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ORNL Environmental Restoration Program

WAG 2 Remedial Investigation and Site Investigation Site-Specific Work Plan/Health and Safety Checklist for the Sediment Transport Modeling Task

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WAG 2 REMEDIAL INVESTIGATION AND SITE INVESTIGATION SITE-SPECIFIC WORK PLAN/HEALTH AND SAFETY CHECKLIST FOR THE SEDIMENT TRANSPORT MODELING TASK

APPROVALS

WAG 2 RI&SI Project Safety and Health Officer	Virginia L. Hoit	5/5/94 Date
WAG 2 RI&SI Project Manager	Stephen E. Hubbs	5/5/94 Date
ORNL Industrial Safety Representative	E A Ford E R. Bank	5/5/94 Date 5/5/94
ORNL Industrial Hygiene Representative	Gary Rose	5/4/94 Date
ORNL Fire Protection Representative	R J Calloy	5/4/94 Date
ORNL Office of Laboratory Protection Representative	J S Greenwood	5/4/94 Date
ORNL Office of Radiation Protection Representative		5-4-94 Date
ORNL HAZWOPER Program Coordinator	Ann W. Saulsbury	5/4/94 Date
ORNL ER ES&H Manager	Charles Clark	5/4/94 Date
ORNL ER Program Manager, DOE Environmental Restoration Division	John L Sheffey	5/6/94 Date

CONTENTS

ACRONYMS

ACGIH	American Council of Governmental Industrial Hygienists
CRZ	contamination reduction zone
ESD	Environmental Sciences Division
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HP	Health Physics
HPC	HAZWOPER Program Coordinator
HSC	Health and Safety Checklist
IH	Industrial Hygiene
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PFD	personal flotation device
PPE	personal protective equipment
PVC	polyvinyl chloride
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
TLD	thermoluminescent dosimeter
WAG	Waste Area Grouping
WBGT	wet-bulb globe temperature
WP	Work Plan

1. INTRODUCTION

This site-specific Work Plan/Health and Safety Checklist (WP/HSC) is a supplement to the general health and safety plan (HASP) for Waste Area Grouping (WAG) 2 remedial investigation and site investigation (WAG 2 RI&SI) activities [*Health and Safety Plan for the Remedial Investigation and Site Investigation of Waste Area Grouping 2 at the Oak Ridge National Laboratory, Oak Ridge, Tennessee* (ORNL/ER-169)] and provides specific details and requirements for the WAG 2 RI&SI Sediment Transport Modeling Task. This WP/HSC identifies specific site operations, site hazards, and any recommendations by Oak Ridge National Laboratory (ORNL) health and safety organizations [i.e., Industrial Hygiene (IH), Health Physics (HP), and/or Industrial Safety] that would contribute to the safe completion of the WAG 2 RI&SI.

Together, the general HASP for the WAG 2 RI&SI (ORNL/ER-169) and the completed site-specific WP/HSC meet the health and safety planning requirements specified by 29 CFR 1910.120 and the ORNL Hazardous Waste Operations and Emergency Response (HAZWOPER) Program Manual. In addition to the health and safety information provided in the general HASP for the WAG 2 RI&SI, details concerning the site-specific task are elaborated in this site-specific WP/HSC, and both documents, as well as all pertinent procedures referenced therein, will be reviewed by all field personnel prior to beginning operations.

2. PRE-ENTRY HEALTH AND SAFETY BRIEFING

The purpose of the pre-entry health and safety briefing is to inform all workers of (1) any and all potential safety and health hazards they may encounter while working on the task identified in the WP/HSC and (2) site-specific emergency response measures. How the work will be accomplished, who should be notified in case of an emergency, and any and all questions will be addressed by the Site Safety and Health Officer (SSHO) at this time. The SSHO will confirm with the Technical Resources and Training Section that ORNL personnel accessing the site areas have received the health and safety training that qualifies them to work at this site. (ORNL special access badges may be used as proof of training.) Each potential field person will be required to sign and date a form or designated section in the field logbook stating that he or she has received a pre-entry briefing and has reviewed both the WAG 2 RI&SI general HASP and this site-specific WP/HSC.

3. PROJECT AND SITE DESCRIPTION

3.1 PROJECT OBJECTIVES

The main project objectives of the Sediment Transport Modeling Task are: (1) to quantify the current transport of contaminated sediment in the White Oak Creek watershed; (2) to develop a computer model to predict contaminant release during storms that produce heavy flow rates and to predict the impact of potential remedial actions in the White Oak Creek watershed on the erosion, transport, and deposition of contaminated sediment; and (3) to provide baseline data to evaluate the potential effectiveness of future remedial actions to control contaminated sediment releases.

3.2 TASK TO BE PERFORMED

Only the field work associated with this project (item 1 above) falls under the scope of the ORNL HAZWOPER Program. The collection of the both hydrologic and mobile sediment field data will be covered by this plan. Procedures ER-WAG2-SOP-3103, ER-WAG2-SOP-3108, and ER-WAG2-SOP-4012 give an overview of and step-by-step method for the collection of field data.

3.3 HISTORY AND OPERATION OF THE SITE

WAG 2 consist of White Oak Creek and its tributaries downstream of the ORNL site, White Oak Lake, White Oak Creek embayment, and the associated floodplain and subsurface environment. The White Oak Creek system is the surface drainage for the ORNL WAGs and has been exposed to a diversity of contaminants from operations and waste disposal activities.

3.4 SITE DESCRIPTION

The sampling locations for the Sediment Transport Modeling Task are shown in Fig. 1. The topography consists of floodplains and waterways.

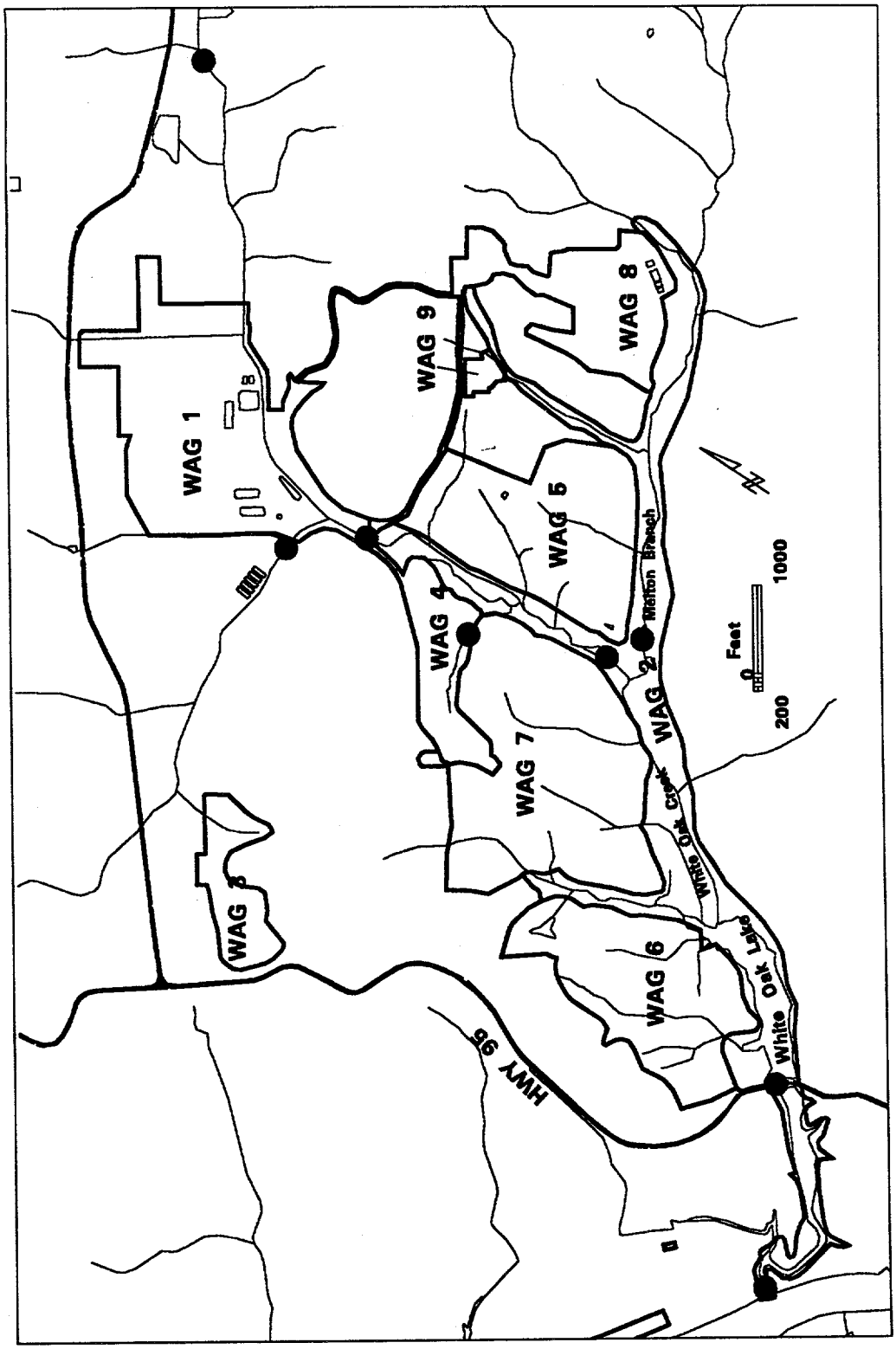

Fig. 1. Sampling locations for the WAG 2 Sediment Transport Modeling Task.

4. PROJECT ORGANIZATION

This work will be performed by the WAG 2 RI&SI Program team. ORNL IH, Industrial Safety, and Radiation Protection will provide oversight for this project. Figure 2 illustrates the chain of command for health and safety issues.

Key personnel and their project roles/responsibilities are listed in Table 1.

Table 1. Key personnel and roles and responsibilities

Function	Name	Telephone no.
WAG 2 RI&SI Project Manager	Steve Herbes, Environmental Sciences Division (ESD)	4-7336
Environmental Restoration Program Environmental, Safety, and Health Manager	Charles Clark	4-8268
Field Team Leader	Telena Moore Benali Burgoa	6-1408 4-6512
Alternate Field Team Leader	Brent Zeigler	1-5240
SSHO	Virgina Holt	1-5240
Alternate SSHO	Telena Moore Brent Zeigler Benali Burgoa	6-1408 1-5240 4-6512
ESD HP contact	George Houser	6-1408
ORNL Radiation Protection	Willie Hayes	4-6542
ORNL IH	Ray Barham	4-7307
ORNL HAZWOPER Program Coordinator	Ann Saulsbury	6-5064
ORNL Safety	Ernie Ford	1-4373
ORNL Fire Department	Bob Atchley	4-6278

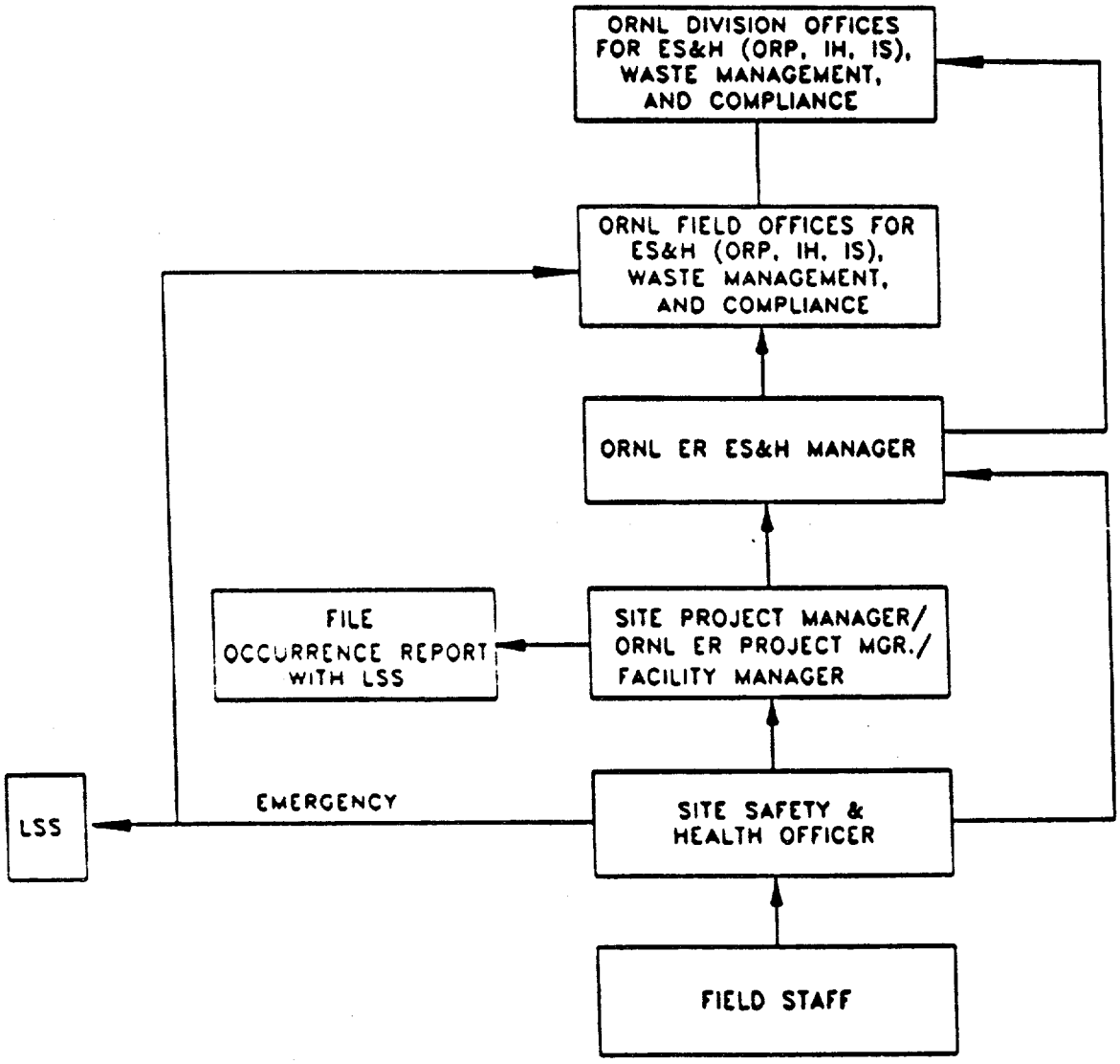

Fig. 2. Chain of command for reporting health and safety issues.

5. SITE TASK HAZARD EVALUATION

5.1 DESCRIPTION OF TASK TO BE PERFORMED

This section, which has been completed with the Project Manager, based on knowledge, site history, site operations, and any and all potential hazards that might affect workers' health and safety, describes the tasks to be preformed and the associated level of personal protective equipment (PPE) required for those tasks. Specific control measures for the hazards indicated in this section and procedures that will be used in the completion of this task are identified in Sect. 5.2.

5.1.1 Task Description (Collection of Suspended Sediment Samples)

Intrusive ____ Nonintrusive _X_

Description. The collection of suspended sediment samples will be accomplished according to ER-WAG2-SOP-3103 and ER-WAG2-SOP-3108. Sampling will be conducted whenever water levels in the White Oak Creek embayment reach an annual flood level. These samples will be collected at locations throughout WAG 2. Sampling locations are shown in Fig. 1. When wading is necessary, the appropriate procedures shall be followed.

Checklist summary of site-specific hazards. For the specific hazards listed in this section, a check mark (✓) indicates hazards that are intrinsic to the site locale itself. An "X" indicates hazards associated with task performance and/or the equipment and materials that may be used to accomplish the task.

Physical Hazards/Agents

(✓) Heat Stress	(✓) Cold Stress	( ) Noise
( ) Confined Space	( ) Enclosed Space	(✓) Heavy Lifting
(✓) Tripping/Falling	( ) Electrical	( ) High Pressure Water
( ) Oxygen Deficient	( ) Explosive/Flammable	( ) Vibration
( ) Asbestos	( ) Underground	( ) Overhead
(✓) Water	( ) Other: _____	( ) Other: Flash flood conditions

Construction Hazards

( ) Trenching	( ) Excavating	( ) Heavy Equipment
( ) Demolition	( ) High Work	( ) Welding/Cutting
( ) Ladders	( ) Drilling	( ) Overhead
( ) Overhead	( ) Other: _____	( ) Other: _____

Chemical Hazards

(✓) Organic Chemical	(✓) Inorganic Chemical	( ) Carcinogen
( ) Corrosive	( ) Reactive	( ) OSHA-Specific Substances
( ) Mutagen	( ) Teratogen	(✓) Other: Heavy Metals

Ionizing Radiation Hazards

(✓) Internal Exposure (✓) External Exposure

Nonionizing Radiation Hazards

(✓) UV ( ) Radio Frequency ( ) Microwave
( ) Laser

Biological/Vector Hazards

(✓) Wildlife (✓) Plants ( ) Medical Waste
( ) Bacterial (✓) Parasites ( ) Other: _____

Initial Level of Personal Protective Equipment

Level of Protection: ( ) A ( ) C ( ) Modified (+)
( ) B (X) D

Respirator: ( ) SCBA ( ) Full Face ( ) ½-Face Resp.
Cartridge: _____

Protective Clothing: ( ) Encapsulating Suit ( ) Tyvek
( ) Saranex ( ) Splash Suit
( ) C-zone (X) Company Clothing (khakis)
(✓) Other: Rain gear

Head/eye/ear: ( ) Hard Hat (X) Safety Glasses ( ) Goggles
( ) Splash Shield ( ) Ear Plugs ( ) Other: _____

Gloves: ( ) Nitrile ( ) Neoprene ( ) PVC
(X) Latex (X) Vinyl ( ) Leather
( ) Other: _____

Footwear: (X) Steel-Toed Leather ( ) Chemical Over-Boots
( ) Steel-Toed Rubber (X) Other: Waders

Additional comments. All sampling efforts will be conducted during storm conditions, with the possibility of flash flooding. All personnel shall wear personal floatation devices (PFDs) in and around the streams. The appropriate procedures shall be followed when wading is necessary. The buddy system is to be used at all times and each team member should be cognizant of the hazards associated with the storm, the stream, flash flood conditions and performing these task at night. A radio, PFDs, and a lifeline are required for each sampling team.

5.1.2 Site Control

Site work zones are required in order to reduce the accidental spread of hazardous substances from contaminated areas to clean areas. Identification of work zones will provide control of operations and flow of personnel. The HAZWOPER Program Coordinator (HPC) will provide signs for posting HAZWOPER requirements at the site. The HP technician will determine radiological postings. Should additional barriers (rope, tape) or signs be required, HP, IH, and Industrial Safety will be consulted. Personnel accessing the zones must meet access requirements as stated in this plan and posted at the entrance of the zones. The SSHO is responsible for ensuring all workers and visitors meet site access requirements. Site access requirements are identified in Sect. 8 of the WAG 2 RI&SI HASP. Task-specific training requirements are identified under "Administrative Controls" in Sect. 5.1.1 of this site-specific WP/HSC. Section 10 of this site-specific WP/HSC is a record of the qualifications of personnel involved in this specific task.

Use of the "buddy system" is required for this project. All workers will have a partner to work with. To ensure worker safety, personnel will (1) maintain internal communication, (2) remain within a line of sight with other workers, and (3) conduct work-party monitoring. The buddy system will be implemented at the contamination reduction zone (CRZ). A two-way radio will be maintained in the support zone to ensure communication with the Laboratory Shift Superintendent and emergency, safety, and health support personnel.

The items below must be completed to ensure that required site controls are identified.

Site posted information/notification required? Yes _X_ No ___ N/A ___

Site guard required? Yes ___ No _X_ N/A ___

Access control required? Yes _X_ No ___

Entry/exit logs required? Yes _X_ No ___

Escape routing/posting required? Yes _X_ No ___ Appendix A shows the sampling locations and assembly point.

5.1.3 Administrative Controls (Required Permits, Training, etc.)

Training requirements for this project are:

- 24-Hour HAZWOPER [Superfund Amendments and Reauthorization Act (SARA)/ Occupational Safety and Health Administration (OSHA)]
- Radiation Worker II

- Access-road training
- Project-specific Standard Operating Procedure (SOP) training

5.1.4 Sanitation

Task(s): All tasks

Potable water required? Yes ___ No _X_

Nonpotable water used? Yes ___ No _X_

Eating, drinking, and use of tobacco products permitted? Yes ___ No _X_

Location: Breaks: Environmental Sciences Division (ESD) buildings 1505 and 1506.

Toilet facilities required? Yes _X_ No ___

Location and number: ESD buildings 1505 and 1506; five toilet facilities.

Washing facilities required? Yes _X_ No ___

Location: ESD buildings 1505 and 1506; five facilities.

Change rooms required? Yes _X_ No ___

Specify: ESD buildings 1505 and 1504, two facilities. It is recommended that all personnel shower at the change rooms at the end of each day, prior to departing for home.

5.1.5 Safety Equipment

A radio, PFDs, and a lifeline are required for each sampling team.

5.2 SITE-SPECIFIC HAZARDS AND CONTROLS

This section provides specific details and control measures for each general hazard identified in Sect. 5.1.

5.2.1 Physical Hazards/Agents

Fire/Explosion: N/A

Confined Space Entry: N/A

Asbestos: N/A

Electrical Hazards: N/A

Temperature:

Task(s): All tasks

Temperature extremes (hot and cold)? Yes _X_ No ___

Average daily high temperature (during work shift): 70–90°F during the summer

Average daily low temperature (during work shift): 35–55°F during the winter

Wet-bulb globe temperature (WBGT) will be obtained prior to daily activities as necessary. When WBGT is >80°F (26.7°C), American Council of Governmental Industrial Hygienists (ACGIH) work-rest regimen guidelines should be followed.

Work load:

Light ___

Moderate _X_

Heavy ___

Controls: The SSHO, with help from ORNL IH, will establish the appropriate work/rest regimen with the ACGIH Threshold Limit Values booklet. See Sect. 3.3 of the WAG 2 HASP for controls of heat stress and cold stress.

Cooling/heating equipment needed: None.

Noise Hazards: None

Underground Hazards: N/A

Overhead Hazards:N/A

Machinery Hazards: N/A

Water Hazards:

Task(s): Collection of suspended sediment samples

Are water hazards present or involved in site tasks? Yes _X_ No ___

Additional comments and controls: All personnel will wear PFDs as well as chest waders. No one will be allowed to wade out to a depth greater than up to the his or her naval. PFDs are to be worn under the straps of the waders. The buddy system is to be used during all sampling activities associated with this project. Each sampling team will be equipped with a lifeline to be used if someone falls in the water.

Other Physical Hazards:

Task(s): All tasks

Hazard: Slips, trips, falls, and wading in streams

Additional comments and controls: Use of the buddy system, limits on how deep to wade and visual observations of each sampling location will help minimizes these hazards.

5.2.2 Construction Hazards

There are no construction hazards associated with this project.

5.2.3 Chemical Hazards

Chemicals to be brought on site: None

Are Material Safety Data Sheets assembled for chemicals to be brought on site?
Yes ___ No ___ N/A _X_

Other chemical hazards known or suspected to exist on site: The information indicated below must be provided for each chemical hazard known or suspected to exist on site. The contaminants should be identified by the Project Manager, and the associated information required for each contaminant should be provided by the SSHO.

Contaminant: See the WAG 2 contaminant list (Appendix B).

5.2.4 Ionizing Radiation Hazards

Isotope: See the WAG 2 contaminant list (Appendix B).

Ionizing radiation present? Yes _X_ No ___ (alpha/beta/gamma)

Radiation work permit required: Yes ___ No _X_

Health Physics contacted: Yes _X_ No ___

Health Physics coverage: Yes ___ No _X_

Protective clothing required: Yes _X_ No ___

Additional comments and controls: The ESD HP will be responsible for HP oversight of this project, and any problems or concerns associated with radiation protection shall be brought to his or her and the SSHO's attention.

5.2.5 Nonionizing Radiation Hazards

High-voltage (>100 kV) electrical transmission lines nearby? Yes ___ No _X_

Radio frequency radiation sources (AM and/or FM broadcast towers, radio frequency sealers) nearby? Yes ___ No _X_

Microwave sources in use on site? Yes ___ No _X_

Lasers in use nearby? Yes ___ No _X_

Are workers potentially exposed to sunlight (ultraviolet radiation)? Yes _X_ No ___

Additional comments and controls: Personnel shall wear long-sleeved clothing and/or use a sunblock on exposed skin.

Are ultrasound sources in use on site? Yes ___ No _X_

5.2.6 Biological/Vector Hazards

Task(s): All tasks

Hazard: Snakes

Comments and controls: Workers should be aware of where they are stepping and should not reach under objects.

Task(s): All tasks

Hazard: Parasites

Comments and controls: All personnel should apply insect repellant before going into the field and should perform a visual inspection at the end of the day.

Task(s): All tasks

Hazard: Poison ivy and poison oak

Comments and controls: Workers should be briefed on how to recognize these plants and should be alert to what they touch.

6. MONITORING REQUIREMENTS

6.1 DIRECT READING INSTRUMENTS

Direct reading instrument monitoring requirements are identified in Table 2.

Table 2. Direct reading instrument monitoring requirements

Instrument	Task(s)	Monitoring frequency	Action level
Lower explosive limit meter			
O_2 meter			
Colorimetric indicator tubes			
Photoionization detector			
Flame ionization detector			
Alpha meter			
Beta/gamma meter	All tasks	Prior to exiting sampling locations	Readings above background
Area radiation monitors			
Noise meter			
Other (specify)			

6.2 PERSONAL MONITORING

Personal monitoring requirements are identified in Table 3.

Table 3. Personal monitoring requirements

Monitoring type	Task(s)	Monitoring frequency	Action level
Whole-body dosimetry	All tasks	Continuous	20 mR/day
Whole-body count	All tasks	Annual	In accordance with Internal Dosimetry SOP 03-60-16

Instruments used by the IH representative will be calibrated and maintained in accordance with IH SOPs. Instruments used by the Office of Radiation Protection are calibrated and source-checked in accordance with established HP procedures.

7. DECONTAMINATION

The purpose of decontamination is to prevent contaminants that may be present on protective clothing and equipment from coming into contact with personnel as they unsuit. Also, decontamination protects workers from hazardous substances that may contaminate and eventually permeate the PPE used on site, and it protects personnel by minimizing the transfer of harmful materials into clean areas. Combining decontamination with the correct sequential method of removing PPE will prevent exposure to personnel leaving the work areas and will prevent off-site migration of contaminants. Generally, decontamination is accomplished by starting with the most heavily contaminated item and progressing to the least contaminated item.

Personnel will remove any disposable PPE, in the order listed in the WAG 2 RI&SI HASP, Sect. 6.2, and dispose of it in provided containers before leaving the CRZ. The Radiation Protection representative will assist the SSHO in establishing stations and sequence for doffing of PPE. Monitoring (frisking) of personnel and equipment prior to exiting the CRZ will be conducted by the SSHO.

Upon job completion, all equipment will be surveyed by ORNL Radiation Protection and tagged accordingly. If contamination is detected on equipment, the equipment will be cleaned with a paper towel. Equipment that cannot be decontaminated will be bagged and disposed of in accordance with instructions from the Radiation Protection representative.

For a more detailed explanation of decontamination, see Sect. 9 of the WAG 2 RI&SI HASP.

8. PERSONAL PROTECTIVE EQUIPMENT

PPE required for each specific job/activity is addressed in Sect. 5.1.1 of this site-specific WP/HSC. For a more detailed description of the recommended levels of PPE, see Sect. 6 of the WAG 2 RI&SI HASP. The recommended levels of PPE shall be determined by the SSHO and the HP technician on a task-by-task basis and shall incorporate recommendations of the appropriate ORNL health and safety organizations. The SSHO may effect PPE downgrades by recording the appropriate changes in the project logbook and notifying the HPC. All upgrades of PPE will require approval from the HPC and appropriate health and safety disciplines.

9. MEDICAL SURVEILLANCE

9.1 PHYSICAL EXAMINATION

Generally, WAG 2 RI&SI personnel do not meet the criteria to meet the criteria listed in 29 CFR 1910.120 for inclusion in the Hazardous Waste Worker Medical Surveillance Program. If field conditions should change, personnel who meet these criteria will be included in the ORNL Hazardous Waste Worker Medical Surveillance Program.

9.2 PERSONNEL SAMPLING/BIOLOGICAL MONITORING

This section is to be filled out by the SSHO and the HP or IH technician in the event a worker has the potential of an exposure to a contaminant that could be detrimental to his or her health or safety. Because of their potential to be exposed to radioactive contaminants, WAG 2 RI&SI field personnel are participants in the bioassay program.

Chemical in question: N/A

Nuclide in question: ^{3}H

Personnel monitoring device: No

Biological samples required? Yes _X_ No ___

Biological samples taken: Bioassay semiannually

Additional comments and controls:

Nuclide in question: ^{90}Sr

Personnel monitoring device: Thermoluminescent dosimeter (TLD)

Biological samples required? Yes _X_ No ___

Biological samples taken: Bioassay annually

Additional comments and controls:

Nuclide in question: ^{137}Cs

Personnel monitoring device: TLD

Biological samples required? Yes ___ No _X_

Biological samples taken: N/A

Additional comments and controls: Whole body count annually

10. SITE PERSONNEL AND CERTIFICATION

Site-specific training requirements are listed in Sect 5.1 of this WP/HSC.

Name: Telena D. Moore Badge no.: 624087

Job preformed: Sampling and coordinating laboratory activities

Respirator qualified? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 40-h training? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 24-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No _X_

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No _X_

Other training:

Name: Anthony Thomas Badge no.: 17401

Job preformed: Sampling

Respirator qualified? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No _X_

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes_X_ No ___

Asbestos worker? Yes ___ No _X_

Other training:

Name: Amanda Carr Badge no.: 624509

Job preformed:Sampling and laboratory processing

Respirator qualified? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No _X_

Confined space entry training? Yes ___ No _X_

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No _X_

Other training:

Name: Benali Burgoa Badge no.: 624088

Job preformed: Sampling and laboratory processing

Respirator qualified? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes _X_ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No _X_

Other training:

Name: Steve Short Badge no.: 623576

Job preformed: Sampling and laboratory processing

Respirator qualified? Yes ___ No X

HAZWOPER (SARA/OSHA) 40-h training? Yes X No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes X No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No X

Confined space entry training? Yes ___ No X

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes X No ___

Asbestos worker? Yes ___ No X

Other training:

Name: Virginia Holt Badge no.: 615182

Job preformed: Sampling and laboratory processing

Respirator qualified? Yes ___ No X

HAZWOPER (SARA/OSHA) 40-h training? Yes X No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes X No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes X No ___

Confined space entry training? Yes ___ No X

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes X No ___

Asbestos worker? Yes ___ No X

Other training:

Name: Donna Pridmore Badge no.: 623624

Job preformed: Sampling and laboratory processing

Respirator qualified? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No _X_

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No _X_

Other training:

Name: Brent Zeigler Badge no.: 626157

Job preformed: Field sampling coordinator, alternate SSHO

Respirator qualified? Yes ___ No _X_

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No _X_

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No _X_

Other training: Access road training

Name: Lisa Baron Badge no.: 623832

Job preformed: Field sampling team, alternate SSHO

Respirator qualified? Yes ___ No X

HAZWOPER (SARA/OSHA) 40-h training? Yes X No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes X No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No X

Confined space entry training? Yes ___ No X

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes X No ___

Asbestos worker? Yes ___ No X

Other training: Tennessee Wildlife Resources Agency boat safety training certification, access road training, waste generator training

Name: Allen Roberts Badge no.: 624926

Job preformed: Field sampling team

Respirator qualified? Yes ___ No X

HAZWOPER (SARA/OSHA) 40-h training? Yes X No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes ___ No X

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No X

Confined space entry training? Yes X No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes X No ___

Asbestos worker? Yes ___ No X

Other training: Tennessee Wildlife Resources Agency boat safety training certification and access road training

Name: Bill McCalla Badge no.: 635910

Job preformed: Field sampling team

Respirator qualified? Yes ___ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No ___

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No ___

Other training:

Name: David Reece Badge no.: 625007

Job preformed: Field sampling team

Respirator qualified? Yes ___ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No ___

Other training:

Name: Kelly Turnage Badge no.: 622771

Job preformed: Field sampling team

Respirator qualified? Yes ___ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No ___

Other training:

Name: Roger Clapp Badge no.: 25864

Job preformed: Field sampling team

Respirator qualified? Yes ___ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes _X_ No ___

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No ___

Other training:

Name: Chris Knight Badge no.: 624904

Job preformed: Field sampling team

Respirator qualified? Yes ___ No ___

HAZWOPER (SARA/OSHA) 40-h training? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 24-h training? Yes ___ No ___

HAZWOPER (SARA/OSHA) 8-h annual refresher? Yes _X_ No ___

HAZWOPER (SARA/OSHA) 8-h supervisor training? Yes ___ No ___

Confined space entry training? Yes ___ No ___

Radiation Worker I? Yes ___ No ___

Radiation Worker II? Yes _X_ No ___

Asbestos worker? Yes ___ No ___

Other training:

Appendix A

EVACUATION ROUTES AND ASSEMBLY POINTS

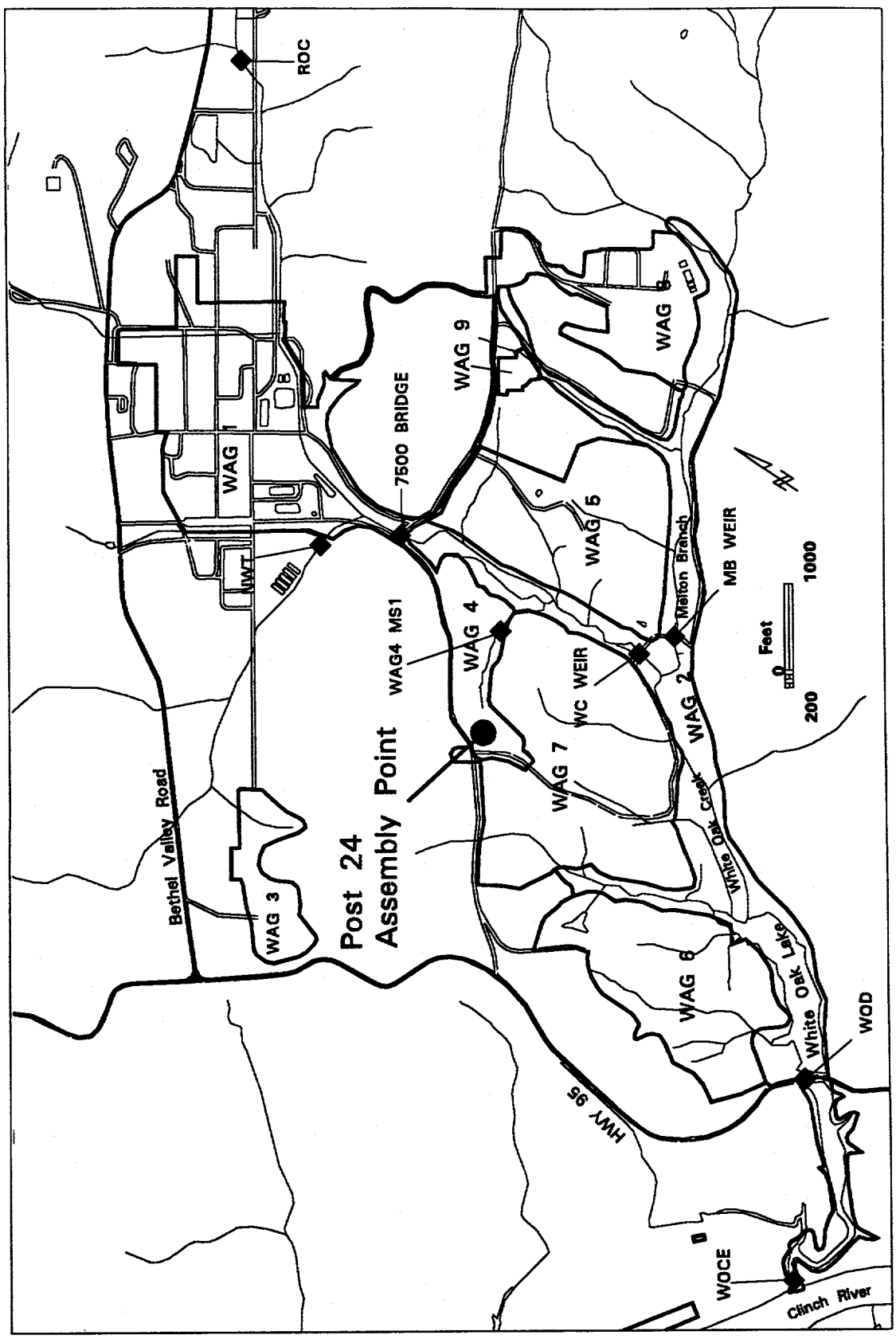

Fig. A.1. Sediment Transport Modeling Task evacuation routes and assembly points.

Appendix B

WAG 2 CONTAMINANT LIST

Table D.1 Suspected WAG 2 contaminants and their characteristics

Contaminant	TLV, PEL, REL, DAC	STEL, IDLH	Health effects, target organs	Physical and chemical properties
2-Pentanone[a] Color: colorless to white	TLV: 150 ppm PEL: 200 ppm REL: NA	STEL: 250 ppm IDLH: 5000 ppm	Irritant to eyes and mucus membrane; headache, dermatitis, narcolepsy, coma	Liquid with characteristic acetone-like odor
Antimony[a] Color: dark gray Suspected carcinogen	TLV: 0.5 mg/m^3 PEL: 0.5 mg/m^3 REL: 0.5 mg/m^3	STEL: NE IDLH: 80 mg/m^3	Irritant to nose, throat, and mouth; causes nausea, dizziness, and cramps	Lustrous powder, insoluble; MP: 1166
Arochlor 1254[a] Color: colorless to yellow Suspected carcinogen	TLV: 0.5 mg/m^3 PEL: 0.5 mg/m^3 REL: 1.0 mg/m^3	STEL: NE IDLH: 5.0 mg/m^3	Inhalation, ingestion, skin absorption, eye irritant, liver	Liquid or solid, odorless, insoluble
Arsenic[a] Color: NE Know carcinogen	TLV: 0.2 mg/m^3 PEL: 0.01 mg/m^3 REL: 0.002 mg/m^3	STEL: NE IDLH: 100 mg/m^3	Liver, kidneys, skin lymphatic system, respiratory system, GI tract, irritant	NE
Beryllium[a] Color: gray-white	TLV: 0.002 mg/m^3 PEL: 0.002 mg/m^3 REL: 0.0005 mg/m^3	STEL: NE IDLH: 10 mg/m^3	Lungs, skin, eyes, respiratory system, mucus membranes; pulmonary fibrosis and heart disease, metal fume fever	Hard brittle metal
^{134}Cs Color: NE	DAC: 4E-8 $\mu Ci/mL$	STEL: NE IDLH: NE	Respiratory system, total body, GI	Variable, half-life: 2.06 years; beta and gamma emitter
Chloroform Color: colorless Known carcinogen	TLV: 10 ppm PEL: NE REL: NE	STEL: NE IDLH: NE	Liver, kidneys, hear, eyes, skin; anesthesia, dizziness, mental dullness, nausea, headache, fatigue, irritant	Liquid with pleasant sweet odor; solubility: 0.8%; not combustible; recommended reproductive exposure limit: 0.4 ppm
Chromium Color: NE	TLV: 0.5 mg/m^3 REL: NE	STEL: NE IDLH: NE	Skin, respiratory system irritant; ulceration of nasal septum	Variable, depending on specific compound
Cobalt[a] Color: black Suspected carcinogen	TLV: 0.05 mg/m^3 PEL: 0.05 mg/m^3 REL: 0.05 mg/m^3	STEL: NE IDLH: 20 mg/m^3	Skin, respiratory system, eye irritant; kidney disorders, GI tract disturbances, dermatitis	Odorless solid, strong oxidizer
^{60}Co Color: black	DAC: 6E-8 $\mu Ci/mL$	STEL: NE IDLH: NE	Skin, respiratory system, eye irritant, kidney disorders, GI tract disturbances, dermatitis	Odorless solid, strong oxidizer; half-life: 5.27 years; beta and gamma emitter

Table D.1 (continued)

Contaminant	TLV, PEL, REL, DAC	STEL, IDLH	Health effects, target organs	Physical and chemical properties
^{154}Eu Color: NE	DAC: 8E-9 μCi/mL	STEL: NE IDLH: NE	GI, lower large intestines, lungs	Half-life: 8.6 years; beta and gamma emitter
^{155}Eu Color: NE	DAC: 4E-8 μCi/mL	STEL: NE IDLH: NE	GI, lower large intestines, kidneys, bone	Half-life: 4.7 years; beta and gamma emitter
Hexane[a] Color: NE	DAC: 2E-5 μCi/mL	STEL: NE IDLH: NE	Body tissue	Liquid with acetone-like odor
^{3}H Color: NE	DAC: 2E-5 μCi/mL	STEL: NE IDLH: NE	Body tissue	Colorless, odorless, tasteless gas; soluble in water; burns as a pale blue flame in the presence of oxygen; critical pressure: 12.4 atm; half-life: 12.2 years; beta emitter
Methylene chloride Color: colorless Known carcinogen	TLV: 50 ppm PEL: 500 ppm REL: NE	STEL: NE IDLH: 3000 ppm	Eyes, skin, liver, CVS, CNS irritant, numbness, tingling, vertigo, angina	Liquid with chloroform-like odor; LEL: 12%; solubility: 2%
Selenium[a] Color: dark red to blue-black	TLV: 0.2 mg/m^3 PEL: 0.2 mg/m^3 REL: 0.2 mg/m^3	STEL: NE IDLH: NE	Kidneys, respiratory system, eyes, liver, blood, skin, mucous membrane irritant; cold-like symptoms	Amorphous solid; insoluble
^{90}Sr Color: NE	TLV: NE PEL: NE REL: NE	STEL: NE IDLH: NE	Skeletal system, respiratory system	Variable; half-life: 29.1 years; beta emitter
Thallium Color: NE	TLV: NE PEL: 0.1 mg/m^3 REL: 0.1 mg/m^3	STEL: NE IDLH: 20 mg/m^3	Eyes, skin, CNS, lungs, liver, kidneys, GI tract, body hair	Appearance, odor, and properties vary depending on the specific organic compound

Table D.1 (continued)

Contaminant	TLV, PEL, REL, DAC	STEL, IDLH	Health effects, target organs	Physical and chemical properties
^{234}U Color: silvery-white	TLV: NE PEL: NE DAC: NE	STEL: NE IDLH: NE	Radioactive; poisonous if ingested or inhaled	Malleable metallic element; half-life: 2.5 E5 years; alpha and gamma emitter
^{238}U Color: silvery-white	TLV: 0.5 mg/m^3 PEL: 0.05 mg/m^3 REL: 0.05 mg/m^3	STEL: 0.6 mg/m^3 IDLH: 30 mg/m^3	Highly toxic, radioactive, skin, bone marrow, lymphatic system, respiratory system	Metallic element; insoluble; half-life: 4.5 E9 years; alpha and gamma emitter

[a]These chemicals are not expected to present a health and safety hazard on the site because either (1) their toxicity in nature depends on the elements with which they are bonded or (2) the published exposure limits are based on occupational exposures to the chemicals that will not take place in the environment.

CNS = central
CVS = central nervous system
DAC = derived air concentration
GI = gastrointestinal
IDLH = immediately dangerous to life and health
PEL = permissible exposure limit
STEL = short-term exposure limit
TLV = threshold limit value
LEL = lower exposure limit
MP = melting point
NE = not established
REL = recommended exposure limit

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