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Hanford Facility Dangerous Waste Closure Plan, Plutonium Finishing Plant Treatment Unit Glovebox HA-20 MB

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Assistant Secretary for Environmental Management



United States
Department of Energy
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1 **HANFORD FACILITY DANGEROUS WASTE CLOSURE PLAN,**
2 **PLUTONIUM FINISHING PLANT TREATMENT UNIT GLOVEBOX HA-20 MB**
3
4

5 **FOREWORD**
6
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8 The *Hanford Facility Dangerous Waste Permit Application* is considered to be a single application
9 organized into a General Information Portion (document number DOE/RL-91-28) and a Unit-Specific
10 Portion. The scope of the General Information Portion includes information used to discuss units
11 undergoing closure, such as the Plutonium Finishing Plant (PFP) Treatment Unit Glovebox HA-20 MB
12 (the unit addressed in this document, DOE/RL-2003-32).
13

14 This closure plan describes the planned activities and performance standards for closing the PFP glovebox
15 HA-20MB that housed a *Resource Conservation and Recovery Act (RCRA) of 1976* treatment unit. The
16 PFP treatment unit equipment immobilized (e.g., cemented) plutonium-bearing sand, slag and crucible
17 residue in a glovebox process. Clean closure is planned for the glovebox and will be accomplished by
18 using the closure standard in WAC 173-303-610. The closure performance standard is either physical
19 removal and disposal of the glovebox, or clean closure and continued use of the glovebox based on either
20 achieving a clean debris surface, or, if necessary, sampling for dangerous waste constituents. Because the
21 intention is to clean close the PFP treatment unit, postclosure activities are not applicable to this closure
22 plan. If it is determined that clean closure is not possible or is environmentally impractical, the closure
23 plan will be modified to address required postclosure activities.

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GLOSSARY

1		
2		
3		
4	CERCLA	<i>Comprehensive Environmental Response, Compensation and Liability Act</i>
5		<i>of 1980</i>
6		
7	CFR	Code of Federal Regulations
8		
9	DQO	data quality objectives
10		
11	Ecology	Washington State Department of Ecology
12		
13	EPA	U.S. Environmental Protection Agency
14		
15	PFP	Plutonium Finishing Plant
16		
17	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
18		
19	SS&C	sand, slag, and crucible
20		
21	TPA, Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
22		
23	TRU	transuranic (waste)
24		
25	WAC	Washington Administrative Code
26		
27		

METRIC CONVERSION CHART

Into metric units

Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			Mass (weight)		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			Volume		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	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
Energy			Energy		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			Force/Pressure		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1993, Professional Publications, Inc., Belmont, California.

1 **HANFORD FACILITY DANGEROUS WASTE CLOSURE PLAN**
2 **PLUTONIUM FINISHING PLANT TREATMENT UNIT GLOVEBOX HA-20MB,**
3
4

5 **1.0 INTRODUCTION**

6 This closure plan describes the planned activities and performance standards for closing the PFP glovebox
7 HA-20MB that housed an interim status RCRA treatment unit. This closure plan is certified and
8 submitted to the Washington State Department of Ecology (Ecology) for incorporation into the Hanford
9 Facility RCRA Permit (HF RCRA Permit) in accordance with *Hanford Federal Facility Agreement and*
10 *Consent Order* (Tri-Party Agreement; TPA) Milestone M-83-30 requiring submittal of a certified closure
11 plan for "glovebox HA-20MB" by July 31, 2003.

12
13 Glovebox HA-20MB is located within the 234-5Z Building in the 200 West Area of the Hanford Facility.
14 Currently glovebox HA-20MB is being used for non-RCRA analytical purposes. The schedule of closure
15 activities under this plan supports completion of TPA Milestone M-83-44 to deactivate and prepare for
16 dismantlement of the above grade portions of the 234-5Z and ZA, 243-Z, and 291-Z and 291-Z-1 stack
17 buildings by September 30, 2015.

18
19 Under this closure plan, glovebox HA-20MB will undergo clean closure to the performance standards of
20 Washington Administrative Code (WAC) 173-303-610 with respect to all dangerous waste contamination
21 from glovebox HA-20MB RCRA operations. Because the intention is to clean close the PFP treatment
22 unit, postclosure activities are not applicable to this closure plan. To clean close the unit, it will be
23 demonstrated that dangerous waste has not been left at levels above the closure performance standard for
24 removal and decontamination. If it is determined that clean closure is not possible or is environmentally
25 impractical, the closure plan will be modified to address required postclosure activities.

26
27 Because dangerous waste does not include source, special nuclear, and by-product material components
28 of mixed waste, radionuclides are not within the scope of this documentation. Any information on
29 radionuclides is provided only for general knowledge.

30
31
32 **2.0 SYSTEM AND PROCESS DESCRIPTION**

33 The PFP treatment unit equipment immobilized plutonium-bearing sand, slag and crucible (SS&C)
34 residue in a glovebox process. The SS&C residue in a solid physical state (chunks and coarse powder),
35 was mixed with water, cemented, and sealed into and out of the glovebox in closed containers. The PFP
36 treatment unit boundary is glovebox HA-20MB in Room 235B of the 234-5Z Building. The treatment
37 unit consisted of a mixer/bowl assembly and associated equipment. Glovebox HA-20MB measures
38 approximately 4.7 meters long, by 1.5 meters wide, by 1.6 meters high. SS&C was treated in
39 glovebox HA-20MB by a cementation process performed by mixing a standard cement material with
40 appropriate amounts of the SS&C and water to form a slurry. Following mixing the slurry was placed
41 into approximately 3-liter billet cans for solidification before loadout. Following cementation, the
42 containers of immobilized waste were loaded out and transferred to a Hanford Site facility for proper
43 storage and disposal as TRU/mixed waste. Three 3-liter billets were filled as a result of this activity. The
44 equipment associated with the TSD activities was removed, designated, and managed as TRU waste.

45
46 The dangerous waste numbers associated with the unit are listed on the Part A, Form 3. However, the
47 waste managed in the unit was limited to SS&C material, which is state only regulated as state-only
48 corrosive solid (WSC2) and state-only toxic (WT02). The D003 characteristic (reactivity) has been
49 treated by the cementation process and is not considered to be a viable characteristic of any waste

1 residues remaining in the glovebox. Therefore, the state-only characteristics, WSC2 and WT02, are the
2 only waste numbers of concern for closure.

3 4 5 **3.0 CLOSURE PLAN**

6 The following sections address performance standards, waste removal, and decontamination standards.

7 8 9 **3.1 CLOSURE PERFORMANCE STANDARD**

10 Clean closure of glovebox HA-20MB will be accomplished by using the closure standard in
11 WAC 173-303-610(2)(b)(ii). Clean closure, as provided for in this plan, will eliminate future
12 maintenance and will be protective of human health and the environment by removing or reducing
13 chemical contamination at glovebox HA-20MB to levels that eliminate the threat of contaminant escape
14 to the environment.

15
16 All process activities took place inside the glovebox. No spills occurred outside of the glovebox and no
17 containers were open outside the glovebox. Therefore, mixed waste or mixed waste residues from this
18 unit operation do not exist outside of the glovebox. This closure plan proposes multiple closure
19 performance standards. The closure performance standard is either physical removal and disposal of the
20 glovebox, or clean closure and continued use of the glovebox based on either achieving a clean debris
21 surface, or, if necessary, sampling for dangerous waste constituents. All of these standards result in clean
22 closure. Initially removal, followed by waste designation and disposal of the glovebox will be
23 considered. If it is determined that removal is not practical, a clean debris surface will be pursued. If it is
24 not feasible to obtain a clean debris surface, removal of the glovebox will be re-evaluated as well as the
25 feasibility of sampling and analysis to meet closure standards.

26 27 28 **3.1.1 Removal of Glovebox**

29 If removed for disposal, the glovebox would be sent to an onsite or offsite facility for appropriate disposal
30 as radioactive or mixed waste. Because the system only contained characteristic waste, materials
31 removed would not be classified as hazardous debris unless the materials contain dangerous waste. The
32 removal activities could be coordinated with *Comprehensive Environmental Response, Compensation and*
33 *Liability Act (CERCLA) of 1980* removal actions.

34 35 36 **3.1.2 Visual Standard of Clean Debris Surface**

37 The visual standard for metal (i.e., the interior surface of the glovebox) is the 'clean debris surface'
38 established for hazardous debris in 40 Code of Federal Regulations (CFR) 268.45, Table 1. The clean
39 debris surface uses a visual standard. "A clean debris surface means the surface, when viewed without
40 magnification, shall be free of all visible contaminated hazardous waste except residual staining from
41 waste consisting of light shadows, slight streaks, or minor discolorations and waste in cracks, crevices,
42 and pits may be present provided that such staining and waste in cracks, crevices, and pits shall be limited
43 to no more than 5% of each square inch of surface area" (40 CFR 268.45).

44
45 Surfaces that meet this standard will be clean closed without additional action. Therefore,
46 decontamination of interior surfaces in support of RCRA closure might not be necessary. However,
47 decontamination of glovebox HA-20MB might occur for radiological reasons. Also, surfaces shown by
48 inspection as potentially contaminated with dangerous waste or dangerous waste residues could be

1 decontaminated using a physical or chemical extraction technology or other approved method. Obtaining
2 a clean debris surface will allow the glovebox to be clean closed and left in place. Eventual disposition of
3 the glovebox would occur in coordination with CERCLA activities at PFP.
4
5

6 **3.1.3 Sampling and Analysis**

7 Components or materials that will not be removed at closure might not be amenable for cleaning and
8 obtaining a clean debris surface. Clean closure of materials that do not meet the visual clean debris
9 surface standard will be verified by sampling and analysis if it is determined to continue to pursue clean
10 closure. Surfaces of potentially contaminated material could be sampled authoritatively by wipe
11 sampling. The clean closure standard will be to demonstrate that the component does not meet dangerous
12 waste designation levels or 'health-based' levels prescribed by WAC 173-303-610(2)(b).
13
14

15 **3.2 CLOSURE ACTIVITIES**

16 Closure activities could entail removal or decontamination of the glovebox as appropriate. The unit will
17 be closed in a manner that protects human health and the environment, and that minimizes or eliminates
18 the escape of waste constituents to the ground, to surface water, groundwater, or to the atmosphere.
19

20 This closure plan provides for the following:

- 21
- 22 • Waste inventory removal
- 23 • Process equipment removal
- 24 • Glovebox removal (if performed)
- 25 • Decontamination and visual inspection (if performed)
- 26 • Sampling and analysis (if performed)
- 27 • Certification that closure activities were completed in accordance with the approved closure plan.
28

29 Closure of the permitted unit will consist of actions discussed in the following sections.
30
31

32 **3.2.1 Waste Inventory Removal**

33 No waste associated with the treatment unit activities remain in the glovebox. Any material in the
34 glovebox at the time of closure will be removed, designated if waste in accordance with WAC 173-303,
35 and managed appropriately.
36

37 **3.2.2 Process Equipment Removal**

38 Equipment used in TSD unit operations has been removed from the glovebox and sent to an onsite facility
39 for proper disposal as radioactive waste. Any equipment in the glovebox at the time of closure will be
40 decontaminated radiologically as necessary, removed from the glovebox, and either disposed or, as
41 necessary in support of Hanford Site cleanup, decontaminated and reused. All decontamination waste
42 will be designated in accordance with WAC 173-303 and managed appropriately.
43

44 **3.2.3 Glovebox Removal (if performed)**

45 If it is determined to remove and dispose of the glovebox, the glovebox will be decontaminated (as
46 necessary) and removed for disposal. The glovebox could be disassembled or cut up in place and
47 packaged before removal from PFP.

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3.2.4 Decontamination and Visual Inspection (if performed)

The internal surfaces of the glovebox will be inspected visually for a clean debris surface as-is (without additional decontamination). If the surfaces meet the requirements of a clean debris surface, the glovebox will be considered cleaned closed. If additional decontamination is necessary, any appropriate method as determined by operations personnel can be used. Any decontaminated rinsate or residue will be collected, designated, and managed appropriately. The surfaces will be re-examined visually. Acceptance of a clean debris surface will be documented on an inspection checklist similar to Figure 1. If it is not possible to confirm a clean debris surface by visual examination, the glovebox could either be removed and disposed (Section 3.2.3) or sampled and analyzed (Section 3.2.5).

3.2.5 Sampling and Analysis (if performed)

If a clean debris surface cannot be obtained, and it is determined to continue to pursue clean closure, sampling and analysis will be performed. If sampling and analysis is necessary for clean closure, a sampling and analysis plan will be prepared and provided to Ecology prior to performing the activities. Results will be made available after completion of sampling and analysis activities.

3.2.6 Closure Certification

Certification of closure will be submitted in accordance with *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

4.0 SCHEDULE FOR CLOSURE

Completion of closure will be timed to coincide with the overall stabilization and transition of PFP to be conducted in support of TPA Milestone M-83-44. To coordinate with TPA Milestone M-83-44, closure activities may require greater than 180 days to complete; a WAC 173-303-610 (4)(b) extension of the closure period will not be required as long as closure activities under this plan are completed according to this schedule. If closure plan revisions are necessary to achieve clean closure, a revised schedule will be proposed.

5.0 REFERENCES

DOE/RL-88-21, *Hanford Facility Dangerous Waste Part A Permit Application*, Vol. 1-3, U.S. Department of Energy, Richland Operations Office, Richland, Washington, updated periodically.

DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General Information Portion*, U.S. Department of Energy, Richland Operations Office, Richland, Washington, updated periodically.

Ecology, EPA, and DOE-RL, 1996, *Hanford Federal Facility Agreement and Consent Order*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Richland Operations Office, Olympia, Washington, amended periodically.

This is an example of a checklist intended to document a "clean debris surface" for components, structures and/or materials.

1. Building/location: _____
 2. Component(s)/Area(s): _____
 3. Material (e.g., concrete, metal): _____
 4. Decontamination/Treatment Method¹ (NA if not performed): _____
-
5. Decontamination/Treatment Parameters (NA if not applicable):
 - a. Temperature _____
 - b. Propellant _____
 - c. Solid media (e.g., shot, grit, beads) _____
 - d. Pressure _____
 - e. Residence time _____
 - f. Surfactant(s) _____
 - g. Detergents _____
 - h. Grinding/striking media (e.g., wheels, piston heads) _____
 - i. Depth of surface layer removal (cm) (e.g., for concrete) _____
 - j. Other _____

The decontamination of the components/areas/materials identified in steps 1 - 3 was completed as specified at steps 4 and 5. Enter NA if decontamination was not performed for these materials.

Signature Title Date

6. Performance Standard:

I have visually inspected the above identified material before/after (circle one) decontamination/treatment in accordance with the closure plan. All dangerous waste residues have been removed to attain a clean debris surface².

Authorized Representative:

Signature Title Date

Notes:

1. Although not mandatory, decontamination could use a physical extraction method from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2. Definition of 'clean debris surface' from Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that 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% of each square inch of surface area".

Figure 1. Typical Checklist.

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