

Metals

The wastes disposed of at the ERDF potentially include metals. These metals are not in a significantly dispersible form (i.e. bound in a soil matrix or in debris) but a baseline of operations will support ensuring worker safety. After the completion of baseline activities, periodic sampling would only be used in unusual circumstances (i.e. when a

particular waste stream represents a high concern for airborne metals) unless the baseline results indicate a more general concern.

Acids

The wastes disposed of at the ERDF have very limited potential for acid gas impact to workers and samples shall be taken during the baseline period to ensure that this is confirmed. After the completion of baseline activities, periodic sampling would only be used in unusual circumstances (i.e. when a particular waste stream represents a high concern for airborne acids) unless the baseline results indicate a more general concern.

Bases

The wastes disposed of at the ERDF have very limited potential for airborne bases impact to workers and samples will be taken during the baseline period to ensure that this is confirmed. After the completion of baseline activities, periodic sampling would only be used in unusual circumstances (i.e. when a particular waste stream represents a high concern for airborne bases) unless the baseline results indicate a more general concern.

Organic Vapors

The wastes disposed of at the ERDF potentially will have a variety of volatile and semi-volatile organic constants. Periodic monitoring on a daily basis will be performed during the baseline period to understand the levels of vapors that are emitted from the wastes, biased towards one of the daily shipments of waste with the highest organic contamination levels. Personnel sampling will also be used to understand the breathing zone impacts over a shift by using personal sampling equipment. Once this baseline is in place, then periodic monitoring and sampling will continue throughout the operational life span at reduced rates and matched to waste shipments with the highest concentrations of organic constituents.

Carbon Monoxide

The ERDF is an outdoor facility open to the environment and has no significant areas where a significant buildup of carbon monoxide would be expected. The use of heavy equipment, however, requires that limited periodic monitoring be performed to ensure worker safety. Periodic monitoring for carbon monoxide will also be utilized as necessary to support confined space entries.

Respirable Dust/Silica and Total Dust

Containment during transport, wetting during dumping, wetting to support compaction, daily operating cover (DOC), and fixative agents is used to minimize the amount of respirable dust. The baseline conducted during the first six months of operations indicates a limited concern based upon the types of equipment used (i.e. cab enclosed heavy equipment) in ERDF operations. Periodic sampling will be performed to ensure that the baseline conditions continue throughout the operational life-span of the facility.

Noise

The baseline exposure data for employees operating heavy equipment on the site indicates the noise levels are less than 85 dB(A) TWA. Hearing protection will be used to protect the workers. Monitoring will be performed updating the baseline, as necessary, to ensure exposures during the operational life-span do not significantly change.

Heat Stress

Heat stress to outside workers is a concern during summer periods of high temperature in the summer. Appropriate personnel awareness training and periodic monitoring of temperature are key during these time periods.

Cold Stress

Cold stress to outside workers is a concern during winter periods, particularly if arctic fronts pass through the area. Appropriate personnel awareness training, protective clothing, and periodic monitoring of temperature are all key during these time periods.

9.4.2 Sampling Frequency

Sampling frequencies are shown in Table 9-6. The baseline periods for individual exposure hazards may run up to a six month period, commencing from the time when the waste manifests indicate a credible potential for measurable exposures. During this period the monitoring/sampling describe will be performed to ensure worker safety and to establish a baseline of industrial hygiene methods. Sampling and monitoring activities shall be reduced after a valid baseline for exposures is established. Baseline sampling will be performed as necessary to account for any changes in operations.

Table -6 Industrial Hygiene Monitoring/Sampling Frequencies

Type of Monitoring/ Sampling	Baseline Frequency	Periodic Frequency
Combustible Gas	Activity Specific	Activity Specific
Oxygen	Activity Specific	Activity Specific
Metals	Weekly	Annually
Acids	Weekly or as dictated by waste stream	Annually
Bases	Weekly or as dictated by waste stream	Annually
Organic Vapors	Weekly	Annually
Carbon Monoxide	Activity Specific	Activity Specific
Respirable Dust	Weekly or as dictated by waste stream	Annually
Total Dust	Weekly or as dictated by waste stream	Annually
Noise	Within first 6 months of operation	Annually
Heat Stress	Weather Specific	Weather Specific
Cold Stress	Weather Specific	Weather Specific

9.5 Communication of Airborne Sampling Results to Workers

The EH&S Manager will personally notify the worker (or represented workers) on which an airborne industrial hygiene or radiological sample was collected of the sampling results as soon as practical after he confirms the results. The EH&S Manager will answer questions concerning sample collection and the significance of sample results. Tabular data depicting the airborne sample results obtained will be posted for at least one week in the change trailer at ERDF. These provisions will apply to all airborne samples collected on the site for personnel reasons, regardless of the employer of the worker(s) sampled.

9.6 Offsite Monitoring

Offsite monitoring is not anticipated under normal conditions with the exception of the radiological airborne samples taken at the permanently installed environmental monitoring stations. These samples will be taken and handled in accordance with the ERDF Environmental Monitoring Program and are not covered by this plan. Equipment used in this plan, including high volume air sampling equipment, could be used in an unusual event to support the environmental monitoring program as required by the EH&S Manager or Project Manager.

10.0 ERDF Site Control

10.1 Site Layout

The overall ERDF site is located inside of a security fence and is broken up into support zone, contamination reduction zone, and exclusions zones in accordance with standard CERCLA control requirements. Figure 10-1 graphically displays the locations of these zones, which are described in the following sections.

10.1.1 Exclusion Zone

The exclusion zone is intended to protect personnel and the environment by encompassing the areas where CERCLA hazardous/radioactive wastes could potentially be spread. The radiological equivalent is a posted Radiological Area. For the ERDF, the exclusion zone encompasses the areas where CERCLA wastes are handled outside of the approved transportation containers. The exclusion zone is marked by tee-posts and rope with appropriate signs. This control method is due to the large amount of vehicle traffic associated with the ERDF waste disposal operations and is protective of personnel and preventing the spread of contamination.

10.1.2 Contamination Reduction Zone/Corridor

The contamination reduction zone (CRZ) is intended to provide a buffer area for prevention of contamination spread between the exclusion zone and the support zone. The radiological equivalent is a Radiological Buffer Area. Two exits from the posted Exclusion Zone are established.

- A Contamination Reduction Corridor (CRC) is located to allow for decontamination of shuttle equipment and radiological survey after dumping materials into the cell. This CRC is located in the area immediately adjacent to the leading face of the dumping ramp.
- A Contamination Reduction Corridor (CRC) is established as the normal ingress/egress route for foot traffic into the exclusion zone and will allow for appropriate dress/undress/survey methods to be performed. This CRC is located at the east edge of the posted Exclusion Zone.

10.1.3 Support Zone

The support zone (uncontaminated) encompasses the majority of the ERDF fenced in area. This area provides for short-term storage of both full and empty transportation containers, as well as a stockpile of clean fill and the decontamination pad. The radiological equivalent is the Radiologically Controlled Area (RCA). The administration offices and other site support functions required to sustain day-to-day operations are located outside the support zone but inside the fenced area, consequently, RCA signs are posted inside the fence line to distinguish the boundary.

10.2 Site Communications

Communications on the ERDF site will consist of verbal face-to-face, radio communications, and telephone communications as necessary to support safe and efficient operations. The main method of communications between in-cell, transportation, and support personnel will be through radio to allow information to be passed on incoming loads, status of waste compaction efforts, and overall operations progress. Hanford Site standard emergency response signals, including sirens and crash phones (as appropriate) will also be installed to allow 200 West Area and site wide emergency information to be passed to ERDF employees.

10.2.1 Site Work Zone Posting and Access Controls

The various exclusion zone and CRZ boundaries will be posted appropriately to ensure that personnel entering the zones have a need to be present, are taking appropriate safety precautions (i.e. PPE), are aware of the various hazards in the zone, and have been appropriately trained to allow access. The entrance roads to the ERDF site will also be posted at the Northwest corner and near the operations trailer to direct visitors to the Operations trailer to verify appropriate training and orientation.

10.2.2 Work Zone Access Requirements

Entry into the ERDF site will require the appropriate level of training as described in the ERDF Training Manual (RFS-ERDF-004). Individuals who are not properly trained or who do not have a valid need to enter a specific area will be denied access and either requested to leave the site or allowed access to only the support zone (as appropriate). Individuals who enter a controlled area without the proper training and authorization will be requested to leave the site and/or Hanford Patrol contacted (as necessary).

10.2.3 Access Control Point Requirements

The road and personnel access control points shall be clearly marked to ensure that only authorized personnel enter the various ERDF control zones. Personnel protective equipment requirements (where identified) will be clearly included and proper donning/doffing procedures shall be posted at appropriate locations.

10.3 Safe Work Practices

The buddy system shall be used for all operations around heavy equipment at the site unless otherwise approved by the Project Manager. Workers using the buddy system shall remain at least in line of sight, and be capable of:

- Provide his or her partner with assistance.
- Observe his or her partner for signs of chemical, heat, or cold exposure.
- Periodically check the integrity of his or her partners PPE.
- Notify the Project Manager or other site personnel if emergency assistance is needed.

10.4 Visitor Access Authorization

All visitors to the site shall be approved by the WMFS Project Manager or EH&S Manager. Appropriate training shall be verified prior to allowing visitors in a controlled area. The EH&S Manager, or designee, shall brief the visitors on the overall HASP requirements, including current AHA and RWPs in place, emergency evacuation procedures and staging area.

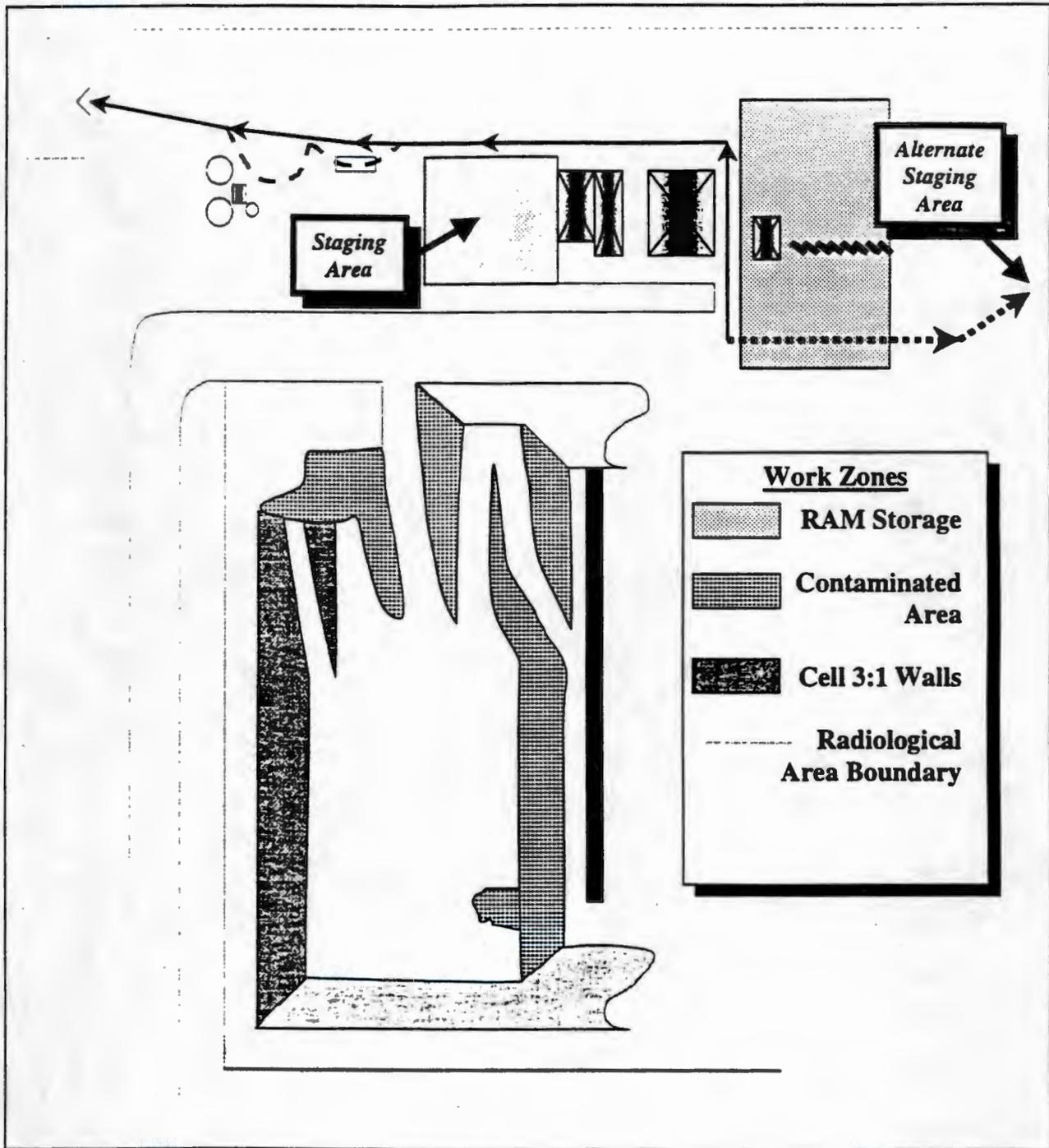


Figure 10-1 ERDF Zone Layout

11.0 Decontamination

11.1 Contamination Prevention

Minimizing worker contact with contaminants starts by working in a safe manner so that contact with contaminant is avoided as much as possible. Workers should don their protective equipment away from the CRZ and enter the exclusion zone through the identified ingress point. Workers who use general safe work practices in the exclusion zone are less likely to be contaminated than workers who do not. Workers should use the following techniques to minimize contact with contaminants:

- Consciously minimize contact with the hazardous substance.
- Refrain from walking through suspected contaminated soils unless necessary.
- Avoid higher contamination areas unless entrance is required.
- Use remote handling devices when handling radioactive materials.
- Cover contaminated tools and equipment with plastic bags when not in use.
- Minimize the generation of hazardous/radioactive waste.
- No eating, drinking, chewing, or smoking in contaminated areas. Avoid contact with mouth or face in contaminated area.
- Avoid contaminated areas unless absolutely necessary and observe work area from elevated locations.
- Practice ALARA principles and follow the requirements of any applicable RWPs.

11.2 Decontamination Location and Layout

The ERDF site has both installed and portable methods for decontamination that can be used to decontaminate equipment and personnel. The majority of the decontamination is conducted at the leading face of the dumping ramp. A fixed facility for decontamination is located in the full-container holding area, and is used to conducted limited decontamination on transportation containers prior to release.

11.3 PPE Removal and Personnel Decontamination

PPE shall be donned and doffed in accordance with the Hanford Site procedures. All personnel shall use the prescribed sequence and remove protective equipment into the designated receptacles at the egress area. Any specific task RWPs shall be reviewed by the radiological technician supervisor and adjustment made to the egress area to allow collection of unusual PPE.

Any personnel who are identified as having contamination to personal clothing or skin contamination shall follow guidance of the BHI/ERC Team RCTs in the removal of the contamination.

11.4 Equipment Decontamination

The methods for decontamination of equipment will vary based upon the type of equipment and the place of normal operation. During normal ERDF dumping operations, the transportation container tailgate edge is decontaminated, when necessary, at the leading edge of the dumping ramp. When transportation containers require release for unrestricted use, decontamination is performed at the fixed facility Decon Pad.

11.4.1 In-cell Decontamination

The shuttle trucks route for waste disposal at the ERDF is aimed at minimizing the possibility of contaminating the equipment and subsequently requiring decontamination.

The shuttle truck route for emptying a full container is; entry into the full-container holding area, loading a full container, entry into the cell area, transit to the working face, and dumping of the waste materials. All of these operations take place on clean DOC or non-contaminated areas.

After dumping the waste the container, the RCT will visually control the Radiological Buffer Area behind the container until it is surveyed properly. Occasionally, soils that hang up on the tailgate edge are hand brushed or rinsed off into the Contaminated Area prior to the container being moved into the Radiological Buffer Area and surveyed by RCT. The release survey of the truck includes the container tailgate, the ramp surface behind the truck, and any other areas deemed appropriate by the RCT. If the container tailgate area remains contaminated, or if the contamination is considered too severe to remove in-cell decontamination, then the truck will be moved to the fixed facility decontamination pad for decontamination.

In-cell equipment that remains in the disposal cells for a large majority of the time, but may require decontamination to allow major maintenance to be performed outside of the cell. The equipment will first be surveyed and then decontaminated in-cell using approved cleaning devices to reduce the loose contamination to an acceptable level. The equipment will then be moved to the decontamination pad area where the same methods for decontamination can be pursued as for transportation equipment.

11.4.1 Decon Pad Decontamination

Decontamination of shuttle trucks and transportation containers at the decontamination pad will vary depending upon the type of contamination, extent of contamination across the vehicle surfaces and activity level of contamination. The following methods, in the preferred order, will be used to decontaminate the equipment to allow continued use on the roads:

- Dry decontamination will be pursued as the first method to eliminate contamination.

- The decontamination pad area allows more controlled efforts and personnel can be placed in appropriate PPE more readily to allow this method to be pursued more vigorously than would potentially occur in the cell. HEPA-filtered vacuum used along with stiff brushes, rags, and other devices will all be used as appropriate to remove contamination.
- High pressure water is provided at the ERDF decontamination pad and will be the next method pursued to remove identified contamination. This is an effective method for spot contamination and will be used as appropriate.
- Wet decontamination using low pressure water will be the next method pursued to remove identified contamination. General area wash down and localized wash assisted by brushes/rags can be used to remove materials that were not effectively removed by previous methods.

11.5 PPE and Decontamination Solution Storage and Disposal

PPE removed from the CRC shall be appropriately bagged to contain any contamination and placed in temporary storage. This PPE will be shipped to the INS commercial laundry facility for decontamination.

All liquid agents used in decontamination operations, as described in Section 11.3 and 11.4, shall be compatible with the ERDF Waste Acceptance criteria to allow collection in the washwater/decontamination storage tank and reuse in landfill operations as compaction water. No decontamination solutions are planned for temporary storage other than as washwater.

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12.0 Emergency Action Plan

This section outlines the methods and responsibilities employed at ERDF to lessen the potential impact on workers, the public, and the environment should an emergency occur at the facility. Appropriate equipment, trained personnel, and a posted Emergency Action Plan must be in place to ensure appropriate response to any conditions that may arise. All emergency actions will be per the posted ERDF Emergency Action Plan, which will comply with BHI-SH-03, "Emergency Management Program," ultimately with applicable DOE orders, state and Federal regulations.

All personnel will evacuate from the ERDF worksite location when an emergency occurs. Personnel will evacuate to the Staging Area, or alternate Staging Area for accountability and follow instructions given by the ERDF Emergency Response Organization.

12.1 ERDF Emergency Response Organization

Members of the emergency response organization (ERO) will be trained prior to being assigned their responsibilities and the names of those persons will be listed on the posted ERDF Emergency Action Plan. The ERO will be made up of a Primary Emergency Coordinator (EC) and Alternate EC, a primary Staging Area Manger (SAM), and an Alternate SAM. The SAM will be responsible for accountability procedures during evacuation of the ERDF. Other personnel may be called upon to assist the ERO during emergency as needed for support.

12.2 ERDF Key Personnel

The names and phone numbers of the personnel filling the following key positions at the ERDF site shall be listed on the posted Emergency Action Plan for notifications during incidents and emergencies:

- DOE/RL Project Manager
- BHI/ERC Team Project Manager
- WMFS Project Manager
- BHI/ERC Team Single Point of Contact (SPOC)
- Patrol Operations Center (POC)
- WMFS EH&S Manager
- BHI/ERC Team Emergency Management Administrator
- BHI/ERC Team Occurrence Reporting Administrator

12.3 Training

Training is one of the first steps to being prepared for an emergency. All ERDF ERO members, employees, and visitors shall complete the proper training as discussed below and as required by BHI-SH-03. Initial and annual reviews shall include the review of this HASP as well as the Emergency Action Plan. All training shall be documented according to the ERDF Training Manual.

12.3.1 ERDF Emergency Response Organization

Members of the ERO shall be trained per BHI-SH-03 prior to being assigned ERO responsibilities, and annually thereafter.

12.3.2 ERDF Employees

ERDF employees (those assigned to the ERDF facility on a regular basis) shall review the posted ERDF Emergency Action Plan initially when hired, when the employees responsibilities or designated actions under the plan change, when the plan is revised, and at least annually.

12.3.3 Visitors

Visitors shall be briefed on the Emergency Action Plan when visiting the ERDF site, in addition to reviewing the Hanford Site Emergency Signals.

12.4 Evacuation Routes and Staging Areas

The ERDF Emergency Action Plan shall contain a detailed map with Evacuation Routes in addition to locations of the primary and alternate staging areas. This map shall be placed on the posted emergency action plan in an area where personnel have easy access to review it. An example of the posting, with annotated evacuation routes is shown in Figure 12-1.

The designated staging areas are shown in Figure 12-1 in conjunction with the evacuation routes. All affected personnel should assemble at the staging area and maintain a safe distance from the evacuated area unless requested to provide assistance by the emergency response organization.

12.4.1 Evacuation Procedure

- **Exit** the trailer or affected area through the nearest available exit (all affected personnel). Note: When evacuating an area, personnel should take their coats, car keys, purses, etc. as appropriate to the outdoor conditions.
- **Help** disabled, injured or impaired persons to evacuate the affected area (all affected personnel).
- **Go to** the designated staging area. Assist visitors to the designated staging area (all affected personnel).

- **Inform** the person(s) performing personnel accountability of any personnel remaining in the affected evacuation area (all affected personnel).
- **Do not eat, drink, smoke or chew** (all affected personnel).

12.4.2 Accountability Procedure

- **Obtain** a current listing of personnel within the area being evacuated
- **Ensure** that all personnel in the evacuation area are accounted for and are either safe or being appropriately attended to. Account for each person normally at the site and visitors in the following groups:
 - ◆ **WMFS Project Manager** - Overall site accountability, including WMFS, BHI/ERC Team, EPA, and visitors
 - ◆ **EH&S Manager** - RCTs and supervisors
 - ◆ **Operations Manager** - Operations personnel
 - ◆ **Waste Acceptance Manager** - Waste acceptance personnel
- **BHI/ERC Team Safety Representative** - BHI/ERC Team personnel
- **Inform** the Emergency Coordinator (EC) of the status of evacuation.
- **Await** instructions from the Emergency Coordinator for further actions.

12.5 Fire Prevention Plan

Table 12-1 lists the major workplace fire hazards and their proper handling and storage procedures, potential ignition sources their control procedures. Fire protection equipment that will be used at the site includes portable fire extinguishers.

Table 12-1 Fire Hazards

Fire Hazards	Ignition Sources	Handling and Storage
Fuels	Cigarette smoking, static electricity.	Storage shall be in an approved flammable storage locker or in a safety can. Proper grounding shall be maintained during all fuel transfers. "No Smoking" signs will be posted to prohibit smoking within 50 feet of fuel transfers and storage areas.
Cleaning Solvents	Cigarette smoking, improper storage	Storage shall be in an approved flammable storage locker. All rags contaminated with cleaning solvents will be stored/disposed of in a covered trash receptacle.
Ground Cover	Vehicle catalytic converters, smoking cigarettes.	Vehicles will be driven over approved road ways. Cigarette smoking in designated areas only, provide mandatory receptacles for cigarette butts.

12.5.1 Control of Fuel Sources

The WMFS EH&S Manager shall maintain a current inventory of fuel sources, and ensure that proper handling and storage procedures are being followed.

12.5.2 Housekeeping

Good housekeeping is an integral part of the fire protection program. The following minimum requirements shall be implemented:

- Litter - No discarded material shall be stored on-site. All discarded materials shall be disposed of properly.
- Combustible Waste - combustible waste materials shall not be accumulated at the ERDF Site.
- Areas designated for refueling operations shall be maintained clear of obstructions, and shall be properly designated.

12.6 Emergency Equipment

The EH&S Manager will determine the equipment requirements for use. The equipment will be assembled and staged at critical locations for use in an emergency. Designated emergency equipment is listed in Table 12-2, with locations shown in Figure 12-1.

Table 12-2 ERDF Emergency Equipment

Emergency Equipment	Location
Petroleum Spill Response Kits	In-Cell Roll-off Container Leachate Pump House
Radiological Spill Response Kits	In-Cell Roll-off Container Leachate Pump House
Water Spill Response Kits	Leachate Pump Station
Type A,B,C Fire Extinguishers	Operations Trailer Shower Trailer RCT Trailer Leachate Pump House Leachate Crest Pads Individual Heavy Equipment Cabs
First Aid Kit	Operations Trailer
Spare Radios	Operations Trailer RCT Trailer

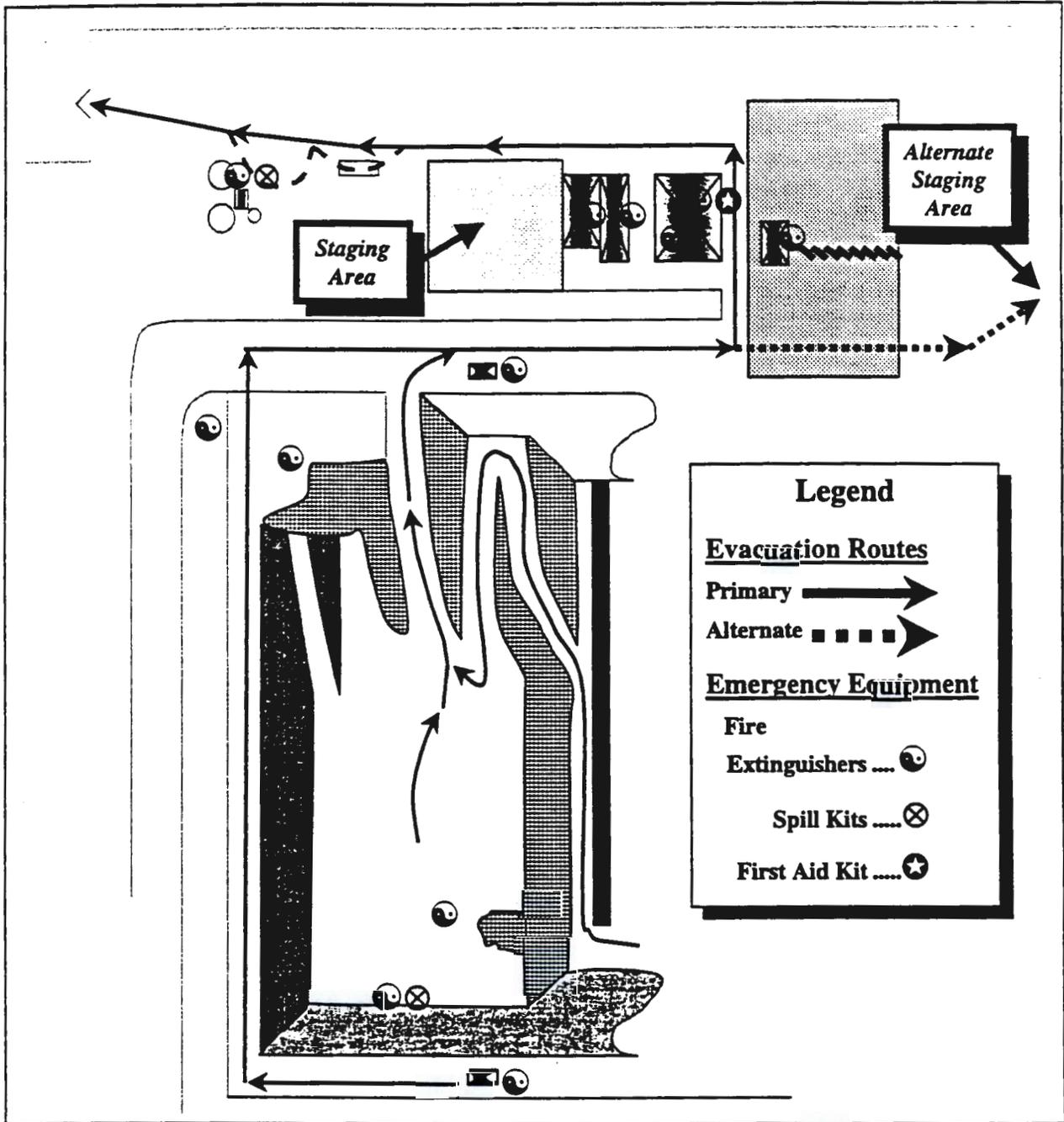


Figure 12-1 ERDF Emergency Equipment Locations and Evacuation Routes

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13.0 Confined Space Entry

13.1 Introduction

A Confined space is defined as:

A space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminant, and which is not intended for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.

A non-permit confined space is defined as:

A confined space that does not contain, or have the potential to contain, any atmospheric hazard capable of causing death or serious physical harm.

A permit-required confined space is defined as:

A space having one or more of the following characteristics:

- *contains, or can contain, a hazardous atmosphere;*
- *contains a material that could engulf an entrant;*
- *has an internal shape that could trap an entrant or contribute to asphyxiation (inwardly-converging walls or sloping floor that tapers);*
- *contains any other recognized serious safety or health hazard.*

Entry is defined as:

The action by which a person passes through an opening into a confined space; entry occurs as soon as any part of the entrant's body breaks the plane of a confined space opening.

13.2 ERDF Confined Spaces

The following have been identified as confined spaces on the ERDF site:

- Leachate Pipeline Manholes
- Electrical/Communications Utility Vaults

13.3 Duties and Responsibilities

13.3.1 EH&S Manager

The EH&S Manager is the confined-space coordinator for the ERDF site.

13.3.2 Confined Space Coordinator

The confined space coordinator will implement an ERDF confined space program through the following:

- Ensure that the confined space list in Section 13.2 is maintained current, and all confined spaces are identified, evaluated, and posted with appropriate "Danger-Confined Space - Enter by Permit Only" or "Danger - Non-Permit Confined Space - Authorized Personnel Only" signs,
- Ensure that any canceled confined space permit is reviewed for lessons learned,
- Ensure that personnel involved in confined space entry are adequately trained,
- Determine entry requirements,
- Require a permit review and signature from the authorized entry supervisor,
- Notify all involved employees of the permit requirements,
- Determine the number of attendants required to perform the work,
- Ensure the attendant knows how to communicate with the entrants and how to obtain assistance,
- Change and reissue the permit, or issue a new permit as necessary,
- Ensure equipment is in compliance with standards, and
- Ensure a list of monitoring equipment and personnel qualified to operate the equipment is maintained.
- Ensure retrieval equipment is in compliance with the standard.
- Ensure monitoring instruments are calibrated and maintained according to the manufacturers specifications.

13.3.3 Entry Supervisor

The entry supervisor is responsible for the overall performance of the confined space entry and is normally the operations manager. His responsibilities are to ensure that:

- Requirements for entry have been completed before entry is authorized,
- Confined-space monitoring is performed and documented by personnel qualified and trained in confined-space entry procedures,
- Remains alert to changing conditions that might affect the conditions of the permits (i.e. required additional atmospheric monitoring or changes in PPE),

- Periodic atmospheric monitoring is performed and documented in accordance with permit requirements,
- Personnel doing the work and all support personnel adhere to permit requirements,
- The permit is canceled when the work is complete,
- The confined space is safely closed and all workers are cleared from the area,
- Necessary information on chemical hazards is kept at the work site for employees or rescue team,
- A rescue team is available and instructed in duties,
- At least one member of the rescue team has current certification in first aid and cardiopulmonary resuscitation (CPR).

13.3.4 Confined Space Training

Personnel involved in permit confined space entries will have current confined space training in accordance with 29 CFR 1910.146.

14.0 Spill Response Plan

14.1 Policy

It is WMFS policy to conduct and manage activities in accordance with applicable laws and regulations and to:

- Prevent or minimize to the extent possible the spilling of petroleum products, hazardous substances, or radioactive materials during ERDF waste disposal operations.
- Prevent or minimize to the extent possible the spread of petroleum products, hazardous substances, or radioactive materials associated with ERDF waste disposal operations.
- Report all spills to BHI/ERC Team Project Management and BHI/ERC Team Safety according to "Spill/Release Reporting Requirements" outlined in BHI-EE-02.

14.2 Scope

This spill response plan is in place to prevent, contain, and report spills of petroleum products, hazardous substances, or radioactive materials during waste disposal operations at the ERDF. The provisions of this spill response plan apply to the initial response and stabilization of spills. A separate follow-up action plan specific to the spill incident will be developed and approved by the EH&S Manager, Project Manager, BHI/ERC Team Project Manager/Safety.

14.3 Prevention of Spills

14.3.1 Inspections

The EH&S Manager will perform routine periodic inspections of all equipment used for spill containment and cleanup to ensure availability and use/ability. Daily inspections of heavy equipment shall reduce the possibility of spills resulting from equipment defects or malfunction. These inspections shall also review storage and handling of hazardous materials to ensure that these practices do not add to the potential for spills to occur.

14.3.2 Hazardous Material Management

Sound management practices for hazardous materials is another key part of preventing spills. Quantities of chemicals, storage sizes, and storage locations should all be properly selected to minimize error in handling and using hazardous materials. Hazardous material inventory sheets will be provided to the BHI/ERC Team Project Manager in support of the Hanford Site EPCRA reporting requirements.

14.3.3 Training

Employee training is an integral part of spill prevention and shall be addressed in both general employee training and ERDF site specific training.

14.4 Preparation for Response to Spills

A combination of PPE and spill response equipment must be adequately staged to ensure that spills can be responded to quickly and with sufficient resources.

14.4.1 PPE

The EH&S manager will determine the PPE requirements for use during emergency containment and subsequent cleanup activities associated with a spill of petroleum products, hazardous substances, or radioactive materials. The minimum PPE for a task described in Section 5 shall be used, with the following staged for response in areas where no PPE is required:

- Goggles or safety glasses,
- Nitrile gloves,
- Cotton glove liners,
- Coveralls,
- Plastic boot liners,
- Hard hat, and
- Tape

14.4.2 Spill Response Kit

Separate Petroleum and Radiological spill response kits and are located at the in the In-Cell Roll-off Container and in the Leachate Pump House. A Water spill response kits located at the Leachate Pump Station. Each of these kits shall be routinely inspected to ensure that appropriate types and quantities of supplies are available to respond to the hazardous materials and petroleum product inventories currently onsite.

14.5 Response to Spills

Individual responses to spills depend upon the location of the spill, the types of materials spilled (i.e. chemical versus radioactive), concentrations of the contaminants in the spill, and the quantity of material spilled. The following are general procedural steps to assist in responding to spills.

14.5.1 Immediate Actions

- **Stop** or secure the operation causing the spill (e.g. upright a container, stop a pump, close a valve).

- **Warn** others in the area using whatever means are available (i.e. two-way radios, shout, telephone, etc.).
- **Identify** any other hazard(s) that may be present (e.g. the potential for fire or explosion).
- **Isolate** the affected spill area and establish control boundaries, if possible.
- **Contain** the spill to prevent further spread (e.g. by moving soil to create berms and/or using absorbent material).
- **Minimize** individual exposure to the spilled product or contaminant.
- **Move** personnel upwind, upstream, upgrade.
- **Notify** the following key personnel:
 - ◆ Immediate supervisor
 - ◆ EH&S Manager
 - ◆ BHI/ERC Team Project Manager/Safety.
 - ◆ Hanford Fire Department
- **Request** assistance

14.5.2 Supplemental Actions

- **Determine** the extent of the spill area and verify the adequacy of the control boundaries already established (EH&S Manager).
- **Install** liners around the spill to stabilize the material and to prevent further spread (EH&S Manager).
- **Remove** personnel who may have initially responded to the spill without PPE from the spill area. Decontaminate personnel in accordance with Section 11. (EH&S Manager)
- **Obtain** air samples in the affected area to assess the airborne contaminant concentrations (EH&S Manager).
- **Initiate** the reporting requirements outlined in Section 14.5 (Project Manager).
- **Establish** the PPE requirements for response entry (EH&S Manger).

- Develop a follow-up action plan for recovery of the spilled material and submit to EH&S Manager, WMFS Project Manager, and BHI/ERC Team Safety for approval (Affected Area Manager).
- Initiate an investigation into why the spill occur and provide lessons learned/corrective actions to prevent recurrence (Affected Area Manager).

14.6 Notification and Reporting Requirements

Notification of spills may be required for either programmatic or regulatory purposes. Spills shall be assessed by the Project Manager and EH&S Manager to determine the severity and reporting required. Notifications will be made in compliance with WMFS administrative procedures and DOE Order 5000.3B and shall be pursued to ensure that appropriate regulatory notification is made.