This document was too large to scan as a single document. It has been divided into smaller sections.

Section 3 of 3

Document Information			
Document #	0301568/03-RCA-0188		
Title	CLASS 1 MOD TO THE HANFORD FACILITY RCRA PERMIT DANGEROUS WASTE (DW) PORTION 03/2003		
Date	03/26/2003		
Originator	HEBDON JB, GURSKE RH, ENGE RD	**Originator Co.**	DOE-RL FH PNNL
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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 6 and Attachment 36

325 Hazardous Waste Treatment Units

March 2003

Index

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
325 Hazardous Waste Treatment Units	**Part III, Chapter 6 and Attachment 36**

Description of Modification:

Hanford Facility RCRA Permit, III.6.A: Incorporated the Appendices in their respective Chapters. Refer to following forms.

III.6.A. COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all requirements set forth in Attachment 36, including the Amendments specified in Condition III.6.B. ~~Enforceable portions of the application are listed below; a~~All subsections, figures, and tables included in these portions are also enforceable.~~, unless stated otherwise:~~

Chapter 1.0	Part A, Form 3, Dangerous Waste Permit-~~Application~~, Revision 4A, from Class 1 Modification for quarter ending December 31, 2002~~June 30, 2000~~
Chapter 2.0~~2~~	Unit Description~~Topographic Map~~, from Class 1~~2~~ Modification for quarter ending December 31, 2002~~dated March 2002, and approved November 2002~~
Chapter 3.0	Waste Analysis Plan,~~Characteristics~~ from Class 1 Modification dated~~for quarter ending~~ March 2003~~December 31, 1998~~
Chapter 4.0	Process Information from Class 1~~2~~ Modification-dated March2003 ~~2002, and approved November 2002~~
Chapter 6.0	Procedures to Prevent Hazards, from Class 1~~2~~ Modification for quarter ending December 31, 2002~~dated March 2002, and approved November 2002~~
Chapter 7.0	Contingency Plan, from Class 1 Modification for quarter ending December 31, 2002~~June 30, 2002~~
Chapter 8.0	Personnel Training, from Class 1 Modification for quarter ending December 31, 2002~~September 30, 2001~~
Chapter 11.0	Closure and Financial Assurance, from Class 1~~2~~ Modification dated March 2003~~2002, and approved November 2002~~
Chapter 12.0	Reporting and Recordkeeping, from Class 1 Modification for quarter ending December 31, 2002~~1998~~
Chapter 13.0	Other Federal and State ~~Relevant~~ Laws, from Class 1 Modification for quarter ending December 31, 2002~~1998~~
~~Appendix 3A~~	~~325 HWTUs Waste Analysis Plan from Class 2 Modification dated March 2002, and approved November 2002~~
~~Appendix 4A~~	~~Engineering Drawings~~

Modification Class: [1 2 3]	Class 1	Class [1]1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:
[signature] for 3-4-03	[signature] 3/4/03		
A. K. Ikenberry Date	R. F. Christensen Date	F. C. Jamison Date	L. E. Ruud Date

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
325 Hazardous Waste Treatment Units	**Part III, Chapter 6 and Attachment 36**

Description of Modification:

Hanford Facility RCRA Permit, III.6.B: Delete the following Conditions, the Conditions were incorporated in their respective Chapters. Refer to following forms.

III.6.B. AMENDMENTS TO THE APPROVED PERMIT APPLICATION

~~III.6.B.a. Only treatment specifically identified in the enforceable portions of the application and these Permit Conditions may be performed at this TSD unit.~~

~~III.6.B.c. For all shipments of dangerous waste to or from the 325 HWTUs, the Permittees shall comply with the applicable information in Conditions II.Q.1.b. and II.Q.2. of the Permit. For clarification, all dangerous waste must be transported in accordance with the unit specific provisions as outlined in the PNNL Operating Procedure for the 325 Building, in effect at the date of the transfer. With exception to, and in addition to, the packaging and transporting operations, shall be as follows:~~

~~The acceptance of all dangerous waste received at the 325 TSD Units will be dependent upon their packaging. Liquid waste containers accepted from other buildings to the 325 HWTUs shall have secondary containment with absorbent materials packed around the contents.~~

~~III.6.B.d. The Permittee must conduct integrity assessments over the life of the two (2) tank systems in this TSD unit, to ensure that the tanks retain structural integrity per WAC 173-303-640. Records must be maintained in the Operating Record for this TSD unit. Within thirty (30) days of completion of each assessment, data relating to each tank system shall be made available, upon request, to Ecology for review.~~

~~III.6.B.e. Within three (3) months of final installation of the new tank, the Permittee shall submit to Ecology a written integrity assessment, which has been reviewed and certified by an independent, qualified, registered professional engineer, in accordance with WAC 173-303-810 (13)(a).~~

~~III.6.B.f. The TSD unit shall comply with all applicable Subpart AA and BB requirements of the Air Emission Standards.~~

~~III.6.B.g. In response to the request in Chapter 11.0, Section 11.7, of Attachment 36, the Permittees are granted two (2) years to close the TSD unit. This time period is necessitated by the high levels of radioactivity in the materials that are present, particularly in the six (6) interconnected hot cells. Removal of waste inventory from the TSD unit is an activity of closure.~~

~~III.6.B.h. All process knowledge and analytical data that are used for waste characterization, LDR determination, and/or treatment activities at this TSD unit shall be documented and placed in the Operating Record.~~

~~III.6.B.i. Shipments of waste shall not be accepted from any on-site generator without information required by the 325 HWTUs WAP, accompanying the first shipment of any waste stream. The TSD unit staff shall obtain, from the on-site generator, the information necessary to determine the waste code, treatability group (i.e., wastewater versus non-wastewater), subcategory, and identification of underlying hazardous constituents for certain characteristic waste. A member of the TSD unit staff may sign the LDR certification as a representative of the generator.~~

~~III.6.B.j. Shipments of waste shall not be accepted from any off-site generator without LDR certification, if applicable, accompanying each shipment. For waste received from off-site generators, the TSD unit shall receive the information pursuant to 40 CFR 268 regarding LDR wastes. The generator must sign the LDR certification.~~

~~III.6.B.k. The QA/QC control program for sampling and analysis related to this TSD unit must, at a minimum, comply with the applicable Hanford Site standard requirements and regulatory requirements. All analytical data shall be defensible and shall be traceable to specific, related quality control samples and calibrations.~~

~~III.6.B.l. By April 28, 1998, the Permittees shall submit the following for review and approval by Ecology: for each parameter, the respective accuracy, precision, and quantitation limit (or minimum detectable activity) necessary to meet the regulatory or decision limit. These data quality requirements shall be added to the WAP and become enforceable Conditions of the Permit. For determining the toxicity characteristics, SW-846 Method 1311 should be followed wherever possible. The Permittee may use the total metals test and assumption of complete extractability as described in Method 1311. A reduced sample size may also be utilized for As Low As Reasonably Achievable (ALARA) purposes as recommended by the "Joint NRC/EPA Guidance on Testing Requirements of Mixed Radioactive and Hazardous Waste" (62 FR 62079).~~

~~III.6.B.m. For a given parameter, analytical methods are selected and may be modified as long as the applicable precision, accuracy, and quantitation limit (or minimum detectable activity) necessary to meet the regulatory or decision limit can be met or improved. (Note: the Permittee submission described in Condition III.6.B.l. will define these data quality requirements for this TSD unit.)~~

~~III.6.B.n. Appendix 7A, Sections 3.2, 4.0, 5.0, and 6.0 are added as enforceable Sections.~~

~~III.6.B.o. Chapter 7, at the end of the paragraph, add "by Ecology and shall follow WAC 173-303-360, where applicable"~~

III.6.B.1p. Portions of DOE/RL-94-02 that are not made enforceable by inclusion in the applicability matrix for that document, are not made enforceable by reference in this document.

Modification Class: [1 2 3]	Class 1	Class [1]1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
DKCarrell for	3-4-03	RF Christensen	3/4/03				
A. K. Ikenberry	Date	R. F. Christensen	Date	F. C. Jamison	Date	L. E. Ruud	Date

[1]Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modifications

Part III, Chapter 6 and Attachment 36

325 Hazardous Waste Treatment Units

March 2003

Replacement Sections

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FIGURES

TABLES

GLOSSARY

325 HWTUs	325 Hazardous Waste Treatment Units consists of the HWTU, SAL, and RLWS tank system subunits)
AA	atomic absorption
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
BED	Building Emergency Director
CFR	Code of Federal Regulations
COLIWASA	Composite Liquid-Waste Sampler
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DOT	U.S. Department of Transportation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
g	gram
gal	gallon
GC/MS	gas chromatography/mass spectroscopy
h	hour
HWTU	Hazardous Waste Treatment Unit
ICP	inductively coupled plasma
in.	inch
kg	kilogram
LDR	land-disposal restriction
MSDS	material safety data sheet
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PNL	Pacific Northwest Laboratory
PNNL	Pacific Northwest National Laboratory (PNL, above, was renamed to Pacific Northwest National Laboratory in October 1995)
psf	pounds per square foot
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SAL	Shielded Analytical Laboratory
TCLP	toxicity characteristic leaching procedure
TSD	treatment, storage, and disposal
UFC	Uniform Fire Code
WAC	Washington Administrative Code

Acceptable Knowledge
Information collected by the generator to meet waste-management requirements and determined to be adequate by the TSD unit. According to EPA, the generator may use process knowledge, waste-analysis data, and records of analysis performed before the effective date of regulation. Process knowledge is acceptable for assigning appropriate waste codes.

Analysis
The process that the generator completes to characterize the waste properly. This analysis must provide the information necessary to manage the waste in accordance with the requirements of WAC 173-303. The analysis may include or consist of a review of existing published or documented data on the dangerous waste, or on waste generated from similar processes, or data obtained by testing, if necessary. The information must include detailed information pertaining to the chemical, physical, and/or biological nature of a dangerous waste, or nondangerous wastes if applicable under WAC 173-303-610(4)(d) [WAC 173-303-300(2)].

Bulk Waste Stream
Large volumes of homogeneous waste from a single generating event, e.g., soil remediation from a single location.

Certification
See Land Disposal Restrictions LDR Certification

Characterize (characterization)
The steps the generator or TSD unit takes to describe the contents of the waste to ensure proper management adequately and accurately. This characterization information is required to provide for compliant treatment, storage, or disposal of a dangerous waste and includes waste designation, TSD unit waste-acceptance criteria, or land-disposal restriction information (to facilitate discussions on characterization, we use the terms characterize for storage, characterize for treatment, or characterize for disposal).

Characterize for Disposal
The minimum information required to demonstrate that a waste was not LDR or no longer LDR. This information consists of analytical data as described in the federal regulations (i.e., 40 CFR 268), which demonstrate the waste meets any concentration-based standards. To demonstrate that a specified technology was used to meet federal treatment standards (i.e., 40 CFR 268.42 or 268.45), acceptable knowledge must be obtained from the customer or by the disposal unit. For state-only land-disposal restrictions, the disposal unit will either test the waste, use process knowledge, or the two to confirm that the customer properly treated the waste, if applicable, to state land disposal restriction standards. Information must also be provided to demonstrate that the waste meets the operational parameters of the disposal facility, such as liner compatibility information.

Characterize for Storage
At a minimum, the information necessary to manage the waste appropriately at a TSD storage unit. Acceptable knowledge may be required for any operational parameters of the TSD unit, TSCA information (i.e., regulated for PCBs), and characteristics which may present a management concern (i.e., waste regulated for ignitability, corrosivity, and/or reactivity).

Characterize for Treatment
The minimum information for a waste to be shipped to a treatment unit and successfully treated. This includes a complete designation, land-disposal restriction determination information including underlying hazardous constituent information (if applicable), and treatment unit operational parameters.

Confirm (confirmation)
The confirmation process includes completing appropriate pre-shipment review and verification steps and/or parameters. The requirement to confirm appears twice in WAC 173-303-300 and applies to two different scenarios.

Scenario 1: The process that an owner or operator uses to ensure knowledge supplied by the generator or TSD unit is acceptable knowledge to ensure that the waste is managed properly [WAC 173-303-300(1)].

Scenario 2: The process that a facility owner or operator receiving off-site facility shipments uses to determine, by analysis if necessary, that each waste received at the facility matches the identity of the waste specified on the accompanying manifest or shipping paper [WAC 173-303-300(3)].

Conformance Issue
Any issue, which, if left unresolved, prevents acceptance of waste. This includes manifest discrepancies and inconsistencies.

Container Failure
A waste container for which a manifest discrepancy has been identified.

Container Receipt Inspection
The process a TSD unit uses to examine an incoming container and will include, but is not limited to, inspecting labels, checking the condition of the container, checking the piece count of the shipment, and checking the shipping papers associated with the container.

Corroborative Testing
Sampling and analysis performed by both the treater and disposer of an LDR waste to meet federal land-disposal restriction concentration-based treatment standards. The frequency of testing is determined on a case-by-case basis by the permit writer, 55 FR 22669.

Customer
The generator or TSD unit who ships waste to another TSD unit, the current custodian of the waste.

Designation
The process of determining if a solid waste is a mixed waste, resulting in the assignment of proper federal and state waste codes.

Disposal Unit
A TSD unit on the Hanford Facility permitted to dispose of mixed waste that meets all applicable state-only and federal land disposal restrictions (i.e., Low-Level Burial Grounds).

Effective Date of Regulation
The date when mixed waste became subject to regulation in Washington State (August 19, 1987).

Equivalent Test Method
A laboratory or field-testing method used to determine characteristics or composition of a waste that has been approved by Ecology in accordance with WAC 173-303 rule-making procedures, in lieu of using a laboratory- or field-testing method required by regulation. A generator or owner/operator must submit a rule-making petition to Ecology in accordance with WAC 173-303-110(5) and WAC 173-303-910(2).

Facility
All contiguous land, structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. The legal and

physical description of the Hanford Facility is set forth in Attachment 2 of the Hanford Facility RCRA permit.

Fingerprint Analysis
Sampling and analysis of several key chemical and physical parameters of a waste to substantiate or verify the composition of a waste as determined previously during characterization. Fingerprint analysis typically is used by generators to substantiate waste characterization of frequently generated wastes. TSD units may use fingerprint analysis for verification. Parameters for sampling and analysis may be a subset of the parameters used during characterization, or they may be parameters that are not normally present in the waste to verify the absence of certain constituents.

General Waste Stream
Waste from a single customer and Waste-Management Group.

Generator
Any person, by site, whose act or process produces dangerous waste or whose act first causes a dangerous waste to become subject to regulation, WAC 173-303-040. The generator on the Hanford Facility is the U.S. Department of Energy Richland Operations Office and its contractors. A generator may accumulate (store or treat) a dangerous waste under the provisions in WAC 173-303-170 and -200.

Hanford Facility
See Facility.

Inconsistencies
Any other discrepancies which are not manifest discrepancies.

Independent Authorized Agent
A group or organization that is functionally independent from the waste-generating function.

Land-Disposal Restrictions (federal)
Federal requirements pertaining to dangerous wastes designated under 40 CFR Part 261 that were generated on or after the effective date of regulation. State-only dangerous wastes are not subject to the federal LDR requirements.

Land-Disposal Restrictions (state-only)
State-only mixed-waste requirements pertaining to dangerous waste designated solely under WAC 173-303 and not 40 CFR 261 that were generated on or after the effective date of regulation.

LDR Certification
A written statement of professional opinion and intent signed by an authorized representative that acknowledges an owner's or operator's and/or generator's compliance with applicable LDR requirements.

Manifest Discrepancy
Significant discrepancies between the quantity or type of the dangerous waste designated on the manifest or shipping paper and the quantity or type of dangerous waste a facility actually receives, WAC 173-303-370(4)(a).

Pre-Shipment Review
The process used by the TSD unit to obtain and evaluate the generator's analysis of waste to be received by the TSD unit and to document acceptable knowledge on the waste profile.

Process Knowledge
Knowledge the generator applies to a solid waste to determine if it is a dangerous waste in light of the materials or the process used when such knowledge can be demonstrated to be sufficient for determining whether a solid waste is designated properly, WAC 173-303-070(3)(c)(ii). Process knowledge includes information on wastes obtained from existing published or documented waste-analysis data or studies conducted on mixed wastes generated by processes similar to that which generated the waste. Process knowledge for dangerous waste may also include information obtained from surrogate material.

QA/QC
Quality assurance (QA) is the process for ensuring that all data and the decisions based on that data are technically sound, statistically valid, and properly documented. Quality control (QC) procedures are the tools employed to measure the degree to which these quality-assurance objectives are fulfilled.

Re-Characterization
A process which occurs when an unsafe condition arises and/or when a waste is removed from a storage unit to meet acceptance criteria for the receiving treatment unit or disposal unit.

Repeat and Review Frequency
The frequency specified in a WAP on a TSD-unit basis that the owner/operator will ensure the knowledge maintained on a specific waste stream is still acceptable knowledge and/or adequate analysis. Repeat and review frequency provisions do not apply to corroborative testing.

Sampling and Analysis (Sampling and Laboratory Analysis)
The process of obtaining a representative sample(s) from a dangerous waste to determine the accuracy of characteristics or composition of the sample through laboratory or field testing.

Shipment Failure
A maximum of two container failures within the first verification sample set or combined first and second verification sample set. If only one container fails, it is considered an anomaly and corrected. It is understood that if the shipment consists of one or two drums, the shipment fails if one drum fails verification.

Significant Discrepancy
A discrepancy with regard to a manifest or shipping paper means a discrepancy between the quantity or type of dangerous waste designated on the manifest or shipping paper and the quantity or type of dangerous waste a TSD unit actually receives. A significant discrepancy in quantity is a variation greater than ten (10) percent in weight for bulk quantities (e.g., tanker trucks, railroad tank cars, etc.) or any variation in piece count for nonbulk quantities (i.e., any missing container or package would be a significant discrepancy). A significant discrepancy in type is an obvious physical or chemical difference which can be discovered by inspection or waste analysis (e.g., waste solvent substituted for waste acid. This also includes a discrepancy in the number of inner containers in a labpack.

Storage Unit
A TSD unit on the Hanford Facility permitted to store dangerous waste.

Treatment Unit
A TSD unit on the Hanford Facility permitted to treat dangerous waste.

TSD Unit
See Unit.

Unit

The term unit (or TSD unit), as used in Parts I through VI of the Hanford Facility RCRA permit, means the contiguous area of land on or in which dangerous waste is placed, or the largest area where there is a significant likelihood of mixing dangerous-waste constituents in the same area. A TSD unit, for the purposes of this Permit, is a subgroup of the Facility which has been identified in the Hanford Facility Dangerous Waste Part A, Form 3.

Verify (Verification)

An assessment the receiving TSD unit performs to substantiate the analysis acquired by the TSD unit before acceptance. Verification must be performed by TSD unit personnel or an authorized agent on wastes received by the TSD unit. Verification may occur at the receiving TSD unit or at the generator's location, depending on many dangerous-waste shipment and packaging configuration factors. Verification activities include container receipt inspection, and as applicable, physical screening (which may include radiological methods), and/or chemical screening/fingerprint analysis.

Waste-Acceptance Criteria

The minimum requirements imposed by a TSD unit to ensure that a dangerous waste is managed properly.

Waste Analysis

See Analysis.

Waste Profile

A mechanism used by the receiving TSD unit to document the generator's acceptable knowledge to meet the owner or operator's analysis obligation in WAC 173-303-300(2). Example forms or documents typically used by the TSD unit to maintain analysis information are included in the WAP as attachments. For offsite facilities, the waste profile will include the waste analysis which dangerous-waste generators have agreed to supply in accordance with WAC 173-303-300(5)(g).

Waste Stream

Per or each waste stream refers to individual waste streams, each with an individual point of generation. Individual waste streams include wastes that are physically or chemically different from each other; wastes that are generated from different types of processes; and wastes that are the same type, but are generated at different points along the same process or at different process locations. For information, the Hanford Facility uses the following factors in determining a waste stream: (1) the Department of Transportation requirements pertaining to the waste materials; (2) the waste designation of the waste materials; (3) the order of events pertaining to the process which generates the waste materials, (4) impermissible dilution concerns based on WAC 173-303-150 and 40 CFR 268.3; and (5) any future treatment- and disposal-management pathways available to the waste materials.

METRIC CONVERSION CHART

The following conversion chart is provided to the reader as a tool to aid in conversion.

If you know	Multiply by	to get	If you know	Multiply by	to get
Length			Length		
Inches	25.40	Millimeters	Millimeters	0.0393	inches
Inches	2.54	Centimeters	Centimeters	0.393	inches
Feet	0.3048	Meters	Meters	3.2808	feet
Yards	0.914	Meters	Meters	1.09	yards
Miles	1.609	Kilometers	Kilometers	0.62	miles
Area			Area		
Square inches	6.4516	square centimeters	square centimeters	0.155	square inches
Square feet	0.092	square meters	square meters	10.7639	square feet
Square yards	0.836	square meters	square meters	1.20	square yards
Square miles	2.59	square kilometers	square kilometers	0.39	square miles
Acres	0.404	Hectares	Hectares	2.471	acres
Mass (weight)			Mass (weight)		
Ounces	28.35	Grams	Grams	0.0352	ounces
Pounds	0.453	Kilograms	Kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	Milliliters	Milliliters	0.03	fluid ounces
Quarts	0.95	Liters	Liters	1.057	quarts
Gallons	3.79	Liters	Liters	0.26	gallons
cubic feet	0.03	Cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	Cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Second Ed., 1990, Professional Publications, Inc., Belmont, California.

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3.0 WASTE ANALYSIS PLAN

This chapter provides information on the chemical, biological, and physical characteristics of the waste treated and stored in the 325 HWTUs, including waste descriptions, designations, and a waste-analysis plan.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste managed at the 325 HWTUs can be categorized as originating from the following general sources:

- listed waste from specific and nonspecific sources
- laboratory waste resulting from analysis of samples
- discarded commercial chemical products
- waste from chemicals synthesized or created in research activities using radioactive isotopes
- discarded commercial chemical products exhibiting dangerous-waste characteristics and/or criteria.

Each of these waste categories is discussed in the following sections, including waste descriptions, hazard characteristics, and basis for hazard designations. This information includes data that must be known to treat, store, or dispose of the waste as required under WAC 173-303-806(4)(a)(ii).

3.1.1 Listed Waste from Specific and Nonspecific Sources

Waste from specific and nonspecific sources consists of listed waste identified in WAC 173-303-9904. Attachment 36, Chapter 1.0, Part A, Form 3, for the 325 HWTUs identifies the following waste from this category:

- F001 - Spent halogenated degreasing solvents and sludges
- F002 - Spent halogenated solvents and still bottoms
- F003 - Spent nonhalogenated solvents and still bottoms
- F004 - Spent nonhalogenated solvents and still bottoms
- F005 - Spent nonhalogenated solvents and still bottoms
- F006 - Wastewater-treatment sludges from electroplating operations
- F007 - Spent cyanide-plating-bath solutions from electroplating operations
- F009 - Spent stripping- and cleaning-bath solutions from electroplating operations where cyanides are used in the process
- F027 - Discarded polychlorinated phenol formulations
- F039 - Leachate resulting from the disposal of more than one restricted waste classified as hazardous
- K011 - Bottom stream from the wastewater stripper in the production of acrylonitrile
- K013 - Bottom stream from acrylonitrile column in the production of acrylonitrile
- K048 - Dissolved air flotation (DAF) float from petroleum-refining industry
- K049 - Slop oil-emulsion solids from the petroleum-refining industry
- K050 - Heat exchange, bundle-cleaning sludge from petroleum-refining industry
- K051 - American Petroleum Institute separator sludge from the petroleum-refining industry
- K052 - Tank bottoms (leaded) from the petroleum-refining industry.

These halogenated and nonhalogenated solvents are in the form of spent solvents; no still bottoms are managed. Degreasing solvents (F001) as well as spent halogenated solvents (F002) are generated primarily in research and analytical processes. Spent nonhalogenated solvents (F003, F004, and F005) also come primarily from research laboratories. Much of the waste to be treated in the 325 HWTUs results from analyses of waste samples from sources already designated as F001 through F005. Manufacturing activities are not performed on the Hanford Facility; therefore, dangerous waste from specific sources (WAC 173-303-9904 K-listed waste) is not generated at PNNL. Small quantities of K-listed waste, however, have been generated from treatability studies at PNNL in the past; the residues from these tests could be treated at the 325 HWTUs.

The F-listed waste is designated on the basis of the process knowledge (e.g., information from container labels, material safety data sheets [MSDS], or process information). Sampling might be performed if additional information is needed to document the composition and characteristics of the waste. The generator is responsible for specifying the characteristics of the waste, based on knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process that generated the waste. The F001- and F002-listed waste types are designated according to WAC 173-303-70 through WAC 173-303-100.

The K-listed waste on the Part A, Form 3, is designated based on the source of the process generating the original waste. These waste types are designated as dangerous waste, unless the waste is mixed with other constituents that require the mixture to be designated as extremely hazardous waste.

3.1.2 Laboratory Waste Resulting from Analysis of Samples

Laboratory waste resulting from analyzing samples makes up the largest volume of waste to be treated or stored in the 325 HWTUs. These waste types include those designated from the dangerous-waste source list as described in WAC 173-303-082, designated as characteristic dangerous waste under WAC 173-303-090, and designated as dangerous waste by the criteria set forth under WAC 173-303-100. These waste types are designated based on process knowledge (i.e., project requirements, client-supplied information, and process information) as well as analytical results. Currently, much of this waste is designated as listed waste from the dangerous-waste source list based on information provided by the generator. The waste is designated as dangerous waste unless constituent concentrations in the waste require the designation to be extremely hazardous waste.

3.1.3 Discarded Commercial Chemical Products

Discarded chemical products consist of those products listed in WAC 173-303-081. The Part A, Form 3, for the 325 HWTUs identifies all of the discarded chemical products listed in WAC 173-303-9903 (P001 through P123 and U001 through U359) and specifies an estimated maximum annual management quantity. Typically, only a few of these waste types are generated at any one time. The Part A, Form 3, lists all of the waste types, because the wide variety of research activities conducted on the Hanford Facility presents the potential for generating these waste types.

Waste types in this category are designated based on process knowledge. Because this waste is usually in the original container, information on the container label is verified by process knowledge (i.e., knowledge that material is in its original container) and the label is used to identify contents. Excess or expired chemicals that have been determined to be a waste and that are still in the original container will not be sampled. These listed-waste types contain those designated as dangerous waste as well as those designated as extremely hazardous waste. These waste types also are subject to land-disposal restriction (LDR) regulations under 40 CFR 268 and WAC 173-303-140, including disposal prohibitions and treatment standards.

3.1.4 Waste from Chemicals Synthesized or Created in Research Activities Using Radioactive Isotopes

Dangerous waste from research activities using radioactive isotopes is designated as mixed waste and typically is generated in small quantities, ranging from a few grams to a few liters. These waste types consist primarily of radiologically contaminated chemicals, such as organics. Waste is designated based on process knowledge or on the basis of sampling and analysis. Process knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste (e.g., log sheets for accumulation containers). If information available from the generator is inadequate for waste designation, the waste is sampled, and the results of the analysis are used for designation. These waste types include waste designated as characteristic dangerous-waste mixtures under WAC 173-303-090 and waste designated as dangerous waste under WAC 173-303-100. Attachment 36, Chapter 1.0, Part A,, Form 3, includes all categories of toxic, persistent, and carcinogenic waste mixtures (i.e., both dangerous waste and extremely hazardous waste). While not all of these waste types currently are generated or have been generated, the wide variety of research activities conducted on the Hanford Facility presents the potential that these waste types could be generated and could require subsequent management at the 325 HWTUs. Similarly, the Part A, Form 3, includes the characteristic dangerous-waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and toxicity characteristics leaching procedure [TCLP] toxics caused by metals or organics content).

The waste also could be LDR waste regulated under 40 CFR 268 and WAC 173-303-140.

3.1.5 Discarded Commercial Chemical Products Exhibiting Dangerous-Waste Characteristics and/or Criteria

Many discarded chemical products handled in the 325 HWTUs are not listed in WAC 173-303-9903 but are still considered dangerous waste, because these products exhibit at least one dangerous-waste characteristic and/or criterion (WAC 173-303-090 and WAC 173-303-100). This waste is included in the Part A, Form 3, under waste numbers D001 through D043, WT01, WT02, WP01, WP02, WP03, and WSC2. This waste typically is received in the manufacturer's original container.

Waste in this category is designated based on the process knowledge. Because this waste is usually in the original container, information on the container label is used to identify the contents. This waste includes waste designated as dangerous waste and waste designated as extremely hazardous waste.

The waste also could be LDR waste regulated under 40 CFR 268 and WAC 173-303-140.

3.1.6 Waste Analysis Plan

The 325 HWTUs Waste-Analysis Plan describes the procedures used to obtain the information necessary to manage waste in accordance with the requirement of WAC 173-303. The following are described: sampling methods; analytical parameters and rationale; quality-control and quality-assurance procedures; requirements for incoming waste; storage requirements for ignitable, reactive, and incompatible waste; and the waste-tracking and record-keeping procedures.

3.1.7 Manifest System

Onsite waste shipments are manifested pursuant to Hanford Facility RCRA Permit Condition 11.P.2. Offsite waste shipments are manifested in accordance with the requirements of WAC 173-303-370 and -180.

3.1.7.1 Procedures for Receiving Shipments

The onsite generator is responsible for identifying waste composition accurately and arranging for the transport of the waste. A copy of each transfer-tracking form and any other pertinent operating records are maintained by the 325 HWTUs for 5 years. The waste-tracking methods are as follows.

Inspection of Transfer Papers/Documentation – The necessary transfer papers for the entire transfer are verified (i.e., signatures are dated, all waste containers included in the transfer are accounted for and correctly indicated on the transfer documentation, there is consistency throughout the different transfer documentation, and the documentation matches the labels on the containers).

Inspection of Waste Containers – The condition of waste containers is checked to verify that the containers are in good condition (e.g., free of holes and punctures).

Inspection of Container Labeling – Transfer documentation is used to verify containers are labeled with the appropriate "Hazardous/Dangerous Waste" labeling and associated markings according to the contents of the waste container.

Acceptance of Waste Containers – The 325 HWTUs personnel sign the transfer documents and retain a copy.

If transport will be over public roads (unless those roads are closed to public access during waste transport), a Uniform Hazardous Waste Manifest will be prepared identifying the 325 HWTUs as the receiving unit. The 325 HWTUs operations staff will sign and date each copy of the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 325 HWTUs. A copy of the manifest also will be retained in the 325 HWTUs operating records for 5 years.

3.1.7.2 Response to Significant Discrepancies

The primary concern during acceptance of containers for storage is improper packaging or waste-tracking form discrepancies. Containers with such discrepancies are not accepted at the 325 HWTUs. Depending on the nature of the condition, such discrepancies can be resolved through the use of one or more of the following alternatives.

- Incorrect or incomplete entries on the Uniform Hazardous Waste Manifest or the onsite waste-tracking form can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.
- The waste packages can be held and the onsite generator or offsite waste generator can be requested to provide written instructions for use in correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- The onsite generator or offsite waste generator can be requested to correct the condition on the Hanford Facility before the waste is accepted.
- If a noncompliant dangerous-waste package is received from an offsite waste generator, and the waste package is nonreturnable because of condition, packaging, etc., and if an agreement cannot be reached among the involved parties as to resolving the noncompliant condition, then the issue will be referred to the U.S. Department of Energy-Richland Operations Office (DOE-RL) and the Washington State Department of Ecology (Ecology) for resolution. Ecology will be notified if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Such waste packages, although not accepted, might be placed in the 325 HWTUs pending resolution. The package will be segregated from other waste and labeled in accordance with instructions in the unit contingency plan in the "Event Scenarios" section.

3.1.7.3 Provisions for Nonacceptance of Shipment

Provisions for nonacceptance of waste transfers are discussed in the following sections.

3.1.7.4 Nonacceptance of Undamaged Shipment

Before waste is brought into the 325 HWTUs, all associated documentation is inspected and verified for treatment and/or storage authorization. Any transfer of materials that the 325 HWTUs are not designed to treat and/or store neither are unloaded from the vehicle nor accepted for treatment or storage.

3.1.7.5 Activation of Contingency Plan for Damaged Shipment

If waste transfers arrive at the 325 HWTUs in a condition that presents a hazard to public health or the environment, the building emergency plan is implemented, as described in Attachment 36, Chapter 7.0.

3.1.8 Tracking System

Upon generation or receipt into the 325 HWTUs, each container of waste is assigned a unique tracking number. This number is used to track the following information:

- a description and the quantity of each dangerous waste received and the method(s) and date(s) of storage or treatment in the 325 HWTUs, in accordance with WAC 173-303-380(2)
- the location of each dangerous-waste container stored within the unit and the quantity at each location, including cross-reference to any applicable manifest and/or waste-tracking numbers
- waste-analysis results.

This system effectively tracks waste containers as the containers move through treatment or storage at the 325 HWTUs. The information is retained as part of the 325 HWTUs operating record, readily accessible for 5 years (refer to Attachment 36, Chapter 6.0, Section 6.2.2).

3.2 325 HAZARDOUS WASTE TREATMENT UNITS WASTE ANALYSIS PLAN

The 325 HWTUs are part of the Unit-Specific Portion of the Hanford Facility Dangerous Waste Permit Application, which reflects the organization of the Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit, WA7890008967.

The 325 HWTUs consist of three units, all within the 325 Building, located in the 300 Area on the Hanford Facility (Figure 3.1). Attachment 36, Chapter 2.0 provides detailed location information.

The 325 Building includes the following: (1) a central portion (completed in 1953) that consists of three floors (basement, ground, and second) containing general-purpose laboratories, provided with special ventilation and work enclosures, designed for radiochemical work; (2) a south (front) wing containing office space, locker rooms, and a lunch room; and (3) east and west wings containing shielded enclosures with remote manipulators. The Shielded Analytical Laboratory (SAL) is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, 524 and 528. Figures 3.2 through 3.5 provide drawings of the TSD units.

The fire water-collection tank, which serves rooms 520 and 528 of the HWTU, is located beneath Room 520 in the basement of the 325 Building. The rectangular tank measures 1.65 meters by 2.25 meters by 1.92 meters, and has a 22,710-liter capacity. The sides and floor of the tank are constructed of epoxy-coated carbon-steel plate. The steel sides and floor provide support for the chemical-resistant polypropylene liner. The tank is secured to the concrete floor of the 325 Building with 1.3-centimeter bolts at 1.82-meter intervals.

3.3 DESCRIPTION OF UNIT PROCESSES AND ACTIVITIES

The 325 HWTUs store and treat dangerous waste generated by Hanford Facility programs (primarily from research activities in the 325 Building and other Pacific Northwest National Laboratory [PNNL] facilities) and potentially from other onsite/offsite laboratories. Storage in containers and bench- or small-scale treatment of dangerous waste occur in both the HWTU and the SAL. As described in further detail in Attachment 36, Chapter 4.0, containers are managed in accordance with WAC 173-303-630; the SAL tank is managed and operated in accordance with WAC 173-303-640.

At the SAL, dangerous waste liquid is stored in a tank in Room 32. This dangerous waste, along with contributions from the HWTU, currently is discharged to the 340 Building via the RLWS. Because of the scheduled deactivation of the 340 Building, a modification to the existing 325 RLWS system is required. As part of this modification, dangerous waste will be collected, stored, and possibly treated in a tank before being transported to the double-shell tank system. This modified system will be referred to as the RLWS load-out tank system. Waste from the RLWS load-out tank system will be transferred to the truck lock where the waste will be transported to the double-shell tank via a shielded-cask trailer system. Two stretches of piping from the existing RLWS system that are associated with the HWTU will not be used in the modified system. As discussed in Attachment 36, Chapter 11.0, these lines will be capped in place and closed during final closure activities of the RLWS load-out tank system.

Before receipt or acceptance of waste at the 325 HWTUs, the generator must supply adequate information to characterize and manage the waste properly. The information may include waste-characterization data, waste volume, container information, and process information.

If the material safety data sheets (MSDS), laboratory reagent, process knowledge, or analytical information provide insufficient information for a complete designation, the 325 HWTUs personnel require the generator unit to provide laboratory analyses before acceptance of the waste at the 325 HWTUs.

Containers in poor condition or inadequate for storage (e.g., damaged, not intact, or not securely sealed to prevent leakage) are not accepted in the 325 HWTUs. Examples of acceptable packaging include laboratory reagent bottles, U.S. Department of Transportation (DOT)-approved containers, spray cans, sealed ampules, paint cans, leaking containers that have been overpacked, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage using the criteria of WAC 173-303-190, and using professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment. Containers will not be opened, handled, or stored in a manner that would cause the containers to leak or rupture. Containers will remain closed except when sampling, adding, or removing waste or when analysis or treatment of the waste is ongoing. Containers of incompatible waste are segregated in the storage areas.

The regulated waste managed in the 325 HWTUs includes dangerous waste designated as listed waste; waste from nonspecific sources; selected waste from specific sources, characteristic waste, and state-only. Dangerous wastes that are managed in the 325 HWTUs are listed by waste code in Attachment 36, Chapter 1.0, Part A, Form 3.

Specific waste-treatment processes are found in the list of treatments in Attachment 36, Chapter 1.0, Part A, Form 3. Attachment 36, Chapter 1.0, Part A, Form 3, also provides the maximum process-design capacity for treatment and storage activities conducted in the HWTU and SAL.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste, as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for transfer are selected and labeled according to applicable regulations. Shipments may include manifesting and DOT compliance requirements. Shipments will be in accordance with 49 CFR as required by WAC 173-303-190.

The containers used for storage or treatment of dangerous waste is compatible with the waste stored in the containers.

All flammable-liquid waste is stored in compatible containers and in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable-storage cabinets or DOT-approved shipping containers. Solid chemicals are stored on shelving/flat surfaces in specifically designated areas based on need. All incompatible materials will be segregated. Storage of dangerous waste in the HWTU is governed by the Uniform Building Code restrictions (ICBO 1991).

325 HWTUs staff moves the dangerous waste containers in accordance with 325 HWTUs collection procedures that address safety and hazard considerations. The procedures cover various dangerous waste types and transportation modes. 325 HWTUs staff does not perform the operations, covered by a procedure, until they are formally trained on the procedure. All 325 HWTU staff is instructed in proper container handling and spill-prevention safeguards as part of their training. When in storage, containers are kept closed except when adding or removing waste, in accordance with WAC 173-303-630(5)(a).

Because of the nature of some dangerous waste stored at the SAL, it is often necessary to modify the standard containers. This modification ensures that the containers are specially shielded to reduce the hazard of the radioactive component of the dangerous waste stored in the container and are compliant with ALARA criteria. These specially designed shielded containers are packaged depending on the amount of shielding required. The shielding is accomplished by surrounding the containers with concrete, lead, or other materials to reduce the dose rate produced by the radiological component of the dangerous waste.

The 325 HWTUs have two drainage systems to handle liquid waste, the RPS and the RLWS. These two systems serve several laboratories and research areas in the 325 Building and are part of the larger liquid-waste systems that serve the entire 300 Area and are not part of the regulated TSD unit.

The RPS system is not part of the regulated unit but serves the entire 325 Building, including the 325 HWTUs. It is included here for informational purposes only.

The RPS system is connected to drains in both the SAL and HWTU subunits. The RPS is used for disposal of wastewater that has been handled in radiation areas (including the SAL and HWTU areas) but is not expected to be radioactively contaminated. The RPS is not used for the disposal of dangerous waste. Unless diverted as stated in the next paragraph, the RPS effluent flows to the 300 Area Treated Effluent Disposal Facility via the process sewer lines.

RPS effluents are routed through a diversion station in the basement common area of the 325 Building. The diversion station is equipped with a radioactivity monitor, which diverts the RPS flow to the RLWS if radioactivity is detected in the RPS flow. A secondary diversion-monitoring system backs up the building system. If a diversion occurs, an alarm sounds to notify appropriate staff.

The requirements in WAC 173-303-140 encourage the best-management practices for dangerous waste according to the priorities of RCW 70.105.150. In order of priority, these are reduction; recycling; physical, chemical, and biological treatment; incineration; stabilization and solidification; and land filling. The 325 HWTUs will observe these priorities whenever a management option exists. Recycling will be performed whenever waste can be used as reagent material to treat other waste received. To the extent practical, reduction of waste will be incorporated in the treatment processes so that the volume of residues will be reduced.

3.3.1 Identification/Classification and Quantities of Dangerous Waste Generated or Managed at the 325 HWTUs and Restricted/Prohibited

The dangerous waste managed at the 325 HWTUs can be categorized as originating from the following general sources:

- listed waste from specific and nonspecific sources
- laboratory waste resulting from analysis of samples
- discarded commercial chemical products
- waste from chemicals synthesized or created in research activities using radioactive isotopes
- discarded commercial chemical products exhibiting dangerous-waste characteristics and/or criteria.

Each of these waste categories is discussed in the following sections, including waste descriptions, hazard characteristics, and basis for hazard designations. This information includes data that must be known to treat, store, or dispose of the waste as required under WAC 173-303-806(4)(a)(ii).

3.3.2 Listed Waste from Specific and Nonspecific

Waste from specific and nonspecific sources consists of listed waste identified in WAC 173-303-9904. Attachment 36, Chapter 1.0, Part A, Form 3, for the 325 HWTUs identifies the following waste from this category:

- F001 - spent halogenated degreasing solvents and sludges
- F002 - spent halogenated solvents and still bottoms
- F003 - spent nonhalogenated solvents and still bottoms
- F004 - spent nonhalogenated solvents and still bottoms
- F005 - spent nonhalogenated solvents and still bottoms
- F006 - wastewater treatment sludges from electroplating operations
- F007 - spent cyanide-plating-bath solutions from electroplating operations
- F009 - spent stripping- and cleaning-bath solutions from electroplating operations where cyanides are used in the process
- F027 - discarded polychlorinated phenol formulations
- F039 - leachate resulting from the disposal of more than one restricted waste classified as hazardous
- K011 - bottom stream from the wastewater stripper in the production of acrylonitrile
- K013 - bottom stream from acrylonitrile column in the production of acrylonitrile
- K048 - dissolved air flotation (DAF) float from petroleum-refining industry
- K049 - slop oil emulsion solids from the petroleum-refining industry
- K050 - heat exchange, bundle-cleaning sludge from petroleum-refining industry
- K051 - American Petroleum Institute separator sludge from the petroleum-refining industry
- K052 - tank bottoms (leaded) from the petroleum-refining industry.

These halogenated and nonhalogenated solvents are in the form of spent solvents. Degreasing solvents (F001) as well as spent halogenated solvents (F002) are generated primarily in research and analytical processes. Spent nonhalogenated solvents (F003, F004, and F005) also come primarily from research laboratories. Much of the waste to be treated in the 325 HWTUs results from analyses of waste samples from sources already designated as F001 through F005. Manufacturing activities are not performed on the Hanford Facility; therefore, dangerous waste from specific sources (WAC 173-303-9904 K-listed waste) typically is not generated at PNNL. Small quantities of K-listed waste, however, have been generated from treatability studies and sample-characterization activities at PNNL in the past; the residues from these tests could be treated at the 325 HWTUs (if covered in Attachment 36, Chapter 1.0, Part A, Form 3).

The F-listed waste is designated on the basis of the process knowledge (e.g., information from container labels, MSDS, or process information). Sampling might be performed if additional information is needed to document the composition and characteristics of the waste. The generating unit is responsible for specifying the characteristics of the waste, based on knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process generating the waste. The F001- and F002-listed waste types are designated according to WAC 173-303-70 through WAC 173-303-100.

The K-listed waste on the Part A, Form 3, is designated based on the source of the process generating the original waste. These waste types are designated as dangerous waste, unless the waste is mixed with other constituents that require the mixture to be designated as extremely hazardous waste.

3.3.3 Laboratory Waste Resulting from Analysis of Samples

Laboratory waste resulting from analyzing samples makes up the largest volume of waste to be treated or stored in the 325 HWTUs. These waste types include those designated from the dangerous-waste source list as described in WAC 173-303-082, designated as characteristic dangerous waste under WAC 173-303-090, and designated as dangerous waste by the criteria set forth under WAC 173-303-100. These waste types are designated based on process knowledge (e.g., project requirements, client-supplied information, and process information) as well as analytical results. Currently, much of this waste is designated as listed waste from the dangerous-waste source list, based on information provided by the generator. The waste is designated as dangerous waste unless constituent concentrations in the waste require the designation to be extremely hazardous waste.

3.3.4 Discarded Commercial Chemical Products

Discarded chemical products consist of those products listed in WAC 173-303-081. The Part A, Form 3, for the 325 HWTUs identifies all of the discarded chemical products listed in WAC 173-303-9903 (P001 through P123 and U001 through U359) and specifies an estimated maximum annual management quantity. Typically, only a few of these waste types are generated at any one time. The Part A, Form 3, lists all of the wastes, because the wide variety of research activities conducted on the Hanford Facility presents the potential for generating these waste types.

Waste types in this category are designated based on process knowledge. Because this waste is usually in the original container, information on the container label is verified by process knowledge (i.e., knowledge that material is in its original container) and the label is used to identify contents. Excess or expired chemicals that have been determined to be waste and that are still in the original container will not be sampled. These listed waste types contain those designated as dangerous waste as well as those designated as extremely hazardous waste. These waste types also are subject to LDR regulations under 40 CFR 268 and WAC 173-303-140, including disposal prohibitions and treatment standards.

3.3.5 Waste from Chemicals Synthesized or Created in Research Activities Using Radioactive Isotopes

Dangerous waste from research activities using radioactive isotopes is designated as dangerous waste and typically is generated in small quantities ranging from a few grams to a few liters. These waste types consist primarily of radiologically contaminated chemicals, such as organics. Waste is designated based on process knowledge or on the basis of sampling and analysis. Process knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste (e.g., log sheets for accumulation containers) If information available from the generator is inadequate for waste designation, then the waste is sampled and the results of the analysis are used for designation. These waste types include waste designated as characteristic dangerous-waste mixtures under WAC 173-303-090 and waste designated as dangerous waste under WAC 173-303-100. The Part A, Form 3, includes all categories of toxic and persistent waste mixtures (i.e., both dangerous waste and extremely hazardous waste). While not all of these waste types currently are generated or have been generated, the wide variety of research activities conducted on the Hanford Facility presents the potential that these waste types could be generated and could require subsequent management at the 325 HWTUs. Similarly, the Part A, Form 3, includes the characteristic dangerous-waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and TCLP toxic because of metals or organics content).

The waste also could be LDR waste, regulated under 40 CFR 268 and WAC 173-303-140.

3.3.6 Discarded Commercial Chemical Products Exhibiting Dangerous-Waste Characteristics and/or Criteria

Many discarded chemical products handled in the 325 HWTUs are not listed in WAC 173-303-9903 but are still considered dangerous waste because these products exhibit at least one dangerous-waste characteristic and/or criterion (WAC 173-303-090 and WAC 173-303-100). This waste is included in the Part A, Form 3, under waste numbers D001 through D043, WT01, WT02, WP01, WP02, WP03, and WSC2. This waste typically is received in the manufacturer's original container.

Waste in this category is designated based on the process knowledge. As this waste is usually in the original container, information on the container label is used to identify the contents. This waste includes waste designated as dangerous waste and waste designated as extremely hazardous waste. The waste also could be LDR waste regulated under 40 CFR 268 and WAC 173-303-140.

3.4 DESCRIPTION OF CONFIRMATION PROCESS

325 HWTUs staff requires confirmation on all dangerous wastes before acceptance into the unit for treatment or storage. Generators must supply adequate information to characterize and manage the waste properly. The information includes waste-characterization data, waste volume, container information, and process information. A flow chart describing the confirmation process is shown in Table 3.1.

3.4.1 Pre-Shipment Review

Essentially all of the waste received at the 325 HWTUs is characterized before acceptance because the waste streams are generated from known processes. Unknown wastes are analyzed by the generator before they are accepted into the 325 HWTUs. Nearly all dangerous waste generated in the 325 Building is generated from analytical or research processes, both of which require detailed records.

The primary source of information used by the generator to complete the waste-tracking form is process knowledge. Other information sources could be used, so long as these sources provide detailed information on the chemical constituents present, chemical concentrations, material characteristics (e.g., physical state, ignitability), and the characterization requirements on the waste-tracking form.

If the MSDS, laboratory reagent, process knowledge, or analytical information provides insufficient information for a complete designation, the 325 HWTUs personnel require the generator to provide laboratory analyses before acceptance of the waste at the 325 HWTUs.

All process knowledge and analytical data that are used for waste characterization, LDR determination, and/or treatment activities at this TSD unit shall be documented and placed in the Operating Record.

3.4.1.1 Technical Review Process Overview

This program, administered by the 325 HWTUs personnel, is designed to obtain the waste information required pursuant to 40 CFR 264.13 and WAC 173-303-300. The review is conducted by qualified 325 HWTUs personnel using procedural guidelines and professional judgment. The reviewer(s), at their discretion, could request additional information or require additional analytical data before determining waste acceptability.

The first step in evaluating the acceptability of a waste is to obtain a general description of the wastes and to identify the waste codes and regulatory requirements that apply to the waste. Examples of forms before movement of the waste to the 325 HWTUs are:

- Disposal Request
- Radioactive Liquid Waste Transfer Request
- Waste Designation Form
- Waste Inventory Sheet
- Analytical Report, if available
- Waste Treatment Information Review Sheet
- Hazardous Waste Record
- Chain of Custody.

Examples of these forms are included at the end of this section. Any revision or update to these forms will be available at the 325 HWTUs for review or inspection.

Technical review of waste information is designed to accomplish three objectives: (1) determine if the 325 HWTUs can accept the material; (2) identify special handling procedures necessary to store the material safely before and during treatment; and (3) identify treatment technologies that meet waste-minimization efforts and applicable regulatory restrictions (e.g., LDR).

The waste-stream file includes the following information submitted by the generator and any literature reviews, records of conversations, etc., completed by the reviewer:

- copies of laboratory-test results, specific information on the process that generated the waste, MSDSs, etc., used to determine the components of the waste;
- waste characteristics, including compatibility, reactivity, ignitability, and corrosivity;
- documentation of conversations that clarify omissions or discrepancies;
- copies of data from additional analytical tests requested or conducted by the 325 HWTUs personnel; and
- container information, including number of containers, volume capacity of each of the containers, and type of material.

3.4.1.2 Review Criteria

The documentation and any required analyses must provide the information necessary to make decisions concerning waste acceptance or denial, storage requirements, treatments, legal/regulatory requirements, additional laboratory work, potential safety and handling hazards, and methods to verify that treatment is successful.

3.4.2 Verification

Where potential deficiencies exist in the information provided or where additional waste constituents might be expected to be present that do not appear on the waste-tracking form and supporting documentation, the generator is contacted by 325 HWTUs personnel for resolution. Upon approval, the

325 HWTUs personnel review the data package to determine whether or not the information is sufficient to complete the following:

- appropriate waste designation per WAC 173-303-070
- LDR per 40 CFR 268
- packaging, marking, and labeling requirements
- DOT compatibility groups, if applicable
- identification of a proper storage location within the 325 HWTUs.

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 325 HWTUs to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The information must be updated by the generator annually or when the waste stream changes, whichever comes first, or if the following occurs.

- The 325 HWTUs personnel have reason to suspect a change in the waste, based on inconsistencies in packaging or labeling of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.
- Parameters for the waste designation and/or characterization rationale are listed in Table 3.1.

Sampling and laboratory analysis or physical screening could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- waste streams generated onsite will be verified at 5 percent of each waste stream
- waste streams received for treatment or storage from non-PNNL offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- identification and characterization for unknown waste and spills within the unit.

Exceptions to physical screening for verification are:

- Shielded, classified, and remote-handled dangerous waste are not required to be physically screened; however, 325 HWTUs staff must perform a more rigorous documentation review and obtain the raw data to characterize the waste (<1 percent of current waste receipts).
- Waste which cannot be verified at the 325 HWTUs must be verified at the generating unit (e.g., large components, containers which cannot be opened, are greater than 20 mrem/hr, contain greater than 100 nCi/g of transuranic radionuclides, or will not fit into the NDE unit). Physical screening at the customer location consists of observing packaging of the waste.

If no location can be found to do the physical screening, then no screening is required.

- Wastes which are packaged by the 325 HWTUs authorized independent agent are considered to have met the physical screening requirements (e.g., PNNL-packaged waste which is transferred to PNNL-operated TSD units).

A bulk-waste stream (e.g., large volumes of waste from a single generating event, such as soil remediation from a single event) may be verified by screening the allowable rate of the total number of loads throughout the waste stream.

3.5 SELECTING WASTE-ANALYSIS PARAMETERS

State and federal regulations [WAC 173-303-300(2) and (5)(a); WAC 173-303-140; 40 CFR 268.7(a)] require that information be obtained, documented, and/or reported on wastes received by a TSD unit. These requirements include ensuring that only waste which meet 325 HWTUs permit requirements are accepted, and reporting the information required by WAC 173-303-380. In addition to providing a general description of the waste, the focus of the information collected for regulatory purposes is to ensure that the 325 HWTUs are permitted to accept the waste and treat it to LDR requirements.

The 325 HWTUs accept only wastes that have been characterized properly. Before receipt or acceptance of waste at the 325 HWTUs, generators must supply adequate information to characterize and manage wastes properly.

One of the most important aspects of operating the 325 HWTUs in a safe manner is to ensure that incompatible wastes are not mixed together. For the purposes of this document, wastes are considered compatible when mixed they do not: (1) generate extreme heat or pressure, fire, or explosion, or violent reaction; (2) produce uncontrolled toxic mists, dusts, or gases in sufficient quantities to threaten human health; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the device or facility containing the waste; or (5) through other like means threaten human health or the environment.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- 5 percent waste verification for PNNL-generated waste
- 10 percent waste verification for non-PNNL-generated waste identification and characterization for unknown waste and spills within the unit.

3.5.1 Parameter Selection Process

The selection of analytical parameters is based on the State of Washington's *Dangerous Waste Regulations*, WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

3.5.2 Criteria and Rationale for Parameter Selection

Waste-testing parameters and the rationale for these parameters are summarized in Table 3.1. Testing parameters for each type of waste were selected to obtain data sufficient to designate the waste properly under WAC 173-303-070, meet requirements for Land Disposal Restrictions (LDR) (refer to Section 3.7.2), and to manage the waste properly. If information on the source of the waste is available, then all parameters might not be required, e.g., exclusion of testing for pesticides from a metal-machining operation.

Some of the analytical screening parameters that could be used for waste received at the 325 HWTUs are as follows.

- Physical description – used to determine the general characteristics of the waste. This facilitates subjective comparison of the sampled waste with previous waste descriptions or samples. Also, a physical description is used to verify the observational presence or absence of free liquids.

- pH screen – used to identify the pH and corrosive nature of an aqueous or solid waste, to aid in establishing compatibility strategies, and to indicate if the waste is acceptable for treatment and/or storage in the 325 HWTUs.

- Cyanide screen – used to indicate whether the waste produces hydrogen cyanide upon acidification below pH 2.

- Sulfide screen – used to indicate if the waste produces hydrogen sulfide upon acidification below pH 2.

- Halogenated hydrocarbon content screen – used to indicate whether chlorinated hydrocarbons or polychlorinated biphenyls (PCBs) are present in waste and to determine if the waste needs to be managed in accordance with the regulations prescribed in the *Toxic Substance Control Act of 1976.*

- Ignitability screen – used to identify waste that must be managed and protected from sources of ignition or open flame.

3.6 SELECTING SAMPLING PROCEDURES

Because of physical variations of the waste that could be received at 325 HWTUs, sampling methodologies differ among the waste streams. The specific sampling methods and equipment used will vary with the chemical and physical nature of the waste material and the sampling circumstances. In all instances, the sampling methods adhere to guidance provided in SW-846 and other pertinent references published and accepted by the EPA. In general, aqueous liquids will be sampled using polyethylene samplers, organic liquids will be sampled using glass samplers, and solids will be sampled using polyethylene samplers. Typical sample-container requirements for aqueous and solid samples are provided in Table 3.1.

Representative samples of liquid wastes (vertical "core sections") will be obtained using a composite liquid-waste sampler (COLIWASA) or tubing, as appropriate. If a liquid waste has more than one phase, then each phase will be separated for individual testing and designation. Other waste types that may require sampling are sludges, powders, and granules. In general, nonviscous sludges will be sampled using a COLIWASA. Highly viscous sludges and cohesive solids will be sampled using a trier, as specified in SW-846 (EPA 1986). Dry powders and granules will be sampled using a thief, also as specified in SW-846 (EPA 1986). The sampling methods and equipment used are identified on Table 3.2. In all instances, sampling methods will conform to the representative sample methods referenced in WAC 173-303-110(2), i.e., American Society for Testing and Materials (ASTM) standards for solids and SW-846 for liquids.

The number of samples collected will depend on the amount of waste present and on the homogeneity of the waste, as determined by observation. In most instances, there will be only one container of waste present. In such instances, only one vertical composite sample will be collected (e.g., COLIWASA). If more than one container of a waste stream is present, then a random number of samples will be collected and analyzed statistically using the procedures specified in Section 9.2 of SW-846 (EPA 1986).

Generators or 325 HWTUs personnel are responsible for arranging all sampling and laboratory support for sample analysis. Samples are processed either onsite or offsite at one of several laboratories qualified to perform analysis of waste samples in accordance with SW-846 methods. Sampling methodologies are included in Table 3.2.

Table 3.1. Sample-Container Compatibility

Sample	Container		
	Plastic	Glass	Metal
Acids (except hydrofluoric acid)	*	*	
Hydrofluoric acid	*		
Alkali	*	*	
Solvents/solvent-contaminated oils	*[1]	*	*
Oils	*	*	*
Solids	*	*	*
Aqueous waste	*	*	*

* Sample compatible for storage in this type of container.
[1] Polypropylene may be used with some solvent/solvent-oil waste.

Table 3.2. Sampling Methods and Equipment

Material	Sampling Method	Sampling Equipment
Containerized liquids	SW-846	COLIWASA* or tubing
Extremely viscous liquid	ASTM D140-70	Tubing or trier
Crushed or powdered material	ASTM D364-75	Tubing, trier, auger, scoop or shovel
Soil or rock-like material	ASTM D420-69	Tubing, trier, auger, scoop or shovel
Soil-like material	ASTM D1452-65	Tubing, trier, auger, scoop or shovel
Fly ash-like material	ASTM D2234-76	Tubing, trier, auger, scoop or shovel
Containment systems	Wipe sample (OSHA 1977)	Filter paper and cleaning solution

* COLIWASA: composite liquid-waste sampler.

Generators or 325 HWTUs personnel also document the sampling activities and chain of custody and arrange sample shipment. Sampling information, custody records, and analytical results are submitted as part of the waste-tracking form data package submitted by the generator to the waste-management section for review, approval, and designation.

All sampling will conform to the protocols in SW-846 or an equivalent. These protocols are described briefly in the following paragraphs.

Sample-control procedures (i.e., chain-of-custody forms) are designed to ensure that each sample is accounted for at all times. The primary objectives of the sample-control procedures are as follows:

- Each sample received for analysis is uniquely identified.
- Correct samples are analyzed and are traceable to the applicable data records.
- Important and necessary sample constituents are preserved.
- Samples are protected from loss, damage, or tampering.
- Any alteration of samples during collection or shipping (e.g., filtration, preservation, breakage) is documented.
- A record of sample custody and integrity is established that will satisfy legal scrutiny.

Sample-container selection is crucial to sample quality. Considering waste compatibility, durability, volume, and analytical sensitivities, the containers listed in Table 3.1 are recommended to the generators for these efforts.

The basic sampling procedure is as follows:

- Obtain samples using a precleaned sampler.
- Fill sample containers in the following sequence: head-space volatile organics, volatile organics, semi-volatile organics, metals, ignitability, pH (corrosivity), reactivity, and radiochemical parameters.
- Label sample containers.
- Properly clean and decontaminate sample containers and the sampling hardware.
- Custody-seal and blister-wrap all sample containers, place wrapped containers in a leak-tight polyethylene bag, and place samples in a durable ice-filled cooler or comparable receptacle for transport to the laboratory or laboratory receiving facility. Radioactive dose rate permitting, custody-seal and blister-wrap will be used; otherwise, seals will be placed on secondary containers.
- Complete the chain-of-custody and request-for-analysis forms.
- Review all paperwork and enclose the forms in a leak-tight polyethylene bag taped to the underside of the cooler lid or attach paperwork to the container as appropriate.
- Seal and mark the coolers or comparable receptacles in accordance with applicable DOT requirements.

Transport coolers or appropriate containers to the analytical laboratory or laboratory receiving facility.

All samples are labeled with at least the following information:

- a unique alpha-numeric identifier
- date and time of collection
- sample collector's name
- preservatives used
- analyses requested.

Immediately after collection, samples are placed on blue ice or an equivalent, as required, in durable coolers or comparable receptacles for transport to the offsite laboratory. Before shipping or transfer, coolers or comparable receptacles are tightly sealed with tape and are custody-sealed along the front and back edges of the lids. Samples are transported to offsite laboratories by overnight courier to ensure delivery within 24 hours of sample collection as allowed or dependent upon sample holding times. All offsite sample collection, preparation, packaging, transportation, and analyses conform to the requirements of SW-846 or equivalent.

During all sampling activities, strict compliance with health physics, industrial hygiene, and safety standards is mandatory. Personnel are required to wear eye-, skin-, and respiratory-protection gear as dictated by industrial hygiene and health- physics personnel. If personnel accidentally contact waste material, decontamination procedures are to be performed immediately.

A chain-of-custody record accompanies samples being analyzed for chemical constituents at all times. The record contains the sample number, date and time of collection, sample description, and signatures of the collector and all subsequent custodians.

Transportation of samples is in accordance with the DOT and the DOE-RL requirements. Hazardous-waste samples are properly packaged, marked, and labeled. For offsite shipments, shipping papers are prepared in accordance with applicable DOT regulations.

All equipment used to sample waste materials is disposable or designed for easy decontamination. Cleanable equipment is thoroughly decontaminated before reuse. Decontamination solutions are managed as hazardous waste as appropriate, according to the threshold-contaminant levels exceeded in the sampled liquids. Disposable samplers will be used whenever possible to eliminate the potential for cross-contamination.

3.6.1 Sample Custody

The generators or 325 HWTUs personnel are responsible for initiating and following chain-of-custody form. Generators initiate sample-custody records in the field at the time samples are collected. A chain-of-custody form is used to document sample-collection activities, including sampling site, sample identification, number of samples, and date and time of collection. Additionally, the form documents the chain of custody including the names of responsible individuals and the dates and times of custody transfers.

3.6.2 Sample Receipt and Storage

Samples are received at a qualified contracted laboratory or laboratory receiving facility by a sample custodian. This individual carefully reviews received samples and documentation for compliance with sampling and documentation requirements, such as type and condition of container, sample preservation, collection date, and chain-of-custody forms. The sample custodian signs and dates the chain-of-custody form after verifying that all samples submitted are listed and that the required information is listed on the form. The sample custodian places an identification number on each sample and returns the samples to a refrigerator, if required, designated for storage of samples requiring analysis, as required. The sample custodian stores and secures the samples appropriately (e.g., in a locked refrigerator). Based on the type of sample and analysis requested, special procedures for sample handling, storage, and distribution could be specified.

3.7 SAMPLE DISTRIBUTION

Where practical, chain-of-custody documentation for samples continues throughout the analytical process. After logging in and storing the samples, the sample custodian distributes sample documentation, which lists sample numbers and analyses to be performed, to the appropriate analysts and technical leaders. On completion of analyses, results are submitted to the generators or 325 HWTUs personnel along with QA/QC information.

3.7.1 Field Analytical Methods

Analytical methods employed to verify or characterize waste are of two types: fingerprint analysis and laboratory analysis. Fingerprint analysis is used primarily to verify waste characteristics of waste received from offsite. Laboratory analytical methods will be employed to establish waste identity and characteristics and verify waste characteristics when 325 HWTUs personnel determine it is necessary.

3.7.1.1 Fingerprint Sampling Analytical Methods

A representative sample will be taken of the waste (if more than one phase is present, each phase must be tested individually), and the following field tests will be performed:

- Reactivity – HAZCAT™ oxidizer, cyanide, and sulfide tests. These tests will **not** be performed on materials known to be organic peroxides, ethers, and/or water-reactive compounds.

- Flashpoint/explosivity by HAZCAT™ flammability Procedure B, explosive-atmosphere meter, or a closed-cup flashpoint-measurement instrument.

- pH - by pH meter or pH paper (SW-846 9041). This test will not be performed on non-aqueous materials (i.e., organic solvents).
- Halogenated organic compounds - by organic-vapor analyzer with a flame ionization detector, Chlor-D-Tect kits, or the HAZCAT™ fluoride, chloride, bromide, and iodide tests.
- Volatile organic compounds – by gas chromatograph/mass spectrometer or gas chromatograph (GC) with a photo- or flame-ionization detector.

If the waste meets the parameters specified in the documentation, then confirmation of designation is complete. If the waste does not meet these parameters, then proceed to the next step.

1. Sample and analyze the materials in accordance with WAC 173-303-110.
2. Reassess and re-designate the waste. Repackage and label as necessary or return to the generator.
3. Data obtained through the waste-verification process will be used to verify the accuracy of the waste designation for waste received at 325 HWTUs.

3.7.2 LDR Waste-Analysis Requirements

The *Hazardous and Solid Waste Amendments of 1984* prohibit the land disposal of certain types of waste that are subject to RCRA. Many of the waste types stored at 325 HWTUs fall within the purview of these LDRs. Information presented below describes how generators and 325 HWTUs personnel characterize, document, and certify waste subject to LDR requirements.

3.7.2.1 Waste Characterization

Shipments of waste shall not be accepted from any off-site generator without LDR certification, if applicable, accompanying each shipment. For waste received from off-site generators, the TSD unit shall receive the information pursuant to 40 CFR 268 regarding LDR wastes. The generator must sign the LDR certification.

Before being received at 325 HWTUs, the RCRA waste characteristics, the level of toxicity characteristics, and the presence of listed, wastes are determined during the physical and chemical analyses process. This information allows waste-management personnel to make all LDR determinations accurately and complete appropriate notifications and certifications.

3.7.2.2 Sampling and Analytical Procedures

The LDR characterization and analysis may be performed as part of the waste-characterization and analysis process. If waste is sampled and analyzed for LDR characterization, then only EPA or equivalent methods are used to provide sufficient information for proper management and for decisions regarding LDRs pursuant to 40 CFR 268.

3.7.2.3 Frequency of Analysis

Before acceptance and during the waste-characterization and analysis process, all LDR characterizations and designations are made. The characterization and analysis process is performed when a disposal request is submitted for waste pick-up, unless there is insufficient data or if the waste stream has changed. Instances where sampling and laboratory analysis may be required to determine accurate LDR determinations include the following:

- when waste-management personnel have reason to suspect a change in the waste based on inconsistencies in the waste-tracking form, packaging, or labeling of the waste

- when the information submitted previously by a generator does not match the characteristics of the waste that was submitted
- when the offsite TSD facility rejects the waste because the fingerprint samples are inconsistent with the waste profile provided by 325 HWTUs, which was established using generator information.

3.7.2.4 Documentation and Certification

The 325 HWTUs have and will continue to receive and store LDR waste. Because 325 HWTUs personnel determine designations and characterization, including LDR determinations, all notifications and certifications, as required by 40 CFR 268, are prepared by PNNL qualified staff for PNNL-generated waste. The 325 HWTUs staff collect from the generator(s) the information pursuant to 40 CFR 268 regarding LDR wastes, the appropriate treatment standards, whether the waste meets the treatment standards, and certification that the waste meets the treatment standards, if necessary, as well as any other data, e.g., documented process knowledge and waste-analyses data that support the generator's determinations. If any of the requested information is not supplied by the generator, then the 325 HWTUs personnel complete and transmit all subsequent information regarding LDR wastes, pursuant to 40 CFR 268. The notification and certifications are submitted to onsite and offsite TSD units during the waste-shipment process. Additionally, any necessary LDR variances are prepared and submitted by PNNL qualified staff.

The 325 HWTUs staff requires applicable LDR information/notifications from non-PNNL generators.

Where an LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268, Subpart D, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, 325 HWTUs provides to the onsite and offsite TSD a written notice that includes the following information:

- EPA hazardous-waste number
- the corresponding treatment standards and all applicable prohibitions set forth in WAC 173-303, 40 CFR 268.32, or RCRA Section 3004(d)
- the manifest number associated with the waste
- all available waste-characterization data.
- identification of underlying hazardous constituents.

In instances where 325 HWTUs determines that a restricted waste is being managed that can be land-disposed without further treatment, 325 HWTUs staff submits a written notice and certification to the onsite or offsite TSD where the waste is being shipped, stating that the waste meets applicable treatment standards set forth in WAC 173-303-140 (40 CFR 268, Subpart D), and the applicable prohibition levels set forth in 40 CFR 268.32 or RCRA Section 3004(d). The notice includes the following information:

- EPA hazardous-waste number
- corresponding treatment standards and applicable prohibitions
- waste-tracking number associated with the waste
- all available waste-characterization data
- identification of underlying hazardous constituents.

The certification accompanying any of the previously described notices is signed by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I *submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.*

Copies of all notices and certifications described are retained at the TSD unit for at least 5 years from the date that the waste was last sent to an onsite or offsite TSD unit. After that time, the notices and certifications are sent to Records Storage.

3.7.3 Waste Analysis for Spills and Unknowns

In the event of a spill or release of dangerous waste within 325 HWTUs, the following steps will be implemented:

1. The identification number on the leaking container will be determined based on visual inspection. If the container(s) involved cannot be approached, the location of the container involved and the associated storage-cell designations can be determined from a distance.
2. The container-identification number or container-location number will be entered into 325 HWTUs inventory database to determine the Disposal Request number.
3. The hard copy of the Disposal Request or a computerized information printout for the container, which contains all applicable information regarding the contents of the container, will be located. The hazards associated with the waste will be determined before exercising the emergency-response procedures outlined in Attachment 36, Chapter 7.0.
4. Respond to the spill in accordance with the requirements of Attachment 36, Chapter 7.0. The Attachment 36, Chapter 7.0, Contingency Plan is implemented if there is a threat to human health or the environment.
5. A new Disposal Request will be filled out using the information from the original Disposal Request and information from any spill-cleanup kits or absorbents. The waste will then be designated and characterized.

If a leak or other liquid is discovered in the 325 HWTUs that cannot be tracked to a specific container because of safety or logistics reasons, then the procedures outlined in Attachment 36, Chapter 7.0, *325 HWTUs Contingency Plan* would be implemented for responding to an "unknown" chemical release. The residues, including cleanup absorbents, of such a release would be sampled and analyzed in accordance with the requirements in the Attachment 36, Chapter 7.0, determine the characteristics of the waste residue as defined by WAC 173-303-070. Sampling and analysis of the residues will include pH, metals, volatile organics, and semi-volatile organics analyses, as required.

Based on the information gathered from the laboratory analysis, a new Disposal Request for the waste cleanup will be filled out. The waste will then be designated and characterized.

3.8 SELECTING A LABORATORY, LABORATORY TESTING, AND ANALYTICAL METHODS

Laboratory selection is limited; only a few laboratories are equipped to handle mixed waste because of special equipment and procedures that must be used to minimize personnel exposure. Preference will be given to the 325 Analytical Chemistry Laboratory (ACL) and then to other laboratories on the Hanford Facility that exhibit demonstrated experience and capabilities in three major areas:

1. comprehensive written QA/QC program based on DOE-RL requirements specifically for that laboratory

2. audited for effective implementation of QA/QC program
3. participate in performance-evaluation samples to demonstrate analytical proficiency.

All laboratories (onsite or offsite) are required to have the following QA/QC documentation.

- Daily analytical data generated in the contracted analytical laboratories is controlled by the implementation of an analytical laboratory QA plan.
- Before commencement of the contract for analytical work, the laboratory will, if requested, have their QA plan available for review. At a minimum, the QA plan will document the following:
- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

3.8.1 Testing and Analytical Methods

325 HWTUs customers will need to conduct analyses to provide information to fill out Disposal Requests, and to determine compatibility, safety, and operating information. As needed, 325 HWTUs staff also will conduct analyses to determine completeness of information and if treatment and verification material meets the acceptance criteria for either disposal via the RLWS, treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of the offsite TSD facility. Examples of the Waste-Treatment Verification form and the RLWS Disposal Log are included at the end of this section for informational purposes only. Any revision or update of these forms will be available at the 325 HWTUs for review and inspection. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information.

All testing is performed by chemists and/or appropriate analytical personnel working under approved QA guidelines. Analytical methods will be selected from those that are used routinely by the Analytical Chemistry Laboratory (ACL) in located in the 325 Building or the various Hanford Facility analytical laboratories.

The 325 HWTUs manages limited quantities of dangerous waste; therefore, deviations from SW-846 protocols may occur during its analysis. Many of the deviations from the SW-846 protocols arise from the radioactive nature of the samples handled.

Analytical methods will be selected from those that are routinely used by the ACL in 325 HWTUs, or by the various Hanford Facility analytical laboratories.

3.8.2 Quality Assurance and Quality Control

PNNL is committed to maintaining a high standard of quality for all of its activities. A crucial element in maintaining that standard is a quality-assurance program that provides management controls for conducting activities in a planned and controlled manner and enabling the verification of those activities.

Activities pertaining to waste analysis include, but are not limited to, the preparation, review, and control of procedures and the selection of analytical laboratories. The PNNL QA manual has administrative procedures that establish requirements and provide guidance for the preparation of analytical and technical (i.e., sampling, chain-of-custody, work processes) procedures, as well as other administrative procedures. Procedures undergo a review cycle and, once issued, are controlled to ensure that only current copies are used.

The primary purpose of waste testing is to ensure that the waste is properly characterized in lieu of process-knowledge data, in compliance with RCRA requirements for general waste analysis [WAC 173-303-300(2); 40 CFR 264.13]. Waste testing also is performed to ensure the safe management of waste being stored, proper disposition of residuals from incidents that might occur, and control of the acceptance of waste for storage. The specific objectives of the waste-sampling and analysis program at 325 HWTUs are as follows:

- Identify the presence of waste that is substantially different from waste currently stored.
- Provide a detailed chemical and physical analysis of a representative sample of the waste, before the waste is accepted at or transferred from 325 HWTUs to an offsite TSD facility, to ensure proper management and disposal.
- Provide an analysis that is accurate and current to ensure that waste is properly treated and disposed of.
- Ensure safe management of waste undergoing storage at 325 HWTUs.
- Ensure proper disposal of residuals.
- Ensure compliance with LDRs.
- Identify and reject waste that does not meet 325 HWTUs acceptance requirements (e.g., incomplete information).
- Identify and reject waste that does not meet specifications for 325 HWTUs (i.e., Part A, Form 3, listing, restricted from storage at 325 HWTUs).

3.8.3 Quality Assurance and Quality Control Objectives

The objectives of the QA/QC program are two-fold. The first objective is to control and characterize any errors associated with the collected data. Quality-assurance activities, such as the use of standard procedures for locating and collecting samples, are intended to limit the introduction of error. Quality-control activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets, are intended to provide the information required to characterize any errors in the data. Other QC activities, such as planning the QC program and auditing ongoing and completed activities, ensure that the specified procedures are followed and that the QA information needed for characterizing error is obtained.

The QA/QC control program for sampling and analysis related to this TSD unit must, at a minimum, comply with the applicable Hanford Site standard requirements and regulatory requirements. All analytical data shall be defensible and shall be traceable to specific, related quality control samples and calibrations.

The second QA/QC objective is to illustrate that waste testing has been performed according to specification in this waste-analysis plan. The QA/QC activities will include the following:

- Field inspections – performed by a PNNL QA officer or designee, depending on the activity. The inspections primarily are visual examinations but might include measurements of materials and equipment used, techniques employed, and the final products. The purpose of these inspections is to verify that a specific guideline, specification, or procedure for the activity is completed successfully.
- Field testing – performed onsite by the QA officer (or designee) according to specified procedures.
- Laboratory analyses – performed by onsite or offsite laboratories on samples of waste. The purpose of the laboratory analyses is to determine constituents or characteristics present and the concentration or level.
- Checklists – required for crucial inspections. Checklists are filled out during the course of inspection to document inspection results.
- Instrument calibration – required for maintaining records of calibration of all instruments used to perform surveying, field testing, and laboratory analyses.

3.8.4 Sampling Objectives

The data-quality objectives (DQO) for the waste sampling and data analyses are as follows:

- Determine if waste samples are representative of the contents of the containers at the time the samples were taken.
- Determine if waste samples are representative of long-term operations affecting 325 HWTUs.
- Determine if waste accepted for storage is within the RCRA permit documentation limitations.
- Determine if waste accepted for storage meets the requirements of 325 HWTUs waste-acceptance criteria.
- Determine if waste accepted for storage meets the information provided by the generator.

3.8.5 Data Collection/Sampling Objectives

For determining the toxicity characteristics, SW-846 Method 1311 should be followed wherever possible. The Permittee may use the total metals test and assumption of complete extractability as described in Method 1311. A reduced sample size may also be utilized for As Low As Reasonably Achievable (ALARA) purposes as recommended by the "*Joint NRC/EPA Guidance on Testing Requirements of Mixed Radioactive and Hazardous Waste*" (62 FR 62079).

For a given parameter, analytical methods are selected and may be modified as long as the applicable precision, accuracy, and quantitation limit (or minimum detectable activity) necessary to meet the regulatory or decision limit can be met or improved.

The acquired data need to be scientifically sound, of known quality, and thoroughly documented. The DQOs for the data assessment will be used to determine compliance with national quality standards, which are as follows:

- Precision – The precision will be the agreement between the collected samples (duplicates) for the same parameters, at the same location, and from the same collection vessel.
- Representativeness – The representativeness will address the degree to which the data accurately and precisely represent a real characterization of the population, parameter variation at a sampling point,

sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness will be addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected

The representativeness of selected media has been defined accurately.

- The sampling and analytical methodologies are appropriate.
- The environmental conditions at the time of sampling are documented.
- Completeness – The completeness will be defined as the capability of the sampling and analytical methodologies to measure the contaminants present in the waste accurately.
- Comparability – The comparability of the data generated will be defined as the data that are gathered using standardized sampling methods, standardized analyses methods, and quality-controlled data-reduction and validation methods.

3.8.6 Analytical Objectives

Analytical data will be communicated clearly and documented to verify that laboratory data-quality objects are achieved.

3.8.7 Field Quality Assurance and Quality Control

Internal QA/QC checks will be established by submitting QA and QC samples to the analytical laboratory. The number of field QA samples will be approximately 5 percent of the total number of field samples taken. The five percent criterion commonly is accepted for a minimum number of QA/QC samples. The types and frequency of collection for field QA samples are as follows:

- Field Blanks – A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. Field blanks are prepared and preserved using sample containers from the same lot as the other samples collected that day. A sample blank is used to document contamination attributable to shipping and field-handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.
- Field Duplicates – defined as independent samples collected in such a manner that the samples are equally representative of the variables of interest at a given point in space and time. The laboratory will use the field duplicate as laboratory duplicate and/or matrix spikes. Thus, for the duplicate sample, there will be the normal sample analysis, the field duplicate, and the laboratory duplicate (inorganic analysis). Duplicate samples will provide an estimate of sampling precision.

3.8.8 Laboratory Quality Assurance and Quality Control

All analytical work, whether performed in-house by PNNL's ACL or by outside, independent laboratories, is defined and controlled by a Statement of Work, prepared in accordance with administrative procedures. The daily quality of analytical data generated in the analytical laboratories will be controlled by the implementation of an analytical laboratory QA plan. At a minimum, the plan will document the following:

- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

The types of internal quality-control checks are as follows:

- Method Blanks – Method blanks usually consist of laboratory reagent-grade water treated in the same manner as the sample (i.e., digested, extracted, distilled) that is analyzed and reported as a standard sample would be reported.

- Method Blank Spike – A method blank spike is a sample of laboratory reagent-grade water fortified (spiked) with the analytes of interest, which is prepared and analyzed with the associated sample batch.

- Laboratory Control Sample – A QC sample introduced into a process to monitor the performance of the system.

- Matrix Spikes – An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. Matrix spikes will be performed on 5 percent of the samples (1 in 20) or one per batch of samples.

- Laboratory Duplicate Samples – Duplicate samples are obtained by splitting a field sample into two separate aliquots and performing two separate analyses on the aliquots. The analyses of laboratory duplicates monitor the precision of the analytical method for the sample matrix; however, the analyses might be affected by nonhomogeneity of the sample, in particular, by nonaqueous samples. Duplicates are performed only in association with selected protocols. Duplicates are performed only in association with selected protocols. Laboratory duplicates are performed on 5 percent of the samples (1 in 20) or one per batch of samples. If the precision value exceeds the control limit, then the sample set must be reanalyzed for the parameter in question.

- Known QC Check Sample – This is a reference QC sample as denoted by SW-846 of known concentration, obtained from the EPA, the National Institute of Standards and Technology, or an EPA-approved commercial source. This QC sample is taken to check the accuracy of an analytical procedure. The QC sample is particularly applicable when a minor revision or adjustment has been made to an analytical procedure or instrument. The results of a QC-check-standard analysis are compared with the true values, and the percent recovery of the check standard is calculated.

3.8.8.1 PNNL Analytical Chemistry Laboratory QA/QC

PNNL's analytical chemistry laboratory may need to be used to analyze samples of high-activity dangerous waste. It has a rigorous QA plan that ensures that data produced are defensible, scientifically valid, and of known precision and accuracy, and meets the requirements of its clients, i.e., the 325 HWTUs.

3.8.8.2 Offsite Laboratory QA/QC

When it is necessary to send samples to an independent laboratory, contracts are not awarded until a pre-award evaluation of the prospective laboratory has been performed. The pre-award evaluation process involves the submittal of its QA plan to the waste-analysis project manager and the QA officer for approval. It also may involve a site visit by QA personnel and a technical expert, or may consist of a review of the prospective laboratories' QA/QC documents and records of surveillances/inspections, audits, nonconformances, and corrective actions maintained by PNNL or other Hanford Facility contractors.

3.8.9 Record-Keeping

Records associated with the waste-analysis plan and waste-verification program are maintained by the waste-management organization. A copy of the Disposal Request for each waste stream accepted at 325 HWTUs is maintained as part of the operating record. Generators maintain their sampling and analysis records. The waste-analysis plan will be revised whenever regulation changes affect the waste-analysis plan.

3.9 SELECTING WASTE RE-EVALUATION FREQUENCIES

Some analysis will be needed to verify that waste streams received by the 325 HWTUs conform to the information on the Disposal Request and or the waste analysis sheet supplied by the generator. If discrepancies are found between information on the Disposal Request, hazardous-waste manifest, shipping papers, waste- analysis documentation and verification analysis, then the discrepancy will be resolved by:

1. returning waste to the generator, or sample and analyze the materials in accordance with WAC 173-303-110; and/or
2. reassessing and re-designating the waste; repackaging and labeling as necessary or return to the generator.

Periodic re-evaluation provides verification that the results from the initial verification are still valid. Periodic re-evaluation also checks for changes in the waste stream.

Exceptions to physical screening for verification are:

- Shielded, classified, and remote-handled dangerous waste are not required to be physically screened; however, 325 HWTUs staff must perform a more rigorous documentation review and obtain the raw data to characterize the waste (< 1 percent of current waste receipts).
- Wastes which cannot be verified at the 325 HWTUs must be verified by the generator (e.g., large components, containers which cannot be opened, are greater than 20 mrem/h, contain greater than 10 nCi/gram of transuranic radionuclides, or will not fit into the NDE unit).

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 325 HWTUs to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The information must be updated by the generator annually or when the waste stream changes, whichever comes first, or if the following occurs.

- The 325 HWTUs personnel have reason to suspect a change in the waste, based on inconsistencies in packaging or labeling of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis are required:

- inadequate information on PNNL-generated waste
- waste streams generated onsite will be verified at 5 percent of each waste stream
- inadequate information before waste was shipped or discrepancy discovered
- waste streams received for treatment from offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- identification and characterization for unknown waste and spills.

3.10 SPECIAL PROCEDURAL REQUIREMENTS

3.10.1 Procedures for Receiving Shipments

The generator is responsible for identifying waste composition accurately and arranging for the transport of the waste. A copy of each transfer-tracking form and any other pertinent operating records are maintained by the 325 HWTUs for 5 years. The waste-tracking methods are as follows.

- **Inspection of Transfer Papers/Documentation** – The necessary transfer papers for the entire transfer are verified (i.e., signatures are dated, all waste containers included in the transfer are accounted for and correctly indicated on the transfer documentation, there is consistency throughout the different transfer documentation, and the documentation matches the labels on the containers).
- **Inspection of Waste Containers** – The condition of waste containers is checked to verify that the containers are in good condition (i.e., free of holes and punctures).
- **Inspection of Container Labeling** – Transfer documentation is used to verify that the containers are labeled with the appropriate "Hazardous/Dangerous Waste" labeling and associated markings according to the contents of the waste container.
- **Acceptance of Waste Containers** – The 325 HWTUs personnel sign the transfer documents and retain a copy.

If transport will be over public roads (unless those roads are closed to public access during waste transport) or offsite, then a Uniform Hazardous Waste Manifest will be prepared identifying the 325 HWTUs as the receiving unit (Hanford Facility Permit Condition II.Q.1). The 325 HWTUs operations staff will sign and date each copy of the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 325 HWTUs. A copy of the manifest also will be retained in the 325 HWTUs operating records for 3 years.

For all shipments of dangerous waste to or from the 325 HWTUs, the Permittees shall comply with the applicable information in Conditions II.Q.1.h. and II.Q.2. of the Permit. For clarification, all dangerous waste must be transported in accordance with the unit specific provisions as outlined in the PNNL Operating Procedure for the 325 Building, in effect at the date of the transfer. With exception to, and in addition to, the packaging and transporting operations, shall be as follows:

The acceptance of all dangerous waste received at the 325 TSD Units will be dependent upon their packaging. Liquid waste containers accepted from other buildings to the 325 HWTUs shall have secondary containment with absorbent materials packed around the contents.

3.10.2 Response to Significant Discrepancies

The primary concern during acceptance of containers for storage is improper packaging or waste-tracking form discrepancies. Containers with such discrepancies are not accepted at the 325 HWTUs. Depending on the nature of the condition, such discrepancies can be resolved through the use of one or more of the following alternatives.

- Incorrect or incomplete entries on the Uniform Hazardous Waste Manifest or the onsite waste-tracking form can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.

- The waste packages can be held and the onsite generator or offsite waste generator requested to provide written instructions for use in correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- The onsite generator or offsite waste generator can be requested to correct the condition on the Hanford Facility before the waste is accepted.
- If a noncompliant dangerous waste package is received from an offsite waste generator, and the waste package is nonreturnable because of condition, packaging, etc., and if an agreement cannot be reached among the involved parties to resolve the noncompliant condition, then the issue will be referred to DOE-RL and Ecology for resolution. Ecology will be notified if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 325 HWTUs. The package(s) will be segregated from other waste.

3.10.3 Provisions for Non-Acceptance of Shipment

Before waste is brought into the 325 HWTUs, all associated documentation is inspected and verified for treatment and/or storage authorization. Any transfer of materials that the 325 HWTUs are not designed to treat and/or store neither are unloaded from the vehicle nor accepted for treatment or storage.

3.10.4 Activation of Contingency Plan for Damaged Shipment

If waste transfers arrive at the 325 HWTUs in a condition that presents a hazard to public health or the environment, the building emergency plan is implemented as described in Attachment 36, Chapter 7.0.

3.10.5 Tracking System

Upon generation or receipt into the 325 HWTUs, each container of waste is assigned a unique tracking number. This number is used to track the following information:

- a description and the quantity of each dangerous waste received and the method(s) and date(s) of storage or treatment in the 325 HWTUs, in accordance with WAC 173-303-380(2)
- the location of each dangerous-waste container stored in the unit and the quantity at each location, including cross-reference to any applicable manifest and/or waste-tracking numbers
- waste-analysis results.

This system effectively tracks waste containers as the containers move through treatment or storage at the 325 HWTUs. The information is retained as part of the 325 HWTUs operating record.

Sample-container selection is crucial to sample quality. When considering waste compatibility, durability, volume, and analytical sensitivities, the containers listed in Table 3.1 are recommended.

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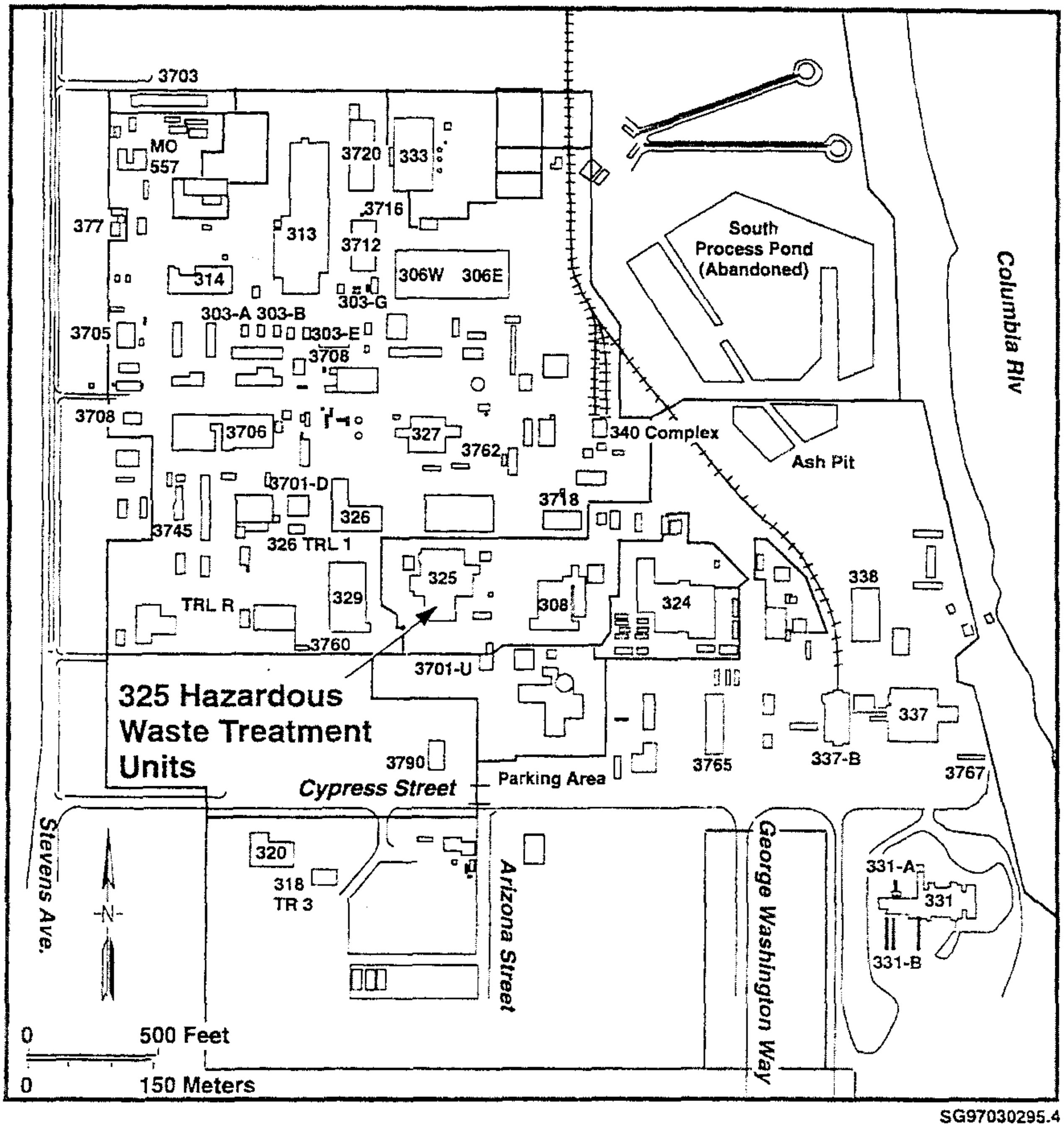
1

Figure 3.1. Drawings of the TSD Units



1 **Figure 3.2. Drawings of the TSD Units**

2

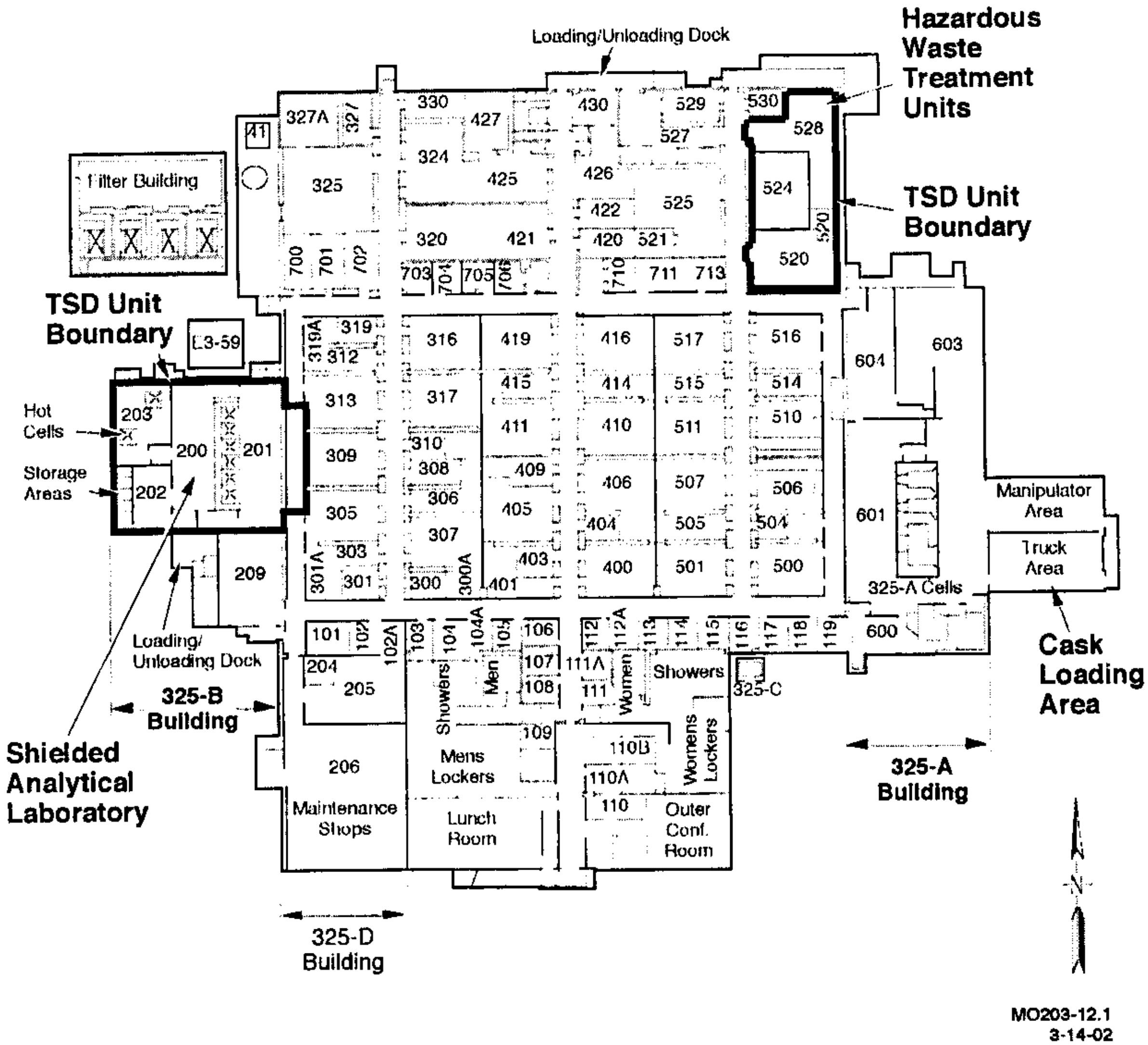
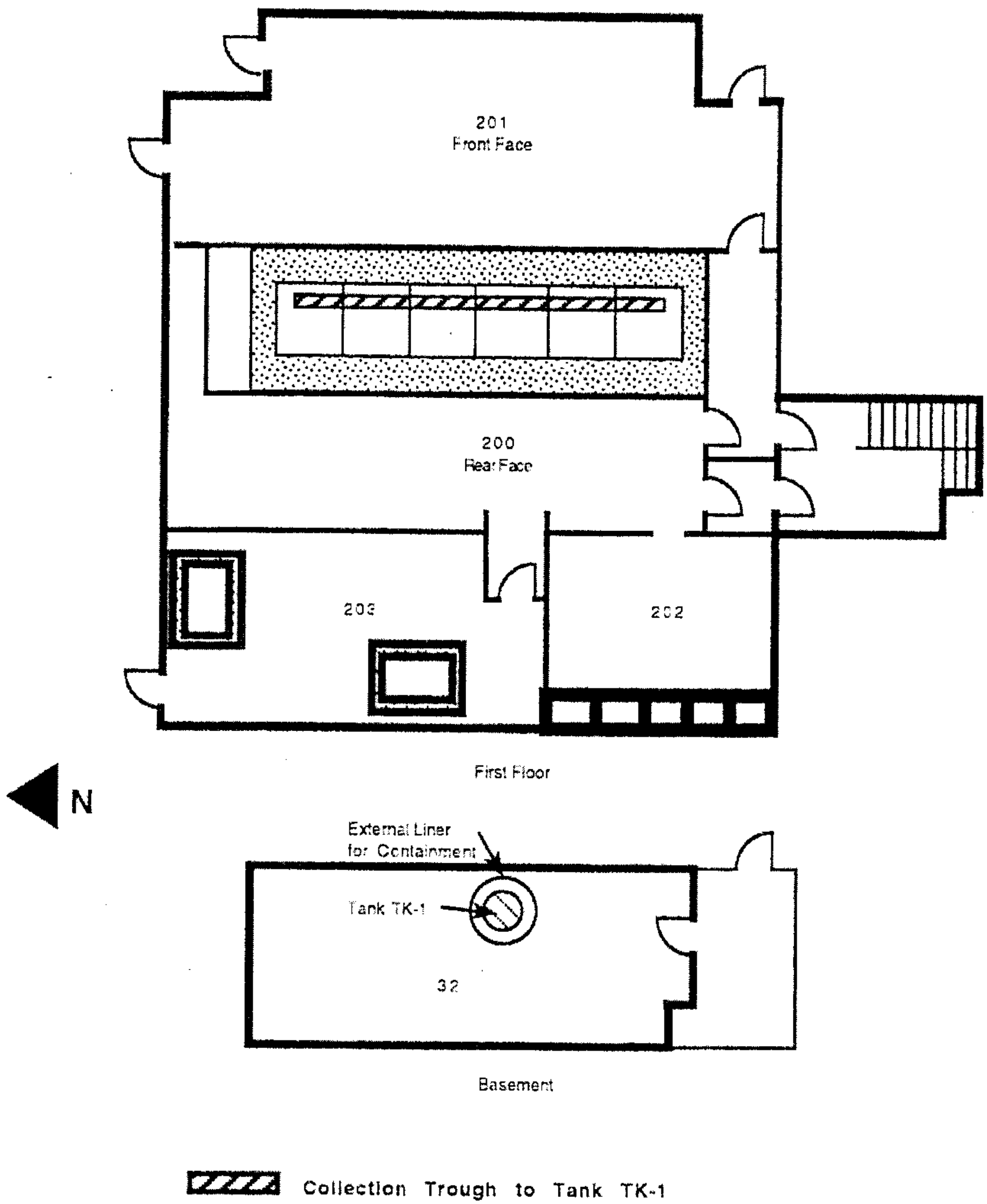
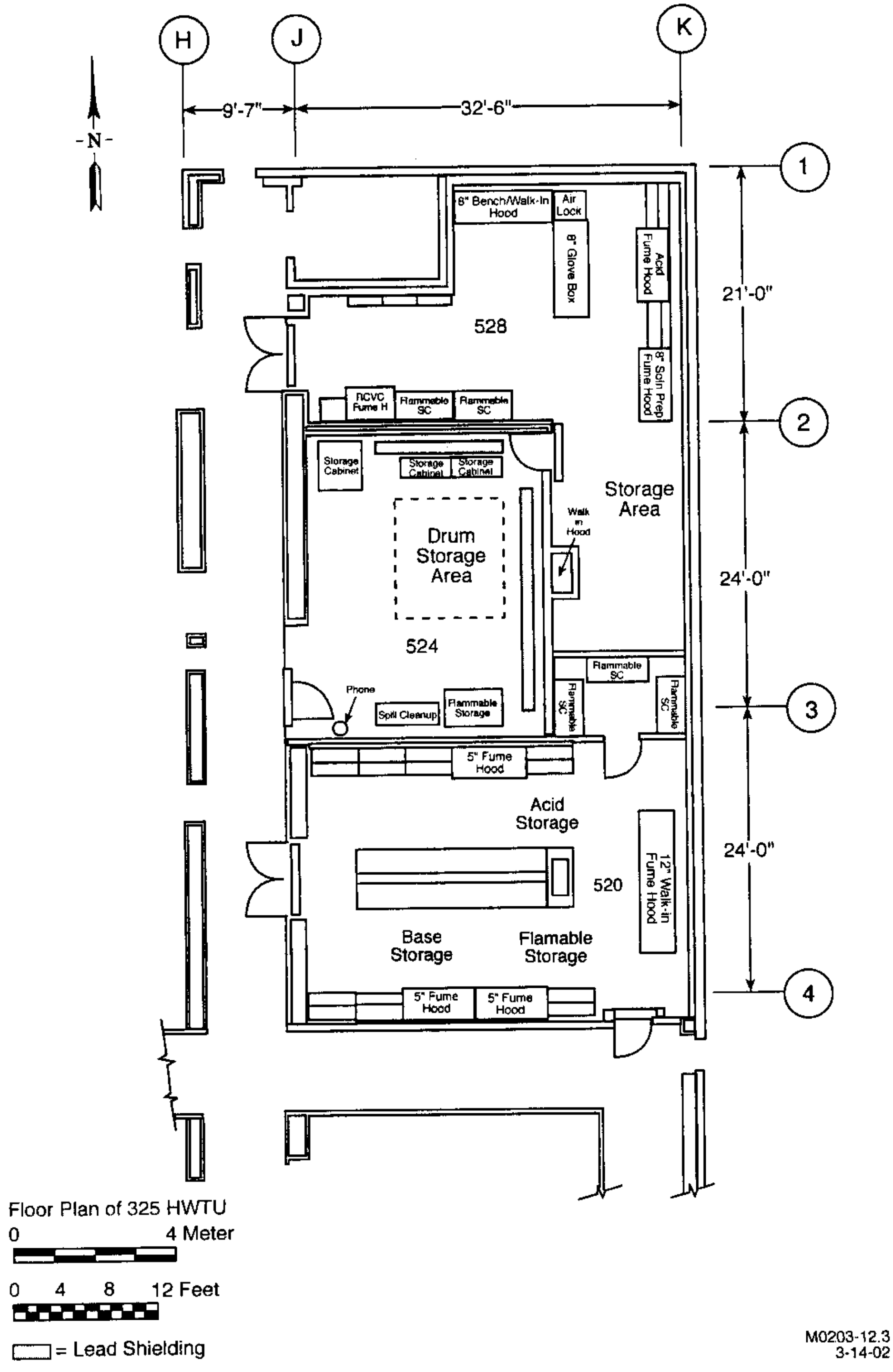


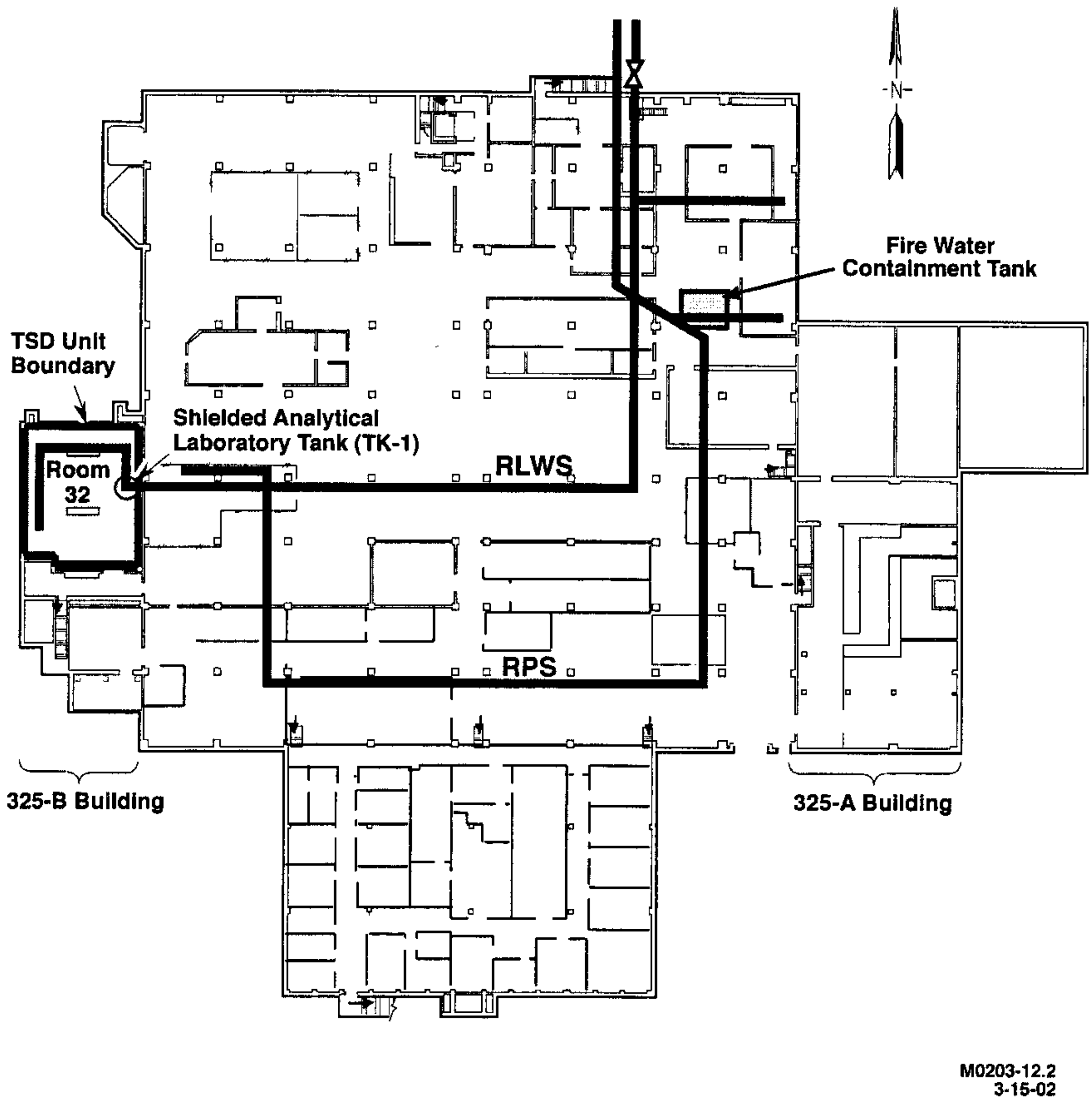
Figure 3.3. Floor Plan of SAL



1 **Figure 3.4. Drawings of the TSD Units**

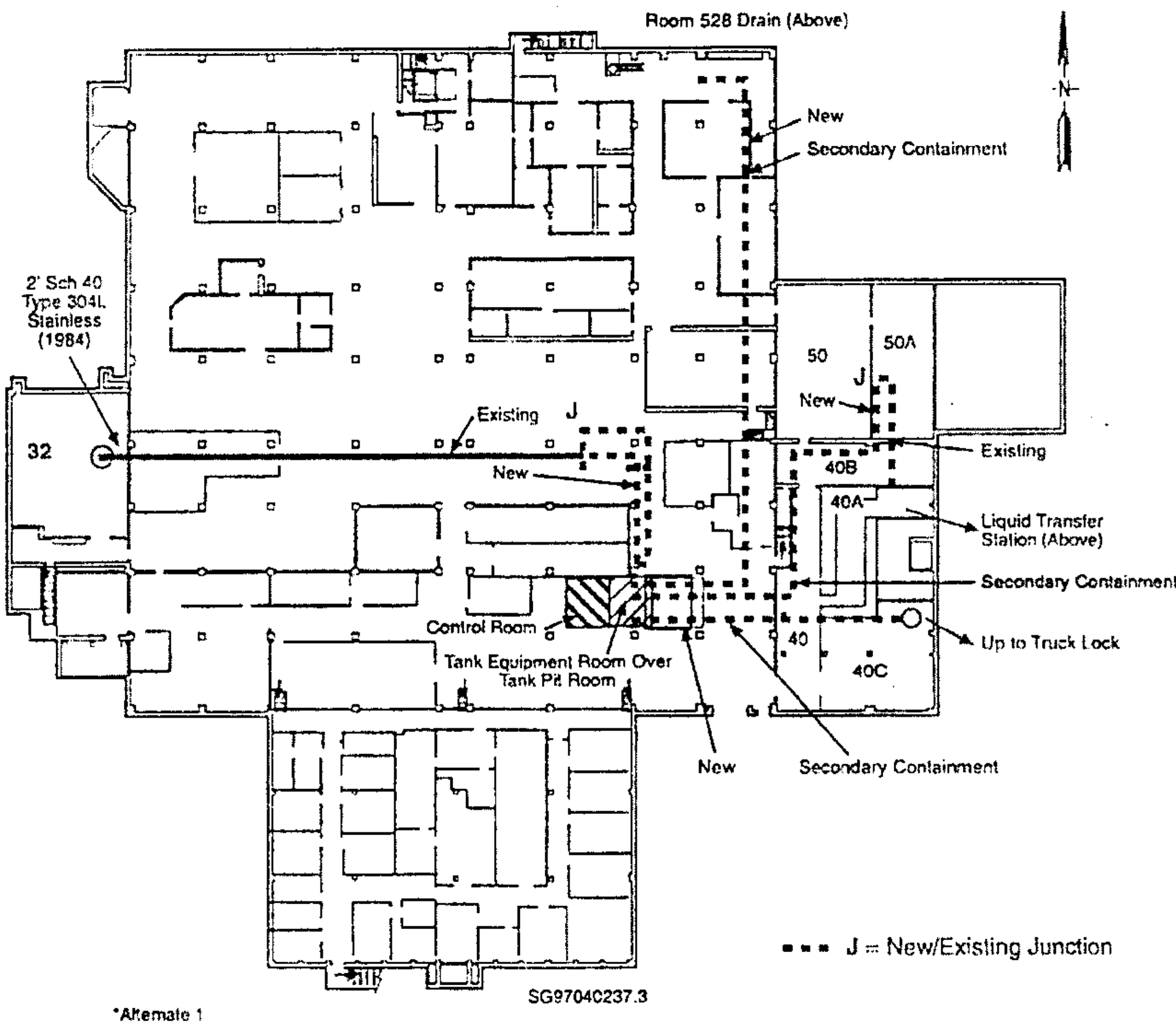


1 **Figure 3.5. Location of 325 HWTUs: Basement Areas**



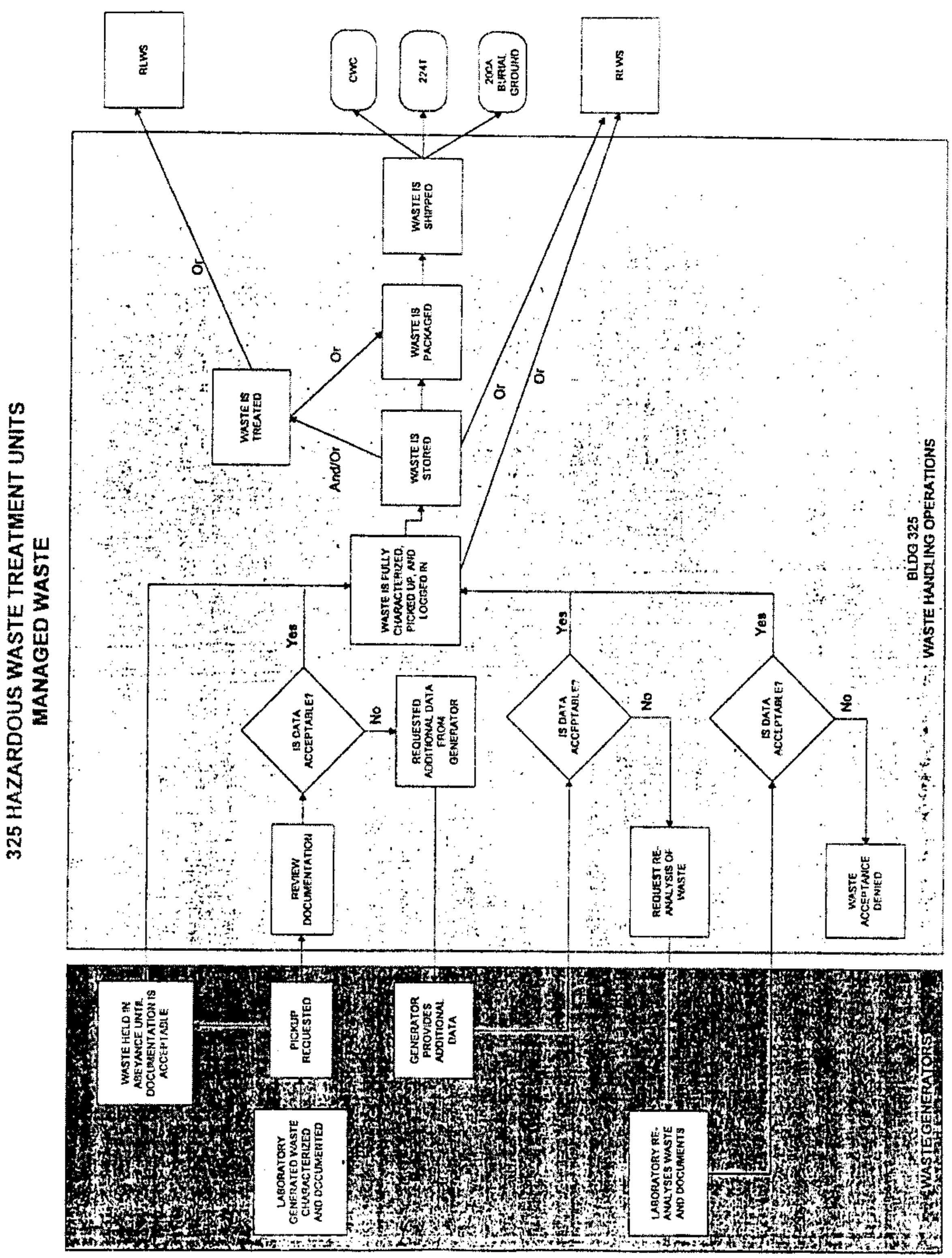
1 **Figure 3.6. 325 RLWS Modifications**

2



Basement Plan

Figure 3.7. Flow Chart of the Confirmation Process



1 **Table 3.3. Summary of Test Parameters, Rationales, and Methods**

Waste-management unit type	Waste parameter	Media type	Rationale for selection
Containers	PH	L, SI	Identify waste that might compromise containers. RLWS waste-acceptance criteria for liquids.
	Flash point	L	Identify appropriate storage conditions (i.e., compatible waste storage). RLWS waste-acceptance criteria for liquids.
	Total and amenable cyanide or sulfide	L, SI, So	Identify potential reactivity and appropriate storage conditions.
	Halogenated hydrocarbon content	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Polycyclic aromatic hydrocarbon content	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Free liquids	SI	Identify/verify land-disposal restrictions for liquid waste.
	PCBs	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Reactivity	L, SI, So	Identify potential reactivity and appropriate storage conditions.
	Halides	L	RLWS waste-acceptance criteria.
	TCLP constituents	L, SI, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
Tanks	PH	L, SI	Identify waste that might compromise tank-system integrity. RLWS waste-acceptance criteria for liquids.
	Flash point	L	Identify appropriate storage conditions (i.e., compatible waste storage). RLWS waste-acceptance criteria for liquids.
	Total and amenable cyanide or sulfide	L, SI, So	Identify potential reactivity.
	Reactivity	L	Identify potential reactivity.
	Halides	L	RLWS waste-acceptance criteria.
	TCLP constituents	L	Identify constituents for compliance with Hanford Facility RCRA Permit.

L = liquid
PCB = polychlorinated biphenyls
RLWS = radioactive liquid waste system
SI = sludge
So = solid
TCLP = toxicity characteristic leaching procedure

Battelle
Pacific Northwest Laboratories

CHEMICAL DISPOSAL/RECYCLE REQUEST

Page 1 of ______

Received/Approved ______

Request No. ______

Picked Up/Labeled ______

Entered ______

Send Completed Form to:

- 300 Area Nonradioactive Materials: TJ Murphy, 372-2745, P8-45
- 3000 Area Nonradioactive Materials: EL Grohs, 375-6309, K3-69
- Radioactive Mixed Waste: MJ Blaes, 372-3517, P7-68

☐ 1830 ☐ 1831 | Org. Code: | Work Package No.:

Level 3 Manager Signature/Date:

Technical Contact/Phone No. (If other than Requester)

☐ <90 Day Accumulation ☐ Satellite Accumulation | Accumulation Date for <90 Day Waste (<30 Days for PCB's)

Requested by (printed or typed name): | Telephone No.: | Requester Signature/Date (indicating accuracy of information to the best of my knowledge)

Location of Waste: (Area/Bldg/Rm) | Requester MSIN:

☐ Nonradioactive Material (complete and submit a CWC form for nonrad material);
☐ Radioactive Material (Include Curies Quantities Below)

SHADED AREA FOR WM USE ONLY | Complete ALL Applicable Information: Detailed Instructions on Reverse, Continuation Sheets Available | SHADED AREA FOR WM USE ONLY

Container ID WM No.	Container Quant.	Container Size	Container Type (a)	Kilograms of Material per Container	Material Description or Trade Name (b)	Chemical Component (use proper chemical name include isotopes and curies for RMW) (c)	Wt. % (d)	Physical State S/L/M/G (e)	Status (f)	Hazards	WM Waste Codes
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc

Figure 3.8. Example of Disposal Request Form

Figure 3.9. Example of Waste Inventory Sheet

WASTE INVENTORY SHEET

Verify integrity of container ____________________
Signature

Page ___ of ___

Bldg. #	Room #	WTN:	Container type:	WSRd No.	Internal Packaging:	Compactible? Yes ___ No ___

Initls	Date	Physical/Chemical Description	Volume	Weight	Radionuclide	Curies	Weight
		Page Totals					
		Total All Pages					

I believe that the submitted information is true, accurate and complete and that unless designated a mixed waste, this package does not contain hazardous or dangerous waste constituents as defined in WAC 173-303, RCRA or TSCA.

____
Signature of Person Sealing Container

Print Name: ____________________ Phone #: ____________________ Date:

Radiation Survey Information on Container

Max Contact: [ ] <0.5 mrem/hr or ___ mrem/hr
at 3": [ ] 0.5 mrem/hr or ___ mR/hr

Smearable Contamination:
[ ] <2200 d/m/100 cm² BETA-GAMMA
[ ] <220 d/m/100 cm² ALPHA

Other: ____________________

Surveyed by: ____________________
Date: ____________________

VOLUME % COMPOSITION

___ % Paper
___ % Rags
___ % Wood
___ % Rubber
___ % Plastic
___ % ______ (Specify)

___ % Metal
___ % Concrete
___ % Glass
___ % Absorbent
___ % Animal
___ % Kotex

Figure 3.10. Example of Radioactive Liquid Waste Transfer Request Form

RADIOACTIVE LIQUID WASTE TRANSFER REQUEST | RLWS Transfer No

Generator Name | Generating Facility | Phone No.

Waste volume = ____________ liters Flush volume = ____________ liters Total transfer volume = ____________ liters

This is a: ☐ One-Time Transfer Request ☐ Multiple Transfer Request

Disposal Method: ☐ RLWS Drain ☐ Deliver to 340 Facility

WASTE CHARACTERIZATION INFORMATION

Dose Rate:
(indicate units and distance)

Radiological Characterization
List all radionuclides and activity levels (indicate units):

Waste Composition		RLWS Limits
pH:	________	pH $\leq$ 13
Total Halides $(F^-+Cl^-+Br^-+I^-)$ (moles/):	________	<0.01M
% Total Organic Carbon:	________	TOC < 1%
Maximum Particle Size (microns):	________	$\leq$ 100 μm
Are solidifying substances present?	________	Not Allowed
Are separable organics present?	________	Not Allowed
Fissile Content (grams/gallon):	________	< 0.01 g/gal
Does waste contain radioiodine?	________	Not Allowed

Waste Description:

Identify all applicable waste codes:

☐ D002 ☐ D004 ☐ D005 ☐ D006 ☐ D007 ☐ D008 ☐ D009
☐ D010 ☐ D011 ☐ D018 ☐ D019 ☐ D022 ☐ D028 ☐ D029
☐ D030 ☐ D033 ☐ D034 ☐ D035 ☐ D038 ☐ D039 ☐ D040
☐ D041 ☐ D043 ☐ F001 ☐ F002 ☐ F003 ☐ F004 ☐ F005
☐ WT01 ☐ WT02 ☐ WP01 ☐ WP02 ☐ WP03 INDICATE: ☐ DW or ☐ EHW

(If your waste has codes which are not on this list, the 340 Facility may be unable to properly manage it. Contact 340 Facility Management at 376-5657 for assistance.)

<90-Day Accumulation Start Date: | Does this waste contain a reportable quantity (RQ) 40 CFR 302.4? ________
If "YES" then identify the hazardous substance(s) and the corresponding RQ value(s).

Is this waste a hazardous waste subject to the land disposal restrictions of 40 CFR 268? ________
If waste is land disposal restricted then provide applicable LDR information to the 340 Facility.

GENERATOR CERTIFICATION

This is to certify that, to the best of my knowledge and ability, the waste described on this form is properly designated and completely described in accordance with the applicable requirements. I understand there are significant penalties, including fines and imprisonment, for falsifying such information.

Certifier's Name ____________ Signature ____________ Date ____________

RLWS TRANSFER APPROVAL

Special Instructions:

340 Facility Review/Approval:

Cognizant Engineer ____________ Date ____________ Environmental Compliance Officer ____________ Date ____________

Send completed forms to: 300 LEF Process Engineering
MSIN L6-04

PNNL Building Manager ____________

Revision 1
11/12/96

Figure 3.11. Example of Waste Designation Form

CDRR#:____________________ Date:____________________

Item #:____________________ pH:______________

Composition: a) formula b) chemical name c) CAS# d) designation info. e) Wt%

WASTE DESIGNATION:

Discarded Chemical Product? (WAC 173-303-081) _____Yes _____No designation:__________

Dangerous Waste Source? (WAC 173-303-082) _____Yes _____No designation:__________

Ignitable? (WAC 173-303-050(5)) _____Yes _____No D001:______

_____Flammable (Flashpoint < 140F) F = 9/5(C)+32

_____Combustible (Flashpoint < 100-200F)

_____Oxidizer (> = 10% oxidizer)

Corrosive Liquid? (WAC 173-303-090(6)) _____Yes _____No D002:______

(pH ≤ 2 or ≥ 12.5..or.. corrodes steel @rate .25"/yr.)

Corrosive Solid? _____Yes _____No WSC2:______

(pH ≤ 2 or ≥ 12.5)

Reactive? (WAC 173-303-090(7)) _____Yes _____No D003:______

(cyanides, sulfides, DWW, explosives, ≥ 70% H2SO4 or HNO3)

TCLP? (WAC 173-303-090(8)) _____Yes _____No designation:________

Toxic? (WAC 173-303-100) E.C.:________ _____WT01(1.0EC) _____WT02 (≥0.001EC)

_____EHW _____DW

Persistent? (WAC 173-303-100) ______Yes ______No

_____WP01 (HH ≥ 1%) EHW

_____WP02 (HH ≥ .01%) DW

_____WP03 (PAH ≥ 1%) EHW

Waste Codes:______________________________ DW______ EHW______

Designator:____________________ Labels Req'd: Hazardous Waste

Figure 3.12. Example of Waste Treatment Information Review Sheet

WASTE TREATMENT INFORMATION REVIEW SHEET

HWTU REFERENCE #:____________________ Date:____________

GENERATOR NAME:____
FACILITY ADDRESS:____________________ PHONE #:____________

CONTACT NAME:____________________ TITLE:____________

Compatibility Class____________________

WHO Technical Review:____________________ Signature____________

APPROVED OR DENIED - REASONS:____________ All Correspondence To:

SPECIAL HWTU INSTRUCTIONS:____________ cc:____________

________ No sample necessary for waste stream verification.

WASTE TREATMENT SUMMARY

Treatment Procedure Number(s) ____________________

Location of Treatment Documentation: HWTU Logbook__, Page Number ___; HWTU File Number ___;

HWTU Computer database ____________

Approved for treatment____________ Approved for storage/packaging____________

Waste Treatment Code Assigned ____________________

Is this a RCRA/Ecology coded waste which has a specified treatment technology to be performed?

____NO ____YES: Specify____________________

Specify treatment in detail: ____________________

Treatment will (destroy/lessen ____________(constituent) and will be verified by____________________(test: specify which; or operator knowledge).

Final disposition of waste treatment residue____________________

HWTU Signature ____________________

Page 1 of 1 HWTU-WTIRS (3/94)

Figure 3.13. Example of Chain-of-Custody Form

Page 1 of _____ Chain of Custody Number: ______________

BATTELLE, PACIFIC NORTHWEST LABORATORIES

Project No.: ________________ Originating Technical Group: ____________

General Sample Description: ____

Test Instruction or ASR No. (as applicable): ____________________________________

Analysis Requested and/or Technical Group: ____________________________________

Prep Method Description: ____

SAMPLE NUMBER	**SAMPLE DESCRIPTION**	**COMMENTS**

Sender: ______________________________ Receiver: ______________________________

(signature/date) (signature/date)

Original - File

Figure 3.14. Example of Hazardous Waste Record (front)

Hazardous Waste Record

Record Number: ____________________

HRM Number: ____________________

Customer Id ____________________

Waste Description: ____________________

Waste Chemical Composition			
Chemical Name	Vol %	Chemical Name	Vol %

Before Treatment		After Treatment		After Treatment	
Container Number		Container Number		Container Number	
Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:	Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:	Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:
Container Wt. (Tare)	Kg	Container Wt. (Tare)	Kg	Container Wt. (Tare)	Kg
Container Wt. (Gross)	Kg	Container Wt. (Gross)	Kg	Container Wt.(Gross)	Kg
WASTE pH		WASTE pH		WASTE pH	
Physical Form	S L G M	Physical Form	S L G M	Physical Form	S L G M
WASTE Weight	Kg	WASTE Weight	Kg	WASTE Weight	Kg
WASTE Volume	Liters	WASTE Volume	Liters	WASTE Volume	Liters
WASTE Density	Kg/Liter	WASTE Density	Kg/Liter	WASTE Density	Kg/Liter
Waste Designation-Before Treatment		Waste Designation-After Treatment		Waste Designation-After Treatment	
I O	DW EHW	I O	DW EHW	I O	DW EHW
Enter All Applicable Waste Codes		Enter All Applicable Waste Codes		Enter All Applicable Waste Codes	
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______
______	______	______	______	______	______

Figure 3.15. Example of Hazardous Waste Record (back)

PROCESS CODES:		HANDLING CODES:		
PIS = Placed in Storage	CIS = Consolidated in Storage	SO1 = Container	T24 = Chemical Reduction	T40 = Filtration
MIS = Moved in Storage	SIS = Split in Storage	SO2 = Tank	T30 = Ion Exchange	T47 = Other (specify)
TRE = Treated	DIS = Transferred	T22 = Chemical Oxidation	T31 = Neutralization	T50 = Blending
		T23 = Chemical Precipitation	T38 = Decanting	T57 = Evaporation
		XFR = Transferred (specify location)	Refer to WAC 173-303 for other applicable codes	

Container Number	Process	Date	Handling Code	Location	Comments

ATTACHMENTS:

[ ] RLWS	[ ] Storage	[ ] Disposal	Other Attachments
[ ] CDRR #	[ ] CDRR #	[ ] Manifest #	[ ] Analytical Data, Project #
[ ] Waste Designation Form	[ ] Waste Designation Form	[ ] SWSDR	[ ]
[ ] RLWS Request #	[ ]	[ ] RSR	[ ]
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	

Figure 3.16. Example of RLWS Disposal Log

RLWS Disposal Log

ITEM#	Date Received	Generator Name	Org. Code	Lab No.	Principle Radionuclides	Hazards	Chemical Constituents	Neutralizing Agent	Amount	Final pH	Final Volume	Flush Volume	Intl.	RLWS Approval No.

Figure 3.17. Example of HWTU Waste Treatment Verification Form

HWTU REFERENCE #: ____________________ Date: ____________________

GENERATOR NAME: ____

FACILITY ADDRESS: ______________________________ PHONE #: ____________________

CONTACT NAME: ________________________ TITLE: ______________________

Constituents of Concern	Concentration to be Achieved	Actual Concentration After Treatment

Check One:
- ____ Waste meets all treatment standards
- ____ Waste requires further treatment
- ____ Waste treated to no residue

HWTU Signature ____

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FIGURES

TABLE

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4.0 PROCESS INFORMATION

This chapter provides a description of waste management, equipment, treatment processes, and storage operations.

4.1 CONTAINERS

The following sections describe the management of dangerous waste in containers at the 325 HWTUs. Container management occurs at both the HWTU and the SAL. Both portions of the 325 HWTUs are used to store and treat dangerous waste generated from onsite programs, primarily because of laboratory analytical activities in the 325 Building and other PNNL facilities. Descriptions of the containers used are provided in the sections that follow for the HWTU and SAL.

4.1.1 Description of Containers

The following sections describe the types of containers used for dangerous waste storage and treatment in the 325 HWTUs.

4.1.1.1 Containers Located in the Hazardous Waste Treatment Unit

Rooms 520, 524 and 528 of the HWTU are used to store and treat dangerous waste generated primarily from laboratory operations throughout the 325 Building and the Hanford Facility. The containers used to store and treat dangerous waste vary widely from original manufacturer containers to laboratory glassware for sample analysis or to 322-liter containers used to overpack smaller containers. Containers used for storage or treatment of dangerous waste is compatible with the waste stored in them. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table 4.1 provides an example of the types of containers that could be used in the HWTU rooms, including the material of construction and the capacity of the container.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to any applicable regulations, including 49 CFR as required by WAC 173-303-190.

All flammable liquid waste is stored in compatible containers and in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable storage. Solid chemicals are stored on shelving in specifically designated areas based on the hazard classification.

4.1.1.2 Shielded Analytical Laboratory Containers.

The primary function of the SAL is to conduct analysis of samples of waste streams collected at various locations on the Hanford Facility. The types of containers used to store dangerous waste in the SAL can vary widely from the original containers to laboratory glassware for sample analysis to 322-liter containers used to overpack smaller containers.

The containers used for storage or treatment of dangerous waste is compatible with the waste stored in the containers. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table 4.1 provides an example of the types of container that could be used in the SAL, including the material of construction and the capacity of the container.

Rooms 32, 200, 202, and 203 are used to store dangerous waste in containers. The back face of the SAL is typically used to store waste in the larger containers. These containers include various types of 208-liter steel containers (lined and unlined). Because of the nature of some dangerous waste being stored at the SAL, it is often necessary that these standard 208-liter containers be modified. This modification ensures that the containers are specially shielded to reduce the hazard of the radioactive component of the dangerous waste stored in the container and are compliant with the ALARA criteria. These specially designed shielded containers are packaged to contain anywhere from 3.79 liters to 53 liters of waste depending on the amount of shielding required. The solid waste typically is packed in individual 3.79-liter to 4.73-liter containers before placement in the 208-liter shielded container. The shielding is accomplished by surrounding the small containers with concrete, lead, or other materials to reduce the dose rate produced by the radiological component of the dangerous waste.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to any applicable regulations, including 49 CFR are required by WAC 173-303-190.

All flammable liquid waste is segregated from any incompatible waste types and packaged in approved containers.

4.1.2 Container Management Practices

Management practices and procedures for containers of dangerous waste ensure the safe receipt, handling, preparation for transfer, and transportation of the waste. The following sections describe the container management practices used for the HWTU and the SAL. Table 4.1 lists the typical containers used in the 325 HWTUs.

4.1.2.1 Hazardous Waste Treatment Unit Container Management Practices.

Dangerous waste containers are inspected for integrity and adequate seals before being accepted at the HWTU. Waste received for storage and treatment from outside Rooms 520, 524 and 528 is either picked up by HWTU personnel or moved to Rooms 520, 524 and 528 in containers suitable for the waste. Depending on the container weight, size or number of containers to be moved, container(s) of dangerous waste are hand carried or moved on a platform or handcart, as appropriate, to Rooms 520, 524 or 528. 325 HWTUs staff moves the dangerous containers in accordance with 325 HWTUs collection procedures that address safety and hazard consideration. These procedures cover various waste types (transuranic (TRU) and low-level) and transportation modes. 325 HWTUs staff does not perform the operations, covered by a procedure, until they are formally trained on the procedure.

Containers in poor condition or inadequate for storage (e.g., damaged, not intact, or not securely sealed to prevent leakage) are not accepted at Rooms 520, 524 and 528. Examples of acceptable packaging include laboratory reagent bottles, U.S. Department of Transportation-approved containers, spray cans, sealed ampules, paint cans, leaking containers that have been over packed, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage using the criteria of WAC 173-303-190 and to use professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment. Container stacking is not performed.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Attachment 36, Chapter 6.0, Section 6.2. Containers are inspected for integrity before acceptance at or transport to the HWTU. Containers found to be in poor condition or inadequate for storage are not accepted.

Container Handling. All HWTU staff is instructed in proper container handling and spill prevention safeguards as part of their training (Attachment 36, Chapter 8.0). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a). All personnel are trained and all operations are conducted to ensure that containers are not opened, handled, or stored in a manner that would cause the container to leak or rupture. All flammable cabinets containing dangerous waste are maintained with a minimum of 76 centimeters of aisle space in front of the doors. In room 520, the walk-in fume hood containing the 208-liter containers is designed to hold four 208-liter containers and has over 76 centimeters of aisle space; the containers are not stacked in the hood. In room 524, the walk-in fume hood containing the 208-liter containers is designed to hold two 208-liter containers and has over 76 centimeters of isle space in front of the doors; the containers are not stacked in the hood. Waste-handling operations can be conducted only when two or more persons are present in the unit or when the personnel present have immediate access to a communication device such as a telephone or hand-held radio.

4.1.2.2 Shielded Analytical Laboratory Container Management Practices.

Containers are not opened, handled, or stored in a manner that would cause the containers to leak or rupture. Containers will remain closed except when sampling, adding, or removing waste; or when analysis or treatment of the waste is ongoing. Containers of incompatible waste are segregated in the storage areas. In-cell containers will be stacked no more than four high and labels will not be obscured.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Attachment 36, Chapter 6.0, Section 6.2. Containers are inspected for integrity before acceptance at or transport to the SAL. Containers found to be in poor condition or inadequate for storage are not accepted.

Container Handling. All personnel are instructed in proper container-handling safeguards as part of their training (Attachment 36, Chapter 8.0). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a).

All container handling in the hot cells must be performed remotely with manipulators. Waste samples managed in the SAL enter the cells through rotating transfer wheels located in the back walls of cells 1, 2, and 6 and through a 17.8-centimeter borehole in the back wall of cell 1. Waste samples are moved into and out of the cells at these locations according to approved procedures that vary with the radioactivity level of the sample. After analysis of the sample and necessary confirmation of results, compatible solid waste samples are consolidated into appropriate size containers often referred to as 'paint cans' and usually stored in cell 1. However, any of the cells can be used for storage of waste during operations.

After evaluation for treatment and the subsequent treatment, liquid waste is either transferred to the SAL tank (discussed in Section 4.2) or solidified and repackaged into shielded 208-liter containers and stored in the back face area of the SAL. Waste generated outside of the hot cells is placed into appropriately sized containers and stored until packaged for shipment or transfer. Waste-handling operations are conducted outside of the cells only when a minimum of two persons are present in the unit or when the personnel present has immediate access to a communication device such as a telephone or hand-held radio.

4.1.3 Container Labeling

Once the material has been designated as a dangerous waste, all containers are marked and/or labeled to describe the content of the container as required by WAC 173-303-395. Containers also are marked with a unique identifying number assigned by the generating unit. All containers used for transfer of dangerous waste are prepared for transport in accordance with WAC 173-303-190.

4.1.4 Containment Requirements for Storing Containers

A description of secondary containment system design and operation is provided for the HWTU and SAL in this section.

4.1.4.1 Secondary Containment System Design and Operation for the Hazardous Waste Treatment Unit

The secondary containment system for the HWTU has three primary components: uniform fire code-approved flammable liquid storage cabinets, the floor of the rooms, and the firewater containment system (Figure 4.1).

Dangerous waste in containers of 65 liters or less is stored in Room 520 in steel flammable storage cabinets located in a storage room that forms the northeast corner of the room. An additional flammable storage cabinet is located beneath a stainless steel ventilated hood located along the south wall of Room 520. Containers over 65 liters may be stored in a hood located along the east wall of the room or on the floor of the unit, as noted below. The containers are made of stainless steel or other suitable material depending on the characteristics of the waste and are kept closed except when waste is being added or withdrawn.

Dangerous waste in containers of 20 liters or less is stored in Room 524 in steel storage cabinets or DOT approved containers providing secondary containment awaiting packaging. Flammable liquids will be stored in the flammable storage cabinet located along the south wall. Larger waste containers that contain liquids are stored in DOT approved containers providing secondary containment. These containers are then placed in one of four 62 inch x 62 inch x 6-inch (157 cm x 157 cm x15 cm) stainless steel "container pans", with an approximate containment volume of 91 gallons (346 liters) each. Containers holding waste not subject to containment system requirements will be stored on the floor.

Dangerous waste in containers of 65 liters or less is stored in Room 528 steel storage cabinets in accordance with WAC 173-303-395(1)(a) and the Uniform Building Code (ICBO 1991). There are eight storage cabinets, four for flammable waste and four for corrosive waste. Two cabinets (one flammable storage cabinet and one corrosive storage cabinet) are located along the north wall of the room. Two cabinets for corrosive waste are located along the east wall. Two cabinets for flammable waste are also located along the south wall. Further storage is provided by a flammable cabinet located beneath a stainless steel ventilated hood on the east wall of the room. Each cabinet is clearly marked as containing either flammable or corrosive waste. Flammable waste cabinets are painted yellow, and corrosive cabinets are painted blue.

Liquid wastes in containers from 65 to 328 liters (17 to 85 gallons) capacity will be placed within drip pans or similar secondary containment devices. Containers from 65 to 328 liters (17 to 85 gallons) capacity holding only wastes that do not contain free liquids, do not exhibit either the characteristic if ignitability or reactivity as described in WAC 173-303-090(5) or (7), and are not designated as F020, F021, F022, F023, F026, or F027 will be stored in DOT approved drums on the floor within the unit.

Rooms 520 and 528 are located on the main floor of the 325 Building and are constructed of concrete. The concrete floors of both rooms have been equipped with a heat-sealed seamless chemical-resistant polypropylene coating that covers the entire floor area of both rooms and laps approximately 10 centimeters up all of the outside walls of each room. The coated floor is capable of containing minor spills and leaks of liquid mixed waste.

Major spills or leaks of liquid mixed waste flow into the firewater containment system. The firewater containment system consists of floor trenches located at each entrance to 520 and 528 and the firewater containment tank located in the basement of the building. The system is designed to collect the fire-suppression water in the event that the automatic sprinkler system was activated. The location of the trenches is shown in Figure 4.1.

The floor trenches located under the double doors on the west side of Rooms 520 and 528 are approximately 20 centimeters wide, 46 centimeters deep and 1.91 meters long. The floor trench located under the single south door of Room 520 is approximately 20 centimeters wide, 46 centimeters deep, and 1.5 meters long. The floor trench located under the single southwest door of Room 528 is 20 centimeters wide, 61 centimeters deep, and 1.5 meters long. The trenches extend completely across the entrance of each room so that liquids do not flow out through a doorway. The trenches are constructed of 14-gauge stainless steel and are equipped with a steel grate cover. All seams are welded to ensure integrity. Trenches under the double doors are equipped with two drains in the bottom, and trenches located under single doors are equipped with one drain to allow liquid to drain from the trench through 15-centimeter-diameter carbon steel piping to the firewater containment tank.

The firewater containment tank is located beneath Room 520 in the basement of the 325 Building. The rectangular tank has dimensions of 1.65 meters by 2.25 meters by 1.92 meters and a capacity of 22,710 liters. The sides and floor of the tank are constructed of epoxy-coated carbon steel plate. The steel sides and floor provide support for the chemical-resistant polypropylene liner. The tank is secured to the concrete floor of the 325 Building basement with 1.3-centimeter bolts at 1.82-meter intervals.

The possibility of mixing incompatible waste in the containment system is minimized, because the number of containers open at one time will be limited to those in process (waste not in process is stored in closed containers). In addition, the very large volume of any firewater flow would dilute waste and would minimize the possibility of adverse reactions.

4.1.4.2 Secondary Containment System Design and Operation for the Shielded Analytical Laboratory

The secondary containment in the SAL is divided into three systems: the six hot cells, the front face, and the back face. Figure 4.2 provides a first floor plan view depicting these three areas.

The secondary containment for the six hot cells consists of the stainless steel base of the cell and a continuous trough located on the east side of the cells. The hot cell secondary containment system is shown in Figure 4.2. The base and trough can collect leaks and spills generated during analytical chemistry operations. The stainless steel bases are approximately 0.55 square meter. The troughs are approximately 15.2 centimeters wide, 7.6 centimeters deep, and extend across the entire 1.82-meter width of each cell. The troughs are equipped with a stainless steel grate cover. The leaks and spills are drained by gravity through drains in the bottom of the trough and through stainless steel piping to the SAL tank located in the basement (Room 32). The SAL tank is constructed of stainless steel and has a capacity of 1,218 liters. Design and operating specifications are provided in Section 4.2.

The secondary containment system for the back face of the SAL consists of shielded 208-liter containers and plastic containers. Solid mixed waste is packaged in containers (e.g., paint cans, bottles, bags) before removal from the hot cells. Once removed from the hot cells, the containers are placed into specially designed, shielded 208-liter containers to provide secondary containment. Containers of liquid waste are placed into plastic containers that provide secondary containment and prevent spilled liquids from contacting other waste containers. Some containers are placed in shielded cubicles in Room 202 depending on container dose rates. The location of the cubicles is shown in Figure 4.2.

The secondary containment system for the front face of the SAL, which is minimally used to store mixed waste, is similar to the system for the back face. Containers holding liquid and solid mixed waste are placed into containers to provide secondary containment; the primary area for mixed waste storage is the fume hood.

4.1.5 Structural Integrity of Base

A description of the requirements for base or liner to contain liquid is provided in the following sections for the HWTU and the SAL.

4.1.5.1 Requirements for Base or Liner to Contain Liquids in the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 have been equipped with the chemical-resistant polypropylene coating. All seams in the coating were finished by heat welding to ensure the integrity of the coating. The coating currently is free of cracks, gaps, and will be maintained that way throughout the life of the HWTU. The condition of the floor is inspected weekly as part of the inspection program (Attachment 36, Chapter 6.0). Floor coating assessment is carried out whenever the floor coating is observed to be chipped, bubbled up, scraped, or otherwise damaged in a manner that would impact the ability of the coating to contain spilled materials. Minor nicks and small chips resulting from normal operations are repaired periodically.

The floor coating holds spilled liquid until the liquid is cleaned up, or enters the drains in each room. Once the liquid has entered the drains, the liquid drains into the firewater containment tank in the basement, where the liquid is stored pending chemical analysis and treatment and/or disposal.

The base of the HWTU floors consists of 14.2 centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete is mixed in accordance with ASTM 094, Section 5.3, Alternate 2, and is finished with a smooth troweled surface. The concrete base has a load capacity of 976 kilograms per square meter.

The floor trenches that prevent liquids from migrating from rooms 520 and 528 are constructed of 14-gauge stainless steel. All seams are welded and the connections with the drains are tight. The stainless steel is compatible with and resistant to the liquid mixed waste managed in the HWTU.

4.1.5.2 Requirements for Base or Liner to Contain Liquids in the Shielded Analytical Laboratory

The base currently is free of cracks, gaps, and will be maintained that way throughout the life of the SAL. The base of the floor for the six hot cells consists of a 0.48-centimeter layer of stainless steel formed on top of poured concrete. The stainless steel base is compatible with most of the waste generated in the hot cells. The exceptions are waste containing hydrofluoric acid and high concentrations of hydrochloric acids. This waste is stored in individual secondary containment to prevent contact of the waste with the stainless steel in the event that a primary waste container was to fail. Because the volumes of waste generated and stored are small and the hot cell floors are not sloped; waste spilled during waste handling activities probably would remain localized and be cleaned up expeditiously to ensure that no damage occurs to the stainless steel. As was previously discussed, a stainless steel tank provides the secondary containment system for the six cells. Liner and base requirements for the SAL tank are discussed in Section 4.2.

The bases of the back face and front face of the SAL consist of a 15.2 -centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete base has a load capacity of 976 kilograms per square meter. The base in Room 201 is topped with a seamless chemical resistant polypropylene coating. Rooms 202 and 203 are topped with epoxy-based paint. Room 200 concrete slab is painted, and has a trap door in the painted floor that enables transfer of equipment between Rooms 200 and 32. The airflow between these rooms is from Room 200 to Room 32 due to positive air pressure in Room 200.

4.1.6 Containment System Drainage

A description of the containment system drainage for the HWTU and SAL is provided in this section.

4.1.6.1 Containment System Drainage for the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 are not sloped. Small spills of liquid probably will remain in a localized area until the spills are cleaned up. Either all containers of dangerous waste are stored in drums, on shelves within open-faced hoods, or within flammable or corrosive storage-cabinets to prevent the containers from contacting spilled materials. Large spills of liquid material would spread laterally across the flat surface of the floor. The flow of the spilled liquid would be stopped by an outside wall(s) of the room or by one of the trenches protecting the entrances to the room. The lower 10 centimeters of the outside walls of the rooms are covered with the same chemical-resistant coating as that on the floor to prevent spills from migrating throughout the walls.

The floor in Room 524 is not sloped. All liquid waste in this room will be stored in secondary containment. The secondary containment for liquids will consist of steel storage cabinets with secondary containment, DOT approved containers or one of the stainless steel 'container pans'. Any container holding waste not subject to containment system requirements will be stored on the floor.

The floor drains across each exit in Rooms 520 and 528 drain spills to an emergency firewater containment tank (22,710-liter capacity) located in the basement of the 325 Building. The tank captures all drained liquid, where the liquid is stored until sampling and analysis indicates a proper treatment and/or disposal method.

4.1.6.2 Containment System Drainage for the Shielded Analytical Laboratory

The stainless steel base of the hot cell is not sloped. Because of the small volume of waste that is handled, small spills probably would remain in a localized area until the spills are cleaned up. As a result, all containers of liquid mixed waste are stored within secondary containment to prevent spilled liquids from contacting the containers. Large spills that occur within the SAL hot cells flow to the stainless steel trough at the front of each cell, which gravity drains into the SAL tank (TK-1, Room 32).

The bases of the front and back faces are not sloped. Containers in these areas are stored within secondary containment and off the base surface to prevent spilled liquids from contacting the containers.

4.1.7 Containment System Capacity

A description of the containment system capacity for the HWTU and SAL is provided in the following sections.

4.1.7.1 Containment System Capacity for the Hazardous Waste Treatment Unit

The maximum combined total volume of all containers of dangerous waste stored in both HWTU rooms is 10,000 liters. The largest mixed waste storage container is a 322-liter container. The firewater containment tank provides secondary containment for both HWTU rooms. The capacity of the firewater containment tank is 22,710 liters; therefore, the containment system is more than adequate to contain either 10 percent of the total volume of waste (2,840 liters) or the entire volume of the largest container (322 liters).

4.1.7.2 Containment System Capacity for the Shielded Analytical Laboratory

The largest container of liquid waste to be stored in the hot cells is a 7.6-liter container.

The SAL tank is considered the secondary containment for the hot cells. The largest quantity of liquid that could be stored in the hot cells while maintaining adequate (10 percent of total volume) secondary containment would be 12,491 liters. The total amount of liquid to be stored in the hot cells is governed by the area constraint of the cells. Typically, the largest amount of liquid waste to be stored in the hot cells at one time is 75.8 liters.

Liquid waste stored in Room 201 is stored in the fume hood. The waste is stored in glass or plastic bottles that are placed in individual plastic containers of a size that is sufficient to hold all of the contents of the inner vessel. The quantity of liquid waste stored in the hood is governed by the area constraint in the hood. Similarly, liquid waste stored in Room 202 is stored in glass or plastic bottles that are each placed in individual secondary containment.

The floors of the front face and back face are constructed of concrete. The rear face floor in Rooms 202 and 203 is covered with epoxy paint. Floor drains flow to the retention process sewer (RPS) system, which has a diverter triggered by a radiation monitor that diverts radioactive liquids detected in the RPS line to the RLWS. Because of the small quantities of liquid stored in the front face and back face, any spill that is not contained by the plastic overpack probably would remain on the floor in a localized area until cleaned. Any liquid that managed to flow to the room drains would be conveyed by gravity to the RPS system or, depending on radionuclide content, to the RLWS and into the RLWT.

4.1.8 Control of run-on

Run-on control for the HWTU and SAL is described in the following sections.

4.1.8.1 Control of run-on for the Hazardous Waste Treatment Unit

The 325 Building mitigates the possibility of run-on for the HWTU. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

4.1.8.2 Control of run-on for the Shielded Analytical Lab

The 325 Building mitigates the possibility of run-on for the SAL. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

4.1.9 Removal of Liquids from Containment System

The removal of liquids from the containment system for the HWTU and SAL is described in the following sections.

4.1.9.1 Removal of Liquids from the Hazardous Waste Treatment Unit Containment System

On discovery of liquid accumulation in the containment resulting from a spill or other release, the Building Emergency Director (BED) must be contacted in accordance with the contingency plan (Attachment 36, Chapter 7.0). The BED may determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area might be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Liquid spills are contained within the Room 520, 524 or Room 528 floor or within the firewater containment tank. Localized spills of liquids to the floor of the HWTU rooms are absorbed with an appropriate absorbent (after the appropriate chemical reaction has occurred to neutralize reactivity in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material is recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material are disposed of in an appropriate manner. If spilled materials in the HWTU reach the firewater containment tank, the material will be held in place until chemical analysis indicates an appropriate treatment and/or disposal method. The waste analysis procedures and analytical methods used to designate the spilled materials are described in Attachment 36, Chapter 3.0, Waste Analysis Plan. The tank is designed to allow easy access for material sampling. Depending on the results of the analysis, the collected spill material is pumped to the RLWS or pumped to the RPS.

4.1.9.2 Removal of Liquids from the Shielded Analytical Laboratory Containment System

The removal of liquid from the SAL tank, which provides the secondary containment for the six hot cells, is discussed in Section 4.2. The tank will be emptied after the accumulated waste is designated.

On discovery of liquid accumulation in the back or front face containment resulting from a spill or other release, the BED must be contacted in accordance with the contingency plan (Attachment 36, Chapter 7.0). The BED could determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area could be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Localized spills of liquids to the floor of the SAL will be absorbed with an appropriate absorbent (after the appropriate chemical reaction to neutralize reactivity has occurred in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material will be recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material will be disposed of in accordance with applicable regulations and PNNL internal waste management procedures.

4.1.10 Management of Ignitable and Reactive Waste in Containers

Management of ignitable and reactive-waste in containers within the HWTU and SAL is described in the following sections.

4.1.10.1 Management of Ignitable and Reactive Waste in Containers in the Hazardous Waste Treatment Units

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the HWTUs.

4.1.10.2 Management of Ignitable and Reactive Waste in Containers in the Shielded Analytical Laboratory

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the SAL.

4.1.11 Management of Incompatible Waste in Containers

The prevention of reaction of ignitable, reactive, and incompatible waste in containers for the 325 HWTUs is discussed in the following sections.

4.1.11.1 Management of Incompatible Waste in Containers at the Hazardous Waste Treatment Unit

Containers of ignitable and reactive waste are stored in segregated flammable storage cabinets. Attachment 36, Chapter 6.0, Section 6.5.2, describes the methods used to determine the compatibility of dangerous waste so that incompatible waste is not stored together. Incompatible waste is never placed in the same container or in unwashed containers that previously held incompatible waste. Operations are conducted such that extreme heat or pressure, fire or explosions, or violent reactions do not occur. Uncontrolled toxic mists, fumes, dust, or gases in sufficient quantities to threaten human health or the environment are not produced; uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion are not produced; and damage to the container does not occur. Information on the hazard classification of waste accepted by the HWTU is documented by the generating unit, which is carefully reviewed by HWTU personnel before waste acceptance. Mixing of incompatible waste is prevented through waste segregation and storage. As the containers received in the HWTU usually are smaller than 19 liters, the most common segregation is performed by storage of incompatible hazard classes in separate chemical storage cabinets. Guidance for the segregation is provided in Attachment 36, Chapter 6.0, Section 6.5.2.

Minimum aisle space is maintained according to the Uniform Fire Code to separate incompatible waste. The possibility of adverse reaction is minimized (Attachment 36, Chapter 6.0, Sections 6.6 and 6.7 for methods used to prevent source of ignition).

4.1.11.2 Management of Incompatible Waste in Containers at the Shielded Analytical Laboratory

Incompatible waste in the SAL hot cells is managed by placing primary containers into a second container or tray capable of managing any leak or spilled material. Incompatible waste is never placed in the same container or in an unwashed container that previously held incompatible waste.

Treatment operations are conducted with minor amounts of waste to ensure that extreme heat or pressure, fire, or explosive or violent reactions do not occur. Potential releases would be controlled by the ventilation system that exhausts through two high-efficiency particulate air (HEPA) filters set in series, and due to the limited amount of waste in the SAL. These HEPA filters are part of the building exhaust system, which is maintained and inspected routinely in accordance with PNNL preventive maintenance standards. Radioactive and nonradioactive emissions from the 325 Building stack, and control devices for those emissions, are regulated by the Washington State Department of Health pursuant to Chapter 246-247 WAC, and the Washington State Department of Ecology (Ecology) pursuant to Chapters 173-400, 173-401, and 173-460 WAC, respectively. Air-pressure barriers for containment control are achieved by supplying air from areas of least contamination (i.e., offices) to areas of higher contamination (i.e., cells). These systems ensure proper emission flow through the HEPA filters.

Because waste normally is treated in the SAL hot cells, human exposure to the remote potential of mixing incompatible waste or reactive waste is minimal. Waste generated and treated within the SAL hot cells is stored within separate secondary containers, which eliminates the potential for combining incompatible waste. Waste stored in the front or back face of the SAL is packaged by hazard classes for transfer or is segregated in separate secondary containment.

4.2 TANK SYSTEMS

The following sections describe the management of dangerous waste in the 325 tank systems. Each tank system consists of the tank; associated piping, valves and pumps; and secondary containment. The first tank system is located in Room 32 of the SAL and is used to collect liquid waste generated from the analytical laboratory operations. This SAL tank system is described in Section 4.2.1. The second tank system is the RLWT system. This tank system is used to collect liquid waste discharged to the RLWS prior to being transferred to the DST System. The RLWS load out tank system will be operated as described in Section 4.2.2.

4.2.1 Shielded Analytical Laboratory Tank System

The SAL is an analytical chemistry laboratory used primarily to prepare and analyze samples of dangerous waste streams for waste characterization. This work is conducted in six inter-connected hot cells that form the nucleus of the SAL. Liquid waste generated during these operations is collected, treated if necessary and drained from the hot cells to the SAL tank located in Room 32 of the basement directly below the hot cells. A stainless steel trough, 15.2 centimeters wide by 7.62 centimeters deep, traverses the front of all six hot cells in which solution is poured. The trough is equipped with stainless steel grating to capture solids during solution pour. The trough collects any liquid waste poured from analytical chemistry operations, mixed waste treatment operations, other chemical and mixed waste stored in the hot cells, and spills or leaks. The liquid waste is transferred through a common stainless steel pipeline that drains into the SAL tank. The waste is batch transferred from the SAL tank to the radioactive liquid waste system and into the RLWT. The SAL tank volume is 1,218 liters and has a throughput of 80,000 liters per year.

4.2.1.1 Design, Installation, and Assessment of Tank Systems

The following sections discuss the design and installation of the SAL tank and provide information on the integrity assessment.

4.2.1.1.1 Design Requirements

Waste stored in the SAL tank has a pH between 7 and 12. The tank is constructed of 316L stainless steel. This material is compatible with any of the dangerous waste that is discharged to the tank. All waste is treated or reacted before introduction into the tank to meet RLWS waste acceptance criteria.

The tank system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the material is adequate and that it can withstand the stress of daily operation. The professional engineer evaluation is included in the tank integrity assessment.

The SAL tank is a vertical double-shell tank supported by 3 legs and stands approximately 1.7 meters above the ground. The top head is a 0.95-centimeter-thick flat stainless steel plate. Both bottom heads are flanged and dished heads (torispherical), and the bottom height is 10.2 centimeters above ground. The inner shell is 107 centimeters outside diameter, the outer shell is 114 centimeters outside diameter, and each shell is 0.8-centimeter-thick stainless steel plate. The tank is located inside a containment pan that has a 203-centimeter diameter and is 51 centimeters high; the total volume of the pan is 1,648 liters. The pan provides for secondary containment of leaks from the tank, piping, and ancillary equipment and instruments located above the tank. Flanged and threaded connections are located within the containment boundary of the pan to capture any leaks that might occur from these connections. Outside the containment area, all connections are welded. There are no outlets, drainage or otherwise, on the bottom or sides of the tank.

Solution enters the tank through a gravity flow, welded drain line piped from the hot cells. The SAL sources that tie into this drainpipe includes: the hot cells, sink drain, hood drain via the sink drain, and floor drain. The cup sink drain and hood drain line is sealed off and is not in use. The drain line also functions as the tank vent that is exhausted by the hot cell exhaust system. Waste solution is pumped from the SAL tank to the RLWS by either a transfer gear pump or a water jet, both of which are located on top of the tank. Both the transfer pump and jet suction lines drop down vertically through the top head to the bottom head and are bent to the center of the tank to minimize the remaining liquid heel when transferring the liquid to the RLWS. The transfer pump is a gear pump with 30 liter per minute capacity at 9-meter water head with 1.5 meters suction head. A flow indicator/totalizer is located on the upstream process water line to be used to verify process water flow during water jet transfer operations. A second, smaller sample pump also is located above the tank. The sample pump provides for solution transfer to the sample station located just north of the tank system. The operators draw a sample at the ventilated sample hood by opening a small sample valve. The sample pump is a gear pump with 3.8 liter per minute capacity at 1.5-meter water head with 1.5 meters suction head. Both gear pumps have magnetic drives to avoid shaft leakage. The discharge piping from each pump has a pressure relief valve installed to protect the gear pumps. The discharge piping from the pressure relief valve is piped back into the tank to contain the solution. A mixer is located on top of the SAL tank to provide agitation of the contents for sampling and washout purposes. Process water also is provided to the tank system for cleanout of the tank and associated piping.

The SAL tank is located in a controlled access room and is monitored from two operating panels. The smaller sample panel is located next to the SAL tank, and the second main control panel is located in Room 201, the main operating gallery. The sample panel provides control for activities related to pulling a sample, such as activating the sample pump and controlling process water, and monitoring the liquid level of the tank. The main control panel provides the operators with the ability to monitor and control the entire SAL tank system. The main control panel provides level indication, high, and high-high level annunciation and contains switches for controlling pumps, agitators, valves, etc. The SAL tank is instrumented with three types of level-monitoring devices. Two devices are wired into the annunciator at the main control panel to provide high-level alarms, and one high-level alarm annunciates at the annunciator board in the control room on the third floor. This control room is staffed 24 hours a day, 7 days a week. If a high-alarm situation occurs after normal working hours operations personnel would be notified immediately by the alarm and would take corrective action according to procedure. The SAL tank system normally is operated on the day shift. Personnel occupy the main operating gallery in Room 201, where the personnel would be alerted to off-normal conditions on the main control panel. A high-level alarm also would deenergize the process water solenoid valves to the closed position on three water lines into the hot cells and on the process water lines to the SAL tank. The containment pan contains a conductivity element that alarms at the main control panel should solution be detected in the pan. Operating procedures require that inspections of the entire system be made daily when in use (Attachment 36, Chapter 6.0).

4.2.1.1.2 Integrity Assessments

An independent, qualified, registered professional engineer's tank integrity certification has been completed and will be submitted as a separate document.

Within three (3) months of final installation of the new tank, the Permittee shall submit to Ecology a written integrity assessment, which has been reviewed and certified by an independent, qualified, registered professional engineer, in accordance with WAC 173-303-810 (13)(a).

4.2.1.2 Secondary Containment and Release Detection for Tank Systems

This section describes the secondary containment systems and leak detection systems installed in the SAL.

4.2.1.2.1 Requirements for Tank Systems

The secondary containment system for the SAL Tank in Room 32 consists of two components. The SAL tank is a double-walled vessel and the outer tank provides secondary containment for the inner tank; and; a pan has been installed under the tank to provide secondary containment for the pumps, valves, and flanges located on the top of the tank. The pan also provides tertiary containment for the tank.

The existing drainpipe from the hot cells to the SAL tank is a single-walled, 5.1-centimeter welded stainless steel pipe. This piping is visually inspected for leaks on a daily basis when the tank system is in use, by means of a remote video system. Flanges in this piping and ancillary equipment are located so that secondary containment is provided by the SAL tank secondary containment pan. For the existing RLWS, the transfer piping from the SAL tank to the RLWT is single-walled, welded stainless steel pipe from the tank to the 325 Building boundary and double-walled stainless steel pipe from the RLWS tank to the cask loading station. The RLWS system will utilize the single-walled, welded stainless steel pipe from the SAL tank to the RLWS tank, and a new double-walled stainless steel pipe will be used to transfer waste from the RLWS tank to the truck lock. New double-walled piping will also be installed to extend the drain line from Room 32 to the RLWS tank. Refer to Figure 2.3b for a schematic of the modified RLWS tank system. The welded single-walled transfer piping is visually inspected for leaks within 24 hours of a transfer. The 325 Building provides additional containment. The basement floors are concrete, and any liquid release remains in the immediate area until cleanup. The openings to the drains in the basement are elevated 10.2 centimeters above the floor; thus, any spill would remain in the basement until enough liquid collects to fill the entire basement to a 10.2-centimeter depth. The SAL tank can hold a maximum of 1,218 liters, and the entire contents of the SAL tank would fill an area of only 3.5 meters by 3.5 meters to a depth of 10.2 centimeters. Because the basement is larger than 3.5 meters square, the liquid from the SAL tank would not enter a drain opening. Details of the design, construction, and operation of the secondary containment system are described in the following sections.

4.2.1.2.2 Requirements for Secondary Containment and Leak Detection

The secondary containment has been designed to prevent any migration of waste or accumulated liquid from the tank system to the soil, groundwater, or surface water. The secondary containment system also can detect and collect releases of accumulated liquids. A zoom color television camera surveillance system allows for tank, ancillary equipment, and general Room 32 viewing. The camera, located in Room 32, is equipped with auxiliary lighting and mounted on a remote controlled pan and tilt head. The color monitor and camera controls are housed in a dedicated cabinet in Room 527 or 527A. The HWTU will have the option of either keeping the camera/monitor controls in Room 527, 527A, or moving it to another location for operational flexibility. By maintaining operational flexibility of where the camera controls are located, the HWTU can meet ALARA (As Low As Reasonably Achievable) requirements and minimize the expense of added HWTU training requirements.

The following is the system description.

Materials of construction. The tank and components are constructed of 316L stainless steel; this material is compatible with the aqueous waste being discharged to the tank. The waste has a pH between 7 and 12.

Strength of materials. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of materials is adequate and that the tank can withstand the stress of daily operation (SAIC 1996). In addition, pressure relief valves are installed in each line exiting the SAL tank. In the event that there is a blockage in the pipe or tubing, pressure will not build up in the lines. The pressure relief valves are set to 30 psi, which is well below the design strength of stainless steel pipe and tubing. Waste drains back into the SAL tank when a pressure relief valve opens.

Strength of foundation. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the tank mounting and foundation is adequate to withstand the design-basis earthquake (DBE). This ensures that the foundation is capable of providing support to the tank and will resist settlement, compression, or uplift.

Leak detection system description. The SAL tank is double walled, and a conductivity probe is installed in the annulus to detect any leak of liquid from the primary containment. If liquid is detected by the probe, alarms are sounded immediately in a local control panel located in Room 32 and in the main control room.

A pan installed beneath the SAL tank provides tertiary containment. The containment pan has a conductivity element that alarms at the main control panel if the presence of liquid in the pan is detected. The containment pan has a 203-centimeter diameter and a 51-centimeter height with a containment capacity of 1,648 liters. The containment pan will easily hold the total capacity of the 1,218-liter SAL tank plus any potential process water that might be released.

Removal of liquids from secondary containment. The tank secondary containment, the outer shell of the double-walled vessel, is designed to contain a liquid leak from the inner vessel until provisions can be made to remove the liquid. The liquid might not be removed within 24 hours because of the coordination that must take place in the 325 Building. A tube is installed in the tank annulus, extending to the bottom and is capped at the top. If liquid were detected in the annulus, the liquid could be removed by connecting a tube between the capped fitting and the transfer pump, which would pump the liquid into the RLWS transfer line.

A delay of greater than 24 hours in removing the liquid from the secondary containment poses no threat to human health or the environment, because the waste continues to be contained in a sealed vessel. In the event that the secondary containment should leak, the containment pan installed beneath the tank provides tertiary containment.

4.2.1.2.3 Secondary Containment and Leak Detection Requirements for Ancillary Equipment

Secondary containment for the SAL tank system ancillary equipment is provided by the containment pan below the SAL tank, by double-walled piping for the sample line between the tank and the sample station, and by daily visual inspection during use of the entire system including the existing single-walled piping. Flanged and threaded connections, joints, and other connections are located within the confines of the containment pan. Outside this pan, only double-walled piping and welded piping is allowed. The pumps are magnetic coupling pumps located above the pan. All construction material is stainless steel; for the welded parts, the material is 316L stainless steel. Stainless steel material is compatible with the expected corrosive, dangerous, and mixed waste stored in the SAL tank. The strength and thickness of the piping, equipment supports, and containment pan are designed to onsite standards that take into account seismic requirements for the region and corrosion protection. The entire system is located on an existing basement floor built in the 1960s. The 325 Building has proven over time to be of a sound structural integrity to withstand mild earthquake forces. The containment pan has a liquid element sensor that alarms immediately at the main control panel should any leakage be detected. The containment pan has a 203-centimeter diameter and a 51-centimeter height, or 1,648 liters of capacity. The containment pan will hold the total capacity of the 1,218-liter SAL tank plus any potential process water that also might be released. In the event of an alarm, the process water solenoid valves will become de-energized to the closed position to minimize the loss of additional water.

The 325 Building is staffed or monitored 24 hours a day, 7 days a week. The control system is designed to alarm on any leak/spill or high-level alarm encountered. The personnel responding to the alarm condition will stop or secure the action causing the leak/spill, warn others of the spill, isolate the spill area, and minimize individual contamination and exposure. The spilled or leaked waste will be removed in an expeditious manner according to procedures for cleaning up spills and leaks.

4.2.1.2.4 Controls and Practices to Prevent Spills and Overflows

The SAL tank system has been designed to account for safe and reliable operation to prevent the system from rupturing, leaking, corroding, or otherwise failing. The tank is provided with redundant-level instrumentation to monitor tank levels. Both capacitance- and conductance-level probes are used for level monitoring and alarming. The tank will alarm on high level and interlock the process water to fail close. The process water is supplied to both the hot cells and the tank system. The containment pan is equipped with a liquid-sensing element to detect the presence of liquid and alarms at the main control panel if liquid is detected. Normally, liquid is drained to the tank by operators pouring solution into the troughs in the hot cells. This operation is carried out in a "batch mode." If this operation sets off a high-level alarm, the operators stop pouring solution into the troughs. Even if this operation caused an alarm condition, no spill is expected, because the tank has sufficient freeboard to hold additional waste solution. The initial level alarm is set at 92 percent of full volume.

Trained personnel respond to spills by stopping or securing the action causing the spill, notifying others in the area of the spill, and following guidance provided in the 325 Building Emergency Plan and the 325 HWTUs Contingency Plan (Attachment 36, Chapter 7.0). Measures are in place to inspect the system daily.

4.2.1.3 Tank Management Practices

According to operating procedures, liquid waste is poured into the troughs. The troughs tie into the 5.08-centimeter drain header located under the hot cells. This drain header is sloped down to the SAL tank located in Room 32 of the basement. The existing drain header is the only method of introducing mixed waste solutions into this tank. The drain line is fully welded and is constructed of 316L stainless steel material. Because this drain line also serves as the SAL tank vent line, the SAL tank operates at the same pressure as that of the hot cells. The heating, ventilation, and air conditioning operating pressure for the hot cells, and therefore the SAL tank, is -1.27 centimeters water (vacuum). The SAL tank operates at slightly subatmospheric pressure, and no pressure controls are necessary for this tank system.

The SAL tank is fully monitored with tank-level instruments. A main control panel provides level status and high-alarm annunciation. Two control panels are provided with the SAL tank monitoring system. One control panel is located adjacent to the sampling station in Room 32 to control the sampling pump when samples are pulled. A second control panel is located on the operating floor in Room 201, the SAL main operating gallery. Tank status is monitored from the first floor control panel. Because waste solution is generated in a batch mode, waste solution drained to the tank is effectively controlled through operating and administrative procedures in order to prevent high-level-alarm conditions. A safety cutoff system for the tank will shut off all incoming water to the SAL in conjunction with a high-level-alarm condition. A backup tank system was determined to be unnecessary for the SAL operations because of the presence of tank monitoring devices and the use of administrative and operational (batch-processing) controls.

The tank transfer controls provide similar safety features. Once the SAL tank contains sufficient volume, the tank's solution is prepared for transfer to the RLWS. After waste characterization is completed, the transfer to the RLWS is initiated by following internal TSD procedures. Once started, the transfer continues until a low-level condition automatically stops the transfer pump or until it is stopped by operator action. The solution can be transferred to the RLWS either by the transfer gear pump or by the water jet. Currently, the RLWS piping is a 316L stainless steel single-walled pipeline inside the basement from the SAL tank to the RLWT. Piping from the SAL tank to the RLWS tank will be single-walled 316L stainless steel, while the piping from the RLWS tank to the truck lock will be double-walled 316L stainless steel.

4.2.1.4 Marking or Labeling

Due to the high radiation levels associated with the SAL tank, the tank itself is not labeled. The tank is located in a locked room to prevent unnecessary radiation exposure. Access points to the room are labeled to meet the requirements of WAC 173-303-395. The marking of the access points is legible from a distance of 15 meters and identifies the waste. The label adequately warns employees, emergency response personnel, and the public of the major risks associated with the waste being stored within the tank. The tank also has a written placard identifying important radioactivity, criticality, and hazard concerns.

4.2.1.5 Ignitable, Reactive, and Incompatible Waste

Many different types of samples and waste materials will be brought to the SAL hot cells for analytical or research activities. These samples are accompanied by an internal PNNL documentation form that provides waste characterization information from the sample-generating unit. Chemical characterization provided in these forms is based on previous chemical analysis or process knowledge. The hazard potential includes exposure to radiation, corrosive chemicals, and hazardous chemicals. All operations performed in the SAL hot cells are conducted by qualified operators following approved procedures. Typical hot cell analytic processes generate liquid waste that is highly acidic and/or that have a high chloride level. A small quantity of organic waste is generated and segregated prior to treatment or disposal. If heavy metals are present in the liquid waste before neutralization, the metals are precipitated as hydroxides incident to the neutralization and are filtered from the solution. If the chloride content of the liquid is above 0.01 Molar, the chlorides may be removed through silver nitrate precipitation.

Therefore, waste solutions are not expected to be ignitable, reactive, or incompatible when transferred to the SAL tank.

The following factors ensure a safe and reliable tank system with regard to ignitable, reactive, and incompatible waste. The tank system operates at ambient temperatures and pressures; all waste added to the tank meets the RLWS waste acceptance criteria; the tank construction material is stainless steel; and the operators have past operating experience are trained in applicable procedures.

4.2.2 Radioactive Liquid Waste Tank (RLWT) System

The Radioactive Liquid Waste Tank (RLWT) system consists of an 11,355-liter waste tank in the basement of the 325 Facility, and piping from Room 52 and the SAL Hot Cell Facility. The RLWT system is intended for the management and disposal of high dose and difficult to manage aqueous waste. After collection in the RLWT, the waste is transferred to a shielded transportation cask and shipped to the double shell tanks in the 200 Area. The 325 Facility is expected to continue to generate approximately 5,678 to 7,570 liters of radioactive liquid waste each year. The RLWT sits below the basement floor in a tank pit.

4.2.2.1 Design, Installation, and Assessment of Tank Systems

The following sections discuss the design of the RLWT system. Information on the integrity assessment was provided in accordance with WAC 173-303-640 and 810.

4.2.2.1.1 Design Requirements

The RLWS tank is constructed of 316L stainless steel. This material is compatible with any of the dangerous waste that is discharged to the tank. Waste in the RLWT will be treated or reacted, if needed, to protect the tank integrity.

The RLWT system design was reviewed by an independent, qualified, registered professional engineer to verify that the strength of the material is adequate and that it can withstand the stress of daily operation before operations began. The professional engineer's evaluation is included in the tank integrity assessment.

The RLWT is a vertical single-shell tank supported by multiple legs and stand approximately 2.4 meters in height and 2.4 meters in diameter. The tank has a welded construction of 316L stainless steel and sits approximately 15.2 centimeters above the floor in the tank pit with a formed bottom to minimize a heel in the tank. The tank is located inside a concrete pit below the basement floor. The tank pit is lined with a stainless steel liner on the floor and approximately 0.6 meters up the walls to allow for a secondary containment capacity of at least 100 percent of the tank. Sealant was placed along the walls at the end of the liner, and the remaining portion of the concrete pit walls were painted with a chemically resistant coating. A concrete shielding cover was placed over the pit. A tank control room constructed of steel studs and gypsum is located on the west side of the tank pit.

The primary tank control panels are located in the control room, and secondary control panels are located in the truck lock, Room 601, Room 201, and in the operator's office. Conductivity probes are installed in the tank at 305-mm intervals. Signals from the probes indicate the liquid level in the tank by signal lights on all control panels. Other signals from the conductivity probes alarm high liquid level by a signal light on each control panel plus sound on the panel in the operator's office.

Liquid waste enters the RLWT through gravity flow piping. A mixing pump provides agitation of the tank contents. Mixing pump system controls are installed on the control panel in the control room.

Samples will be collected prior to transferring the waste from the RLWS tank to the DST System. A sampling pump and recirculating loop was installed on the tank. A small sample hood is located in the control room. Controls for the sample hood are located near the sample hood. This hood is connected to the HEPA filtered exhaust system.

4.2.2.1.2 Integrity Assessments

An independent, qualified, registered professional engineer's tank integrity certification was completed and provided to Ecology before the tank system begins operation.

4.2.2.2 Secondary Containment and Release Detection for Tank System

This section describes the secondary containment systems and leak detection systems installed in the RLWT system.

4.2.2.2.1 Requirements for Tank Systems

The secondary containment system for the RLWT consists of the stainless steel liner in the bottom of the concrete tank pit and 0.6 meters up the tank pit walls. The remaining portion of the concrete walls is painted with a chemically resistant coating and the boundary between the steel liner and the coating is sealed.

The welded single-walled transfer piping will be visually inspected for leaks within 24 hours of a transfer. The 325 Building provides additional containment. The basement floors are concrete, and any liquid release remains in the immediate area until cleanup.

The transfer piping from the SAL tank to the RLWT is single-walled, welded stainless steel pipe. Sections of the RLWT system piping have secondary containment where feasible. Secondary containment for the piping system consists of double-walled stainless steel pipe with outlet valves at the ends. Secondary containment piping was installed on the new line from Room 40A to the RLWT. Secondary containment piping was also installed on the line between Room 528 and the RLWT and from the RLWT to the cask loading station. Any leaks in the primary piping will cause liquid to gravity flow to the area of the pipe containing the outlet valve. An increase in radiological dose will be seen if liquid is collecting in the annulus.

4.2.2.2.2 Requirements for Secondary Containment and Leak Detection

The secondary containment was designed to prevent any migration of waste or accumulated liquid from the tank system to the soil, groundwater, or surface water. The secondary containment system is able to detect and collect releases of accumulated liquids. Remote television cameras provide a surveillance system for the RLWT, ancillary equipment, and general viewing of the tank pit. Viewing screens and controls are located in the control room. The following is the system description based on conceptual design.

Materials of construction. The RLWT and components are constructed of 316L stainless steel; this material is compatible with the aqueous waste being discharged to the tank. The waste has a pH between 7 and 12, and the chloride ion concentration averages less than 0.01 Molar.

<u>Strength of materials.</u> The system design was reviewed by an independent, qualified, registered professional engineer to verify that the strength of materials is adequate and that the tank can withstand the stress of daily operation before operations began.

<u>Strength of foundation.</u> The system design was reviewed by an independent, qualified, registered professional engineer to verify that the strength of the tank mounting and foundation is adequate to withstand the Design Basis Earthquake (DBE) before operations began. This ensures that the foundation is capable of providing support to the tank and will resist settlement, compression, or uplift.

<u>Leak detection system description.</u> Conductivity probes are installed inside the single-walled tank to detect the liquid level in the tank. Any leaks from the tank will be collected in the stainless steel lined tank pit. Liquid sensing tape is installed in the bottom of the tank pit to detect any leak of liquid from the primary containment. If liquid is detected, alarms will sound immediately in a local control panel and in the operator's room.

<u>Removal of liquids from secondary containment.</u> The RLWT secondary containment, the lined tank pit, is designed to contain a liquid leak from the tank until provisions can be made to remove the liquid. The liquid might not be removed within 24 hours because of the coordination that must take place in the 325 Building and the DST personnel. The dip tube is installed in the tank pit, extending from the bottom of the pit to the outside of the vault and is capped at the top. If liquid were detected in the tank pit, the liquid will be removed by connecting a transfer pump to the dip tube. Any liquid removed from the secondary containment would be transferred to the DSTs in a manner consistent with the transfer of waste from the RLWT to the DSTs.

A delay of greater than 24 hours in removing the liquid from the secondary containment poses no threat to human health or the environment, because the waste continues to be contained in the tank pit.

4.2.2.2.3 Secondary Containment and Leak Detection Requirements for Ancillary Equipment

Secondary containment for the RLWT system ancillary equipment will be provided by the lined tank pit, double-walled piping, and daily visual inspection during use of the entire system including the existing single-walled piping. All material of construction will be stainless steel; for welded parts, the material is 316L stainless steel. Stainless steel material is compatible with the expected corrosive, dangerous, and mixed waste stored in the tank. The strength and thickness of the piping, equipment supports and secondary containment are designed to onsite standards that take into account seismic requirements for the region and corrosion protection. The entire system is located on an existing basement floor built in the 1960s. The 325 Building has proven over time to be of a sound structural integrity to withstand mild earthquake forces. The tank pit has a liquid element sensor that alarms immediately at the main control panel should any leakage be detected. The tank pit will hold the total capacity of the 11,355-liter tank plus any potential process water that also might be released. In the event of an alarm, the process water solenoid valves will become de-energized to the closed position to minimize the loss of additional water.

The 325 Building is staffed or monitored 24 hours a day, 7 days a week. The control system is designed to alarm on any leak/spill or high-level alarm encountered. The personnel responding to the alarm condition will stop or secure the action causing the leak/spill, warn others of the spill, isolate the spill area, and minimize individual contamination and exposure. The spilled or leaked waste will be removed in an expeditious manner according to procedures for cleaning up spills and leaks.

4.2.2.2.4 Controls and Practices to Prevent Spills and Overflows

The RLWT system has been designed to account for safe and reliable operation to prevent the system from rupturing, leaking, corroding, or otherwise failing. The tank is provided with redundant-level instrumentation to monitor tank levels. Conductance-level probes are used for level monitoring and alarming, and as a secondary tank level monitoring system. The tank will alarm on high level and interlock the process water to fail close.

Trained personnel respond to spills by stopping or securing the action causing the spill, notifying others in the area of the spill, and following guidance provided in the 325 Building Emergency Plan and the 325 HWTUs Contingency Plan (Attachment 36, Chapter 7.0). Measures are in place to inspect the system daily.

4.2.2.3 Tank Management Practices

The RLWT was installed in an existing pit in the basement, entirely below grade. The top of the tank is shielded by a concrete deck on top of the pit. The deck is constructed of multiple stepped cover blocks to simplify installation/removal.

The single wall vertical tank is supported by multiple legs. Secondary containment is provided by lining the lower portion of the tank pit. The stainless steel liner is sealed to the pit wall, and the wall above the liner will be coated with a chemical-resistant material. The tank is operated near atmospheric pressure and vented through HEPA filters.

The primary panel in the control room is adjacent to the tank pit. Other Liquid level monitoring panels are located in Room 601, 325A truck lock, Room 201, Room 527 and the power operator's office. The tank is monitored with two liquid level instruments, and meters/indicating lights are provided in all control panels. Several of the panels have high liquid level alarms. These alarms are audible or visual, depending on location.

There is a leak detection system for the double walled piping and the tank pit liner. Liquid sensing cable is connected to alarms in the operator's office. There are remotely operated TV cameras in the pit to inspect the tank and the liner. These cameras will be viewed by operators when performing the daily inspection of the tank for evidence of corrosion and releases of dangerous waste.

Because liquid waste is generated in a batch mode, waste drained to the RLWT will be effectively controlled through operating and administrative procedures in order to prevent high-level-alarm conditions. When there is an alarm, a safety cutoff system will shut off all incoming process water lines.

A backup tank system was determined to be unnecessary because of the presence of tank monitoring devices and the use of administrative and operational (batch-processing) controls.

Liquid waste will be transported from 325 Building to DSTs using the cask system. The 325A truck lock has been modified to handle the cask system. There is a transfer line with secondary containment in 325 Building between the tank and the truck lock. A pump is used to transfer the waste from the RLWT to the truck lock.

Prior to transferring waste from the RLWT, responsible personnel will schedule the cask system for a waste transfer. A small quantity of waste will be obtained for characterization using a sample pump and small hood. The cask system will be positioned in the 325A truck lock. Transfer of the waste to the cask system will be performed in accordance with 325 Building and approved cask system procedures.

4.2.2.4 Marking or Labeling

Due to the high radiation levels associated with the RLWT, the tank itself is not labeled. The tank is located below grade in a sealed pit. Access points to the tank pit are labeled to meet the requirements of WAC 173-303-395. The marking of the access points is legible from a distance of 15 meters and identifies the waste. The label will adequately warn employees, emergency response personnel, and the public of the major risks associated with the waste being stored within the tank. The RLWT also has a written placard identifying important radioactivity, criticality, and hazard concerns.

4.2.2.5 Ignitable, Reactive, and Incompatible Waste

Many different types of samples and waste materials will be brought to the SAL hot cells, and the HWTU. These samples are accompanied by an internal PNNL documentation form that provides waste characterization information from the sample-generating unit. Chemical characterization provided in these forms is based on previous chemical analysis or process knowledge. The hazard potential includes exposure to radiation, corrosive/flammable chemicals, and hazardous chemicals.

Prior to transferring wastes to the RLWT system, the wastes are evaluated to ensure compatibility with the system and to preclude introduction of flammable or reactive waste in order to protect the integrity of the new RLWS tank. The RLWT system is equipped with treatment capabilities including neutralization and chloride removal. These treatment systems include chemical additive tanks and a tank agitator.

Based on analytical results and process knowledge of the 325 laboratories generating the waste, treatment of the SAL generated waste prior to discharge, and agitation and treatment capabilities in the RLWT, waste solutions are not expected to be ignitable, reactive, or incompatible.

The following factors ensure a safe and reliable tank system with regard to ignitable, reactive, and incompatible waste. The tank system operates at ambient temperatures and pressures, all waste added to the tank meets the RLWS waste acceptance criteria, the tank construction material is stainless steel, and the operators have past operating experience and are trained in the applicable procedures. Closure of the RLWT is addressed in Attachment 36, Chapter 11.0, Section 11.4.

4.3 AIR EMISSIONS CONTROL

The TSD unit shall comply with all applicable Subpart AA and BB requirements of the Air Emission Standards. The air emissions standards on 40 CFR 265, Subpart AA and BB do not apply to any part of the 325 HWTUs. Containers in the 325 HWTUs are primarily managed as mixed waste. Such containers are exempt from 40 CFR 264, Subpart CC by 40 CFR 264.1080(6).

4.4 ENGINEERING DRAWING

H-3-300294 Waste Tank Piping Installation

Table 4.1. Typical Storage Containers Used at the 325 Hazardous Waste Treatment Units.

Material of construction	Waste Capacity
Glass container/bottles	1 milliliter to 3.79 liters
Plastic containers/bottles	1 milliliter to 19 liters
Paint cans	0.47 liters to 4.73 liters
Steel containers	114 liters, 322 liters
Plastic-lined steel containers	114 liters, 208 liters
Steel "shielded" 208-liter container	Various nominal capacity depending on necessary shielding; 3.79 liters; 53 liters
Overpack containers	322 liters

Figure 4.1. Hazardous Waste Treatment Unit Secondary Containment System.

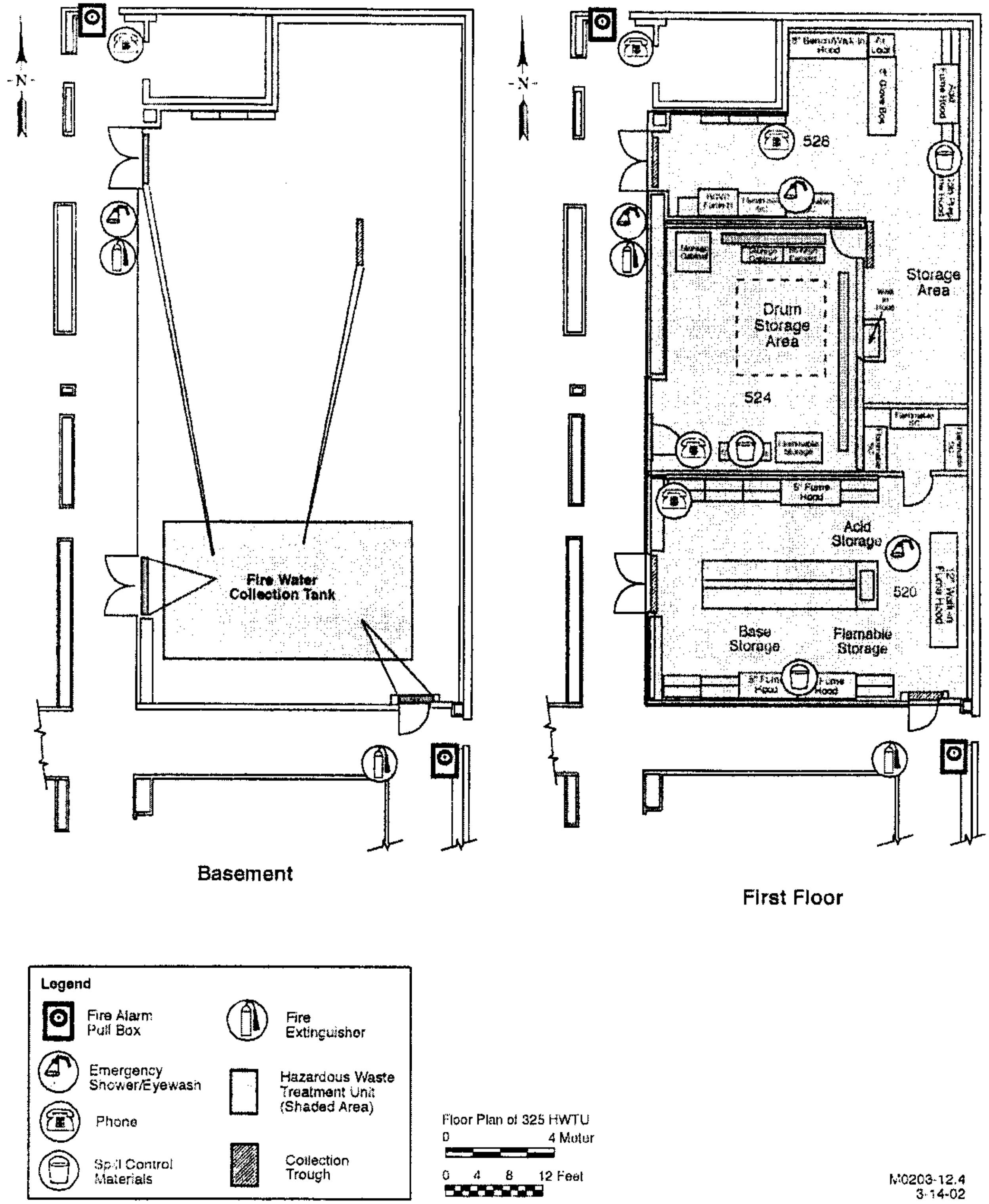
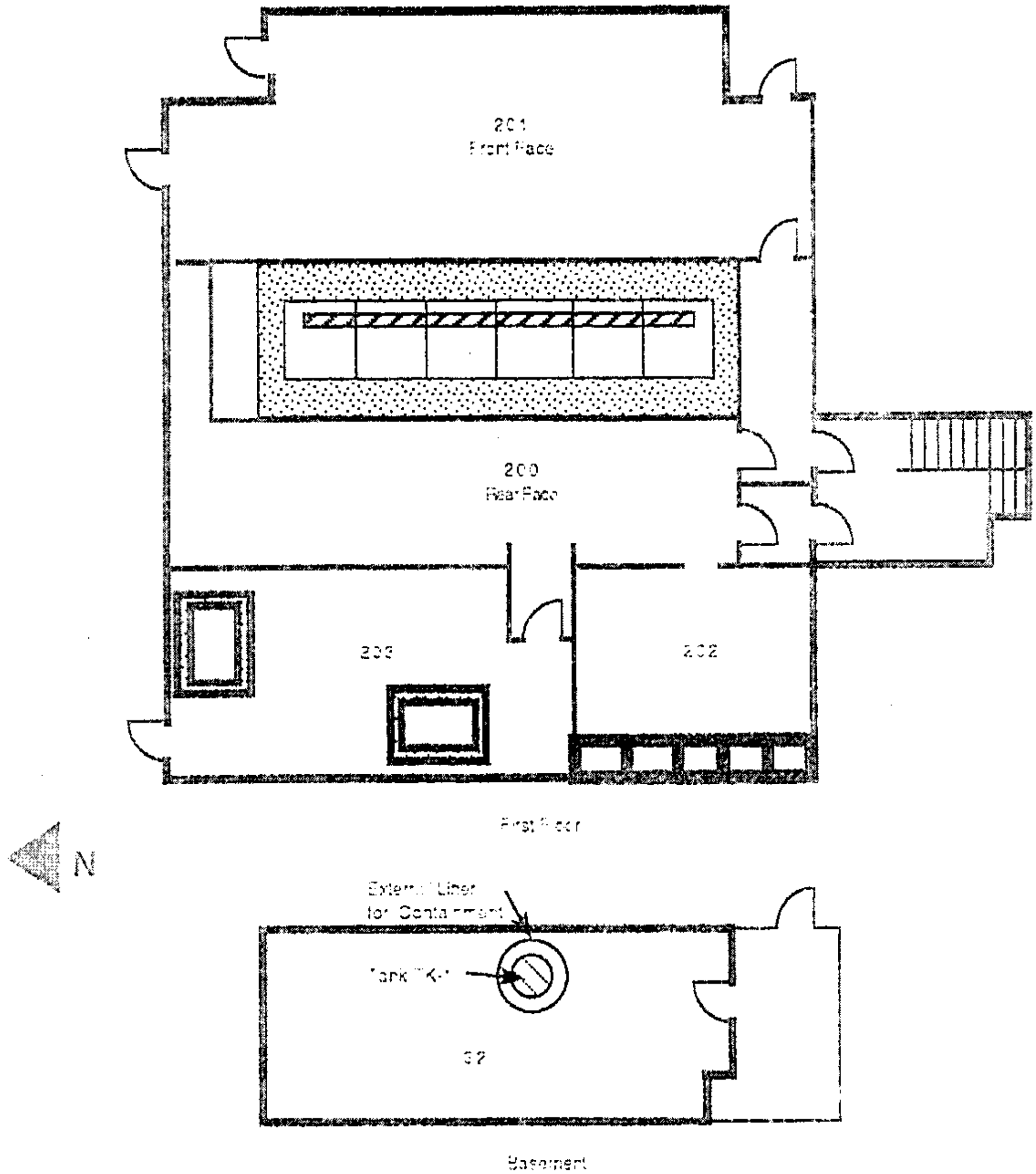


Figure 4.2. Hot Cell Secondary Containment System.



Collection Trough to Tank TK-1

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TABLES

11.0 CLOSURE AND FINANCIAL ASSURANCE

This chapter discusses the planned activities and performance standards for closure of the 325 HWTUs in accordance with the requirements of WAC 173-303-610. No postclosure activities currently are applicable or required because the 325 HWTUs are proposed to be clean closed.

To clean close the 325 HWTUs, it will be demonstrated that dangerous waste has not been left onsite at levels above the closure performance standard for removal and decontamination. Regulations and laws will be reviewed periodically and the closure plan modified as necessary. If it is determined that clean closure is not possible or is environmentally impractical, the closure plan will be modified to address required postclosure activities.

11.1 CLOSURE PLAN

The 325 HWTUs are planned to be clean closed.

11.1.1 Closure Performance Standard

The 325 HWTUs will be clean closed in a manner that will minimize the need for further maintenance and will eliminate postclosure release of dangerous waste or dangerous waste constituents. This standard will be met by removing dangerous waste and any dangerous waste residues from the units.

If the 325 Building ceases operations (i.e., utilities are disconnected and routine personnel access is not allowed), a decision will be made whether to implement this closure plan, or if continued operating authority will be sought.

After closure, the building areas formerly occupied by the HWTUs will be in a condition suitable for use in support of ongoing or future research and development activities. This use will be consistent with other land use activities in the 300 Area.

If there is any evidence of spills or leaks from the unit into the environment, further remediation will be deferred to the final disposition of the 325 Building. A postclosure monitoring plan will then be developed.

Clean closure decontamination standards for structures, equipment, bases, liners, etc., will be those specified for hazardous debris in 40 CFR 268.45, Table 1. The 'clean debris surface' will be the performance standard for metal and concrete surfaces. This standard is consistent with Ecology guidance (Ecology 1994b) for achieving clean closure.

Attainment of a 'clean debris surface' will be verified by a visual inspection in accordance with the standard that states:

A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices and pits shall be limited to no more than 5 percent of each square inch of surface area. (40 CFR 268.45, Table 1).

Some unit equipment such as pumps, cartridge filters, and pipes may not be sufficiently visible for in-place contamination evaluation and waste designation. Equipment that cannot be designated in-place must be removed and then designated.

Equipment and structures will be decontaminated using the procedures in Sections 11.2.3 and 11.3.3. If decontamination is impracticable, components will be removed, designated, and disposed of. All residues resulting from decontamination will be sampled and analyzed as described in Sections 11.2.4 and 11.3.6 to determine whether they are dangerous waste. Residues containing listed waste, having dangerous waste characteristics, or exceeding dangerous waste designation limits will be managed in accordance with all applicable requirements of WAC 173-303-170 through 173-303-203. [Reference WAC 173-303-610(5)].

11.1.2 Closure Activities

This closure plan describes the steps necessary to perform final closure of the 325 HWTUs. Closure activities will involve removing dangerous waste from the units and decontaminating associated structures and equipment in the units as necessary. These activities, which are discussed in subsequent sections, could be implemented at any point during the life of the 325 HWTUs.

Partial closure could involve closing the SAL, the HWTU, or the RLWT individually or closing a portion of a unit, such as the SAL tank system, which includes the tank; associated piping, valves and pumps; and the secondary containment. Except for the timing of the closure activities, these closure activities would remain identical to those described in this closure plan.

11.1.3 Maximum Extent of Operation

The 325 HWTUs consist of three units, all within the 325 Building, located in the 300 Area on the Hanford Facility. The SAL is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, 524 and 528, and the firewater containment tank located in the basement beneath Room 520. The RLW system currently collects radioactive liquid waste from the SAL and Rooms 520 and 528 of the HWTU. The RLWT collects radioactive liquid waste from the SAL, RLW system, Rooms 520 and 528 of the HWTU, and the other hot cells in the 325 Building. The RLW system runs throughout the 325 Building as depicted on Figures 2-3 and 2-4. The SAL, the HWTU RLW system, and the RLWT represent the maximum extent of operations for the 325 HWTUs as indicated in the Part A, Form 3, permit application. If additional operations are added to the unit, the closure plan will be modified to reflect closure of the new areas.

11.2 CLOSURE OF THE HAZARDOUS WASTE TREATMENT UNIT

The following sections address the activities required to conduct closure of the HWTU.

11.2.1 Removing of Dangerous Waste, Disposal, or Decontamination of Equipment, Structures, and Soils

Steps for inventory removal, decontamination, and disposal of all dangerous waste containers, residues, and contaminated equipment are described in the following sections.

11.2.2 Removing Dangerous Waste

Closure or partial closure activities will be initiated by removal of the dangerous waste inventory present at the HWTU at the time of closure or partial closure. Inventory removal procedures will be identical to the waste handling, treating, packaging, and manifesting activities associated with normal permitted operations at the HWTU.

All dangerous waste will be placed in containers that meet specifications stated in Attachment 36, Chapter 4.0, Section 4.1. To the extent possible, waste will be bulked into larger containers. If waste is bulked, containers will be emptied in compliance with WAC 173-303-160 so that the containers can be considered a solid nondangerous waste. Small-quantity laboratory chemicals that can't be bulked will be packaged in lab pack containers in compliance with the requirements of WAC 173-303-161. All containers of dangerous waste will be manifested and transferred to the custody of a dangerous waste transporter having a proper dangerous waste identification number. All containers of dangerous waste will be transferred to an appropriate onsite unit permitted to manage the waste and that will ensure proper handling and disposal.

Equipment and structural components in the HWTU requiring decontamination will be decontaminated using the methods described in Section 11.2.3. All waste residues resulting from decontamination will be sampled and analyzed as described in Section 11.2.4 to determine whether the residue is mixed, dangerous, radioactive, or nonhazardous waste and to discern how to dispose of the waste properly. All residues will be removed from the units and transferred to a TSD unit having the necessary permits for proper treatment, storage, and/or disposal. Residues containing listed waste, having dangerous characteristics, or exceeding dangerous waste designation limits will be managed in accordance with all applicable requirements of WAC 173-303-170 through 173-303-203. [Reference WAC 173-303-610(5)].

11.2.3 Decontaminating Structures, Equipment, and Soil

All equipment and structures in dangerous waste storage and treatment areas will be decontaminated at the time of closure or partial closure except equipment and structures that exhibit a 'clean debris surface' before starting closure activities. These will be considered decontaminated and receive to further decontamination. Initial closure activities will entail decontamination of all piping and equipment that is known to have contacted the waste. Equipment and structures to be decontaminated include the following:

- Waste handling and treatment equipment
- Glove boxes
- Open-face hoods
- Storage cabinets
- Floors, walls, and ceilings of Rooms 520, 524 and 528
- Firewater containment tank (beneath Room 520).

Decontamination methods for equipment and structures will be selected from appropriate technologies (40 CFR 268.45, Table 1) such as washing with water, high-pressure water jet scarifiers, abrasive blasting, aquablasting, or mechanical concrete scrubbers and scarifiers. Following the decontamination process, a visual inspection will be conducted for monitoring the effectiveness of the decontamination work.

All equipment used for decontamination will be used exclusively within the HWTU during closure activities. When all structural and equipment decontamination is complete, and when the equipment is no longer necessary, the equipment will be decontaminated before final closure of the units. All cleaning and decontamination waste will be collected and analyzed as described in Section 11.2.4. Any disposable equipment will be placed in a container and disposed at an appropriate unit based on the status of the waste as dangerous, mixed, radioactive, or nonhazardous. Dangerous waste placed in containers will be managed in accordance with Attachment 36, Chapter 4.0.

All waste-handling equipment in the HWTU will be decontaminated by washing with water or a solvent to a 'clean debris surface' as defined in Section 11.1.1. If additional decontamination is necessary, a decontamination technique will be selected from appropriate technologies (40 CFR 268.45, Table 1) such as high-pressure water wash. If adequate cleaning is not possible, the equipment will be disposed of as dangerous waste. The decision to dispose or decontaminate equipment will be made at the time of closure. The option that is the most environmentally and economically feasible will be chosen. Adequate decontamination will be determined by a visual inspection for a 'clean debris surface' as described in Section 11.1.1. All wastewater will be collected in sumps or portable containers, pumped to chemically compatible, closed-top containers, and transported and managed as described in Section 11.2.4.

The time required for decontamination of waste-handling equipment and the amount of wastewater generated by these methods will depend on the amount of equipment that needs to be decontaminated. At this time, minimal time and effort are anticipated. The wastewater to be generated through decontamination is not anticipated to exceed approximately 378 liters. The volume of solid waste generated will depend on the extent of decontamination necessary.

The radiological conditions of the unit will be established before starting closure activities. If a 'clean debris surface' is present at the time that closure activities are started, the area will be considered clean closed. In this case, housekeeping measures may be undertaken and could include sweeping, dusting, vacuuming, and wiping with soap and water. Brushing or sweeping will be used to clean up coarse debris. Vacuuming will be performed using a commercial or industrial vacuum equipped with a high-efficiency particulate air (HEPA) filter. The vacuum cleaner bag containing captured particulates will be disposed appropriately. Dust wiping will be done with a damp cloth or wipe (soaked with water) to remove dust from surfaces that cannot be decontaminated with a vacuum. The cloth or wipe also will be disposed appropriately. HEPA filters from installed equipment and vacuum cleaners will be assessed for radiological condition, designated and managed as described in Section 11.2.4. The volume of solid waste (e.g., personal protective clothing/equipment, wipes, HEPA filters, vacuum bags) generated will depend on the extent of decontamination necessary.

Minimal time will be required for setup of the decontamination equipment. Labor requirements for the process should be moderate. Minimal time also will be required for packaging debris, dismantling, and removing cleaning equipment. Small quantities of wastewater (only the contents of buckets used in the decontamination procedure) will be generated. However, if a clean debis surface is not present, more sophisticated decontamination methods will be implemented. The surfaces in the HWTU that do not have a 'clean debris surface' will be treated extensively using an appropriate decontamination technology such as water washing (40 CFR 268.45, Table 1). The contaminated surfaces will be decontaminated to remove all residues from the surfaces. The contaminated waste generated by this activity will be contained by the designed spill controls already in place for the unit (i.e., fire water containment tank and associated drain lines/sumps) or by disposable absorbent pads that might be placed around the area to be water washed. Pumps or vacuums will be used to empty the wastewater from the containment area into chemically compatible, closed-top containers. Containers of wastewater will be managed as described in Section 11.2.4.

Although this method will require more time than the dusting, vacuuming, and wiping procedures outlined previously, time requirements are still considered minimal for the water washing approach. Wastewater generated by this method is not anticipated to exceed 500 liters.

If necessary, further decontamination methods such as sandblasting or other appropriate technologies could be used effectively to clean contaminated structure surfaces. All residues from the decontamination effort will be collected for sampling and proper subsequent disposal as described in Section 11.2.5.4. Following completion of decontamination, additional visual inspections will be performed to determine that the 'clean debris surface' standard has been achieved. In the unlikely event that structures cannot be cleaned using the methods described, these structures might be demolished, removed, and managed as dangerous waste.

The collection sumps and secondary containment system will be decontaminated by water washing. Wastewater collected from the cleaning process in each sump and containment system will be pumped into chemically compatible, closed-top containers and analyzed as described in Section 11.2.4 to determine if the wastewater is a dangerous waste under WAC 173-303-070. If the wastewater is determined to be a dangerous waste, the wastewater will be managed and disposed at an appropriate permitted unit. If the wastewater is not a dangerous waste, the wastewater will be discharged to the 300 Area retention process sewer system. The water washing of all sumps should take minimal time and should generate less than 500 liters of wastewater. Additional decontamination techniques such as grit blasting, scabbling, or chipping might be used if necessary. The volume of solid waste generated will depend on the extent of decontamination necessary.

The radiological condition of the firewater containment tank will be established before starting closure activities. The internal surface of the firewater containment tank will be visually inspected. If a 'clean debris surface' is present at the beginning of the closure process, the firewater containment tank will be considered clean closed. If the surface of the liner does not meet the 'clean debris surface' standard then the firewater containment tank for the HWTU and ancillary equipment could be flushed with water, and if flushed, the water could be tested for dangerous waste constituents. Detergents, solvents, or a dilute acid wash could be required to remove constituents from the tank. In all cases, the final decontamination rinse water will be tested. To demonstrate decontamination, the interior surface of the tank liner will be visually inspected to determine if the 'clean debris surface' standard has been achieved. If this proves to be impractical or impossible, the tank liner will be removed and disposed. Runoff of decontamination solutions and wastewater will be prevented either by performing cleaning activities within existing containment structures or within portable containment pans or by surrounding the decontamination area with plastic and absorbent pads.

If water flushing is unsuccessful at removing dangerous waste and dangerous waste constituents, other decontamination processes will be employed, including appropriate technologies such as aquablasting and high-pressure water jet scarifiers. The actual equipment used will consist of an appropriate combination of equipment that will be the most effective as determined by sampling results. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

Management of decontamination residues is provided in Section 11.2.4. The time requirements for decontamination of the tank are expected to be minimal, and wastewater generated by this procedure is not expected to exceed 757 liters.

All dangerous waste storage and treatment operations at the 325 HWTUs will be conducted indoors, which will minimize potential contamination of the soil and groundwater. Unit design and administrative controls minimize the possibility of loss of waste to the soil and contamination of the groundwater. The potential for degradation of surface water quality also is very low due to the building design and administrative controls employed. Additional details on spill prevention and emergency response are provided in Attachment 36, Chapter 7.0.

11.2.4 Management of Decontamination Waste from HWTU

Decontamination waste from the HWTU will be placed in containers and sampled to determine disposal requirements. Samples from each container will be analyzed for the following:

- Corrosivity using the methods described in EPA SW-846 (Methods 9040/9045)
- Ignitability using methods described in EPA SW-846 (Methods 1010/1020)
- Toxicity characteristic using the Toxicity Characteristic Leaching Procedure (TCLP) described in 40 CFR 261 Appendix II (Method 1311) [including analysis for metals; volatile organics; and semivolatile organics, which includes chlorinated pesticides, using methods identified in the waste analysis plan (Attachment 36, Chapter 3.0]
- Total radioactivity using gross alpha, gross beta, and gamma scan (Method 9310).

Other analyses might be performed based on process knowledge to determine the presence of a listed waste. The results of sample analyses will be used to determine how to dispose of decontamination waste. (Background levels will be determined by analysis of the tap water used for makeup of the decontamination solutions.) The results of the ignitability, corrosivity, and toxicity characteristic analyses will be used to determine if the waste is characteristic dangerous waste (WAC 173-303-090). The results of the radiological analyses will be used to determine whether any of the waste generated during the

HWTU closure is low-level liquid radioactive waste or mixed waste. Depending on designation, decontamination waste will be managed as follows:

- Dangerous waste – Manifested and shipped and/or transferred to a permitted TSD unit
- Mixed waste – Manifested and shipped to a TSD unit as available, or treated and disposed onsite
- Low-level radioactive waste and nonregulated waste – Handled in accordance with the Liquid Effluent Consent Order (No. DE91NM-177) and Milestone M-17 of the Tri-Party Agreement.

11.2.5 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

The radiological condition of the unit will be determined before starting closure activities. Attainment of a 'clean debris surface' will be verified by a visual inspection in accordance with the standard that states, "A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices and pits shall be limited to no more than 5 percent of each square inch of surface area." (40 CFR 268.45, Table 1).

Areas of degraded surface material, such as significant concrete cracking or heavily gouged steel, will be evaluated by non-destructive or destructive means to determine depth of significant surface defects, amount of contamination present in the defects, and to determine if environmental contamination has resulted from the material defect.

11.3 CLOSURE OF THE SHIELDED ANALYTICAL LABORATORY

The activities required for the closure of the SAL are described in the following sections.

11.3.1 Removing Dangerous Waste, Disposal and Decontamination of Equipment, Structures, and Soils

Steps for inventory removal, decontamination, or removal of all dangerous waste containers, residues, and contaminated equipment are described in the following sections.

11.3.2 Removing Dangerous Waste

Closure or partial closure activities will be initiated by removal of the dangerous waste inventory present at the SAL at the time of closure or partial closure. Inventory removal procedures will be identical to the waste handling, treating, packaging, and manifesting activities associated with normal permitted operations at the SAL.

At the SAL, liquid waste will be treated and packaged to meet requirements for disposal in onsite units or will be transferred through the SAL tank to the RLW system and RLWT system. Liquid dangerous waste in the SAL tank will be transferred to the RLW system and then to the RLWT system. If, for some reason, the RLWT-system closes before the SAL tank, the contents of the SAL tank will be loaded into containers and managed in accordance with Section 11.2.2. Any other suitable RCRA-permitted units that might exist when the SAL tank is closed could be used as a storage alternative. Liquid waste handling, packaging, transportation, and manifesting procedures will follow those used during normal operation of the SAL.

Equipment and structural components in the 325 HWTUs will be decontaminated using appropriate methods described in Sections 11.2.3 and 11.3.3. If decontamination is impracticable, components will be removed, designated, and disposed of. All waste residues resulting from decontamination will be sampled and analyzed as described in Section 11.3.6 to determine whether the residue is mixed, dangerous, radioactive, or nonhazardous waste and to discern how to dispose of the waste properly. All residues will be removed from the units and transferred to a TSD unit having the necessary permits for proper treatment, storage, and/or disposal. Residues containing listed waste, having dangerous characteristics, or exceeding dangerous waste designation limits will be disposed of properly.

11.3.3 Decontaminating Equipment, Structures, and Soils

All equipment and structures in dangerous waste storage and treatment areas will be decontaminated at the time of closure or partial closure except equipment and structures that exhibit a 'clean debris surface' before starting closure activities. These will be considered decontaminated and receive no further decontamination. Initial closure activities will entail decontamination of all piping and equipment that is known to have contacted the waste. Equipment and structures to be decontaminated include the following:

- Floors, walls, and ceilings of the SAL front face (Room 201), hot cells, back face (Rooms 200, 202, and 203), and associated airlocks
- Floors, walls, and ceiling of the basement of Room 32 in the SAL
- SAL tank and ancillary equipment
- Secondary and tertiary containment pans
- Interior surfaces of all secondary containment trenches.

Decontamination methods for equipment and structures will be selected from appropriate technologies such as washing with water, high-pressure water jet scarifiers, abrasive blasting, aquablasting, or mechanical concrete scrubbers and scarifiers. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

All equipment used for decontamination will be used exclusively within the units during closure activities. When all structural and equipment decontamination is complete, and when the equipment is no longer necessary, the equipment will be decontaminated before final closure of the units. All cleaning and decontamination waste will be collected and packaged as described in Section 11.3.6. Any disposable equipment will be containerized and disposed of based on the status of the waste as dangerous, radioactive, or nondangerous waste.

Initial gross decontamination of the hot cells will be necessary before entry of personnel into the hot cells for the visual inspection of the cell liners. The high radiation levels in the cells will preclude personnel entry into the cells, and configuration of the cells precludes thorough visual inspection of the interior surfaces of the cells. This decontamination will be accomplished using high-pressure water sprays or other appropriate decontamination techniques operated by means of the manipulators.

If a 'clean debris surface' is present at the time that closure activities are started, decontamination procedures will consist of sweeping, dusting, vacuuming, and wiping with soap and water. Brushing or sweeping will be used to clean up coarse debris. Vacuuming will be performed using a commercial or industrial vacuum equipped with a HEPA filter. The vacuum cleaner bag containing captured particulates will be appropriately disposed. Dust wiping will be done with a damp cloth or wipe (soaked with water) to remove dust from surfaces that cannot be decontaminated with a vacuum. The cloth or wipe also will be appropriately disposed. The volume of solid waste generated will depend on the extent of decontamination necessary.

Moderate time will be required for setup of the decontamination equipment. However, labor requirements for the process will be extensive for radioactively contaminated areas and particularly for the hot cells where radiation levels will be very high, and will, at least initially, require remote operations.

Moderate time also will be required for packaging debris, dismantling, and removing cleaning equipment. Moderate quantities of wastewater will be generated by this procedure. However, if a 'clean debris surface' is not present, more sophisticated decontamination methods will be implemented. The dangerous waste management portions of the SAL will be treated extensively using an appropriate decontamination technique (40 CFR 268.45, Table 1). The ceiling, walls, and floor will be treated by applying the decontamination technique to remove all residues from the surfaces. The contaminated waste generated by this activity will be collected in the SAL and will be managed as described in Section 11.3.6. The volume of waste generated by this procedure is anticipated to be on the order of 2,000 liters.

If necessary, more aggressive decontamination methods, such as sandblasting or other appropriate technologies, could be used effectively to clean contaminated structure surfaces. All residues from the decontamination effort will be collected for sampling and proper subsequent disposal as described in Section 11.3.6. Following completion of decontamination, additional visual inspections will be performed to determine that the 'clean debris surface' standard has been achieved. In the unlikely event that structures cannot be cleaned using the methods described, these structures might be demolished, removed, and managed as dangerous waste.

The hot cells in the SAL also include two other areas that might require decontamination. These are the storage rooms 200, 202 and 203 in the backside of SAL and the operating area (gallery). It is expected that the level of contamination will be minimal based on the operations performed. Accordingly, the level of the decontamination effort also is expected to be minimal. For example, decontamination efforts in the operating gallery might be limited to decontamination and removal of the fume hood. If a 'clean debris surface' is present at the time that closure activities are started, decontamination procedures will consist of sweeping, dusting, vacuuming, and wiping with soap and water.

All dangerous waste storage and treatment operations at the 325 HWTUs will be conducted indoors, which will minimize potential contamination of the soil and groundwater. Unit design and administrative controls minimize the possibility of loss of waste to the soil and contamination of the groundwater. The potential for degradation of surface water quality also is very low due to the building design and administrative controls employed. Additional details on spill prevention and emergency response are provided in Attachment 36, Chapter 7.0.

If contaminated soil is found and if practical, it may be excavated, removed, and disposed as dangerous waste. Extensive soil contamination may be deferred to the closure of the 325 Building and to the CERCLA RI/FS process for the 300-FF-2 and 300-FF-5 operable units.

11.3.4 Decontamination of Hot Cell Trough

The collection trough in the interconnected SAL hot cells will be decontaminated using an appropriate decontamination technique (40 CFR 268.45, Table 1). Any wastewater collected in each sump from the cleaning process will be collected in the SAL waste tank system and analyzed to determine if the wastewater is a dangerous waste. If the wastewater is a dangerous waste, it will be managed and disposed at an appropriate permitted facility. If the wastewater is not a dangerous waste, the wastewater will be discharged to an appropriate radioactive waste disposal facility. The decontamination of the hot cell collection trough should take moderate time and should generate less than 500 liters of waste. Additional decontamination techniques, such as grit blasting or chemical cleaning, could be used if necessary. The volume of solid waste generated will depend on the extent of decontamination necessary.

11.3.5 Decontamination of the Shielded Analytical Laboratory Tank System

The SAL tank and ancillary equipment, tank secondary containment, tank tertiary containment pan, and associated tank piping will be flushed with water; the water will then be tested for dangerous waste constituents. Detergents, solvents, or a dilute acid wash could be required to remove constituents. In all cases, the final decontamination rinse water will be tested to determine whether cleaning activities are effective. Run-off of decontamination solutions and wastewater will be prevented either by performing cleaning activities within existing containment structures or within portable containment pans or by surrounding the decontamination area with plastic and absorbent pads.

If water flushing is unsuccessful at removing dangerous waste and dangerous waste constituents, other decontamination processes will be employed, including appropriate technologies such as, aquablasting, sandblasting, and high-pressure water jet scarifiers. The actual equipment used will be selected based on what the sampling results indicate will be the most effective. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

Management of decontamination residues is provided in Section 11.3.6. The time requirements for decontamination of the SAL tank system are expected to be moderate, and wastewater generated by this procedure is not expected to exceed 1,200 liters. The volume of solid waste generated will depend on the extent of decontamination necessary.

On completion of decontamination activities, the SAL tank either will remain in place for other uses within the 325 Building, will be moved for other uses on the Hanford Facility, or will be demolished and disposed as scrap (if its usefulness is determined to be complete).

11.3.6 Management of Decontamination Waste from SAL

Decontamination liquid from the SAL hot cells will be sent to the RLW system. All nonliquid waste generated during decontamination operations and the equipment used (e.g., sandblast grit, personnel protective equipment and clothing, disposable equipment) will be collected in 208-liter, open-head containers and stored onsite. Samples of the waste could be collected and analyzed as described in Section 11.2.4.

11.3.7 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

Methods to demonstrate success of decontamination will be the same as described in Section 11.2.5 for the HWTU.

11.4 CLOSURE OF THE RADIOACTIVE LIQUID WASTE TANK SYSTEM

The activities required for the closure of the RLWT system in the 325 Building are described in the following sections. The RLWT system includes the storage tank, chemical addition tanks, associated pipes, valves, pumps, filters, and secondary containment system. Activities for partially closing the existing RLW system before beginning operations of the RLW system load out tank system are also described.

11.4.1 Removing Dangerous Waste

Closure or partial closure activities will be initiated by removal of the dangerous waste inventory present in the RLW system at the time of closure or partial closure. Inventory removal procedures will be identical to the waste handling, treating, packaging, and manifesting activities associated with normal permitted operations of the RLW system.

Liquid waste will be transferred from the RLW system to the transfer cask and transported to the DSTs. Liquid waste handling, packaging, transportation, and manifesting procedures will follow those used during normal operation of the RLW system.

Equipment and structural components in the 325 HWTUs will be decontaminated using the methods described in Sections 11.2.3, 11.3.3 and 11.4.3. If decontamination is impractical, components will be removed, designated, and disposed of in accordance with WAC 173-303. All waste residues resulting from decontamination will be sampled and analyzed as described in Section 11.4.4 to determine whether the residue is mixed, dangerous, radioactive, or nonhazardous waste and to discern how to dispose of the waste properly. All residues will be removed from the units and transferred to a TSD unit having the necessary permits for proper treatment, storage, and/or disposal. Residues containing listed waste, having dangerous characteristics, or exceeding dangerous waste designation limits will be disposed of properly.

11.4.2 Decontaminating Equipment, Structures, and Soils

All equipment and structures in dangerous waste handling, storage, and treatment areas will be decontaminated at the time of closure or partial closure except equipment and structures that exhibit a 'clean debris surface' before starting closure activities. These will be considered decontaminated and receive no further decontamination (refer to Section 11.3.3).

There are two sections of piping that-were being utilized in the-former RLW system but are not utilized with the new RLWT system. Both sections of the former RLW system piping are located in the northeastern portion of the building; one runs in a north-south direction and the other runs in an east-west direction. These sections of piping are capped and left in place. Decontamination and other closure activities for these abandoned pipelines will be conducted along with final closure activities for the RLWT system.

Decontamination methods for equipment and structures will be selected from appropriate technologies such as washing with water, high-pressure water jet scarifiers, abrasive blasting, aquablasting, or mechanical concrete scrubbers and scarifiers. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

All equipment used for decontamination will be used exclusively within the units during closure activities. When all structural and equipment decontamination is complete, and when the equipment is no longer necessary, the equipment will be decontaminated before the final closure of the units. All cleaning and decontamination waste will be collected and packaged as described in Section 11.4.4. Any disposable equipment will be containerized and disposed of based on the status of the waste as dangerous, radioactive, or nondangerous waste.

The radiological conditions of the unit will be established before starting closure activities. If a 'clean debris surface' is present at the time that closure activities are started, the area will be considered clean closed. For these instances, housekeeping measures may be undertaken and could include sweeping, dusting, vacuuming, and wiping with soap and water. Brushing or sweeping will be used to clean up coarse debris. Vacuuming will be performed using a commercial or industrial vacuum equipped with a HEPA filter. The vacuum cleaner bag containing captured particles will be appropriately disposed. Dust wiping will be done with a damp cloth or wipe (soaked with water) to remove dust from surfaces that cannot be decontaminated with a vacuum. The cloth or wipe will also be appropriately disposed. The volume of solid waste generated will depend on the extent of decontamination necessary.

11.4.3 Decontamination of Radioactive Liquid Waste Tank System

The RLWT, chemical addition tanks, ancillary equipment, tank secondary containment pan (tank pit liner), and associated tank piping will be flushed with water; the water will then be tested for dangerous waste constituents. Detergents, solvents, or a dilute acid wash could be required to remove constituents. In all cases, the final decontamination rinse water will be tested to determine whether cleaning activities are effective. Run-off of decontamination solutions and wastewater will be prevented either by performing cleaning activities within existing containment structures or within portable containment pans or by surrounding the decontamination area with plastic and absorbent pads.

If water flushing is unsuccessful at removing dangerous waste and dangerous waste constituents, other decontamination processes will be employed, including appropriate technologies such as aquablasting, sandblasting, and high-pressure water jet scarifiers. The actual equipment used will be selected based on what the sampling results indicate will be the most effective. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

Some unit material such as pumps, cartridge filters, and pipes may not be sufficiently visible for in-place waste designation. Material that cannot be designated in-place must be removed and then designated.

Management of decontamination residues is provided in Section 11.4.4. The time requirements for decontamination of the RLWT system are expected to be moderate, and wastewater generated by this procedure is not expected to exceed 34,065 liters. The volume of solid waste generated will depend on the extent of decontamination necessary.

On completion of decontamination activities, the RLWT either will remain in place for other uses within the 325 Building, will be moved out for other uses on the Hanford Facility, or will be demolished and disposed as scrap (if its usefulness is determined to be complete).

11.4.4 Management of Decontamination Waste from RLWT System

Decontamination liquid from the RLWT system will be sent to the DSTs via the approved shielded cask system. All nonliquid waste generated during decontamination operations and the equipment used (e.g., sandblast grit, personal protective equipment and clothing, disposable equipment) will be collected in 208-liter, open-head containers and dispositioned according to the following criteria: material that is dangerous waste (only) will be disposed of at an offsite TSD Facility; mixed waste will be transferred to the Central Waste Complex for interim storage and future treatment or disposal; and low-level radioactive waste will be disposed onsite in the 200 Area. Samples of the waste could be collected and analyzed as described in Section 11.2.4.

11.4.5 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

Methods to demonstrate success of decontamination will be the same as described in Section 11.2.5 for the HWTU.

11.5 MAXIMUM WASTE INVENTORY

The 325 HWTUs are used to store and treat a variety of different research-and-operations-related dangerous waste. The maximum inventory of waste that could be present at any one time in the 325 HWTUs is constrained by the following factors.

- The maximum inventory of dangerous waste stored in containers will not exceed the limits listed in the Part A, Form 3, permit application
- The maximum inventory of dangerous waste in tank storage in the SAL will not exceed 12,574 liters in accordance with the design capacity of the SAL and the RLWT and the Part A, Form 3, permit application
- The total amount of dangerous waste at any one time will not exceed Uniform Building Code hazardous material quantity restrictions (Attachment 36, Chapter 4.0).

11.6 SCHEDULE FOR CLOSURE

Completion of closure activities is expected to take up to two years from the date of receipt of the final volume of waste at the units. This extended time for closure is necessary due to the high radiation levels and radiological contamination present in the facility, particularly the six interconnected hot cells. Safety systems needed to protect the environment will continue to operate during the closure process. Ecology personnel will be notified by the DOE-RL at least 45 days before the final closure activities are to begin. Closure activities are summarized in Table 11.2, and a detailed schedule of closure activities is provided in Table 11.3.

11.7 EXTENSION FOR CLOSURE TIME

An extension of the time for removal of the inventory of dangerous waste from the unit designated for closure is requested for the 325 HWTUs. The high levels of radioactive materials that are present, particularly in the six interconnected hot cells, necessitate this extension. The expected time needed to remove all waste from the units is two years.

The extended period for removal of the inventory of dangerous waste is needed to accomplish the procedures that are needed to safely work with the levels of radioactive materials that are present in the SAL. All activities required to remove the inventory of dangerous waste will be conducted in accordance with applicable permit conditions and all safety systems will continue to be operated. The removal of the inventory of dangerous waste will be conducted following procedures that are designed to be protective of the workers and the environment.

An extension of the closure time is requested for the 325 HWTUs. The high levels of radioactive materials that are present, particularly in the six interconnected hot cells, necessitate this extension. The expected time needed to close the units is two years.

Decontamination of hot cells is a slow and labor-intensive operation, complicated by the fact that most of the work must be done remotely using manipulators because of the very high radiation levels that are present in the hot cells. Even after radiation levels in the hot cells have been reduced enough to allow personnel entry, work is hampered by the extensive personal protective equipment that staff are required to wear, and the strict procedures that are enforced to ensure that both workers and the environment are protected from contamination with radioactive material.

Most equipment located in the hot cells must be packaged in shielded containers. Typically, this requires extensive remotely operated size reduction of the equipment. Removal of hot cell equipment, such as is located in the SAL, usually takes many months to a year or more to complete.

The extended closure period is needed to accomplish the procedures that are needed to safely work with the levels of radioactive materials that are present in the SAL. All closure activities will be conducted in accordance with applicable permit conditions and all safety systems will continue to be operated. The closure activities will be conducted following procedures that are designed to be protective of the workers and the environment.

11.8 CLOSURE COST ESTIMATE

An annual report outlining updated projections of anticipated closure costs for the Hanford Facility TSD units having final status will be submitted to Ecology in accordance with WAC 173-303-390 by October 31 of each year.

1 **Table 11.1. Analysis Parameters for Closure of the 325 Hazardous Waste Treatment Units**

Parameter and EPA SW-846a Analytical Method	Equipment and Structures Wipe Samples	Decontamination Waste Water Samples	Soil Samples (if determined to be contaminated)
pH for corrosivity (Method 9040 or 9045)		X	
Ignitability (Method 1010 or 1020)		X	
TCLP (Extraction Method 1311) • Metals (Method 6000 and/or 7000 series) • Volatile organics (Method 8240) • Semivolatile organics (Method 8270) • Chlorinated pesticides (Method 8080)		X	
Total metals: antimony, arsenic, beryllium, boron, cadmium, chromium, lead, mercury, nickel, selenium, silver, and thallium (Method 6000 and/or 7000 series)	X		X
Volatile organics (Method 8240)	X		X
Semivolatile organics (Method 8270)	X		X
Radioactivity[b] • Gross alpha (Method 9310) • Gross beta (Method 9310)	X	X	X

(a) SW-846 = EPA Test Methods for Evaluating Solid Wastes (Third Edition, latest update, 1986).
(b) Characterization of radionuclides is not within the scope of WAC 173-303 or of this permit application. The information on radionuclides is provided for general knowledge where appropriate.

1 **Table 11.2. Summary of Closure Activities for the 325 Hazardous Waste Treatment Units**

Closure Activity Description	Expected Duration (a)
Receive final volume of dangerous waste	N/A
Notify Ecology that closure activities will commence (at least 45 days before final closure activities begin)	N/A
Remove waste inventory and package, manifest, and transport all dangerous waste for treatment, storage, and/or disposal	80 days
Initial decontamination of the hot cells	120 days
Remove equipment from hot cells	270 days
Visual inspection of structural surfaces, equipment, troughs, and tanks in the HWTU and SAL to identify areas of contamination and to determine levels and methods of decontamination required	30 days
Decontaminate structural surfaces, equipment, troughs, and tanks at the HWTU and SAL using methods determined after visual inspection	180 days
Decontaminate front face and rear face	120 days
Reinspect surfaces to verify thoroughness of decontamination	2 days
Evaluate best methods for treatment and disposal of waste resulting from decontamination	25 days
Dispose of waste resulting from decontamination	80 days
Submit certification of closure to Ecology (within 60 days of completion of final closure activities)	N/A
(a) Some activities are performed concurrently.	

2 **Table 11.3. Closure Schedule for the 325 Hazardous Waste Treatment Units**

Action	Schedule
Date of receipt of last volume of waste	Day 0
Waste inventory removal	Day 90
Equipment decontamination or disposal and visual inspection of structural surfaces to identify areas of contamination and to determine level of decontamination needed	Day 530
HWTU and SAL structural decontamination	Day 635
HWTU sump and fire water containment tank and SAL hot cells trough decontamination	Day 650
Visual inspection to determine effectiveness of decontamination	Day 690
Further decontamination and visual inspection, if necessary, and disposal of all decontamination waste based on results of waste analyses	Day 720
Clean closure certification	Day 780

3

Hanford Facility RCRA Permit Modification Notification Forms

Part V, Chapter 20

300 Area Waste Acid Treatment System

Index

Hanford Facility RCRA Permit Modification Notification Form	
Unit: 300 Area Waste Acid Treatment System	Permit Part & Chapter: Part V, Chapter 20

Description of Modification:

Part V, Chapter 20: This modification incorporates requirements and conditions that were outlined in the recently retired Attachment 46.

CHAPTER 20

300 Area Waste Acid Treatment System

(Partial Closure Plan Completed, December 3, 2001)

The 300 Area Waste Acid Treatment System (300 WATS) was a tank system that was used to treat and store nonrecoverable uranium-bearing waste acid from reactor fuel fabrication operations. Waste acid neutralization occurred in portions of what now is the 300 Area WATS before operation of the system as a *Resource Conservation and Recovery Act* (RCRA) *of 1976* unit. The Closure Plan detailed closure of ~~RCRA~~ 300 Area WATS components, ~~and~~ areas, and ~~of~~ contamination resulting from RCRA operations. This unit consisted of portions of four (4) buildings and two (2) tank farms: 334-A Building, 313 Building, 303-F Building, 333 Building, 334 (tank 4), and 311 Tank Farms (tanks 40 and 50).

Closure activities were completed in September 1999, in accordance with the approved Closure Plan contained in Attachment 46 that was retired during Revision 6 of this Permit. Clean closure was given for structures above the ground using the visually verifiable 'clean debris surface' rule and table in the *Ecology Guidance for Clean Closure of Dangerous Waste Facilities Publication #94-111* (August, 1994). ~~Transition of WATS from EM-60 to EM-40 will be done to complete~~ The disposition of "unclosed" 300 Area WATS soils ~~beneath the units to be cleaned~~ will be performed in conjunction with the 300-FF-2 CERCLA OU remedial action ~~and~~ to complete WATS RCRA closure.

V.20.A. The Permittees shall comply with all requirements listed below following partial closure:

V.20.A.1 Part A, Form 3, Revision 5A

V.20.A.2 Soil Contamination Areas 1 and 2, identified in the Part A, Form 3, Revision 5A, shall be inspected annually to ensure that the contamination at these locations remains immobilized until final disposition. Soil over the concrete WATS and U-Bearing Piping Trench that covers Soil Contamination Area 1 will be inspected annually for disturbance indicating a potential for contamination at this area to become mobilized. The concrete surface over Soil contamination Area 2, located inside the 313 Building, will be inspected annually for cracks or major degradation and the presence of water that could mobilize soil contamination at this location. If unsatisfactory conditions are identified during annual inspections, Ecology will be notified for discussion of an appropriate response. This condition constitutes the TSD unit's inspection schedule.

V.20.A.3 A contingency plan, personnel training plan, or a waste analysis plan will not be required for the 300 Area WATS following partial closure.

Modification Class: [1 2 3] Please check one of the Classes:	Class 1	Class [1]1	Class 2	Class 3
				X

Relevant WAC 173-303-830, Appendix I Modification:	d. Other modifications

Enter wording of the modification from WAC 173-303-830, Appendix I citation
(d) Other modifications, request downgrade to Class [1]1 modification.

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
[signature]	2/25/03	[signature]	2/26/03				
L. T. Olguin	Date	D. T. Evans	Date	F. W. Bond	Date	L.E. Ruud	Date

[1] ass 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.