PART III, OPERATING UNIT 5 UNIT-SPECIFIC CONDITIONS

325 Hazardous Waste Treatment Units

The 325 Hazardous Waste Treatment Units (325 HWTUs) consists of the Shielded Analytical Laboratory (SAL) that includes Rooms 32, 200, 201, 202, and 203; and the Hazardous Waste Treatment Unit (HWTU) that includes Rooms 520, 524, and 528 of the 325 Building located in the 300 Area.

This document sets forth the operating conditions for the 325 HWTUs.

III.5.A COMPLIANCE WITH PERMIT CONDITIONS

The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Permit (Permit) as specified in Permit Attachment 3, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

In the event that the Part III-Unit-Specific Conditions for Operating Unit 5, 325 HWTUs conflict with the Part I-Standard Conditions and/or Part II-General Facility Conditions of the Permit, the unit-specific conditions for Operating Unit 5, 325 HWTUs prevail.

OPERATING UNIT 5:

Chapter 1.0	Part A Form, Revision 5A, dated March 31, 2007
Chapter 2.0, §2.1	Topographic Map (refer to Chapter 1.0)
Chapter 3.0	Waste Analysis Plan, dated June 30, 2005
Chapter 4.0	Process Information, dated June 30, 2005
Chapter 6.0	Procedures to Prevent Hazards, dated September 30, 2007 (also refer to Permit Attachment 33, §6.1)
Chapter 7.0	Contingency Plan, dated September 30, 2006
Chapter 8.0	Personnel Training, dated September 30, 2003
Chapter 11.0	Closure and Postclosure Requirements, dated August 2004
Chapter 12.0	Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1, Reports and Records)

III.5.B UNIT-SPECIFIC CONDITIONS FOR 325 HWTUs

III.5.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan*, (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.

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Chapter 1.0 Part A Form

1.0 PART A FORM 1.1

1.0 PART A DANGEROUS WASTE PERMIT

The following is the 325 Hazardous Waste Treatment Units (325 HWTUs) Part A history.

- May 19, 1988, submitted Revision 0, Part A, Form 3, to the State of Washington Department of Ecology (Ecology).
- June 30, 1992, submitted Revision 1, Part A, Form 3, to Ecology.
- March 1, 1993, Revision 2, Part A, Form 3, defined the activities occur within the 325 portion (325 HWTUs) of the 325/3100 HWTUs. Earlier revisions limited the processes to be conducted in the 325 HWTUs to stabilization and alkali metal treatments. The revision specifies treatments to be conducted in the 325 HWTUs: pH adjustment, ion exchange, carbon absorption, oxidation, reduction, waste concentration by evaporation, precipitation, filtration, liquid/solids separation, catalytic destruction, grouting, encapsulation, and stabilization. Added waste codes left out of Revision 1. Corrected the total storage capacity for 325/3100 HWTUs to 5500 gallons to reflect the combined storage capacity of both treatment portions, storage capacity for 325 HWTUs was reduced from 1000 to 500 gallons.
- December 2, 1994, Revision 3, Part A, Form 3, deleted the 3100 Facility from the Part A, Form 3. The 3100 facility project has no funding, no activities identified for it, and never existed. Consolidated the 325 Shielded Analytical Laboratory (SAL) and activities under the 325 HWTUs Part A, Form 3. The 325 SAL was operating under Physical/Chemical Treatment Facilities Part A, Form 3. This allowed the Pacific Northwest Laboratory (PNL) and the U.S. Department of Energy, Richland Operation Office (RL) to consolidate similar 325 Building activities.
- June 30, 1997, Revision 4, Part A, Form 3, that addressed close out of the Notice of Intent (NOI) process that began in 1995 for the HWTUs and gained interim status for the portions of the facility named in Revision 4. Acquisition of interim status by July 29, 1997, was necessary to assure that further extensions or other actions to authorize storage of mixed waste in the HWTUs, specifically tank TK-1, was not needed from Ecology. The 45-day NOI comment period was complete July 24, 1997 and per WAC 173-303-281(3)(b), submittal of the revised Form 3 was appropriate at that time. Revision 4 of Form 3, submitted to DOE RL STO on July 24 stated the Revision 4 provided the 325 Building with tank storage capability, which will eliminate that facility's dependency on the 300 Area Radioactive Liquid Waste System for disposal of liquid radioactive or mixed waste. It also provided conforming changes to the quantities and types of waste managed.
- June 30, 2000, Revision 4A, Part A, Form 3, addressed the installation of the Radioactive Liquid Waste Tank (RLWT) system.
- March 2002, Revision 4B, Part A, Form 3, addressed the addition of Room 524 to the 325 HWTU. Added waste number P191 and K044.
- December 2002, Revision 4C, Part A, Form 3, submitted as Permit Attachment 36, Chapter 1.0.
- April 2004, Revision 4D, Part A, Form 3, reflected procedural closure of the RLWT system.
- May 2005, Part A, Revision 2, adopted the new Ecology Part A Form [ECY 030-31 Hanford (Rev. 3/5/04)].

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Dangerous Waste Permit Application Part A Form

Date Received	Reviewed by:	Date:
Month Day Year	Approved by:	Date:
0 7 1 1 2 0 0 5		

I. This form is submitted to: (place an "X" in the appropriate box)

☒	**Request modification to a final status permit (commonly called a "Part B" permit)**
☐	**Request a change under interim status**
☐	**Apply for a final status permit. This includes the application for the initial final status permit for a site or for a permit renewal (i.e., a new permit to replace an expiring permit).**
☐	**Establish interim status because of the wastes newly regulated on:** (Date)
	List waste codes:

II. EPA/State ID Number

W A 7 8 9 0 0 0 8 9 6 7

III. Name of Facility

US Department of Energy – Hanford Facility

IV. Facility Location (Physical address not P.O. Box or Route Number)

A. Street

825 Jadwin

City or Town	State	ZIP Code
Richland	WA	99352

County Code (if known)	County Name
0 0 5	Benton

B. Land Type	C. Geographic Location Latitude (degrees, mins, secs)	Longitude (degrees, mins, secs)	D. Facility Existence Date Month Day Year
F	S E E T O P O	M A P	0 3 2 2 1 9 4 3

V. Facility Mailing Address

Street or P.O. Box

P.O. Box 550

City or Town	State	ZIP Code
Richland	WA	99352

VI. Facility contact (Person to be contacted regarding waste activities at facility)		
Name (last)	**(first)**	
Klein	Keith	
Job Title	**Phone Number (area code and number)**	
Manager	(509) 376-7395*	
Contact Address		
Street or P.O. Box		
P.O. Box 550		
City or Town	**State**	**ZIP Code**
Richland	WA	99352

VII. Facility Operator Information		
A. Name	**Phone Number (area code and number)**	
Department of Energy* Owner/Operator Pacific Northwest National Laboratory** Co-Operator for 325 HWTUs	(509) 376-7395* (509) 376-1187**	
Street or P.O. Box		
P.O. Box 550* P.O. Box 999**		
City or Town	**State**	**ZIP Code**
Richland	WA	99352
B. Operator Type F		
C. Does the name in VII.A reflect a proposed change in operator?	☐ Yes ☒ No	
If yes, provide the scheduled date for the change:	**Month**	**Day** / **Year**
D. Is the name listed in VII.A. also the owner? If yes, skip to Section VIII.C.	☐ Yes ☒ No	

VIII. Facility Owner Information		
A. Name	**Phone Number (area code and number)**	
Keith A. Klein, Operator/Facility-Property Owner	(509) 376-7395*	
Street or P.O. Box		
P.O. Box 550		
City or Town	**State**	**ZIP Code**
Richland	WA	99352
B. Operator Type F		
C. Does the name in VII.A reflect a proposed change in operator?	☐ Yes ☒ No	
If yes, provide the scheduled date for the change:	**Month**	**Day** / **Year**

IX. NAICS Codes (5/6 digit codes)													
A. First							**B. Second**						
5	4	1	7	1	0	Research & Development in the Physical, Engineering, & Life Sciences	9	9	9	9	9	9	Unclassified Establishments
C. Third							**D. Fourth**						

X. Other Environmental Permits (see instructions)

A. Permit Type	B. Permit Number	C. Description
E	AIR-02-1202	WAC 246-247, Non radioactive Air, 40 CFR 61, Subpart H, NESHAPS
E	DE98NWP-003	WAC 173-400, General Regulations for Air Pollution Sources, WAC 173-460, Controls for New Sources of Toxic Air Pollutants

XI. Nature of Business (provide a brief description that includes both dangerous waste and non-dangerous waste areas and activities)

The 325 Hazardous Waste Treatment Units (325 HWTUs) consist of the Shielded Analytical Laboratory (SAL), which includes Rooms 32, 200, 201, 202, and 203 of the 325 Building; and the Hazardous Waste Treatment Unit (HWTU) encompassing Rooms 520, 524, and 528 of the 325 Building. The 325 HWTUs began waste management operations in 1991 (SAL) and 1995 (HWTU). Up to 12, 000 liters of dangerous and/or mixed waste may be stored in the 325 HWTUs (S01). A maximum of 1514 liters of dangerous and/or mixed waste may be treated per day in containers in the 325 HWTUs (T04).

A maximum of 1,218 liters of dangerous and/or mixed waste may be stored in tanks in the 325 HWTUs (S02). A maximum of 1,218 liters per day of dangerous and/or mixed waste may be treated in tanks in the 325 HWTUs (T01).

Dangerous and/or mixed waste treatments are generally conducted as small bench-scale operations except for in-tank treatments. Treatment processes utilized at the 325 HWTUs may include any of the types of treatment described in WAC 173-303-380(2)(d), Table 2, Section 2 except for the following: incineration technologies (T06-T10), large-scale biological treatment (T68, T72, and T73), boiler and industrial furnace-based treatment (T80-T93), and treatment in containment buildings (T94).

Routine dangerous and/or mixed waste treatment that will be conducted in the 325 HWTUs will include pH adjustment, ion exchange, carbon absorption, oxidation, reduction, waste concentration by evaporation, precipitation, filtration, solvent extraction, solids washing, phase separation, catalytic destruction, and solidification/stabilization. These waste treatments will be conducted on small quantities of diverse radioactive, dangerous, and/or mixed wastes generated from ongoing research and development and analytical chemistry activities. Waste to be handled in the 325 HWTUs will include listed waste, waste from non-specific sources, characteristic waste, and state-only criteria waste. Multi-source leachate (F039) is included as a waste derived from non-specific source waste F001 through F005.

EXAMPLE FOR COMPLETING ITEMS XII and XIII (shown in lines numbered X-1, X-2, and X-3 below): A facility has two storage tanks that hold 1200 gallons and 400 gallons respectively. There is also treatment in tanks at 20 gallons/hr. Finally, a one-quarter acre area that is two meters deep will undergo *in situ vitrification.*

Section XII. Process Codes and Design Capacities								Section XIII. Other Process Codes								
Line Number		A. Process Codes (enter code)			B. Process Design Capacity		C. Process Total Number of Units	Line Number		A. Process Codes (enter code)			B Process Design Capacity		C. Process Total Number of Units	D. Process Description
					1. Amount	2. Unit of Measure (enter code)							1. Amount	2. Unit of Measure (enter code)		
X	1	S	0	2	1,600	G	002	X	1	T	0	4	700	C	001	In situ vitrification
X	2	T	0	3	20	E	001									
X	3	T	0	4	700	C	001									
	1	S	0	1	12,000	L	001		1							
	2	S	0	2	1218	L	001		2	T	0	4	1514	V	1	Treatment in containers
	3	T	0	1	1218	V	001		3							
	4								4							
	5								5							
	6								6							
	7								7							
	8								8							
	9								9							
1	0							1	0							
1	1							1	1							
1	2							1	2							
1	3							1	3							
1	4							1	4							
1	5							1	5							
1	6							1	6							
1	7							1	7							
1	8							1	8							
1	9							1	9							
2	0							2	0							
2	1							2	1							
2	2							2	2							
2	3							2	3							
2	4							2	4							
2	5							2	5							

XIV. Description of Dangerous Wastes

Example for completing this section: A facility will receive three non-listed wastes, then store and treat them on-site. Two wastes are corrosive only, with the facility receiving and storing the wastes in containers. There will be about 200 pounds per year of each of these two wastes, which will be neutralized in a tank. The other waste is corrosive and ignitable and will be neutralized then blended into hazardous waste fuel. There will be about 100 pounds per year of that waste, which will be received in bulk and put into tanks.

Line Number			A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes (1) Process Codes (enter)									D. Processes (2) Process Description [If a code is not entered in D (1)]
X	**1**		**D**	**0**	**0**	**2**	**400**	**P**	**S**	**0**	**1**	**T**	**0**	**1**				
X	**2**		**D**	**0**	**0**	**1**	**100**	**P**	**S**	**0**	**2**	**T**	**0**	**1**				
X	**3**		**D**	**0**	**0**	**2**												**Included with above**
		1	D	0	0	1	82,500 [60,000 (S01); 22,500 (T04)]	K	S	0	1	T	0	4				Includes Debris
		2	D	0	0	2		K	S	0	1	T	0	4				Includes Debris
		3	D	0	0	3		K	S	0	1	T	0	4				Includes Debris
		4	D	0	0	4		K	S	0	1	T	0	4				Includes Debris
		5	D	0	0	5		K	S	0	1	T	0	4				Includes Debris
		6	D	0	0	6		K	S	0	1	T	0	4				Includes Debris
		7	D	0	0	7		K	S	0	1	T	0	4				Includes Debris
		8	D	0	0	8		K	S	0	1	T	0	4				Includes Debris
		9	D	0	0	9		K	S	0	1	T	0	4				Includes Debris
	1	0	D	0	1	0		K	S	0	1	T	0	4				Includes Debris
	1	1	D	0	1	1		K	S	0	1	T	0	4				Includes Debris
	1	2	D	0	1	2		K	S	0	1	T	0	4				Includes Debris
	1	3	D	0	1	3		K	S	0	1	T	0	4				Includes Debris
	1	4	D	0	1	4		K	S	0	1	T	0	4				Includes Debris
	1	5	D	0	1	5		K	S	0	1	T	0	4				Includes Debris
	1	6	D	0	1	6		K	S	0	1	T	0	4				Includes Debris
	1	7	D	0	1	7		K	S	0	1	T	0	4				Includes Debris
	1	8	D	0	1	8		K	S	0	1	T	0	4				Includes Debris
	1	9	D	0	1	9		K	S	0	1	T	0	4				Includes Debris
	2	0	D	0	2	0		K	S	0	1	T	0	4				Includes Debris
	2	1	D	0	2	1		K	S	0	1	T	0	4				Includes Debris
	2	2	D	0	2	2		K	S	0	1	T	0	4				Includes Debris
	2	3	D	0	2	3		K	S	0	1	T	0	4				Includes Debris
	2	4	D	0	2	4		K	S	0	1	T	0	4				Includes Debris
	2	5	D	0	2	5		K	S	0	1	T	0	4				Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
26	D026		K	S01	T04								Includes Debris
27	D027		K	S01	T04								Includes Debris
28	D028		K	S01	T04								Includes Debris
29	D029		K	S01	T04								Includes Debris
30	D030		K	S01	T04								Includes Debris
31	D031		K	S01	T04								Includes Debris
32	D032		K	S01	T04								Includes Debris
33	D033		K	S01	T04								Includes Debris
34	D034		K	S01	T04								Includes Debris
35	D035		K	S01	T04								Includes Debris
36	D036		K	S01	T04								Includes Debris
37	D037		K	S01	T04								Includes Debris
38	D038		K	S01	T04								Includes Debris
39	D039		K	S01	T04								Includes Debris
40	D040		K	S01	T04								Includes Debris
41	D041		K	S01	T04								Includes Debris
42	D042		K	S01	T04								Includes Debris
43	D043		K	S01	T04								Includes Debris
44	F001		K	S01	T04								Includes Debris
45	F002		K	S01	T04								Includes Debris
46	F003		K	S01	T04								Includes Debris
47	F004		K	S01	T04								Includes Debris
48	F005		K	S01	T04								Includes Debris
49	F027		K	S01	T04								Includes Debris
50	P001		K	S01	T04								Includes Debris
51	P002		K	S01	T04								Includes Debris
52	P003		K	S01	T04								Includes Debris
53	P004		K	S01	T04								Includes Debris
54	P005		K	S01	T04								Includes Debris
55	P006		K	S01	T04								Includes Debris
56	P007		K	S01	T04								Includes Debris
57	P008		K	S01	T04								Includes Debris
58	P009		K	S01	T04								Includes Debris
59	P010		K	S01	T04								Includes Debris
60	P011		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
61	P012		K	S01	T04								Includes Debris
62	P013		K	S01	T04								Includes Debris
63	P014		K	S01	T04								Includes Debris
64	P015		K	S01	T04								Includes Debris
65	P016		K	S01	T04								Includes Debris
66	P017		K	S01	T04								Includes Debris
67	P018		K	S01	T04								Includes Debris
68	P020		K	S01	T04								Includes Debris
69	P021		K	S01	T04								Includes Debris
70	P022		K	S01	T04								Includes Debris
71	P023		K	S01	T04								Includes Debris
72	P024		K	S01	T04								Includes Debris
73	P026		K	S01	T04								Includes Debris
74	P027		K	S01	T04								Includes Debris
75	P028		K	S01	T04								Includes Debris
76	P029		K	S01	T04								Includes Debris
77	P030		K	S01	T04								Includes Debris
78	P031		K	S01	T04								Includes Debris
79	P033		K	S01	T04								Includes Debris
80	P034		K	S01	T04								Includes Debris
81	P036		K	S01	T04								Includes Debris
82	P037		K	S01	T04								Includes Debris
83	P038		K	S01	T04								Includes Debris
84	P039		K	S01	T04								Includes Debris
85	P040		K	S01	T04								Includes Debris
86	P041		K	S01	T04								Includes Debris
87	P042		K	S01	T04								Includes Debris
88	P043		K	S01	T04								Includes Debris
89	P044		K	S01	T04								Includes Debris
90	P045		K	S01	T04								Includes Debris
91	P046		K	S01	T04								Includes Debris
92	P047		K	S01	T04								Includes Debris
93	P048		K	S01	T04								Includes Debris
94	P049		K	S01	T04								Includes Debris
95	P050		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number			A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
									(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
	9	6	P	0	5	1		K	S	0	1	T	0	4				Includes Debris
	9	7	P	0	5	4		K	S	0	1	T	0	4				Includes Debris
	9	8	P	0	5	6		K	S	0	1	T	0	4				Includes Debris
	9	9	P	0	5	7		K	S	0	1	T	0	4				Includes Debris
1	0	0	P	0	5	8		K	S	0	1	T	0	4				Includes Debris
1	0	1	P	0	5	9		K	S	0	1	T	0	4				Includes Debris
1	0	2	P	0	6	0		K	S	0	1	T	0	4				Includes Debris
1	0	3	P	0	6	2		K	S	0	1	T	0	4				Includes Debris
1	0	4	P	0	6	3		K	S	0	1	T	0	4				Includes Debris
1	0	5	P	0	6	4		K	S	0	1	T	0	4				Includes Debris
1	0	6	P	0	6	5		K	S	0	1	T	0	4				Includes Debris
1	0	7	P	0	6	6		K	S	0	1	T	0	4				Includes Debris
1	0	8	P	0	6	7		K	S	0	1	T	0	4				Includes Debris
1	0	9	P	0	6	8		K	S	0	1	T	0	4				Includes Debris
1	1	0	P	0	6	9		K	S	0	1	T	0	4				Includes Debris
1	1	1	P	0	7	0		K	S	0	1	T	0	4				Includes Debris
1	1	2	P	0	7	1		K	S	0	1	T	0	4				Includes Debris
1	1	3	P	0	7	2		K	S	0	1	T	0	4				Includes Debris
1	1	4	P	0	7	3		K	S	0	1	T	0	4				Includes Debris
1	1	5	P	0	7	4		K	S	0	1	T	0	4				Includes Debris
1	1	6	P	0	7	5		K	S	0	1	T	0	4				Includes Debris
1	1	7	P	0	7	6		K	S	0	1	T	0	4				Includes Debris
1	1	8	P	0	7	7		K	S	0	1	T	0	4				Includes Debris
1	1	9	P	0	7	8		K	S	0	1	T	0	4				Includes Debris
1	2	0	P	0	8	1		K	S	0	1	T	0	4				Includes Debris
1	2	1	P	0	8	2		K	S	0	1	T	0	4				Includes Debris
1	2	2	P	0	8	4		K	S	0	1	T	0	4				Includes Debris
1	2	3	P	0	8	5		K	S	0	1	T	0	4				Includes Debris
1	2	4	P	0	8	7		K	S	0	1	T	0	4				Includes Debris
1	2	5	P	0	8	8		K	S	0	1	T	0	4				Includes Debris
1	2	6	P	0	8	9		K	S	0	1	T	0	4				Includes Debris
1	2	7	P	0	9	2		K	S	0	1	T	0	4				Includes Debris
1	2	8	P	0	9	3		K	S	0	1	T	0	4				Includes Debris
1	2	9	P	0	9	4		K	S	0	1	T	0	4				Includes Debris
1	3	0	P	0	9	5		K	S	0	1	T	0	4				Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
1 3 1	P 0 9 6		K	S 0 1	T 0 4								Includes Debris
1 3 2	P 0 9 7		K	S 0 1	T 0 4								Includes Debris
1 3 3	P 0 9 8		K	S 0 1	T 0 4								Includes Debris
1 3 4	P 0 9 9		K	S 0 1	T 0 4								Includes Debris
1 3 5	P 1 0 1		K	S 0 1	T 0 4								Includes Debris
1 3 6	P 1 0 2		K	S 0 1	T 0 4								Includes Debris
1 3 7	P 1 0 3		K	S 0 1	T 0 4								Includes Debris
1 3 8	P 1 0 4		K	S 0 1	T 0 4								Includes Debris
1 3 9	P 1 0 5		K	S 0 1	T 0 4								Includes Debris
1 4 0	P 1 0 6		K	S 0 1	T 0 4								Includes Debris
1 4 1	P 1 0 8		K	S 0 1	T 0 4								Includes Debris
1 4 2	P 1 0 9		K	S 0 1	T 0 4								Includes Debris
1 4 3	P 1 1 0		K	S 0 1	T 0 4								Includes Debris
1 4 4	P 1 1 1		K	S 0 1	T 0 4								Includes Debris
1 4 5	P 1 1 2		K	S 0 1	T 0 4								Includes Debris
1 4 6	P 1 1 3		K	S 0 1	T 0 4								Includes Debris
1 4 7	P 1 1 4		K	S 0 1	T 0 4								Includes Debris
1 4 8	P 1 1 5		K	S 0 1	T 0 4								Includes Debris
1 4 9	P 1 1 6		K	S 0 1	T 0 4								Includes Debris
1 5 0	P 1 1 8		K	S 0 1	T 0 4								Includes Debris
1 5 1	P 1 1 9		K	S 0 1	T 0 4								Includes Debris
1 5 2	P 1 2 0		K	S 0 1	T 0 4								Includes Debris
1 5 3	P 1 2 1		K	S 0 1	T 0 4								Includes Debris
1 5 4	P 1 2 2		K	S 0 1	T 0 4								Includes Debris
1 5 5	P 1 2 3		K	S 0 1	T 0 4								Includes Debris
1 5 6	P 1 2 7		K	S 0 1	T 0 4								Includes Debris
1 5 7	P 1 2 8		K	S 0 1	T 0 4								Includes Debris
1 5 8	P 1 8 5		K	S 0 1	T 0 4								Includes Debris
1 5 9	P 1 8 8		K	S 0 1	T 0 4								Includes Debris
1 6 0	P 1 8 9		K	S 0 1	T 0 4								Includes Debris
1 6 1	P 1 9 0		K	S 0 1	T 0 4								Includes Debris
1 6 2	P 1 9 1		K	S 0 1	T 0 4								Includes Debris
1 6 3	P 1 9 2		K	S 0 1	T 0 4								Includes Debris
1 6 4	P 1 9 4		K	S 0 1	T 0 4								Includes Debris
1 6 5	P 1 9 6		K	S 0 1	T 0 4								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
166	P197		K	S01	T04								Includes Debris
167	P198		K	S01	T04								Includes Debris
168	P199		K	S01	T04								Includes Debris
169	P201		K	S01	T04								Includes Debris
170	P202		K	S01	T04								Includes Debris
171	P203		K	S01	T04								Includes Debris
172	P204		K	S01	T04								Includes Debris
173	P205		K	S01	T04								Includes Debris
174	U001		K	S01	T04								Includes Debris
175	U002		K	S01	T04								Includes Debris
176	U003		K	S01	T04								Includes Debris
177	U004		K	S01	T04								Includes Debris
178	U005		K	S01	T04								Includes Debris
179	U006		K	S01	T04								Includes Debris
180	U007		K	S01	T04								Includes Debris
181	U008		K	S01	T04								Includes Debris
182	U009		K	S01	T04								Includes Debris
183	U010		K	S01	T04								Includes Debris
184	U011		K	S01	T04								Includes Debris
185	U012		K	S01	T04								Includes Debris
186	U014		K	S01	T04								Includes Debris
187	U015		K	S01	T04								Includes Debris
188	U016		K	S01	T04								Includes Debris
189	U017		K	S01	T04								Includes Debris
190	U018		K	S01	T04								Includes Debris
191	U019		K	S01	T04								Includes Debris
192	U020		K	S01	T04								Includes Debris
193	U021		K	S01	T04								Includes Debris
194	U022		K	S01	T04								Includes Debris
195	U023		K	S01	T04								Includes Debris
196	U024		K	S01	T04								Includes Debris
197	U025		K	S01	T04								Includes Debris
198	U026		K	S01	T04								Includes Debris
199	U027		K	S01	T04								Includes Debris
200	U028		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)	D. Process (2) Process Description [If a code is not entered in D (1)]
201	U029		K	S01 T04	Includes Debris
202	U030		K	S01 T04	Includes Debris
203	U031		K	S01 T04	Includes Debris
204	U032		K	S01 T04	Includes Debris
205	U033		K	S01 T04	Includes Debris
206	U034		K	S01 T04	Includes Debris
207	U035		K	S01 T04	Includes Debris
208	U036		K	S01 T04	Includes Debris
209	U037		K	S01 T04	Includes Debris
210	U038		K	S01 T04	Includes Debris
211	U039		K	S01 T04	Includes Debris
212	U041		K	S01 T04	Includes Debris
213	U042		K	S01 T04	Includes Debris
214	U043		K	S01 T04	Includes Debris
215	U044		K	S01 T04	Includes Debris
216	U045		K	S01 T04	Includes Debris
217	U046		K	S01 T04	Includes Debris
218	U047		K	S01 T04	Includes Debris
219	U048		K	S01 T04	Includes Debris
220	U049		K	S01 T04	Includes Debris
221	U050		K	S01 T04	Includes Debris
222	U051		K	S01 T04	Includes Debris
223	U052		K	S01 T04	Includes Debris
224	U053		K	S01 T04	Includes Debris
225	U055		K	S01 T04	Includes Debris
226	U056		K	S01 T04	Includes Debris
227	U057		K	S01 T04	Includes Debris
228	U058		K	S01 T04	Includes Debris
229	U059		K	S01 T04	Includes Debris
230	U060		K	S01 T04	Includes Debris
231	U061		K	S01 T04	Includes Debris
232	U062		K	S01 T04	Includes Debris
233	U063		K	S01 T04	Includes Debris
234	U064		K	S01 T04	Includes Debris
235	U066		K	S01 T04	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)	D. Process (2) Process Description [If a code is not entered in D (1)]
236	U067		K	S01T04	Includes Debris
237	U068		K	S01T04	Includes Debris
238	U069		K	S01T04	Includes Debris
239	U070		K	S01T04	Includes Debris
240	U071		K	S01T04	Includes Debris
241	U072		K	S01T04	Includes Debris
242	U073		K	S01T04	Includes Debris
243	U074		K	S01T04	Includes Debris
244	U076		K	S01T04	Includes Debris
245	U077		K	S01T04	Includes Debris
246	U078		K	S01T04	Includes Debris
247	U079		K	S01T04	Includes Debris
248	U080		K	S01T04	Includes Debris
249	U081		K	S01T04	Includes Debris
250	U082		K	S01T04	Includes Debris
251	U083		K	S01T04	Includes Debris
252	U084		K	S01T04	Includes Debris
253	U085		K	S01T04	Includes Debris
254	U086		K	S01T04	Includes Debris
255	U087		K	S01T04	Includes Debris
256	U088		K	S01T04	Includes Debris
257	U089		K	S01T04	Includes Debris
258	U090		K	S01T04	Includes Debris
259	U091		K	S01T04	Includes Debris
260	U092		K	S01T04	Includes Debris
261	U093		K	S01T04	Includes Debris
262	U094		K	S01T04	Includes Debris
263	U095		K	S01T04	Includes Debris
264	U096		K	S01T04	Includes Debris
265	U097		K	S01T04	Includes Debris
266	U098		K	S01T04	Includes Debris
267	U099		K	S01T04	Includes Debris
268	U101		K	S01T04	Includes Debris
269	U102		K	S01T04	Includes Debris
270	U103		K	S01T04	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)	D. Process (2) Process Description [If a code is not entered in D (1)]
271	U105		K	S01T04	Includes Debris
272	U106		K	S01T04	Includes Debris
273	U107		K	S01T04	Includes Debris
274	U108		K	S01T04	Includes Debris
275	U109		K	S01T04	Includes Debris
276	U110		K	S01T04	Includes Debris
277	U111		K	S01T04	Includes Debris
278	U112		K	S01T04	Includes Debris
279	U113		K	S01T04	Includes Debris
280	U114		K	S01T04	Includes Debris
281	U115		K	S01T04	Includes Debris
282	U116		K	S01T04	Includes Debris
283	U117		K	S01T04	Includes Debris
284	U118		K	S01T04	Includes Debris
285	U119		K	S01T04	Includes Debris
286	U120		K	S01T04	Includes Debris
287	U121		K	S01T04	Includes Debris
288	U122		K	S01T04	Includes Debris
289	U123		K	S01T04	Includes Debris
290	U124		K	S01T04	Includes Debris
291	U125		K	S01T04	Includes Debris
292	U126		K	S01T04	Includes Debris
293	U127		K	S01T04	Includes Debris
294	U128		K	S01T04	Includes Debris
295	U129		K	S01T04	Includes Debris
296	U130		K	S01T04	Includes Debris
297	U131		K	S01T04	Includes Debris
298	U132		K	S01T04	Includes Debris
299	U133		K	S01T04	Includes Debris
300	U134		K	S01T04	Includes Debris
301	U135		K	S01T04	Includes Debris
302	U136		K	S01T04	Includes Debris
303	U137		K	S01T04	Includes Debris
304	U138		K	S01T04	Includes Debris
305	U140		K	S01T04	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
306	U141		K	S01	T04								Includes Debris
307	U142		K	S01	T04								Includes Debris
308	U143		K	S01	T04								Includes Debris
309	U144		K	S01	T04								Includes Debris
310	U145		K	S01	T04								Includes Debris
311	U146		K	S01	T04								Includes Debris
312	U147		K	S01	T04								Includes Debris
313	U148		K	S01	T04								Includes Debris
314	U149		K	S01	T04								Includes Debris
315	U150		K	S01	T04								Includes Debris
316	U151		K	S01	T04								Includes Debris
317	U152		K	S01	T04								Includes Debris
318	U153		K	S01	T04								Includes Debris
319	U154		K	S01	T04								Includes Debris
320	U155		K	S01	T04								Includes Debris
321	U156		K	S01	T04								Includes Debris
322	U157		K	S01	T04								Includes Debris
323	U158		K	S01	T04								Includes Debris
324	U159		K	S01	T04								Includes Debris
325	U160		K	S01	T04								Includes Debris
326	U161		K	S01	T04								Includes Debris
327	U162		K	S01	T04								Includes Debris
328	U163		K	S01	T04								Includes Debris
329	U164		K	S01	T04								Includes Debris
330	U165		K	S01	T04								Includes Debris
331	U166		K	S01	T04								Includes Debris
332	U167		K	S01	T04								Includes Debris
333	U168		K	S01	T04								Includes Debris
334	U169		K	S01	T04								Includes Debris
335	U170		K	S01	T04								Includes Debris
336	U171		K	S01	T04								Includes Debris
337	U172		K	S01	T04								Includes Debris
338	U173		K	S01	T04								Includes Debris
339	U174		K	S01	T04								Includes Debris
340	U176		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
341	U177		K	S01	T04								Includes Debris
342	U178		K	S01	T04								Includes Debris
343	U179		K	S01	T04								Includes Debris
344	U180		K	S01	T04								Includes Debris
345	U181		K	S01	T04								Includes Debris
346	U182		K	S01	T04								Includes Debris
347	U183		K	S01	T04								Includes Debris
348	U184		K	S01	T04								Includes Debris
349	U185		K	S01	T04								Includes Debris
350	U186		K	S01	T04								Includes Debris
351	U187		K	S01	T04								Includes Debris
352	U188		K	S01	T04								Includes Debris
353	U189		K	S01	T04								Includes Debris
354	U190		K	S01	T04								Includes Debris
355	U191		K	S01	T04								Includes Debris
356	U192		K	S01	T04								Includes Debris
357	U193		K	S01	T04								Includes Debris
358	U194		K	S01	T04								Includes Debris
359	U196		K	S01	T04								Includes Debris
360	U197		K	S01	T04								Includes Debris
361	U200		K	S01	T04								Includes Debris
362	U201		K	S01	T04								Includes Debris
363	U202		K	S01	T04								Includes Debris
364	U203		K	S01	T04								Includes Debris
365	U204		K	S01	T04								Includes Debris
366	U205		K	S01	T04								Includes Debris
367	U206		K	S01	T04								Includes Debris
368	U207		K	S01	T04								Includes Debris
369	U208		K	S01	T04								Includes Debris
370	U209		K	S01	T04								Includes Debris
371	U210		K	S01	T04								Includes Debris
372	U211		K	S01	T04								Includes Debris
373	U213		K	S01	T04								Includes Debris
374	U214		K	S01	T04								Includes Debris
375	U215		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
376	U216		K	S01	T04								Includes Debris
377	U217		K	S01	T04								Includes Debris
378	U218		K	S01	T04								Includes Debris
379	U219		K	S01	T04								Includes Debris
380	U220		K	S01	T04								Includes Debris
381	U221		K	S01	T04								Includes Debris
382	U222		K	S01	T04								Includes Debris
383	U223		K	S01	T04								Includes Debris
384	U225		K	S01	T04								Includes Debris
385	U226		K	S01	T04								Includes Debris
386	U227		K	S01	T04								Includes Debris
387	U228		K	S01	T04								Includes Debris
388	U234		K	S01	T04								Includes Debris
389	U235		K	S01	T04								Includes Debris
390	U236		K	S01	T04								Includes Debris
391	U237		K	S01	T04								Includes Debris
392	U238		K	S01	T04								Includes Debris
393	U239		K	S01	T04								Includes Debris
394	U240		K	S01	T04								Includes Debris
395	U243		K	S01	T04								Includes Debris
396	U244		K	S01	T04								Includes Debris
397	U246		K	S01	T04								Includes Debris
398	U247		K	S01	T04								Includes Debris
399	U248		K	S01	T04								Includes Debris
400	U249		K	S01	T04								Includes Debris
401	U271		K	S01	T04								Includes Debris
402	U278		K	S01	T04								Includes Debris
403	U279		K	S01	T04								Includes Debris
404	U280		K	S01	T04								Includes Debris
405	U328		K	S01	T04								Includes Debris
406	U353		K	S01	T04								Includes Debris
407	U359		K	S01	T04								Includes Debris
408	U364		K	S01	T04								Includes Debris
409	U367		K	S01	T04								Includes Debris
410	U372		K	S01	T04								Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)	D. Process (2) Process Description [If a code is not entered in D (1)]
411	U373		K	S01T04	Includes Debris
412	U387		K	S01T04	Includes Debris
413	U389		K	S01T04	Includes Debris
414	U394		K	S01T04	Includes Debris
415	U395		K	S01T04	Includes Debris
416	U404		K	S01T04	Includes Debris
417	U409		K	S01T04	Includes Debris
418	U410		K	S01T04	Includes Debris
419	U411		K	S01T04	Includes Debris
420	WPCB		K	S01T04	Includes Debris
421	WP01		K	S01T04	Includes Debris
422	WP02		K	S01T04	Includes Debris
423	WP03		K	S01T04	Includes Debris
424	WT01		K	S01T04	Includes Debris
425	WT02		K	S01T04	Includes Debris
426	WSC2		K	S01T04	Includes Debris
427	D001	10,000	K	S02T01	Includes Debris
428	D002		K	S02T01	Includes Debris
429	D003		K	S02T01	Includes Debris
430	D004		K	S02T01	Includes Debris
431	D005		K	S02T01	Includes Debris
432	D006		K	S02T01	Includes Debris
433	D007		K	S02T01	Includes Debris
434	D008		K	S02T01	Includes Debris
435	D009		K	S02T01	Includes Debris
436	D010		K	S02T01	Includes Debris
437	D011		K	S02T01	Includes Debris
438	D018		K	S02T01	Includes Debris
439	D019		K	S02T01	Includes Debris
440	D022		K	S02T01	Includes Debris
441	D028		K	S02T01	Includes Debris
442	D029		K	S02T01	Includes Debris
443	D030		K	S02T01	Includes Debris
444	D033		K	S02T01	Includes Debris
445	D034		K	S02T01	Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process	
				(1) Process Codes (enter)	(2) Process Description [If a code is not entered in D (1)]
446	D035		K	S02 T01	Includes Debris
447	D036		K	S02 T01	Includes Debris
448	D038		K	S02 T01	Includes Debris
449	D039		K	S02 T01	Includes Debris
450	D040		K	S02 T01	Includes Debris
451	D041		K	S02 T01	Includes Debris
452	D043		K	S02 T01	Includes Debris
453	WT01		K	S02 T01	Includes Debris
454	WT02		K	S02 T01	Includes Debris
455	WP01		K	S02 T01	Includes Debris
456	WP02		K	S02 T01	Includes Debris
457	WSC2		K	S02 T01	Includes Debris
458	F001		K	S02 T01	Includes Debris
459	F002		K	S02 T01	Includes Debris
460	F003		K	S02 T01	Includes Debris
461	F004		K	S02 T01	Includes Debris
462	F005		K	S02 T01	Includes Debris
463	F039		K	S02 T01	Includes Debris

XV. Map

Attach to this application a topographic map of the area extending to at least one (1) mile beyond property boundaries. The map must show the outline of the facility; the location of each of its existing and proposed intake and discharge structures; each of its dangerous waste treatment, storage, recycling, or disposal units; and each well where fluids are injected underground. Include all springs, rivers, and other surface water bodies in this map area, plus drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. The instructions provide additional information on meeting these requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (refer to Instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, recycling, and disposal areas; and sites of future storage, treatment, recycling, or disposal areas (refer to Instructions for more detail).

XVIII. Certifications

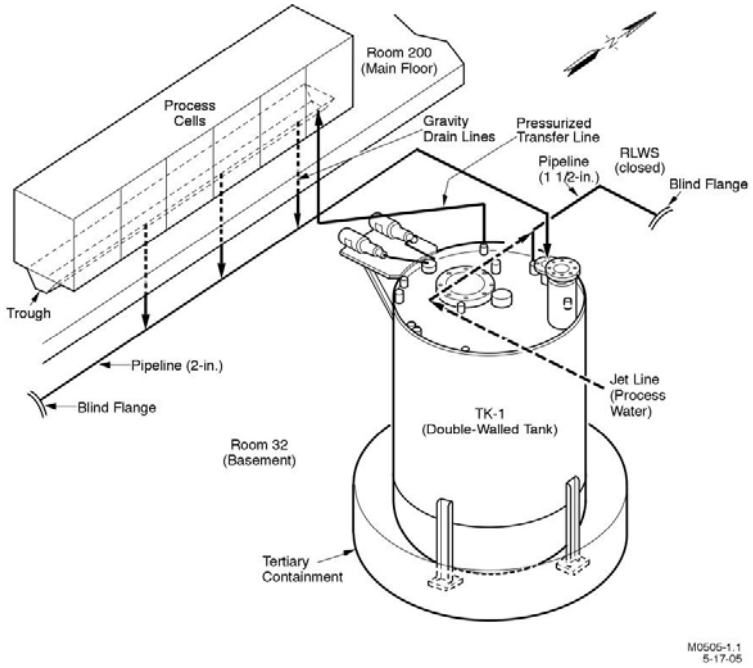
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Operator* Name and Official Title (type or print) Keith A. Klein, Manager U.S. Department of Energy Richland Operations Office	**Signature**	**Date Signed** 7/11/05
Co-Operator** Name and Official Title (type or print) Roby D. Enge, Director Environment, Safety, Health and Quality Pacific Northwest National Laboratory	**Signature**	**Date Signed** 5/20/05
Co-Operator** – Address and Telephone Number 3350 George Washington Way P.O. Box 999 Richland, WA 99352 (509) 376-1187		
Facility-Property Owner* Name and Official Title (type or print) Keith A. Klein, Manager U.S. Department of Energy Richland Operations Office	**Signature**	**Date Signed** 7/11/05

Comments

325 Hazardous Waste Treatment Units

Shielded Analytical Laboratory Tank and Ancillary Piping



Room 528

96010398-22CN
(Photo Taken 1996)

325 Hazardous Waste Treatment Units

Room 528

96010398-20CN
(Photo Taken 1996)

Room 520

96010398-17CN
(Photo Taken 1996)

325 Hazardous Waste Treatment Units

Room 201

96010398-16CN
(Photo Taken 1996)

Room 201

96010398-7CN
(Photo Taken 1996)

Shielded Analytical Laboratory

Room 200

96010398-1CN
(Photo Taken 1996)

SAL Tank (Room 32)

96010398-3CN
(Photo Taken 1996)

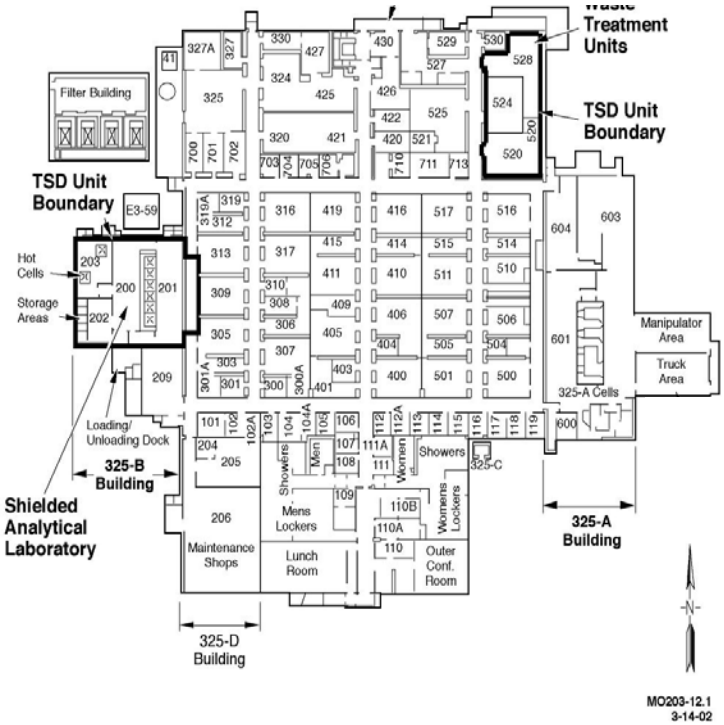
Shielded Analytical Laboratory

Room 203

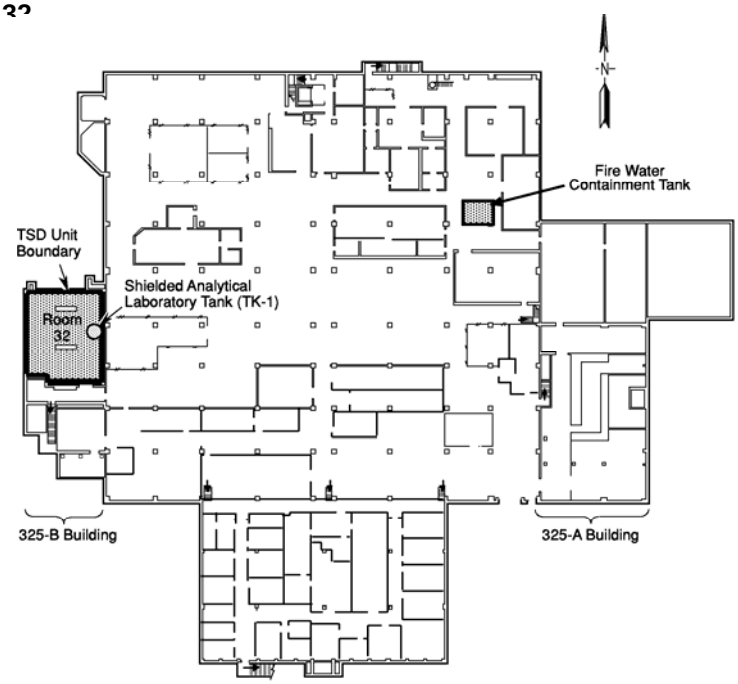
7908247-1CN
(Photo Taken 1979)

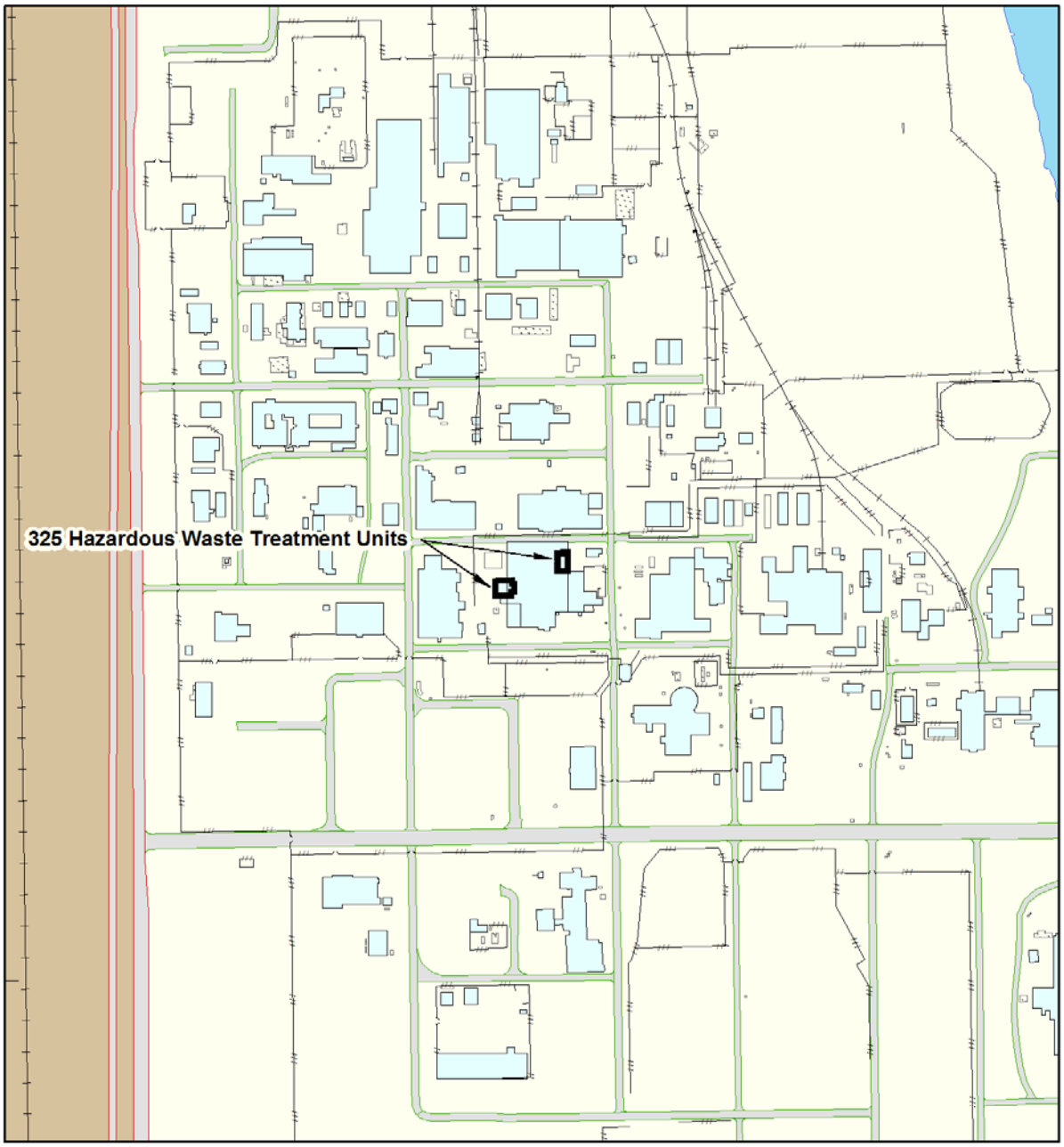
325 Hazardous Waste Treatment Units

Location of the Hazardous Waste Treatment Unit and Shielded Analytical Laboratory (main floor)



Location of Shielded Analytical Laboratory Tank in Room 32





325 Hazardous Waste Treatment Units

Prepared for:
US DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE

Created and Published by: Central Mapping Services
Fluor Hanford, Richland, WA (509) 376-8759

INTENDED USE: REFERENCE ONLY

TSD Unit Boundary
DOE Operating Areas
Hanford Facility
Columbia River
Structures
Concrete

Buildings and Mobiles
Major Hanford Routes
Local Hanford Roads
Minor Roads
Railroads
Fences

Meters: 0 50 100 150 200
Feet: 0 100 200 400 600

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Glossary

325 HWTUs	325 Hazardous Waste Treatment Units consists of the HWTU, SAL, and RLWS tank system subunits)
AA	atomic absorption
ALARA	as low as reasonably achievable
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
Refer to 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 Permit Attachment 2, *Hanford Facility Legal Description*.

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
Refer to 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
Refer to 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.

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, 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
Refer to 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
- hazardous or mixed 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). Process information is provided in Chapter 4.0.

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. Chapter 1.0, 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. These listed solvents are managed in containers and in the SAL tank system. 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 in Chapter 1.0, 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. Chapter 1.0, 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. Chapter 1.0, 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 Hazardous or Mixed Waste from Chemicals Synthesized or Created in Research Activities Using Radioactive Isotopes

Waste from research activities may contain radioactive isotopes in addition to RCRA regulated constituents. In such cases the wastes are designated as mixed waste. Typically such wastes are

generated in small quantities, ranging from a few grams to a few liters. 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. Chapter 1.0, 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 Chapter 1.0, 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 Chapter 1.0, 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 (Permit) Condition II.P.2. Offsite waste shipments are manifested in accordance with the requirements of WAC 173-303-370 and -180. The process for managing waste shipment documentation is given in Section 3.10.

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 all 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 between documents provided that describe the waste(s) being transferred, 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 record 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. Depending on the nature of the condition, waste-tracking form discrepancies can be resolved through the stepwise use of the following alternatives.

- Contact the generator and transporter to reconcile the discrepancy. Incorrect or incomplete entries thus identified 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 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.

3.2 325 HAZARDOUS WASTE TREATMENT UNITS WASTE ANALYSIS PLAN

The 325 HWTUs are part of the Unit-Specific Portion of the Hanford Facility Resource Conservation and Recovery Act Permit (WA7890008967).

The 325 HWTUs consist of two units; all within the 325 Building, located in the 300 Area on the Hanford Facility (refer to Chapter 1.0). 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 (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 3.1 through Figure 3.2 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 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.

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 Chapter 1.0.

Specific waste-treatment processes are found in the list of treatments in Chapter 1.0. Chapter 1.0, 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.

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 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 hazardous or mixed 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 Section 3.1, 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).

3.4 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. This data is provided for review prior to shipment to determine acceptability and to verify the waste in accordance with Section 3.4.2.

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.

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.

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 in the 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 3.3.

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 mixed waste are not required to be physically screened; however, 325 HWTUs staff must perform a more rigorous documentation review utilizing the radionuclide content information as an indicator of the accuracy of process knowledge of RCRA-regulated components 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, for ALARA reasons, or will not fit into the NDE unit). Physical screening at the customer location consists of observing packaging of the waste.

If the physical screening cannot be performed due to a location having adequate radiological and hazardous materials safety provisions for the container(s) involved, then no screening is required and the waste is eligible for acceptance. A more rigorous documentation review utilizing the radionuclide content information is used as an indicator of the accuracy of process knowledge of RCRA-regulated components.

- 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).

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).

At least five percent of the waste containers received at the HWTU during a federal fiscal year (October 1 through September 30) will undergo confirmation of designation. The number of containers needed to meet the five percent requirement is five percent of the average of containers for the previous three months. For example if 200 containers are received in January, 180 in February, and 220 in March, then 10 containers of received waste must undergo confirmation of designation in April. All non-PNNL generating units which ship more than 20 containers through the HWTU in a fiscal year will have at least

one container sampled and analyzed. Containers, for which there is insufficient process knowledge, or analytical information to designate without sampling and analysis, may not be counted as part of the five percent requirement unless there is additional confirmation of designation

Containers of the following are exempt from the confirmation calculation above: Laboratory reagents or other unused products such as paint, lubricants, solvent, or cleaning products, whether received for redistribution, recycling, or as waste. To qualify for this exemption, such materials must be received at the HWTU in their original containers.

Wastes that are considered non-verifiable if the dose rate is >20mRem/hr, at contact contains greater than, 100 nCi/g of Transuranics, will not fit into the X-ray unit, is shielded, classified or remote handled.

Prior to acceptance of wastes at the HWTU, confirmation of designation may be required. Wastes that shall undergo confirmation are divided into two groups; those that easily yield a representative sample (Category I), and those that do not (Category II). The confirmation steps for each type are outlined below along with a description of which wastes fall into each category:

Category I. If a waste which easily yields a representative sample is received, a representative sample will be taken from the waste containers selected. If more than one phase is present, each phase must be tested individually. The following field tests will be performed as appropriate for the waste stream:

- Oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- pH - by pH meter[1] or pH paper (Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045)[1]. This test will be used to identify the pH and corrosive nature of an aqueous or solid waste.
- Halogenated organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.
- Volatile organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

When mathematically possible, the Permittees shall perform confirmation on an equal number of Category I and Category II containers.

Category II. If a representative sample is not easily obtained (for example, discarded machinery or shop rags), or if the waste is a labpack or discarded laboratory reagent container, the following steps will be performed:

a. Visually verify the waste. Examine each selected container to ensure that it matches the data provided on the Disposal Request form(s) provided to document the waste. Depending on accessibility of items to be verified, this may be done through direct observation or with the aid of an x-ray examination unit. Labpacks and combination packages that are accepted from non-PNNL generators must be removed from the outer container. If the waste matches the description specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, more information is collected or the waste is rejected and returned to the generating unit, and the generating unit revises and resubmits the documentation to reflect the actual contents. If necessary, the waste shall be re-designated utilizing the designation methods identified in WAC 173-303-070 through 173-303-100.

If the sample data observed meets the parameters specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, more information is collected or the waste

is rejected and returned to the generating unit for additional characterization. The waste will be required to be resubmitted with a revised Disposal Request following the additional characterization activity.

[1]The pH paper must have a distinct color change every 0.5 pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

3.5.2 Criteria and Rationale for Parameter Selection

Waste testing methods and references are as specified in WAC 173-303-110(3) or approved by Ecology in accordance with WAC 173-303-110(5). These methods are summarized in Table 3-3. All methods are specified in *Chemical Testing Methods*, WDOE 83-13 (Ecology 1983) and/or *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA SW-846 (EPA 1986).

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, 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 parameters that are considered for waste received at the HWTU are as follows.

- Visual Inspection – 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. Visual inspections may be performed utilizing the X-ray examination unit to verify contents and inspect for prohibited articles. (Materials not allowed to be disposed of at the TSD facility planned for disposal of the waste. e.g. prohibited articles identified in HNF-EP-0063 for waste to be disposed of in Hanford burial grounds).

- pH – used to identify the pH and corrosive nature of an aqueous or solid waste.

- Oxidizer – used to indicate if the waste is an oxidizing agent.

- Cyanide – 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*.

- Volatile Organic Analysis – used to confirm or deny the presence of VOAs in the waste stream as listed by the generator. This may also indicate the potential ignitable waste that must be managed and protected from sources of open flame.

Testing kits – used to determine waste characteristics and verify information provided on the disposal paperwork. The testing procedures for each test are included in the appropriate test kit.

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. 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. Containers selected should be durable, and must be compliant with applicable DOT and other shipping requirements if the sample is to be transported offsite for analysis. If any questions arise as to the appropriateness of a sample container for a particular sample, consult the MSDS for the material(s) to be sampled and/or a chemist.

Representative sampling methods for these various types of waste are selected according to the methods and equipment listed in WAC 173-303-110(2). Sampling methods and equipment are identified in Table 3.2. 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.

Exceptions to the representative sampling methods may be used if permissible pursuant to the provisions of:

- WAC 173-303-110
- NRC/EPA *Clarification of RCRA Hazardous Waste Testing Requirements for Low-Level Radioactive Mixed Waste – Final Guidance* (62 Federal Register 62080, November 20, 1997)
- Data Quality Objectives developed in accordance with the Tri-Party Agreement Action Plan Section 6.5 or 7.8 (Quality Assurance), and/or
- An alternative approved by Ecology pursuant to the permit modification process.

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.

Table 3.1. Sample-Container Compatibility

Sample	Container		
	Plastic	Glass	Metal
Acids (except hydrofluoric acid)	*	*	
Hydrofluoric acid	*		
Alkali (concentrated)	*		
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; consult a chemist and/or MSDS for the material(s) being sampled.

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 meet or exceed 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), and reactivity.
- 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. If ALARA practices allow, 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:

- Oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- pH - by pH meter[1] or pH paper (Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045)[1]. This test will be used to identify the pH and corrosive nature of an aqueous or solid waste.
- Halogenated organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

- Volatile organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

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.

[1] The pH paper must have a distinct color change every 0.5 pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

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 Chapter 7.0.

4. Respond to the spill in accordance with the requirements of Chapter 7.0. The 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 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 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 treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of the offsite TSD facility. 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 mixed waste 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., Chapter 1.0, listing is 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 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.

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 mixed 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, for ALARA reasons, 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 (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 Permit Conditions II.Q.1.h. and II.Q.2. 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 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.

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

Parameter [a]	Method [b, c]	Rationale for Selection
Physical Screening		
Visual inspection	Field method - observe phases, presence of solids in waste and look for prohibited articles utilizing x-ray examination when appropriate.	Confirm that waste matches that information described on waste acceptance documentation.
Chemical Screening [d]		
Oxidizer	Oxidizer Screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
pH	pH screen Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Cyanides	Cyanide screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Sulfides	Sulfide screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Halogenated/Volatile Organic Compounds	Photoionizer or Flame Ionizer, or Clor-D-Tect © Kits	Confirm that waste matches that described on waste acceptance documentation
Toxicity characteristic organic compounds [e]	Generator knowledge or SW-846 Methods 1311 and 8260 (volatile organic compounds) and 8270 (semivolatile organic compounds)	Identify constituents for compliance with Hanford Facility Permit

[a] Addition parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.
[b] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[c] QA/QC requirements associated with these screening methods are addressed by following manufacturer's instructions for instrumentation (such as photoionizer), or test kit instructions. Detection limits are given in the SW-846 method, manufacturer's instructions for instrumentation (such as photoionizer), or test kit instructions.
[d] These test will not be performed on materials known to be organic peroxides, ether, and/or water reactive compounds.
[e] This test will only be performed on waste to be stored in tank TK-1waste in addition to any other appropriate chemical screening.

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Figure 3.1. Floor Plan of SAL

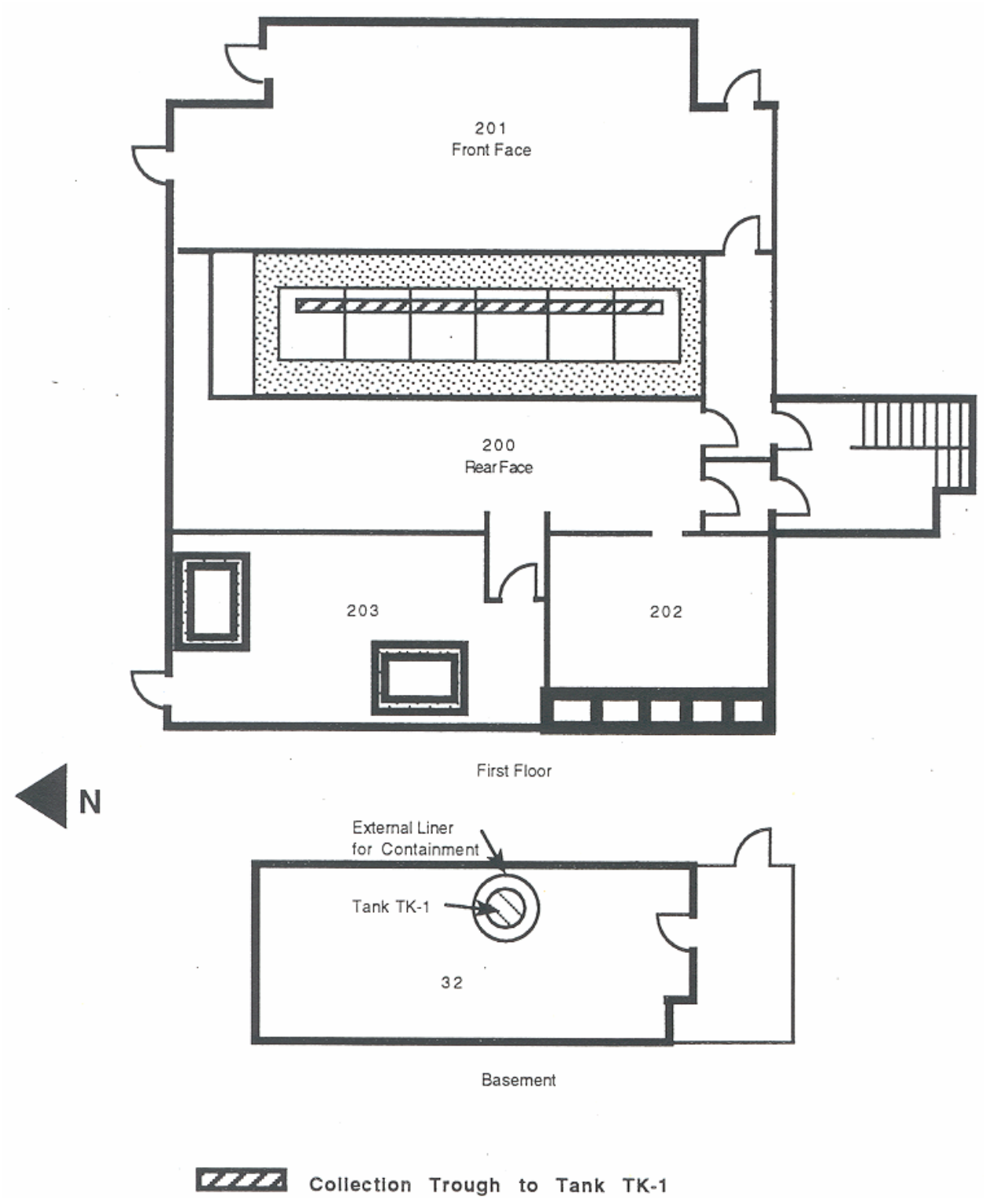
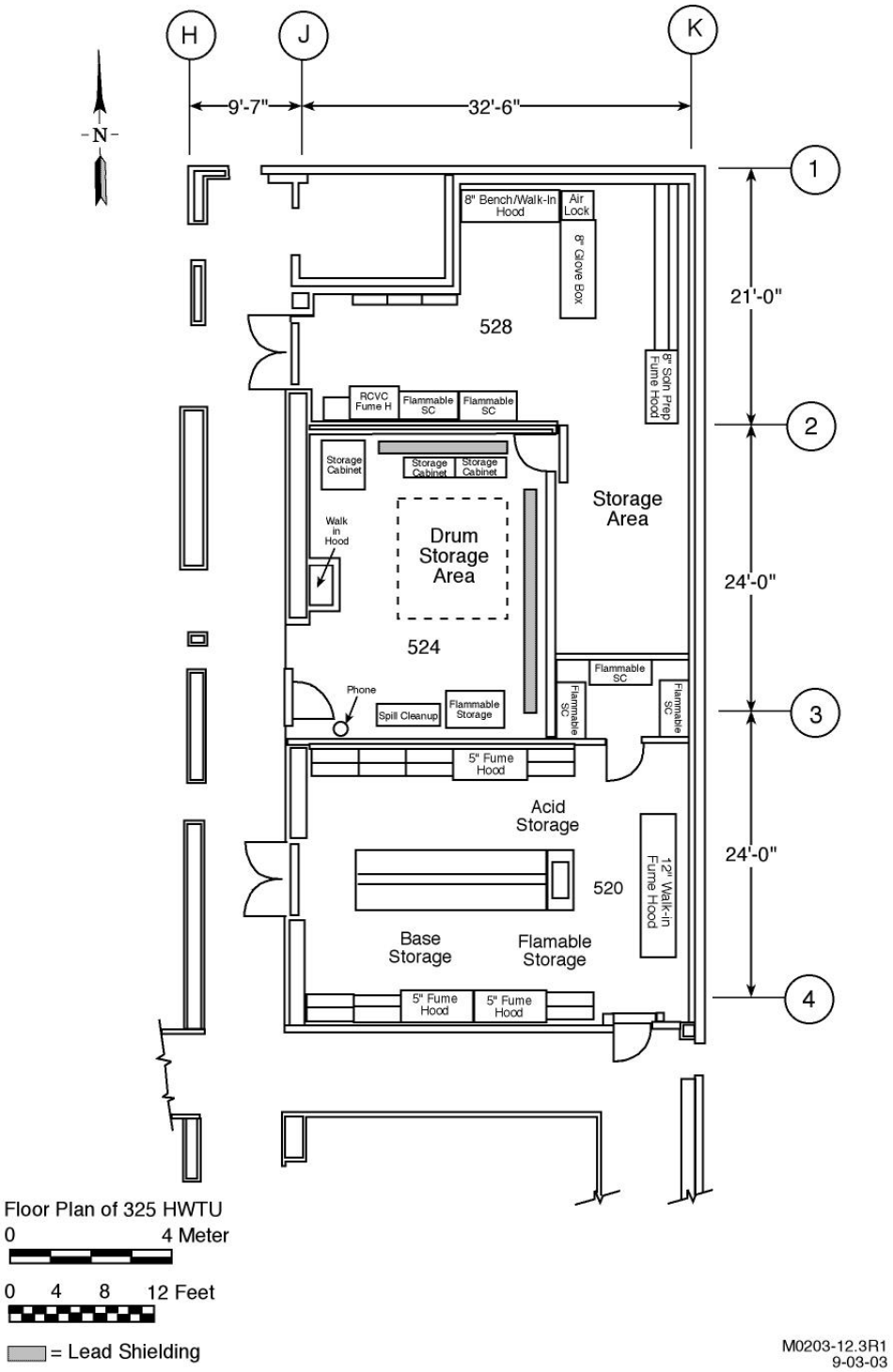


Figure 3.2. Drawings of the TSD Units



Chapter 4.0 Process Information

4.0 PROCESS INFORMATION 4.1

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4.0 PROCESS INFORMATION

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

The 325 HWTUs receive and treat and/or store wastes described in Chapter 3.0, Waste Analysis Plan. Small-volume containers are segregated by compatibility and stored until sufficient quantity is accumulated to prepare a labpack or bulk container (usually a 208-liter (55 gallon) drum.) Waste introduced into the SAL tank is containerized for further management as described in Section 4.2.1. Containers are repackaged for shipment as necessary and manifested for shipment to a permitted onsite or offsite TSD facility for any necessary further treatment and compliant disposal.

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 wastes generated from onsite programs, primarily research laboratory analytical activities in the 325 Building and other PNNL facilities. Containers are then prepared for shipment to other TSD facilities for further treatment as required and compliant disposal. Descriptions of the containers used are provided in the sections that follow for the HWTU and SAL.

4.1.1 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 are 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 or in drums in specifically designated areas based on the hazard classification.

4.1.1.1 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 are 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, 201, 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 mixed 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 be 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.

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 and transportation modes. Unsupervised 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.

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 Chapter 6.0, 36, §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 (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 Chapter 6.0, §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 (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 ALARA concerns with 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 §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 a portable secondary containment system. 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-meters. 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 §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, and 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 (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 §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 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. 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.

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 (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 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 will be recovered and disposed of at an appropriate facility.

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 §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 (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. Chapter 6.0, §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 Chapter 6.0, §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 (Chapter 6.0, §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. 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 SAL tank system. The tank system consists of the tank; associated piping, valves and pumps; and secondary containment. The 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 §4.2.1.

4.2.1 Shielded Analytical Laboratory Tank System

The SAL is an analytical chemistry laboratory used primarily to prepare and analyze samples for research and development activities and waste characterization. Storage and treatment of dangerous waste in containers also occurs in the SAL. This work is conducted in six inter-connected hot cells. Liquid waste generated during these operations is collected, treated if necessary and may be containerized or 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 treated in the tank, as needed, and batch transferred from the SAL tank to containers for disposal through a pressurized transfer line that leads back into Cell 6 of the SAL. The SAL tank volume is 1,218 liters and has a throughput of 10,000 kilograms 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.

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. A return line of stainless steel is attached to the top of the tank and can be 'jetted' using water pressure to transfer the tank contents back up to Cell 6 of the SAL. 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 solution is stored in the SAL tank, treated as needed and transferred to containers for final disposal.

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 hour's 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 (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. 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.

<u>Materials of construction.</u> 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.

<u>Strength of materials</u>. 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 out the liquid to appropriate containers.

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. Any required release reports will be filed according to the requirements of WAC 173-303-640(7).

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 (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. The SAL tank volume maybe transferred, to SAL Cell 6 for treatment and/or subsequent storage in containers using a pressurized transfer line. As

with the drain lines, the pressurized line is constructed of single-wall stainless steel piping. All connections outside the tank's secondary containment system are welded.

4.2.1.4 Marking or Labeling

Due to the ALARA concerns associated with the SAL tank, the tank itself is not labeled. The tank is located in a locked room to comply with ALARA standards. 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 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 mixed waste, 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.

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).

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

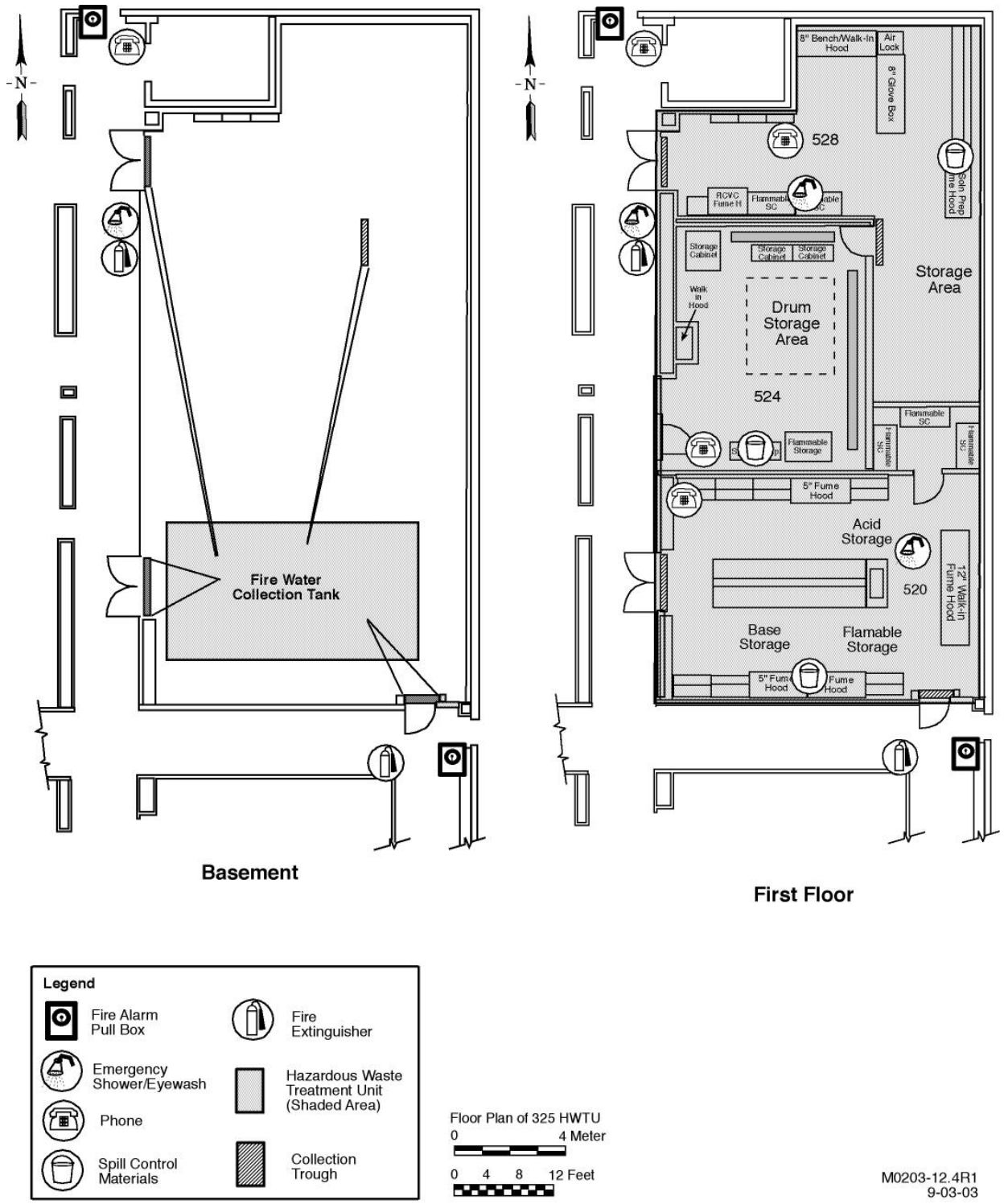
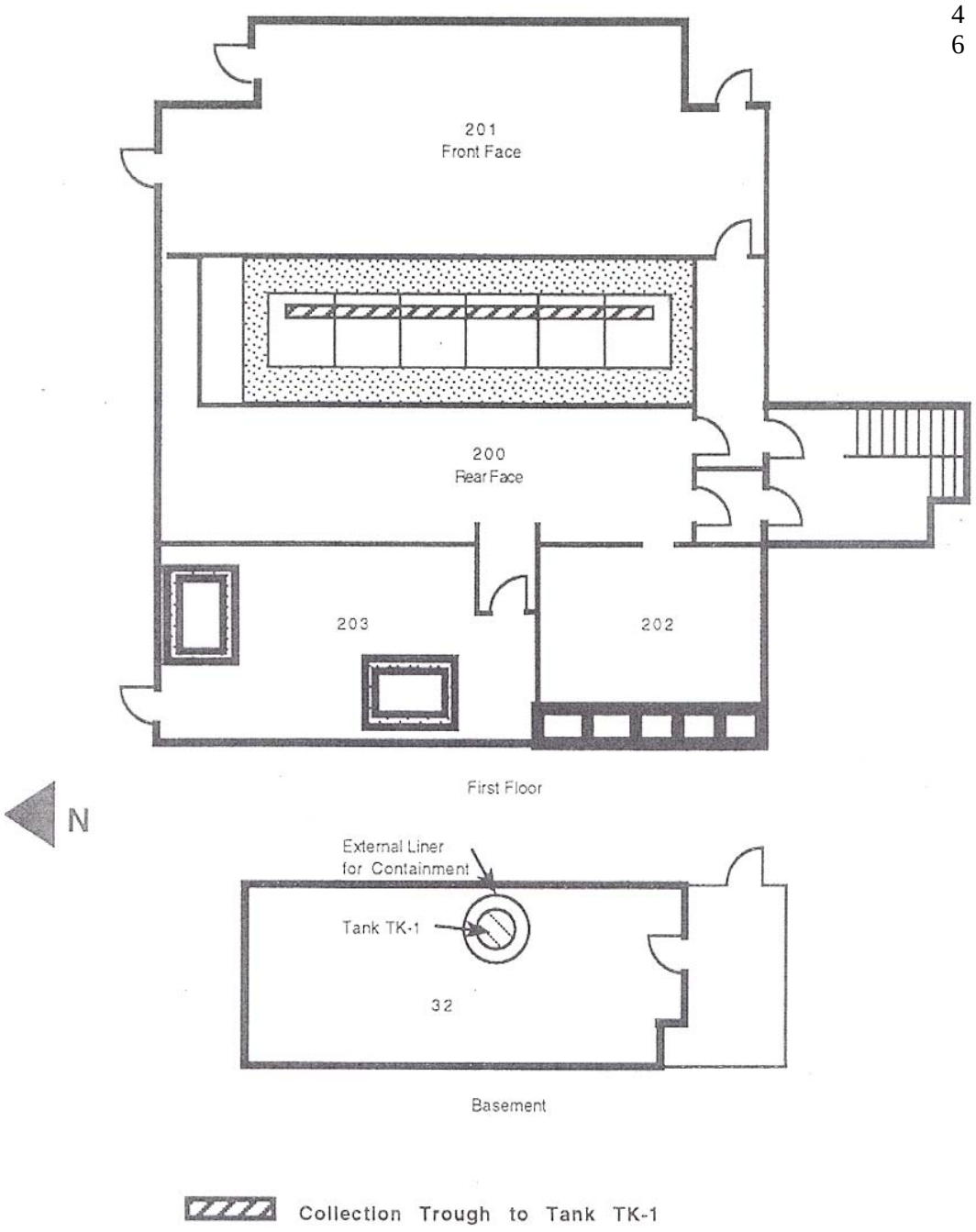


Figure 4.2. Hot Cell Secondary Containment System



Chapter 6.0 Procedures to Prevent Hazards

6.0 PROCEDURES TO PREVENT HAZARDS 6.1

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6.0 PROCEDURES TO PREVENT HAZARDS

The 325 HWTUs are operated to minimize exposure of the general public and operating personnel to dangerous waste.

6.1 SECURITY

Refer to Permit Attachment 33, §6.1.

6.1.1 Waiver

Waiver of the security procedures and equipment requirements for the 325 HWTUs are not requested. Therefore, the waiver requirement outlined in WAC 173-303-310(1)(a) and (b) are not applicable.

6.2 INSPECTION PLAN

The purpose and intent of implementing inspection procedures at the 325 HWTUs are to prevent malfunctions, deterioration, operator errors, and/or discharges that might cause or lead to the release of regulated waste to the environment or threats to human health. A system of daily, and weekly, inspections involving various PNNL departments and levels of management has been implemented at the 325 HWTUs. The Hanford Facility 300 Area Fire Department performs inspection once-every-four months of the fire suppressant and notification systems and annually an inspection of the sprinkler systems.

6.2.1 General Inspection Requirements

The content and frequency of inspections performed at the 325 Building are described in this section. Also described is maintenance of inspection records.

Observations made and deficiencies and corrective actions noted during an inspection are recorded on the inspection checklist. The checklist includes the inspector's printed name, signature, date, and time. Once approved, the checklist is kept in 325 HWTUs files. The inspection records and dates are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion as appropriate to mitigate health risks to workers, and to maintain integrity of waste management units.

6.2.1.1 Types of Problems

Inspections are performed at the 325 HWTUs daily, weekly, quarterly, once every four months, and annual. The types of problems addressed by each of these inspections are described as follows.

Daily Inspections

The 325 HWTUs staff performs daily inspections whenever waste packaging, transfer, shipping, or movement operations are conducted. HWTU personnel monitor container condition and integrity, the building waste containment system, and other building areas daily where waste is handled. Specific inspection points include, but are not limited, to the following:

- Container integrity
- Mislabeled or opened containers
- Improper storage (e.g., incompatible waste storage)

- Disorderliness or uncleanliness of storage unit
- Accumulation of waste in containment systems

Results of these daily inspections are documented as part of the 325 HWTUs operating record.

Weekly Inspections

The 325 HWTUs personnel conduct weekly inspections of both safety and operating equipment in the 325 HWTUs. Safety and emergency equipment are inspected for functionality and adequacy of supply. The weekly and daily inspections are usually conducted on or before the last working day of each week, and have the same inspection points (Section 6.2.1.1.1). Results of these weekly inspections are documented as a part of the 325 HWTUs operating records.

Quarterly, Once Every Four Months, and Annual Inspections

The Hanford Facility 300 Area Fire Department performs a once-every-four-months inspection of fire suppressant and notification systems (i.e., sprinkler system and fire alarm pull boxes). This inspection includes flow tests of the sprinklers to ensure that there is no blockage in the system lines; the alarm system is activated to ensure proper pull box operation. Annually, the Fire Department performs a full inspection of the sprinkler system, smoke detectors, heat detectors, and pull boxes. A complete flow test of the sprinkler system is performed from the furthest valve to ensure proper flow through the entire system. Fire extinguishers also are checked for proper pressure and function. The Hanford Fire Department retains these records.

Additional documented inspections are performed quarterly of the emergency eyewash/shower units, the fume hoods, and other ventilation system components. Records of these safety equipment inspections and the results, as well as documentation of any required corrective actions, are maintained by the appropriate facilities and operations staff.

6.2.1.2 Frequency of Inspections

The frequency of inspections is based on specific regulatory requirements and on the rate of possible deterioration of equipment and probability of environmental or human health incidents.

Areas where dangerous and mixed waste are actively handled, including all of the hot cells, the front and back face of the SAL, and Rooms 520, 524 and 528 in the HWTU are considered to be areas subject to spills. These areas are given daily inspections when in use as required by WAC 173-303-320(2)(c).

The primary and secondary containment systems (i.e., floors, troughs, and sumps) are inspected daily when in use for accumulation of spilled material. The containment systems are inspected weekly for structural integrity (i.e., no cracks, gaps, leaks that could result in environmental release of waste in the event of a spill). This frequency is based on the need to perform timely corrective actions in the event that problems are noted.

Aisle space between containers is inspected weekly when applicable. As the objective of the aisle space requirements is to allow for unobstructed movement of personnel and equipment in case of an emergency, the aisle space requirements do not apply to the hot cells, shielded cubicles, or storage cabinets. If quantities of waste are packaged in large containers or drums, temporarily stored before a transfer, a minimum aisle space of 76 centimeters is maintained in accordance with WAC 173-303-340(3), As-Low-As-Reasonably-Achievable (ALARA) concerns, and with applicable standards of the Uniform Building

Code and Life Safety Code. Weekly inspections, where applicable, allow container spacing problems to be identified and corrected.

Emergency and safety equipment and personal protective equipment are inspected weekly. Weekly inspections will assure this equipment is available and in adequate supply.

6.2.2 Specific Process Inspection Requirements

The following sections detail the inspections to be performed at the 325 HWTUs.

6.2.2.1 Container Inspection

Dangerous and mixed waste containers stored in the 325 HWTUs are inspected daily where waste handling activities are performed for leakage, evidence of damage or deterioration, proper and legible labeling, and proper lid and bung closure. Any observations made during the inspections, including any repairs or remedial actions taken, are documented in the logbook with the date, time, and printed name and signature of the inspectors. This logbook is maintained in the 325 HWTUs for at least 5 years from the dates of the inspections. All areas subject to spills are inspected daily when in use. Structural integrity of the containment systems is checked weekly.

6.2.2.2 Tank System Inspection

The Shielded Analytical Laboratory (SAL) tank located in Room 32 is used to store mixed waste generated because of waste treatment activities. Routine inspections of the SAL tank system are conducted in accordance with WAC 173-303-640. Inspections involve a combination of visual, mechanical, and electronic means. Due to ALARA considerations, visual inspections of the tank system are conducted by remotely operated cameras mounted in Room 32. These visual inspections are limited to areas of the tank system that can be observed by the camera. In the event of a camera system malfunction, the tank system will be visually inspected from the doorway of Room 32 until the malfunction has been corrected. A mirror is mounted on the back wall of Room 32 to allow viewing the rear of the tank from the window in the door. A logbook or inspection sheet of all inspections is maintained in the operating record for at least 5 years from the date of the inspection.

6.2.2.2.1 Tank System External Corrosion and Releases

Aboveground portions of the SAL tank are inspected each operating day to detect corrosion or releases of waste.

6.2.2.2.2 Tank System Construction Material and Surrounding Area

The SAL tank is double-walled and constructed of corrosion-resistant stainless steel, with a capacity of 1,218 liters. The secondary wall is a cylindrical stainless steel tank that provides secondary containment sufficient to contain 100 percent of the inner tank volume. The construction materials of the tank and the area immediately surrounding the externally accessible portion of the tank system, including the secondary and tertiary containment systems, are inspected during use to detect erosion or signs of releases of mixed waste (e.g., wet spots).

Any deteriorations or malfunctions observed during inspection of the tank system will be corrected. As applicable, any release to the environment is reported within 24 hours to Ecology, as identified in

WAC 173-303-640(7)(d)(ii); and to the National Response Center, as identified in 40 CFR 302 for any detected leaks.

6.2.2.2.3 Tank System Overfilling Control Equipment

The tank controls for the SAL tank include two high-level alarm systems that respond to overfill conditions. The initial tank high-level alarm is activated by a conductivity probe, the second by a capacitance probe. The conductivity probe high-level alarm and associated functions can be tested electrically by depressing a button on the main control panel in Room 201. Activation of this alarm results in a visible red light and audible alarm on the main control panel in Room 201, an alarm condition on the annunciator panel on the second floor of the 325 Building, and closure of electric solenoid valves on all inlet water supply lines to the hot cell area and tank system. Activation of the capacitance probe alarm results in a red light and audible alarm.

6.2.2.2.4 Tank System Monitoring and Leak Detection Equipment

The leak detection conductivity probe for the SAL tank is located between the primary and secondary shells of the double-walled tank. The leak detection probe signal activates if any liquids collect in the annulus between the two walls of the tank. The leak detection probe can be functionally tested electrically by depressing a test button on the main control panel in Room 201. Leaks in the RLWT are detected by liquid sensing cable. Liquid sensing cable is located in the stainless steel lined tank pit to detect any liquid in the secondary containment that may have leaked from the tank. The liquid sensing cable circuits can also be tested from the control room.

6.2.3 Inspection Log

Copies of the completed inspection checklists are provided to operations personnel and maintained in the 325 HWTUs files. Any corrective actions noted or deterioration or malfunctions in equipment discovered by the inspector are delegated to responsible individuals in the operations group. Corrective actions identified must be completed within 2 weeks unless there is documentation and reason for further delay. Examples of problems that could be identified and the corresponding remedial action are listed in Table 6.1. Inspection reports and corrective action response documentation are retained at the 325 HWTUs for a minimum of 5 years.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS

The following section documents the preparedness and prevention measures taken at the 325 HWTUs.

6.3.1 Equipment Requirements

The following sections describe the internal and external communications and emergency equipment in use at the 325 HWTUs.

6.3.1.1 Internal Communications

Internal communication systems are used to provide immediate emergency instruction to personnel in the 325 HWTUs. Internal communications address general emergencies that might occur in the 300 Area and the 325 Building, as well as specific emergencies that might occur. Personnel have access to these internal communication devices whenever waste is handled.

Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside of the 325 HWTUs that could impact operations and personnel. Fire alarm signals are located in each building throughout the 300 Area. The nearest emergency siren for 'area evacuation' and 'take cover' is located approximately 46 meters northwest of the 325 Building on top of the 326 Building and is audible in all parts of the 325 Building. Numerous criticality howlers (horns) are located throughout the 325 Building and are audible in all parts of the building.

Internal communications to provide emergency instruction in the event of an emergency in the 325 HWTUs and in the 325 Building are listed below:

- Fire alarms
- Differential pressure alarms (for the SAL)
- Differential pressure alarm in the glove box in Room 528
- Leak detection alarms (for the SAL)
- Building-wide public address (PA) system
- Intercom system (for the SAL)
- Telephones

The fire alarms are used to provide notification for immediate evacuation of the 325 Building. The fire alarms are initiated on activation of the manual pull boxes, heat detectors, and the sprinkler system. Fire alarm pull boxes are located as indicated in Figures 6.1 and 6.2. Air monitoring systems with alarms are located in the 325 HWTUs. The PA system is used for building-wide broadcasting of verbal emergency instructions to 325 Building personnel. The telephone system is used to provide verbal emergency instructions to 325 HWTUs personnel. The telephones also can be used to transmit verbally emergency information to personnel outside of the 325 HWTUs and to request emergency services. A network of telephones is provided throughout the 325 Building. Locations of telephones within the 325 HWTUs are shown in Figures 6.1 through 6.3. In addition to the telephone communication system, personnel have access to hand-held radios. The radios are available from the Building Manager. All of the radios transmit at the same frequency and are capable of summoning the PNNL Single-Point Contact in case of an emergency.

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There are two fire alarm pull boxes near the HWTU; one is located in the hall north of the entrance to Room 528, and one is in the hallway just east of the south entrance to Room 520. Rooms 520 and 528 are provided with smoke detectors that, upon activation, initiate the fire alarm system and close dampers between the two rooms and the corridor. Heat detectors are provided in the glove box in Room 528. There are two fire alarm bells just outside the HWTU. These fire alarm bells are located north of the entrance to Room 528 in the hall and east of the south entrance to Room 520 in the hall.

Additionally, a fire alarm strobe is installed in Room 528. The locations of the fire pull boxes are shown in Figure 6.1.

The glove box in Room 528 is equipped with a differential air pressure alarm that monitors the glove box for loss of negative pressure. If a loss occurs, a local alarm is sounded.

The PA system speakers are located in Rooms 520 and 528.

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There are four fire alarm pull boxes provided in the SAL; three are in Room 201, and one is in Room 203. Additionally, a fire alarm pull box is located just outside of Room 32. Heat detectors are provided in the six large interconnected hot cells in the SAL. Several fire alarm bells are located throughout the 325 Building, including two fire alarm bells within the SAL (one each in Rooms 201 and 203). These alarms are audible at all locations within the SAL. The locations of the fire alarm bells are shown in Figure 6.2.

The six interconnected hot cells in the SAL are equipped with a differential air pressure alarm that monitors the hot cells for loss of negative pressure. If a loss occurs, a local alarm is sounded.

A cable leak-detection system is installed in Room 200. The cable runs behind the back wall of all six hot cells. Liquid escaping from the hot cells on the rear face (Room 200) would contact the cable and automatically sound an alarm device in Room 201. This conductivity cable runs from the hot cells to the tertiary containment pan for the SAL tank in Room 32. Any release of the tank system contents to this pan, which contacts the cable, initiates the cable leak-detection alarm.

The SAL tank is equipped with a conductivity probe for leak detection within the annulus of this double-shelled tank. The tank also is equipped with a high-liquid-level alarm. In the event of an interstitial leak or overfilling, audible alarms sound at the SAL tank's main control panel in Room 201.

The PA system speakers are located in Rooms 200, 201, and 203. An intercommunication system supplies two-way voice communications between Rooms 32, 200, 201, and 201a.

6.3.1.2 External Communications

As mentioned in Section 6.3.1.1, a fire alarm system and telephone network system are in place at the 325 HWTUs. Both systems can be used to summon emergency assistance. The fire alarm system summons direct response from the 300 Area Fire Station. The telephone system can be used to access the PNNL Single-Point Contact directly by dialing 375-2400 or by dialing the emergency number 911. For DOE-RL and other non-PNNL contractor personnel dialing 911 from onsite phones, the call goes directly to the Hanford Patrol, which calls the PNNL Single-Point Contact. Locations of fire alarm pull boxes and telephones are given in Figures 6.1 through 6.3. Personnel on the premises have access to these external communication devices.

6.3.1.3 Emergency Equipment

Emergency equipment available for trained 325 HWTUs personnel includes portable fire extinguishers, a fire suppression system, spill response equipment, and decontamination equipment.

With the exception of the hot cells, the entire building also is equipped with automatic sprinkler protection consisting of Schedule 40 steel pipe per ASTM A120 (ASTM 1991) and 150-pound malleable iron fittings per ANSI B16.3 (ANSI 1992). All components are UL-listed or FM-approved. The fire sprinkler system was designed and installed in accordance with NFPA 13 for 'ordinary hazard' (NFPA 1996).

Absorbent pillows are capable of absorbing small quantities of spilled inorganic and organic liquids and can be used to contain temporarily any spills of these materials. Their rated absorption capacities range from 250 to 4,000 milliliters.

Mercury spill kits are capable of cleaning up to 25 milliliter of spilled mercury. Acid, caustic, and solvent spill kits contain the materials necessary to clean up small spills of acids, bases, and organic solvents. The absorbent kits in the SAL contain absorbent pads and other materials needed to temporarily contain and clean up small chemical spills.

The appropriate spill kits can be applied, respectively, to small acid and base spills for neutralization during cleanup efforts. The caustic neutralizer has similar capabilities for neutralizing small quantities of spilled bases. If needed, the Hanford Fire Department provides additional emergency equipment.

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Two portable 4.5 kilogram ABC fire extinguishers are available adjacent to the HWTU as shown in Figure 6.1. The portable fire extinguishers are located in the hall outside the entrance to Room 524 and in the hall south of the south entrance to Room 520.

For chemical contamination needs, an emergency shower is located in the hall outside the entrance to Room 524 (Figure 6.2). Emergency eyewash is located in Rooms 520 and 528. Any contaminated water will be contained and cleaned up in accordance with the 325 HWTU contingency plan.

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Four 9.0-kilogram ABC portable fire extinguishers are located in the SAL. A portable fire extinguisher is located in Room 201 and Rooms 200 and 203 each have one portable fire extinguisher. Additionally, ABC dry chemical fire extinguishers are provided for each of the six large interconnected hot cells in Room 201. These extinguishers are mounted on the outside of each cell with the distribution system within the cells. The cell manipulator arms are used to direct the discharge at a fire within the cell.

Two emergency eye wash/showers are located in Rooms 200 and 201 (Figure 6.2). Any contaminated water will be contained and cleaned up in accordance with the 325 HWTU's contingency plan.

6.3.1.4 Water for Fire Control

The five water pipelines that service the 325 Building for fire protection supply adequate water volume and pressure. Each of these lines is 15.2 centimeters in diameter.

Three fire hydrants are located in immediate proximity to the 325 Building; one is approximately 30.4 meters east of the southeast corner of the 325 Building; one is approximately 21.3 meters directly north of the northwest corner of the 325 Building, and one is 33.5 meters west of the southwest corner of the 325 Building. In addition, the 300 Area Fire Station is located within 0.4-kilometer of the building.

6.3.2 Aisle Space Requirements

Aisle spacing is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association and the Life Safety Code (NFPA 1994) for the protection of personnel and the environment. A minimum 76.0-centimeter aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

The following sections describe preventive procedures, structures, and equipment.

6.4.1 Unloading Operations

Procedures have been developed to prevent hazards and to minimize the potential for breakage, punctures, or the accidental opening of containers during the transfer of waste to the 325 HWTUs. All waste is inspected before acceptance to ensure that the waste is in appropriate containers and that the containers are in good condition. Inspection of containers before acceptance minimizes the potential for spills during unloading operations. The potential for spills during waste handling also is minimized using appropriate container-handling equipment; small waste items can be unloaded by hand.

The volumes of dangerous waste entering and exiting the SAL are in relatively small containers (Chapter 4.0) and, have secondary containment because of the packaging requirements for the mixed waste materials. Any spill from such containers will be contained and not released to the environment.

6.4.2 Run-off

The 325 HWTU and SAL were designed to eliminate the likelihood of waste migration via run-off. Because the 325 HWTUs are enclosed completely (i.e., complete roof and no open walls), run-off of precipitation is not a factor. The following paragraphs address additional design features provided to eliminate the likelihood of run-off.

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The concrete floor in Rooms 520 and 528 of the HWTU is provided with a chemical-resistant polypropylene coating. The coating covers the entire floor and extends approximately 10 centimeters up on each perimeter wall in each room. The rooms also are provided with floor drains and floor trenches at each entrance. The trenches and floor drains flow into the firewater containment tank located in the basement of the 325 Building. The management of any mixed waste that might accumulate in the tank because of a fire is discussed in Chapter 4.0.

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The secondary containment in the SAL is divided into three systems based on three designated areas of the SAL. These areas are the six large, interconnected hot cells, the front side of the SAL, and the backside of the SAL.

The secondary containment system for the six large, interconnected hot cells involves the use of a 15.2-centimeter-wide by 6.7-centimeter-deep stainless steel trough that runs continuously along the front face of each of the 1.8-meter cells.

Typically, the use of the secondary containment system is enough to ensure that waste is safely contained. If there were to be a larger scale spill, however, the cell base and trough would collect any spilled waste within the cell. The spills are drained by gravity through drains in the bottom of the trough and stainless steel piping to the SAL tank.

Specially designed, shielded, 208-liter containers are used as the secondary containment system for the backside of the SAL. The backside of the SAL is used to store mainly solid mixed waste in cans, which

are packed in the containers. Any liquids stored here are placed in compatible secondary containment. The secondary containment system for the front side of the SAL, which is only used minimally to store mixed waste, consists of the same practice of using the plastic, pan-type containers described previously.

The secondary containment system for the HWTU and SAL is described in detail in Chapter 4.0.

6.4.3 Water Supplies

The 325 Building is designed and operated to contain safely waste and to prevent any contamination of water supplies. The secondary containment systems, described in Chapter 4.0, prevent releases to the environment and infiltration of waste that could contaminate groundwater. The containment systems also prevent waste run-off that could contaminate surface water. The nearest water supply is the 300 Area water intake located on the Columbia River, which is less than 0.8 kilometers from the 325 HWTUs.

6.4.4 Equipment and Power Failure

The 325 Building is provided with an emergency power system that initiates upon failure of the primary power system, thereby minimizing the likelihood of the release of dangerous waste or mixed waste during a power failure or equipment failure. The 325 HWTUs have emergency lighting systems that operate automatically during power-failure incidents. For actions to be taken in the event of power failure to unit systems or equipment, refer to the contingency plan (Chapter 7.0).

6.4.5 Personal Protection Equipment

Protective clothing and equipment are provided to employees during normal and emergency operations. Protection levels for emergencies are determined either in consultation with an industrial hygienist, or applicable control work permits or applicable operating procedure.

Per the identified work requirements, protective clothing and equipment is available for all staff working at the SAL. Protective clothing and equipment available at the SAL include, but are not limited to, the following:

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- Safety glasses (Room 201)
- Chemical protective suits (Rooms 200 and 201) (part of absorbent kits)
- Goggles (Rooms 200 and 201) (part of absorbent kits)
- Gloves (Rooms 200 and 201) (part of absorbent kits).

Storage and treatment of dangerous waste can occur in Room 520, 524, and 528 of the HWTU. Personal protective equipment is required for personnel working these areas of the HWTU. Protective clothing and equipment available at the HWTU include, but are not limited to, the following:

<u>Hazardous Waste Treatment Unit</u>

- Laboratory coats (325 Building – Mens/womens change room)
- Shoe covers (325 Building – Mens/womens change room)
- Surgeon gloves (Rooms 520, 524 and 528)
- Chemical-resistant gloves (Rooms 520, 524 and 528)
- Chemical-resistant aprons (Rooms 520, 524 and 528)
- Face shields (Rooms 520, 524 and 528)
- Hard hats (Room 528)
- Safety glasses (Rooms 520, 524 and 528).

The protective equipment storage areas are well stocked at all times. This equipment is replaced periodically as it is used. The above inventory reflects each type of personal protective equipment that typically is present at the 325 HWTUs. Additional personal protective equipment can be obtained, as needed, from storage locations and sources outside of the 325 HWTUs. These areas include the personal protective equipment storage area in the 700 hall men's and women's change rooms, Room 529, and the men's and women's change rooms in the south end (first floor) of the 325 Building. This personal protective equipment also can be obtained from onsite suppliers for the 325 HWTUs.

Respiratory protective equipment (air-purifying, full-face/negative-pressure respirators) that can be used by personnel is managed by the 325 Building Manager and must be checked out. This equipment is stored within the 325 Building. In addition, the 700 hall men's and women's change rooms normally contain a 1-week supply of coveralls, laboratory coats, hoods, skull caps, cloth shoe covers, rubber shoe covers, and gloves (canvas, surgeon's, and canner's).

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE

The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

6.5.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste

The 325 HWTUs are used to store a variety of ignitable waste. Precautions to prevent ignition of ignitable waste involve separation of waste from sources of ignition and use of procedures to minimize the potential for accidental ignition. There are no routine sources of ignition or open flame in the 325 HWTUs. Work with ignition or heat sources, if required, is limited and controlled in the following ways by management and is performed in compliance with internal health and safety procedures for elimination of ignition sources.

- Use of open-flame equipment when working with flammable liquids is prohibited.
- Smoking is prohibited around flammable liquids (no smoking is allowed in the 325 Building).
- Electrical equipment used in flammable or explosive atmospheres is required to comply with the National Electrical Code, NFPA 70.
- Use of equipment with automatic, adjustable temperature controls and high-temperature limit switches is required to prevent overheating.
- Placement of flammable liquids on hot surfaces is prohibited.
- All static electricity sources require grounding in areas where ignitable vapors might be present.
- Bonding of conductive containers is required when transferring flammable liquids.
- Use of nonsparking tools is required in flammable waste storage areas.

All maintenance or modifications in the 325 HWTUs that require work with ignition sources must receive prior approval by a safety engineer. This approval is documented in the operating records for the 325 HWTUs. Smoking is not allowed in the 325 Building at any time, and the interior and exterior of the building are clearly posted with 'No Smoking' signs. Waste storage areas are not heated by any radiant heat source. All tools used to open ignitable waste containers are constructed of nonsparking materials.

A fire safety engineer familiar with the Uniform Fire Code inspects ignitable waste storage areas annually. This inspection is documented in the operating records for each of the 325 HWTUs. There also are storage restrictions at the 325 HWTUs for combustible waste as part of fire safety requirements. The

storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 Building (ICBO 1991).

6.5.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

As described in Section 6.5.1, ignitable waste is managed to protect the waste from sources of ignition or open flame. Ignitable waste containers are maintained in good condition and inspected weekly to minimize the potential for releases that could result in fire. Containers of ignitable waste are protected from high temperatures to prevent the potential for pressurization and buildup of ignitable vapors. Containers of ignitable waste are stored in flammable material storage cabinets within waste storage cells (Chapter 4.0). Limitations on sizes of containers and amount of storage in cabinets are discussed in Chapter 4.0.

Small quantities of reactive waste are accepted for storage in the 325 HWTUs. Information on all reactive and other waste accepted by the HWTU and SAL is documented on a waste tracking form, which is reviewed carefully by personnel before accepting the waste. This form contains information on the unique handling requirements of the waste. Any reactive waste requiring special handling and storage to prevent unwanted reactions is appropriately packaged before arriving at the 325 HWTUs. This packaging safeguards against reactions resulting from air or water contact, shock, and other causes. Reactive waste is handled and stored in a manner commensurate with the specific reaction hazards posed by the waste. This includes segregating the waste from other waste and reagent chemicals with which the waste potentially could react.

Because a wide variety of waste can be accepted at the 325 HWTUs, the potential exists for storage of incompatible waste. Mixing of incompatible waste is prevented through waste segregation and storage procedures. Chemical waste stored in the 325 HWTUs is separated by compatibility and hazard class and stored in separate storage areas. Separate storage shelves and cabinets are used within the storage areas (Chapter 4.0) to provide further waste segregation. Before accepting unfamiliar waste from generating units, waste management staff determines the Reactivity Group Number per *A Method for Determining the Compatibility of Hazardous Wastes* (EPA 1980) for each waste so that waste can be stored with compatible materials. The following general guidance is used to segregate and separate chemicals:

- Store acids on a low storage shelf or in acid storage cabinets
- Separate acids from bases and alkaline metals such as potassium or sodium
- Separate oxidizing acids from organic acids and flammable or combustible materials
- Store bases away from acids and store solutions of inorganic hydroxides in polyethylene containers
- Store oxidizers away from flammable or combustible materials and reducing agents such as zinc, alkaline metals, and formic acid
- Store peroxide-forming chemicals in air-tight containers in a dark, cool, and dry place (inside of cabinets)
- Store flammable materials in approved containers or cabinets
- Separate flammable materials from oxidizing acids and oxidizers and keep them away from sources of ignition
- Clearly, mark cabinets to identify the hazards associated with their contents.

The potential for waste ignition or reaction at the 325 HWTUs also is minimized through storage restrictions on hazardous materials quantities. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 HWTUs (ICBO 1991). The weekly inspection of the 325 HWTUs includes checking to see if waste inventories are below these limits. These inspections are

documented in the operating records that (includes the weekly inspection forms) for each of the 325 HWTUs.

In the unlikely event the fire sprinkler system in Rooms 520, 524, and 528 is activated, the resulting run-off will be contained in the firewater collection tank located in the basement of the 325 Building. This tank is described in detail in Chapter 4.0, §4.1.4.1.

6.5.3 Management of Incompatible Waste in Tank Systems

Waste discharged to the SAL tank from the hot cells typically consists of the same type of waste managed in the hot cells. Sampling and analysis would be used if sufficient process knowledge were not available to characterize the waste for waste acceptance criteria purposes. The waste is treated in the SAL tank, if necessary.

6.5.4 Management of Incompatible Waste in Containers or Tanks

Incompatible waste and other materials are handled as described in Section 6.5.2 and in accordance with established operating methods. Storage restrictions that ensure proper separation of containers of incompatible material in the 325 HWTUs are described in Section 6.5.2.

Ignitable or reactive waste is not placed in the tank systems unless the waste has been treated, rendered, or mixed so that the waste no longer meets the definition of ignitable or reactive waste under WAC 173-303-090 (Chapter 3.0).

Drawings of the 325 HWTUs are available to ensure that ignitable and/or reactive waste is located at least 15 meters from the unit's property line.

Table 6.1. Remedial Actions for Major Problems

Major Problems	Remedial Actions
Containment system failures	
Cracks in floor of container storage area	Remove containers from area and cease use until cracks are repaired.
Cracks in floor of SAL cell liner	Remove containers from area and cease use until cracks are repaired, or provide secondary containment for containers holding liquid waste.
Leaking container in container storage area	Transfer waste to another container. Clean up spill.
Leaking tank or ancillary equipment	For minor leaks or drips, conduct inspection of affected equipment every 12 hours. For major leaks, immediately remove all waste from tank system. Prevent addition of waste to tank system until repaired. Notify Building Emergency Director. Initiate contingency plan if appropriate.
Spills	
Minor spills in container storage area	Clean up spill according to guidance in the building emergency procedure.
Major spills in container storage areas	Notify Building Emergency Director. Initiate contingency plan if appropriate.

Figure 6.1. Locations of Emergency Equipment at the Hazardous Waste Treatment Units

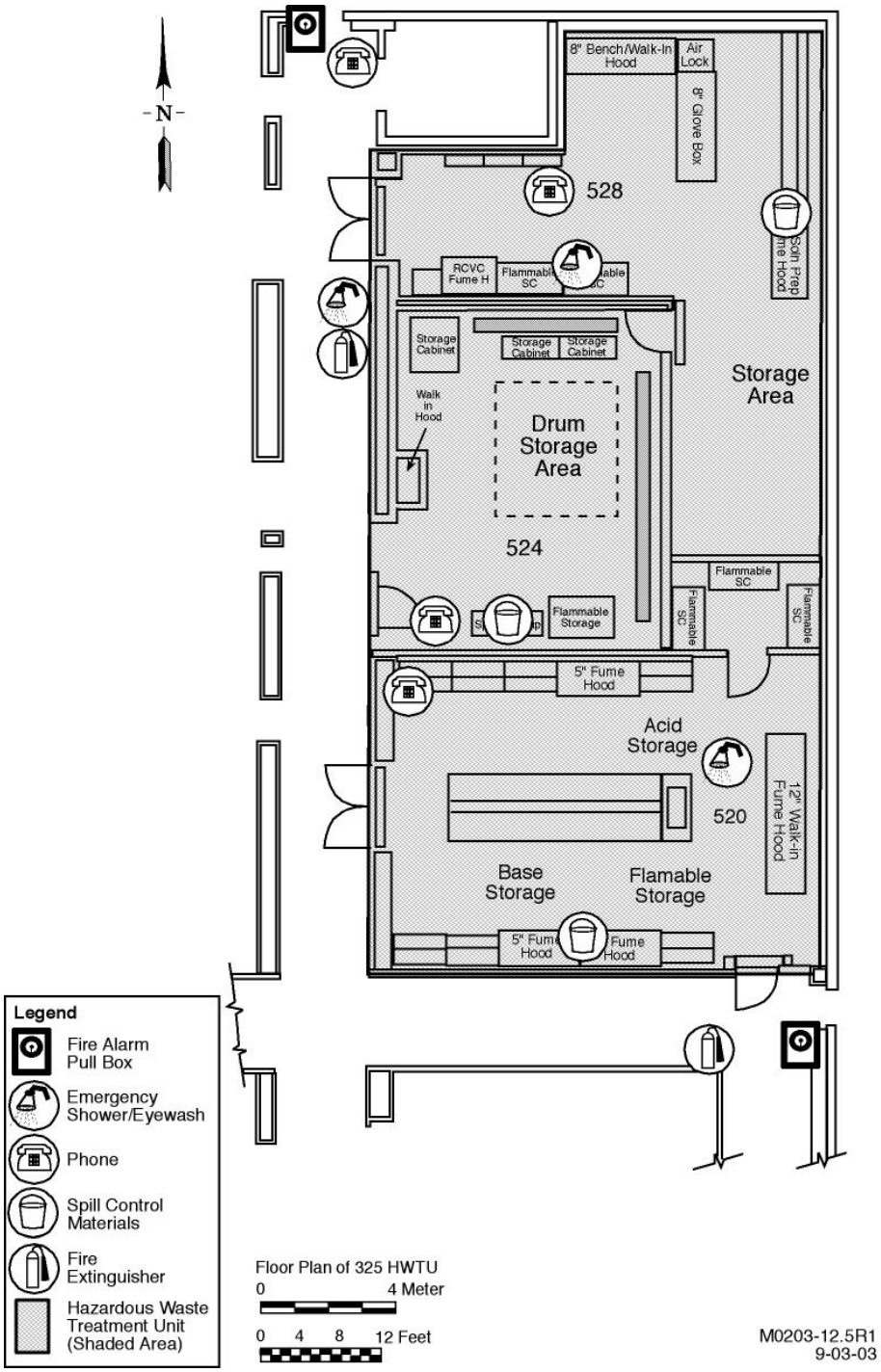


Figure 6.2. Locations of Emergency Equipment at the Shielded Analytical Laboratory (First Floor)

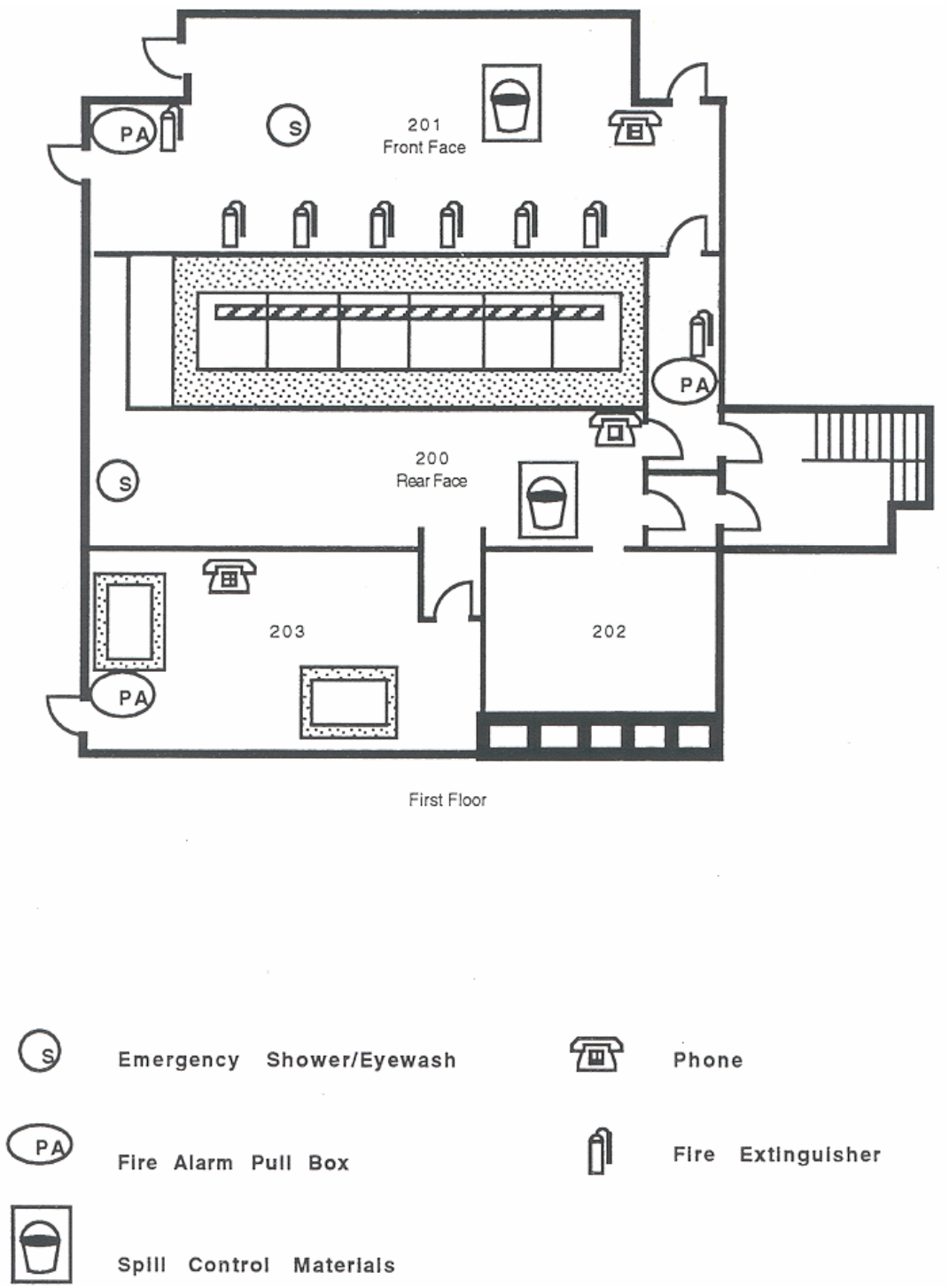
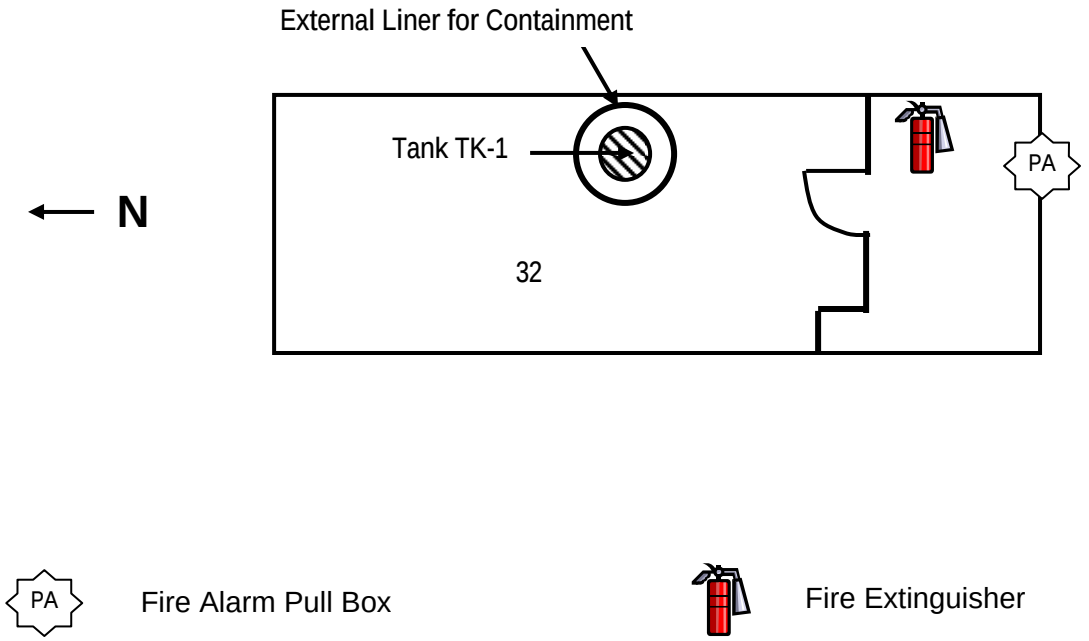


Figure 6.3. Locations of Emergency Equipment at the Shielded Analytical Laboratory (Basement)



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Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

WAC Requirement WAC 173-303-XXX	Permit Attachment 4 *Hanford Emergency Management Plan* DOE/RL-94-02[1]	325 Building Emergency Procedure[2]	Permit, Part III, 325 HWTUs
None	N/A	§1.1 thru 1.4	Chapter 1.0, Site Plan
-350(3)(d)	N/A	§12.2.1[3]	N/A
-360(1)	N/A	§3.1.1, 28th bullet	Chapter 8.0, references Training Plan
-350(3)(a), (b)	§1.3.4	§6.1, §6.3, and §6.4	§3.10 (activation of plan for damaged shipment)
-360(2)(a)	§1.3.4 §5.2.1	§1.5, §6.1, §6.3, and §6.4	N/A
-360(2)(b)	§2.2.1.1.3(g)	§3.1.1, 17th bullet; §9.2	N/A
-360(2)(c), (d), and (e)	§2.2.1.1.3(a) and (c), §4.2, 5.1.1, and §5.1.2	§3.7 notification §4.0 criteria	N/A
-360(2)(f) and (g); -630(2), and -640(7)	§2.2.1.1.3(g)	§3.1.1, 17th bullet; §4.0	N/A
-360(h), (i), (j), and (k)	§5.1.2.2, §5.1.2.3, §9.2.3, and §11.2	§3.1.1, 25th bullet; §3.7, §9.2, and §9.3	§6.4.5 (restocking of protective equipment as it is used)
-350(3)(e)	Appendix C	§10	§6.3.1 emergency equipment and §6.4.5 protective clothing
-350(3)(c) and -340(4)	§3.2.3, §3.3.1, §3.3.2, §3.4, §3.4.1.1, §3.4.1.2, §3.4.1.3, §3.7, and Table 3-1	§1.7	N/A
-350(3)(f)	Figure 7-3, Table 5-1	§1.5 and §1.6; Exhibits 13.1 through 13.4	N/A
-360(2)(k)	§5.1.2.2	§3.1.1, 25th bullet; §3.7, §9.2, and §9.3	N/A
-640(7)(d)(iii) and -640(7)(f)	§5.1.2.2 and §5.1.2.3	§3.1.1, 25th bullet; §3.7, §9.2, and§ 9.3	§.2.1.2.3 non-emergency reporting

[1] Sections of the Hanford Emergency Management Plan and the 325 BEP not referenced here are not enforceable under the Permit. Refer to also Permit Condition III.6.B.a.
[2] March 2005 version.
[3] This information is not required pursuant to Permit Condition II.A.4 and is included only in order to avoid modification to the complete Building Emergency Procedure.

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Chapter 8.0 Personnel Training

8.0 PERSONNEL TRAINING 8.1

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8.0 PERSONNEL TRAINING

This chapter discusses personnel training requirements based on WAC 173-303 and the Hanford Facility RCRA Permit, WA7890008967 (Permit). In accordance with WAC 173-303-806(4)(a)(xii), the *Hanford Facility Dangerous Waste Part B Permit Application* must contain two items: (1) *an outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330*, and (2) *a brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)*. Permit Condition II.C, *Personnel Training* contains training requirements applicable to Hanford Facility personnel and non-Facility personnel.

Compliance with these requirements at 325 HWTUs is contained in Permit Attachment 33, Chapter 8.0 and this chapter. This chapter supplements Permit Attachment 33, Chapter 8.0.

8.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

The introductory and continuing training programs are designed to prepare personnel to manage and maintain the TSD unit in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain TSD units under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in Attachment 36, Chapter 7.0, Contingency Plan. The introductory and continuing training programs contain the following objectives:

- Teach Hanford Facility personnel to perform their duties in a way that ensures the Hanford Facility's compliance with WAC 173-303
- Teach Hanford Facility personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles/positions in which they are employed, and
- Ensure Hanford Facility personnel can respond effectively to emergencies.

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and TSD unit-specific training. General Hanford Facility training is described in Attachment 33, General Information Portion (DOE/RL-91-28), Chapter 8.0, Section 8.1, and is provided in accordance with the HF RCRA Permit (DW Portion), Condition II.C.2. TSD unit-specific training is provided to Hanford Facility personnel allowing those personnel to work unescorted, and in some cases is required for escorted access. Hanford Facility personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. Hanford Facility personnel must be trained within 6 months after their employment at or assignment to the Hanford Facility, or to a new job title/position at the Hanford Facility, whichever is later.

General Hanford Facility training: Refer to description in Attachment 33, *General Information Portio*n (DOE/RL-91-28), Chapter 8.0, Section 8.1.

Contingency Plan training: Hanford Facility personnel receive training on applicable portions of HF RCRA Permit, Attachment 4, *Hanford Emergency Management Plan* in general Hanford Facility training. In addition, Hanford Facility personnel receive training on content of the description of actions contained

in contingency plan documentation in Attachment 36, Chapter 7.0 to be able to effectively respond to emergencies.

Emergency Coordinator training: Hanford Facility personnel who perform emergency coordinator duties in WAC 173-303-360 (e.g., Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the contingency plan and fulfilling the position within the Hanford Incident Command System. These Hanford Facility personnel must also become thoroughly familiar with applicable contingency plan documentation, operations, activities, location, and properties of all waste handled, location of all records, and the unit/building layout.

Operations training: Dangerous waste management operations training (e.g., waste designation training, shippers training) will be determined on a unit-by-unit basis and shall consider the type of waste management unit (e.g., container management unit) and the type of activities performed at the waste management unit (e.g., sampling). For example, training provided for management of dangerous waste in containers will be different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training and supplemented at the TSD unit. Training provided for TSD unit-specific operations will be identified in the training plan documentation based on: (1) whether a general training course exists, (2) the training needs to ensure waste management unit compliance with WAC 173-303, and (3) training commitments agreed to with Ecology.

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes general Hanford Facility training and TSD unit-specific training.

General Hanford Facility training: Annual refresher training is provided for general Hanford Facility training. Refer to description in Attachment 33, *General Information Portion* (DOE/RL-91-28), Chapter 8.0, Section 8.1.

Contingency plan training: Annual refresher training is provided for contingency plan training. Refer to description above in Section 8.1.1.

Emergency coordinator training: Annual refresher training is provided for emergency coordinator training. Refer to description above in Section 8.1.1.

Operations training: Refresher training occurs on many frequencies (i.e., annual, every other year, every 3 years) for operations training. When justified, some training will not contain a refresher course and will be identified as a one-time only training course. The TSD unit-specific training plan documentation will specify the frequency for each training course. Refer to description above in Section 8.1.1.

8.2 DESCRIPTION OF TRAINING DESIGN

Proper design of a training program ensures personnel who perform duties on the Hanford Facility related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173-303. Actual job tasks, referred to as duties, are used to determine training requirements. The first step taken to ensure Hanford Facility personnel have received the proper training is to determine and document the waste management duties by job title/position. The second step compares waste management duties to general waste management unit training curriculum. If general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided. The third step summarizes the content of a training course necessary to ensure that

the training provided to each job title/position addresses associated waste management duties. The last step is to assign training curriculum to Hanford Facility personnel based on the previous evaluation. The training plan documentation contains this process.

Waste management duties include those specified in Section 8.1 as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to the 325 HWTUs operations include the following:

Part I - Procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment
Part II - Communications or alarm systems
Part III - Response to fires or explosions
Part IV - Shutdown of operations.

Hanford Facility personnel who perform these duties receive training pertaining to their duties. The training plan documentation described in Section 8.3 contains specific information regarding the types of training Hanford Facility personnel receive based on the outline in Section 8.1.

8.3 DESCRIPTION OF TRAINING PLAN

In accordance with HF RCRA Permit (DW Portion), Condition II.C.3, the unit-specific portion of the *Hanford Facility Dangerous Waste Permit Application* must contain a description of the training plan. Training plan documentation is maintained outside of the *Hanford Facility Dangerous Waste Part B Permit Application* and the HF RCRA Permit. Therefore, changes made to the training plan documentation are not subject to the HF RCRA Permit modification process. However, the training plan documentation is prepared to comply with WAC 173-303-330(2).

Documentation prepared to meet the training plan consists of hard copy and/or electronic media as provided by HF RCRA Permit (DW Portion), Condition II.C.1. The training plan documentation consists of one or more documents and/or a training database with all the components identified in the core document.

A description of how training plan documentation meets the three items in WAC 173-303-330(2) is as follows:

1. -330(2)(a): "The job title, job description, and name of the employee filling each job. The job description must include requisite skills, education, other qualifications, and duties for each position."

   <u>Description</u>: The specific Hanford Facility personnel job title/position is correlated to the waste management duties. Waste management duties relating to WAC 173-303 are correlated to training courses to ensure training is properly assigned.

   Only names of Hanford Facility personnel who carry out job duties relating to TSD unit waste management operations at the 325 HWTUs are maintained. Names are maintained within the training plan documentation. A list of Hanford Facility personnel assigned to the 325 HWTUs is available upon request.

   Information on requisite skills, education, and other qualifications for job title/positions are addressed by providing a reference where this information is maintained (e.g., human resources). Specific information concerning job title, requisite skills, education, and other qualifications for personnel can be provided upon request.

2. -330(2)(b): "A written description of the type and amount of both introductory and continuing training required for each position."

   Description: In addition to the outline provided in Section 8.1, training courses developed to comply with the introductory and continuing training programs are identified and described in the training plan documentation. The type and amount of training is specified in the training plan documentation as shown in Table 8-1.

3. -330(2)(c): "Records documenting that personnel have received and completed the training required by this section. The Department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received."

   Description: Training records are maintained consistent with DOE/RL-91-28, Section 8.4.

Table 8.1. 325 HWTUs Training Matrix

	Training Category*					
Attachment 33, General Information Portion DOE/RL-91-28) Chapter 8.0, Training Category	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training		
325 HWTUs	Orientation Program	Building Emergency Plan	Building Emergency Director Training	Advanced Waste Management Training	Container Management	Tank System Management
Staff Position						
Technical Group Lead	X	X	X[1]	X	X	X[1]
HWTU Staff	X	X	X[1]	X	X	X[1]
Shielded Analytical Laboratories Staff	X	X	X[1]	X	X	X[1]

[1] Required for any staff that has been assigned these duties.

* Refer to the 325 HWTUs Training Plan for a complete description of coursework in each training category.

Chapter 11.0 Closure and Financial Assurance

11.0 CLOSURE AND FINANCIAL ASSURANCE 11.1

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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 or the HWTU 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 SAL represents the maximum extent of operations for the 325 HWTUs as indicated in Attachment 36, Chapter 1.0. 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, §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 waste, dangerous, 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 waste, 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.

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 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 systems. 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 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]

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). 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

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

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. 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 waste, dangerous, 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, nondangerous, or mixed 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. ALARA concerns 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 areas with ALARA concerns, 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 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 accumulated in cell or in the tank and sent to a permitted facility. 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 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 Attachment 36, Chapter 1.0
- The maximum inventory of dangerous waste in tank storage in the SAL will not exceed 1,218 liters in accordance with the design capacity of the SAL and Attachment 36, Chapter 1.0
- 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).

11.5 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 ALARA concerns 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.

11.6 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 ALARA concerns 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 ALARA concerns 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 ALARA concerns 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 ALARA concerns that are present in the hot cells. Even after ALARA concerns 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.

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 ALARA concerns 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.

11.7 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.

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

Parameter and EPA SW-846[a] 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 provided for general knowledge where appropriate.

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.

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

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