

START

0027655 19

ENGINEERING CHANGE NOTICE

1. ECN **189908**Page 1 of 2Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. R. R. Lehrschall, Environmental Restoration Safety Support, H4-67, 376-6788		4. Date April 5, 1993
	5. Project Title/No./Work Order No. Activities Involving Drilling and Sampling of Contaminated Soils (Vol. 1)	6. Bldg./Sys./Fac. No. Hanford Site	7. Impact Level 2 ESQ
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-EN-SAD-016, Rev. ^{vol 1} 2, 0-A	9. Related ECN No(s). 188144	10. Related PO No. N/A

11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package No. N/A	11c. Modification Work Complete N/A _____ Cog. Engineer Signature & Date	11d. Restored to Original Condition (Temp. or Standby ECN only) N/A _____ Cog. Engineer Signature & Date
---	------------------------------	---	---

12. Description of Change

Two changes have been made to the baseline safety assessment. The first change allows the use of a small quantity of liquid (1 L) to be used in sample preparation in glove boxes in two trailers. The liquid will be a mixture of water and ethanol. Any liquid used for sample preparation that may contain acid should not be mixed with any soil that potentially contains ferrocyanide. The second change is to operational safety limit 1. This change provides a limit on the surface radioactivity for alpha on the drive barrel and split spoon sample tools. Also included is the basis for this requirement as identified in HSRCM-1, *Hanford Site Radiological Control Manual*. This limit is required to allow drilling in areas where subsurface alpha contamination may be present.

13a. Justification (mark one) As-Found <input type="checkbox"/>	Criteria Change <input checked="" type="checkbox"/>	Design Improvement <input type="checkbox"/>	Environmental <input type="checkbox"/>
	Facilitate Const. <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	Design Error/Omission <input type="checkbox"/>

13b. Justification Details

See block 12.

14. Distribution (include name, MSIN, and no. of copies)
See attached distribution sheet.



RELEASE STAMP

OFFICIAL RELEASE **20**
BY WHC
DATE APR 06 1993

Sta. 21

ENGINEERING CHANGE NOTICE

15. Design Verification Required

Yes
 No

16. Cost Impact

ENGINEERING

Additional N/A
Savings N/A

CONSTRUCTION

Additional N/A
Savings N/A

17. Schedule Impact (days)

Improvement
Delay N/A

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input checked="" type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	Hazardous Waste Operations Permit	<input checked="" type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
--------------------------	--------------------------	--------------------------

NA

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer M. J. Galgoul <i>MJ Galgoul</i>	<u>4/5/93</u>	PE.	_____
Cog. Mgr. R. A. Carlson <i>RA Carlson</i>	<u>4/5/93</u>	QA	_____
QA T. L. Bennington <i>T Bennington</i>	<u>4/5/93</u>	Safety	_____
Safety K. A. Smith <i>KA Smith</i>	<u>4/5/93</u>	Design	_____
Security		Environ.	_____
Environ. K. A. Gano <i>KA Gano</i>	<u>4/5/93</u>	Other	_____
Projects/Programs			_____
Tank Waste Remediation System			_____
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			_____
IRM		ADDITIONAL	
ERSS N. R. Kerr <i>NRK</i>	<u>NRK 4/5/93</u>		_____
RRSA J. J. Zimmer <i>JJ Zimmer</i>	<u>4/5/93</u>		_____
ESQ/HSF M. A. Tredway			_____

SUPPORTING DOCUMENT

1. Total Pages 245

2. Title

Title: Safety Assessment for Environmental Investigations and Site Characterizations
Vol. 1: Activities Involving Drilling and Sampling of Contaminated Soils

3. Number

WHC-SD-EN-SAD-016,
Vol. 1

4. Rev No.

0-B

5. Key Words

Characterization Activities
Safety Assessment
Vadose Zone Soils

**APPROVED FOR
PUBLIC RELEASE**

4/6/93 J. Jones

6. Author

Name: R. R. Lehrschall

R. R. Lehrschall
Signature

Organization/Charge Code 29550/HIBBE

7. Abstract

This safety assessment addresses the characterization activities required for defining the extent of radioactive and chemical contamination in the vadose zone soils. These activities include at a minimum, cable tool drilling, split spoon sampling, handling and preparation of samples in a sample trailer and glove box, interim storage of soils extracted from drilling activities and site decontamination activities.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.

DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

10. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE APR 06 1993

Sta. 21

9. Impact Level 2 ESQ

4600 6108166
9313019.0094

1. Measured dose rates of the drive barrel containing extracted soils shall not exceed 1.4 R/h at the side of the drive barrel on contact [window closed cutie pie (cp)]. Measured dose rates of the drive barrel containing extracted soils shall not exceed 2.0 R/h at the end of the drive barrel and on contact with the soil (window open cp). The limit for surface radioactivity on the drive barrel and split spoon surfaces shall not exceed 50,000 dpm/100 cm² alpha fixed plus removable.
2. If combustible gas levels exceed 10% of the lower explosive limit (LEL) in the borehole, drilling, sampling, welding, cutting and grinding operations shall cease. Actions required by the work procedures shall be implemented to reduce the combustible gas levels below 10% of the LEL before continuing operations (i.e., installation of purge bladder, purging borehole with inert gas, etc).
3. The total volume of soils removed from boreholes, where a potential exists to involve greater than 15 g of fissionable materials, are controlled in accordance with the criticality safety program as prescribed in WHC 1991d.

The following recommended prudent actions are management commitments towards ALARA implemented through work procedures and will be specified at each specific site. These commitments are documented in Radiation Work Permits (RWP), Hazardous Work Operations Permit (HWOP), Job Safety Analysis (JSA), and other work procedures verified prior to start of operation by Safety Assurance.

1. Monitor ambient air in the workers breathing air zone for detection of toxic vapors in areas where workers will be required to perform their activities. Concentrations detected that exceed the time weighted average (TWA) limits should require removal of personnel from the work area or donning of appropriate protective gear as required by the HWOP, JSA, or RWP.
2. Use plastic liners or sleeving as barriers around the drive barrel, split spoon sampler and while loading the waste drums to prevent releases of contaminated or potentially contaminated radioactive materials.
3. Appropriate protective clothing as required by the site specific RWP and HWOP should be worn to protect the site worker.
4. Use field monitoring instruments to survey equipment for detection of any radioactive contamination.
5. Ensure double bagging and prompt control of contaminated equipment to minimize possibility of skin contaminations or inhalation hazards.
6. Change glove box gloves per the appropriate work procedures at the required frequency identified to minimize the potential for glove failures resulting in potential inhalation, skin or work site radioactive contamination hazards.

9313019.0096

7. Appropriate respiratory equipment should be available that protects the worker based upon the potential hazards at each work site.
- 8a. Use lead lined gloves and lead shielding at the glove box to minimize extremity and whole body exposures. Shielding should be used around waste drums when readings on contact, with exterior of drum surface, exceeds 100 mR/h.
- b. Use field monitoring instruments to establish dose rates associated with the radioactive materials being handled in the glove box per the requirements of the specific RWP.
- c. A radiation control area may be established and posted outside of the sample trailer, behind the glove box where an individual can receive a dose equivalent greater than 2 mR/h from the radiation source during glove box sampling operations.
9. A site specific evaluation should be conducted early in the planning process (i.e., readiness review) assessing chemical compatibility issues. This would identify sites that may have chemical inventories not analyzed as part of this assessment. This would eliminate potential chemical reactions that could result in production of volatile gases, fire or other adverse consequences.
10. Activities involving the use of acids should be conducted such that acids do not come into contact with the soils, potentially interacting with ferrocyanide that could result in generation of any hazardous volatile gases.
11. Survey measurements of drilling equipment and tools at non alpha sites should be conducted by the monitoring organization. Surfaces of equipment should not exceed an alpha reading of 50,000 dpm/100 cm².
12. A zone of control should be established a minimum of 10 m (33 ft) or greater out from the well site to assure any potential consequences associated with this activity to the onsite worker are below the limits for a low hazard operation. Within the zone of control appropriate protective apparel should be used.
13. Stack effluent sampling should be conducted whenever split spoon samples are being handled in the glove box. This will aid in detecting a potential release of radioactive particulate while samples are being handled in the glove box.
14. Monitoring for flammable gases in areas at the tank farms where there may be welding and cutting activities should be in accordance with the requirements in the operating specification document for watch list tanks.

The activities planned as part of this characterization work are controlled by adherence to the operational safety limits (OSL) and work procedures contained in the *Environmental Investigations and Site*

9313019-0097

- A 6.0 Kw generator is located outside the trailer for providing primary power in the event pole power is unavailable. The generator may be used as backup power if pole power is used.
- There is a 12 volt battery located outside the trailer that provides backup power for interior lighting in the trailer.

The primary components of the sample trailer designed for providing or maintaining confinement are the glove box, its ventilation system, the glove box exhaust and the sampling equipment. These components are defined as safety class 3 (WHC 1988a). The consequence of this operation could affect the health and safety of the site workers due to accidental releases of radioactive materials potentially exceeding occupational exposure limits.

The trailer and glove box design have been evaluated against the safety design criteria document that lists the design requirements as indicated in the DOE Orders (WHC 1991b). An evaluation of the glove box design against the safety design criteria is provided in Attachment A.

The glove box will be used for handling radiological contaminated environmental samples obtained from soils around SSTs, cribs, trenches, and other locations. Free liquids are not allowed in the glove box. The only liquids (mixture of water/ethanol) will be 500 ml (17 oz) in a spray bottle in each of the two radiation screening trailers (inside the glove boxes) for sample preparation. Any liquids used for sample preparation containing acid should not be mixed with any soils that potentially contain ferrocyanide as identified in Section 5.2, Function 10. The inventory of fissionable materials allowed in the glove box will be limited to less than 15 g. Where inventories of fissionable materials are planned to be handled in the sample trailer and glove box that could exceed 15 g, Criticality Engineering and Analysis (CE&A) involvement will be required per the requirements of WHC 1991d. Figures 10, 11 and 12 provides a description of the sample trailer. Figure 13 shows the glove box design and ventilation system.

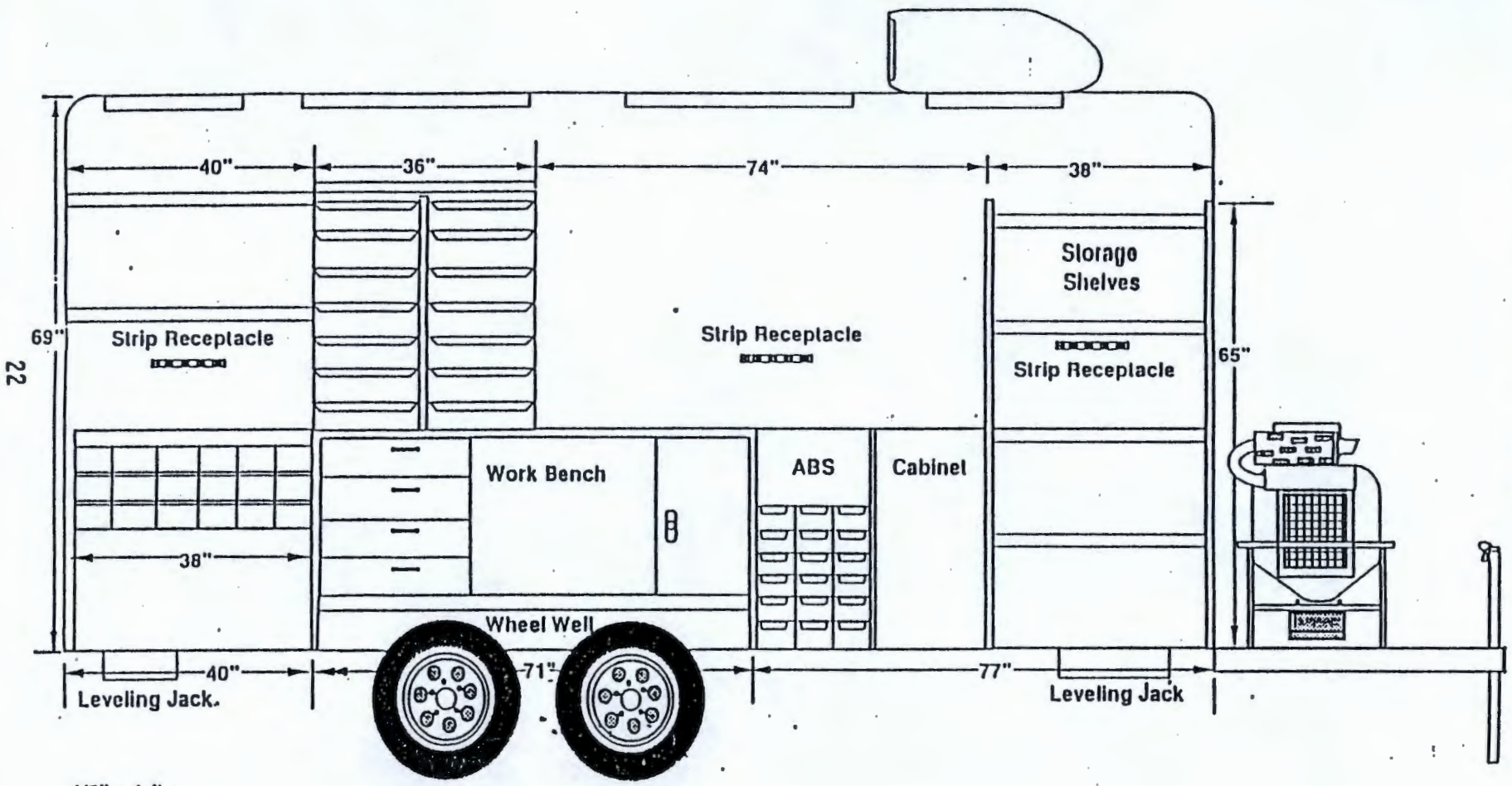
2.2.3 Interim Storage of Waste Drums

All cuttings from the drilling operation will be packaged in a plastic bag or other appropriate liner inside a 115 or 210 L (30 or 55 gal) container. These waste drums will be segregated according to suspected radioactive, nonradioactive waste or unknown waste per EII 4.3, "Control of CERCLA and Other Past-Practice Investigation Derived Waste" (WHC 1992a). Shielding will be provided for the waste drums if the radiation readings at contact exceed 100 mR/h. A location at or near the waste site would be used to store the waste containers while waiting for laboratory analysis to confirm the designation of the waste contents. The interim storage areas will be roped off with signs installed to provide the appropriate waste identification. The containers will be stored on drum pallets.

Containers of mixed waste will be properly labeled and placed in a portable metal building designed for hazardous and radioactive mixed waste in compliance with Westinghouse Hanford criteria that implement the EPA and Ecology policies and regulations or negotiated agreements.

9313019.0198

Figure 10. Drivers Side View Inside the Sample Trailer.



1/2" = 1 ft

5.0 SAFETY FUNCTIONS AND CONTROLS

The required safety function provided for the soil sampling and characterization activities is monitoring and administrative survey to control radiological exposures within occupational requirements. Occupational control will assure the onsite and public receptors protection, considering the majority of the activities will be conducted in the central part of the site along with the low inventories anticipated from these activities.

The following OSLs and prudent actions will ensure that the intrinsic hazards (mechanical relocation of potentially contaminated soils, handling and packaging of soil samples in the glove box and accumulation of potentially hazardous materials) comply with the intent of the DOE Orders regarding the appropriate and necessary controls for low hazard activities.

5.1 OPERATIONAL SAFETY LIMITS

Operational Safety Limit 1 - Radiological Soil Content

- 1.0 TITLE: Limiting Radiological Exposure to Contaminants in Soil Materials.
- 1.1 APPLICABILITY: This OSL applies to the potentially contaminated drill cuttings and sample materials as they are extracted from the characterization boreholes with the drive barrel and split spoon.
- 1.2 OBJECTIVE: To assure that the inventories of soil materials are controlled and radiological concentrations are within the bounds of the worst cases anticipated, to assure control of potential consequences to site workers, onsite personnel, and the public.
- 1.3 REQUIREMENTS:
1. Measured dose rates of the drive barrel and split spoon cores as they are removed shall not exceed 1.4 R/h at the side of the drive barrel on contact (window closed CP) or 2.0 R/h at the end of the drive barrel and on contact with the soil (window open CP).
 2. The limit for surface radioactivity on the drive barrel and split spoon surfaces shall not exceed 50,000 dpm/100 cm² alpha fixed plus removable.
 3. The responsible site safety officer or field team leader will assure appropriate personnel are available for monitoring at all times during borehole operations in any potentially contaminated zones.
- 1.4 SURVEILLANCE: The responsible operating organization shall verify daily (prior to startup and during periods of operations) that the work site is in compliance with the requirements of this OSL. Compliance with the

9313019.0100

stated requirements shall be documented in an auditable log or Field Activity Report (FAR).

1.5 RECOVERY: **Noncompliance with the requirements of the OSL**

1. If the field instrument readings exceed the limits allowed (1.3, requirements 1 and 2), the drive barrel or split spoon containing the source shall be returned to the borehole.
2. The drilling and sampling activities shall cease until a recovery plan has been prepared and approved by line management with concurrence by Safety Assurance.
3. In the event there is no monitoring support at the site during drilling or sampling operations in contaminated zones, work shall immediately cease. Notification to appropriate line and health physics management will be required. Approval to continue work will be required by the site safety officer and health physics. Monitoring support will be required to be in attendance prior to restart of operations.
4. The OSL violation shall be documented as required by Management Requirement Procedures (MRP).

Noncompliance with the surveillance requirement:

1. The surveillance shall be performed immediately.
2. If surveillance determines noncompliance with the requirement, then Section 1.5, recovery action 1 shall be initiated.
3. Failure to implement a surveillance requirement shall be documented as required by the applicable MRP.

1.6 AUDIT POINT:

An audible log or FAR shall be maintained at the site documenting the results of the surveillance. This log shall be reviewed weekly by the operating organization assuring compliance with the requirements and surveillance.

1.7 BASIS:

The limits in the requirements are consistent with the concentrations in Table 3 which are equivalent to the dose rates identified in the requirements. The maximum contamination levels evaluated for in this assessment are 10 times the guides for alpha decaying transuranics. For example, the maximum contamination levels would be 50,000 dpm/100 cm² for ²³⁹Pu as identified in HSRCM-1, *Hanford Site Radiological Control Manual* (PNL 1992). Onsite and offsite safety consequences are based on the worst case anticipated inventories. These controls assure consequences to

9313019.000

the onsite worker and public are insignificant (ALARA), and will assure integrity of the assessment conclusions.

Operational Safety Limit 2 - Monitoring for Volatile Gases

- 2.0 TITLE: Limits on Drilling/Sampling Activities When Volatile Gases Are Detected.
- 2.1 APPLICABILITY: This limit applies to sampling for volatile gases and limiting work activities (drilling/sampling) if concentrations exceed acceptable limits.
- 2.2 OBJECTIVE: To assure that the drilling, sampling, welding, cutting, and grinding operations are curtailed when volatile gases are detected at levels that exceed >10% LEL in the boreholes.
- 2.3 REQUIREMENTS: 1. Use of portable combustible gas analyzers are required for detection of volatiles that are potentially flammable. Levels that exceed >10% of the LEL in the borehole shall require more frequent monitoring per the requirements of the applicable work procedures.
2. If combustible gas levels exceed >10% LEL in the borehole, drilling, sampling, welding, cutting and grinding operations shall cease. Actions required by the work procedures shall be implemented to reduce the combustible gas levels below 10% LEL before continuing operations (i.e., installation of purge bladder, purging of borehole volume with inert gas, etc).
- 2.4 SURVEILLANCE: The responsible operating organization shall verify daily (prior to startup and during periods of operations) that a calibrated combustible gas analyzer is in place and operable before weather caps are removed. Compliance with the stated requirements shall be documented in an auditable log or FAR.
- 2.5 RECOVERY: **Noncompliance with the requirements of the OSL**
1. If a calibrated portable combustible gas analyzer is found not to be in place, work shall immediately cease (2.3, requirement 1). Notification to the appropriate line and safety assurance management shall be made. Work shall not continue until a calibrated portable combustible gas analyzer is in place and operable.
2. Failure to cease operations and implement the actions as required in the work procedures if combustible gas levels exceed 10% of the LEL shall necessitate

93099.002

immediate shutdown of operations (2.3, requirement 2). Notification shall be made to the appropriate line and safety management. Restart of operations shall require line management approval and safety assurance concurrence.

3. The OSL violation shall be documented as required by the applicable MRP.

Noncompliance with the surveillance requirement

1. The surveillance shall be performed immediately.
2. If surveillance determines noncompliance with the requirement, the recovery actions identified in Section 2.5 shall be initiated.
3. Failure to implement a surveillance requirement shall be documented as required by the applicable MRP.

2.7 AUDIT POINT: An auditable log or FAR shall be maintained at the site documenting the results of the surveillance. The log shall be reviewed weekly by the operating organization assuring compliance with the requirements and surveillance.

2.8 BASIS: The limits of this OSL are conservatively based on the potential volatile concentrations for potential gases that may be encountered but cannot be qualitatively predicted at this time. The concentration limits are set to provide a safety margin between detection and potential deflagration/detonation.

Operational Safety Limit 3 - Criticality Safety Control

3.0 TITLE: Site Specific Evaluations of Fissionable Materials Inventories.

3.1 APPLICABILITY: This requirement applies to conducting an evaluation of inventories of fissionable materials that may be encountered at specific sites where soil sampling may occur.

3.2 OBJECTIVE: To assure that the total quantity of soils removed at each specific site containing more than 15 g of fissionable materials are controlled under the criticality safety program (WHC 1991d).

3.3 REQUIREMENT: Line management shall be responsible for assuring:

1. Sites identified where greater than 15 g of fissionable materials can be removed or relocated

9313019.0103

shall have CE&A involvement as required in WHC 1991d.

2. Inventories of fissionable materials that are planned to be handled in the sample trailer and glove box that could exceed 15 g shall have CE&A involvement as required in WHC 1991d.

3.4 SURVEILLANCE: The responsible operating organization shall verify early in the planning process (i.e., readiness review) for each site if there are inventories of fissionable materials that can be removed in the soils that require controls identified in WHC 1991d. This should be documented as part of the readiness review or in an auditable record.

3.5 RECOVERY: **Noncompliance with the requirements of the OSL**

1. Start up of operations shall not be allowed at the affected site if the requirements of the OSL are not met. Notification to appropriate line and safety management shall be made.
2. An evaluation shall be conducted to ascertain what will be the inventories of fissionable materials in the volume of soils removed at the affected site. The appropriate reviews and approvals shall be obtained once the evaluation is completed.
3. The OSL violation shall be documented as required by applicable MRP.

Noncompliance with the surveillance requirement

1. The surveillance shall be performed immediately.
2. If surveillance determines noncompliance with the requirements, the recovery actions identified in Section 3.5 shall be initiated.
3. Failure to implement a surveillance requirement shall be documented as required by the applicable MRP.

3.6 AUDIT POINT: An auditable record shall be maintained documenting the results of the surveillance. This log shall be reviewed prior to initiation of operations at each individual site where soil characterization activities are planned.

3.7 BASIS: The basis for this OSL is to assure that the total volume of soils removed from a specific site or handled in the sample trailer and glove box containing greater than 15 g of fissionable materials, are controlled in accordance with the criticality safety program as prescribed in WHC 1991d. This control assures that CE&A evaluates the

933019.0004

activities planned, prepares the required specifications and obtains appropriate approvals if needed.

5.2 PRUDENT ACTIONS

Prudent actions define management commitments for worker safety in ALARA practices. These commitments are implemented through the governing work procedures (i.e, work plans, RWPs, HWOPs, JSAs, WHC 1992a, WHC 1988c, etc.).

Function 1 - Protection of site workers from chemical carcinogens in the breathing air zone.

Prudent Action 1 - Using portable gas monitors, monitor air in the workers breathing air zone for detection of toxic vapors that exceed the TWA limit. Concentrations detected at or above the TWA will require removal of personnel from the work area or donning of appropriate protective gear as required by the HWOP or other work procedures.

Function 2 - Use of plastics as barriers.

Prudent Action 2 - Plastic liners or sleeving should be used as barriers around the drive barrel, split-spoon sampler and while loading spoils into the waste drums to prevent releases of contaminated or potentially contaminated radioactive materials.

Function 3 - Personnel protection.

Prudent Action 3 - Appropriate protective clothing as required by the site specific RWP and HWOP will be required to protect the site worker.

Function 4 - Monitoring for radioactive contamination.

Prudent Action 4 - Field monitoring instruments should be available at the work site to survey equipment for detection of any contamination.

Function 5 - Minimizing potential for skin contaminations or inhalation hazards.

Prudent Action 5 - Double bagging and prompt control of contaminated equipment to minimize the spread and release of airborne radioactive particulate resulting in possible inhalation, skin or work site radioactive contamination hazards.

Function 6 - Change out of glove box gloves per work procedures.

Prudent Action 6 - Changing of gloves at routine frequencies will minimize potential for glove failures that may result in potential inhalation of radioactive particulate and possible skin or work site radioactive contamination hazards.

Function 7 - Protection of site worker from inhalation hazards.

9313019.0105

Prudent Action 7 - Appropriate respiratory equipment should be available that protects the worker based upon the potential hazards at each work site.

Function 8 - Minimizing exposures to site worker to ALARA.

Prudent Actions 8 -

- Lead lined gloves and lead glass shielding should be utilized at the glove box to minimize extremity and whole body exposures.
- Shielding should be used around waste drums when readings on contact exceed 100 mR/h.
- Field monitoring instruments should be used to establish dose rates associated with radioactive materials being handled in the glove box per the requirements of the RWP.
- A radiation control area may need to be established and posted outside the sample trailer, behind the glove box, where an individual can receive a dose equivalent greater than 2 mR/h from the radiation source during glove box sampling operations.

Function 9 - Evaluate chemical compatibility issues.

Prudent Action 9 - A site specific evaluation should be conducted early in the planning process assessing chemical compatibility issues (i.e., readiness review, etc). This would identify sites that may have chemical inventories not analyzed as part of this assessment. This would eliminate potential chemical reactions that could result in production of volatile gases, fire or other adverse consequences.

Function 10 - Activities involving the use of acids should be conducted such that acids do not come into contact with soils at work sites near SSTs that were known to contain ferrocyanide.

Prudent Action 10 - Acids should be controlled at the work site to prevent any interaction with ferrocyanide that could result in generation of hazardous volatile gases.

Function 11 - Surface radioactive measurements of equipment and tools.

Prudent Action 11 - The monitoring organization should conduct survey measurements at the surface of drilling equipment or tools at non alpha controlling sites. Surfaces of equipment should not exceed an alpha reading of 50,000 dpm/100 cm².

Function 12 - Establishment of a zone of control.

Prudent Action 12 - A zone of 10 m (33 ft) or greater out from the well site should be established in all directions to assure that any potential consequences to the onsite worker are below the limits for a low hazard operation. Within this zone of control appropriate protective apparel should be utilized.

Function 13 - Sample stack effluent for detection of unanticipated releases.

Prudent Action 13 - Stack effluent sampling should be conducted whenever split spoon samples are being handled in the glove box. This will aid in detecting a potential release of radioactive particulate while samples are being handled in the glove box.

Function 14 - Monitor for flammable gases in areas at the tank farms where there may be welding and cutting activities.

Prudent Action 14 - Monitoring for flammable gases in areas at the tank farms should be in accordance with the requirements in the operating specification document for watch list tanks.

5.3 SAFETY SYSTEMS AND EQUIPMENT

The safety functions associated with the drilling/sampling, handling and preparation of samples in a sample trailer and glove box, and interim storage of soils extracted are identified as safety class 3. The systems, components, or structures identified below provide specific functions to assure treatment or confinement of radioactive or other hazardous materials (WHC 1988a):

1. Plastic liners or sleeving are barriers used to prevent releases of contaminated or potentially contaminated particulate. This minimizes the potential for radiological or toxicological exposures to occupational workers that exceed sound ALARA principles.
2. The HEPA filters function as a treatment and removal system. This system prevents the release of radioactive particulates and chemical vapors that could preclude implementing sound ALARA principles.
3. The instrumentation associated with sampling the stack effluent is required to detect unanticipated releases that could result in exposures to the occupational worker or environment that would preclude implementing sound ALARA principles.
4. The glove box and drum shielding provides a reduction of whole body and extremity exposures to the occupational worker. This would assure implementation of sound ALARA principles.
5. The glove box is designed to maximize confinement of radioactive materials. The integrity of this confinement system minimizes the potential for radioactive releases below the criteria limits as defined in WHC 1988b.

6.0 REFERENCES

- DOE, 1988a, *Radiation Protection for Occupational Workers*, DOE Order 5480.11, U.S. Department of Energy, Washington, D.C.
- DOE, 1988b, *Safety Analysis and Review System*, DOE Order 5481.1B, U.S. Department of Energy, Washington, D.C.

2010*6108186

- DOE/RL, 1991, *Expedited Response Action Proposal for 200 West Area Carbon Tetrachloride Plume*, DOE/RL-91-32, Draft B, U.S. Department of Energy, Richland, Washington.
- PNL, 1992, *Hanford Site Radiological Control Manual*, HSRCM-1, Hanford Contractors: Westinghouse Hanford Company; Kaiser Engineers Hanford; and Hanford Environmental Health Foundation, available on Hanford Local Area Network, Hanford Site, Richland, Washington.
- Kennedy, R. P. et al. 1990, *Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, UCRL-15910, U.S. Department of Energy, Washington, D.C.
- PNL, 1992, *Gross Gamma Logging for Westinghouse*, PNL-MA-567, GL-7A, Pacific Northwest Laboratories Hanford, Richland, Washington.
- Price, S. M., 1979, *Distribution of Plutonium and Americium Beneath the 216-Z-1A Crib: A Status Report*, RHO-ST-17, Rockwell Hanford Operations, Richland, Washington.
- RHO, 1979, *High Level Waste Leakage From the 241-T-106 Tank at Hanford*, RHO-ST-14, Rockwell International, Richland, Washington.
- WHC, 1988a, *Management Requirements and Procedures*, WHC-CM-1-3, Rev. 4, MRP 5.46, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988b, *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988c, *Radiation Protection Manual*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1989, *Preliminary Operable Unit Designation Project*, WHC-EP-0216, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *Emergency Plan*, WHC-CM-4-1, Rev. 2, Section 4.0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991a, *Geology and Hydrology of the Hanford Site: A Standard Text for Use in Westinghouse Hanford Company Documents and Reports*, WHC-SD-ER-TI-003, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991b, *Guidance for Identifying and Documenting Conformance with DOE Design Criteria in Safety Analysis Reports*, WHC-SD-GN-ER-304, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991c, *Implementation Guideline for Hazard Documentation*, WHC-SD-GN-ER-301, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991d, *Nuclear Criticality Safety Manual*, WHC-CM-4-29, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1992a, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

9313019.0108

Date Received:

4/6/93 DS

INFORMATION RELEASE REQUEST

Reference:

WHC-CM-3-4

Complete for all Types of Release

Purpose <input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape		<input type="checkbox"/> Reference <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input type="checkbox"/> Other	ID Number (include revision, volume, etc.) WHC-SD-EN-SAD-016, Vol. 1, Rev. 0-B List attachments. Date Release Required <p style="text-align: center;">April 5, 1993</p>
---	--	---	---

Title Safety Assessment for Environmental Investigations and Site Characterizations Volume 1: Activities Involving Drilling and Sampling of Contaminated Soil	Unclassified Category UC-	Impact Level 2 ESQ
--	------------------------------	--------------------------

New or novel (patentable) subject matter? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has disclosure been submitted by WHC or other company? <input type="checkbox"/> No <input type="checkbox"/> Yes Disclosure No(s).	Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)
---	---

Copyrights? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has written permission been granted? <input type="checkbox"/> No <input type="checkbox"/> Yes (Attach Permission)	Trademarks? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)
---	---

Complete for Speech or Presentation

Title of Conference or Meeting	Group or Society Sponsoring
Date(s) of Conference or Meeting	City/State
Will proceedings be published?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Will material be handed out?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Title of Journal

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature	Indicates Approval	Date
			Name (printed)	Signature	
Classification/Unclassified Controlled Nuclear Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Patent - General Counsel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OGC Memo 09943	H. E. Marquez	4/5/93
Legal - General Counsel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	OGC Memo 09943	H. E. Marquez	4/5/93
Applied Technology/Export Controlled Information or International Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
WHC Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Communications	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
RL Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Publication Services	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Other Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

Information conforms to all applicable requirements. The above information is certified to be correct.

References Available to Intended Audience	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Transmit to DOE-HQ/Office of Scientific and Technical Information	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Author/Requestor (Printed/Signature)	Date
R. R. Lehrschaal	3-5-93
Intended Audience	
<input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External	
Responsible Manager (Printed/Signature)	Date
N. R. Kerr	4-5-93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.



Date Cancelled	Date Disapproved
----------------	------------------

DISTRIBUTION SHEET

To Distribution	From R. R. Lehrschall	Page 1 of 1 Date April 5, 1993
Project Title/Work Order Safety Assessment for Environmental Investigations and Site Characterizations Volume 1: Activities Involving Drilling and Sampling of Contaminated Soils		EDT No. ECN No. 189908

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
T. L. Bennington	H4-16		X		
M. D. Campbell	S3-90		X		
R. A. Carlson	H6-03		X		
J. A. Charboneau	S3-10		X		
L. P. Diediker	T1-30		X		
K. A. Gano	X0-21		X		
J. R. Freeman-Pollard	H6-03		X		
M. J. Galgoul	H6-03		X		
D. O. Hess	L4-74		X		
N. R. Kerr	H4-67		X		
R. R. Lehrschall	H4-67		X		
A. R. Schade	H4-60		X		
D. E. Skoglie	N3-05		X		
T. W. Spicer	N3-06		X		
W. S. Thompson	N3-05		X		
M. A. Tredway	R3-54		X		
D. B. Tullis	L6-57		X		
C. R. Webb	H6-04		X		
J. J. Zimmer	H4-67		X		
Central Files (original + 2)	L8-04		X		
ERSS Files (3)	H4-67		X		
Docket Files (2)	H5-36		X		
EDMC (2)	H6-08		X		

9313019-0110
010-6103165

23