

Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels

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Department of Energy**
P.O. Box 550
Richland, Washington 99352

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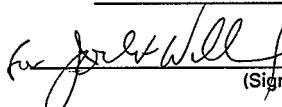
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11-28-95

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11/22/95

Date

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John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

R. J. Bliss

11/21/95

Date

Co-operator

R. J. Bliss, Vice President and Manager
Transition Projects
Westinghouse Hanford Company

THE HANFORD FACILITY DANGEROUS WASTE PERMIT APPLICATION,
PUREX STORAGE TUNNELS

FOREWORD

The Hanford Facility Dangerous Waste Permit Application is considered to be a single application organized into a General Information Portion (document number DOE/RL-91-28) and a Unit-Specific Portion. The scope of the Unit-Specific Portion is limited to Part B permit application documentation submitted for individual, 'operating' treatment, storage, and/or disposal units, such as the PUREX Storage Tunnels (this document, DOE/RL-90-24).

Both the General Information and Unit-Specific portions of the *Hanford Facility Dangerous Waste Permit Application* address the content of the Part B permit application guidance prepared by the Washington State Department of Ecology (Ecology 1987 and 1995) and the U.S. Environmental Protection Agency (40 Code of Federal Regulations 270), with additional information needs defined by the *Hazardous and Solid Waste Amendments* and revisions of Washington Administrative Code 173-303. For ease of reference, the Washington State Department of Ecology alpha-numeric section identifiers from the permit application guidance documentation (Ecology 1987 and 1995) follow, in brackets, the chapter headings and subheadings. A checklist indicating where information is contained in the PUREX Storage Tunnels permit application documentation, in relation to the Washington State Department of Ecology guidance, is located in the Contents Section.

Documentation contained in the General Information Portion is broader in nature and could be used by multiple treatment, storage, and/or disposal units (e.g., the glossary provided in the General Information Portion). Wherever appropriate, the PUREX Storage Tunnels permit application documentation makes cross-reference to the General Information Portion, rather than duplicating text.

Information provided in this PUREX Storage Tunnels permit application documentation is current as of November 1995.

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9 7A UNIT-SPECIFIC CONTINGENCY PLAN FOR THE 218-E-14 AND
10 218-E-15 STORAGE TUNNELS
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4 METRIC CONVERSION CHART
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8 The following conversion chart is provided to the reader as a tool to aid
9 in conversion.
10

11 Into metric units

12 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	0.0393	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

39
40 Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed.,
41 1990, Professional Publications, Inc., Belmont, California.
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Application Checklist

Complete this checklist by providing the facility name and indicating where the listed material has been placed in the application. This is particularly important when the application does not closely follow the outline of the checklist and guidance.

Include the completed checklist with the Dangerous Waste Permit application.

Facility name PUREX Storage Tunnels (DOE/RL-90-24), Rev. 2

Date Application Received _____

State of Washington Part B Permit Application Review Checklist for Treatment and Storage in Tanks and Containers		
	Technically Adequate?	Location in Application
A. Part A Form		Chapter 1.0
B. Facility Description and General Provisions		Chapter 2.0
B-1 General Description		2.1
B-1(a) Facility Description		2.1
B-1(b) Construction Schedule		Not Applicable
B-2 Topographic Map		2.2
B-2a General Requirements		2.2
B-2b Additional Requirements for Land Disposal Facilities	Not Applicable	Not Applicable
B-3 Seismic Consideration		Not Applicable
B-4 Traffic Information		2.3
C. Waste Analysis		Chapter 3.0
C-1 Chemical, Biological and Physical Analyses		3.1
C-1a Waste In Piles	Not Applicable	Not Applicable
C-1b Landfilled Wastes		
C-1c Wastes Incinerated and Wastes Used in Performance Tests		
C-2 Waste Analysis Plan		3.2 and Appendix 3A

		Technically Adequate?	Location in Application
C-2a	Detailed Chemical, Physical, and/or Biological Analysis		Appendix 3A
C-2a(1)	Parameters and Rationale		Appendix 3A
C-2a(2)	Analytical Methods		Appendix 3A
C-2a(3)	Generator-Supplied Analyses		Appendix 3A
C-2b	Additional Requirements for Wastes Generated Off-site		Appendix 3A
C-2b(1)	Parameters and Rationale to Confirm Identity of Off-site Waste		Appendix 3A
C-2b(2)	Analytical Methods to Confirm Identity of Off-site Waste		Appendix 3A
C-2b(3)	Representative Sampling of Incoming Off-site Wastes		Appendix 3A
C-2c	Methods for Collecting Samples for Detailed and Confirming Analyses		Appendix 3A
C-2d	Frequency of Analyses		Appendix 3A
C-3	Manifest System		Appendix 3A
C-3a	Procedures for Receiving Shipments		Appendix 3A
C-3b	Response to Significant Discrepancies		Appendix 3A
C-3c	Provisions for Non-acceptance of Shipment		Appendix 3A
C-3c(1)	Non-acceptance of Undamaged Shipment		Appendix 3A
C-3c(2)	Activation of Contingency Plan for Damaged Shipment		Appendix 3A
C-4	Tracking System		3.3

	Technically Adequate?	Location in Application
D. Process Information		Chapter 4.0
D-1 Containers		4.2
D-1a Description of Containers		4.2
D-1b Container Management Practices		4.2
D-1c Container Labelling		4.2
D-1d Containment Requirements for Storing Containers		4.2
D-1d(1) Secondary Containment System Design		4.2
D-1d(1)(a) System Design		4.2
D-1d(1)(b) Structural Integrity of Base		4.2
D-1d(1)(c) Containment System Capacity		4.2
D-1d(1)(d) Control of Run-on		4.2
D-1d(2) Removal of Liquids from Containment System		4.2
D-1e Demonstration that Containment Is Not Required Because Containers Do Not Contain Free Liquids, Wastes That Exhibit Ignitability or Reactivity, or Wastes Designated F020 - 023, F026, or F027		4.2
D-1f Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers		4.2
D-1f(1) Management of Certain Reactive Wastes in Containers		4.2
D-1f(2) Management of Ignitable and Certain Other Reactive Wastes in Containers		4.2

		Technically Adequate?	Location in Application
D-1f(3)	Design of Areas to Manage Incompatible Wastes		4.2
D-2	Tank Systems		Not Applicable
D-2a	Design, Installation and Assessment of Tanks Systems		Not Applicable
D-2a(1)	Design Requirements		Not Applicable
D-2a(2)	Integrity Assessments		Not Applicable
D-2a(3)	Additional Requirements for Existing Tanks		Not Applicable
D-2a(4)	Additional Requirements for New Tanks		Not Applicable
D-2a(5)	Additional Requirements for New On-ground or Underground Tanks		Not Applicable
D-2b	Secondary Containment and Release Detection for Tank Systems		Not Applicable
D-2b(1)	Requirements for All Tank Systems		Not Applicable
D-2b(2)	Additional Requirements for Specific Types of Systems		Not Applicable
D-2b(2)(a)	Vault Systems		Not Applicable
D-2b(2)(b)	Double-walled Tanks		Not Applicable
D-2b(2)(c)	Ancillary Equipment		Not Applicable
D-2c	Variances from Secondary Containment Requirements		Not Applicable
D-2d	Tank Management Practices		Not Applicable
D-2e	Labels or Signs		Not Applicable

		Technically Adequate?	Location in Application
D-2f	Air Emissions		Not Applicable
D-2g	Management of Ignitable or Reactive Wastes in Tank Systems		Not Applicable
D-2h	Management of Incompatible Wastes in Tank Systems		Not Applicable
D-3	Waste Piles	Not Applicable	Not Applicable
D-4	Surface Impoundments		
D-5	Incinerators		
D-6	Landfills		
D-7	Land Treatment		
D-8	Air Emissions Control		Not Applicable
D-8a	Process Vents		Not Applicable
D-8a(1)	Applicability of Subpart AA Standards		Not Applicable
D-8a(1)(a)	Process Vents Subject to Subpart AA Standards		Not Applicable
D-8a(1)(b)	Process Vents Not Subject to Subpart AA Standards		Not Applicable
D-8a(1)(c)	Re-evaluating Applicability of Subpart AA Standards		Not Applicable
D-8a(2)	Process Vents - Demonstrating Compliance		Not Applicable
D-8a(2)(a)	The Basis for Meeting Limits/Reductions		Not Applicable
D-8a(2)(b)	Demonstrating Compliance via Selected Method		Not Applicable
D-8a(2)(c)	Design Information and Operating Parameters for Closed Vent Systems and Control Devices		Not Applicable
D-8a(2)(d)	Re-evaluating Compliance with Subpart AA Standards		Not Applicable
D-8b	Equipment Leaks		Not Applicable

		Technically Adequate?	Location in Application
D-8b(1)	Applicability of Subpart BB Standards		Not Applicable
D-8b(1)(a)	Equipment Subject to Subpart BB		Not Applicable
D-8b(1)(b)	Re-evaluating Applicability of Subpart BB Standards		Not Applicable
D-8b(2)	Equipment Leaks - Demonstrating Compliance		Not Applicable
D-8b(2)(a)	Procedures for Identifying Equipment Location and Method of Compliance, Marking Equipment, and Ensuring Records are Up-to-date		Not Applicable
D-8b(2)(b)	Demonstrating Compliance with D-8b(1)(a) and (2)(a) Procedures		Not Applicable
D-8b(2)(c)	Closed Vent Systems or Control Devices: Showing Compliance with Emission Reduction Standards		Not Applicable
D-8c	Tanks and Containers		Not Applicable
D-8c(1)	Applicability of Subpart CC Standards		Not Applicable
D-8c(2)	Tank Systems and Container Areas - Demonstrating Compliance		Not Applicable
D-9	Waste Minimization		Chapter 10.0
D-10	Groundwater Monitoring for Land-based Units	Not Applicable	Not Applicable Chapter 5.0

		Technically Adequate?	Location in Application
E.	Releases from Solid Waste Management Units		Chapter 2.0
E-1	Solid Waste Management Units and Known and Suspected Releases of Dangerous Wastes or Constituents		2.4
E-1a	Solid Waste Management Units		2.4
E-1b	Releases		2.4
E-2	Corrective Actions Implemented		2.4
F.	Procedures to Prevent Hazards		Chapter 6.0
F-1	Security		6.1
F-1a	Security Procedures and Equipment		6.1
F-1b	Waiver		6.1.2
F-2	Inspection Plan		6.2
F-2a	General Inspection Requirements		6.2
F-2b	Inspection Log		6.2
F-2c	Schedule for Remedial Action for Problems Revealed		6.2
F-2d	Specific Process or Waste Type Inspection Requirements		6.2
F-2d(1)	Container Inspections		Not Applicable
F-2d(2)	Tank System Inspections and Corrective Actions		Not Applicable
F-2d(2)(a)	Tank System Inspections		Not Applicable
F-2d(2)(b)	Tank Systems - Corrective Actions		Not Applicable

		Technically Adequate?	Location in Application
F-2d(3)	Storage of Ignitable or Reactive Wastes		6.2
F-2d(4)	Air Emissions Control and Detection - Inspections, Monitoring, and Corrective Actions		Not Applicable
F-2d(4)(a)	Process Vents		Not Applicable
F-2d(4)(b)	Equipment Leaks		Not Applicable
F-2d(4)(c)	Tanks and Containers		Not Applicable
F-2d(5) F-2d(6) F-2d(7) F-2d(8) F-2d(9)	Waste Pile Inspection Surface Impoundment Inspection Incinerator Inspection Landfill Inspection Land Treatment Facility Inspection	Not Applicable	Not Applicable
F-3	Preparedness and Prevention Requirements		6.3
F-3a	Equipment Requirements		6.3.1
F-3b	Aisle Space Requirement		6.3.2
F-4	Preventive Procedures, Structures, and Equipment		6.4
F-5	Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Wastes		6.5
F-5a	Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste		6.5
F-5b	Precautions for Handling Ignitable or Reactive Waste and Mixing Incompatible Wastes		6.5
F-5b(1)	Ignitable or Reactive Wastes In Tanks		Not Applicable
F-5b(2)	Incompatible Wastes In Containers or Tanks		Not Applicable

		Technically Adequate?	Location in Application
G.	Contingency Plan		Chapter 7.0
G-1	General Information		Appendix 7A
G-2	Emergency Coordinators		Appendix 7A
G-3	Circumstances Prompting Implementation		Appendix 7A
G-4	Emergency Response Procedures		Appendix 7A
G-4a	Notification		Appendix 7A
G-4b	Identification of Dangerous Materials		Appendix 7A
G-4c	Hazard Assessment and Report		Appendix 7A
G-4d	Prevention of Recurrence or Spread of Fires, Explosions, or Releases		Appendix 7A
G-4f	Post-Emergency Actions		Appendix 7A
G-5	Emergency Equipment		Appendix 7A
G-6	Coordination Agreements		Appendix 7A
G-7	Evacuation Plan		Appendix 7A
G-8	Required Reports, Recordkeeping, and Certifications		Appendix 7A
G-8(1)	General Requirements		Appendix 7A
G-8(2)	Requirements for Tank Systems		Not Applicable

		Technically Adequate?	Location in Application
H. Personnel Training			Chapter 8.0
H-1 Job Title/Job Description			Appendix 8A
H-2 Outline of Training Program			Appendix 8A
H-3 Implementation of Training Program			Appendix 8A
I. Closure and Financial Assurance			Chapter 11.0
I-1 Closure Plan/Financial Assurance for Closure			Chapter 11.0
I-1a Closure Performance Standard			Chapter 11.0
I-1b Closure Activities			Chapter 11.0
I-1b(1) Maximum Extent of Operation			Chapter 11.0
I-1b(2) Removing Dangerous Wastes			Chapter 11.0
I-1b(3) Decontaminating Structures, Equipment, and Soil			Chapter 11.0
I-1b(4) Sampling and Analysis to Identify Extent of Decontamination/ Removal and to Verify Achievement of Closure Standard			Chapter 11.0
I-1b(4)(a) Sampling to Confirm Decontamination of Structures and Soils			Chapter 11.0
I-1b(5) Other Activities			Chapter 11.0
I-1c Maximum Waste Inventory			Chapter 11.0
I-1d Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment, and Miscellaneous Units	Not Applicable		Not Applicable
I-1e Closure of Landfill Units			
I-1f Schedule for Closure			Chapter 11.0

		Technically Adequate?	Location in Application
I-1g	Extension for Closure Time		Chapter 11.0
I-1h	Closure Cost Estimate		Chapter 11.0
I-1i	Financial Assurance Mechanism for Closure		Not Applicable
I-2	Notice in Deed of Already Closed Disposal Units		Not Applicable
I-3	Post-Closure Plan		Not Applicable
I-4	Liability Requirements		Not Applicable
I-4a	Coverage for Sudden Accidental Occurrences		Not Applicable
I-4b	Coverage for Nonsudden Accidental Occurrences		Not Applicable
I-4c	Request for Variance		Not Applicable
J. Other Federal and State Laws			Chapter 13.0
K. Part B Certification			Chapter 14.0

1 CONTENTS

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1 1.0 PART A [A]

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4 The original Part A, Form 3, Revision 0, for the PUREX (plutonium-uranium
5 extraction) Storage Tunnels was submitted in November 1987. A revised Part A,
6 Form 3, Revision 1, was submitted September 1990.

7
8 The Part A, Form 3, Revision 1, was submitted to redesignate the
9 PUREX Storage Tunnels as a miscellaneous unit. Additionally, dangerous waste
10 code D001 [Washington Administrative Code (WAC) 173-303-090(5)] was added to
11 address the ignitable characteristic of the silver nitrate stored in Tunnel
12 Number 2. The estimated annual quantities of waste also were modified to
13 represent the maximum quantity of waste placed in the PUREX Storage Tunnels in
14 any given year since initial operation.

15
16 The Part A, Form 3, Revision 2, was submitted in December 1994. This
17 revision was prepared to add Dangerous Waste Numbers D006 (cadmium),
18 D007 (chromium), WT01 (state-only, toxic, extremely hazardous waste), and
19 WC02 (state-only, carcinogenic, dangerous waste) to existing Process Code
20 S05 (storage-miscellaneous). Also, State-only Dangerous Waste Numbers
21 WT02 (state-only, toxic, dangerous waste) and WP01 (state-only, persistent,
22 extremely hazardous waste) were added to Process Code S05. State-only
23 Dangerous Waste Number WT01 was removed from Dangerous Waste Number D008
24 (lead) in accordance with WAC 173-303-100.

25
26 The Part A, Form 3, Revision 3, included in this permit application
27 documentation consists of five pages, three figures, and one photograph, and
28 was prepared to add dangerous waste numbers D005 (barium), D010 (selenium),
29 and WT02 (state-only, toxic, dangerous waste for light mineral oil) to process
30 code (S05). State-only dangerous waste numbers WT02 (state-only, toxic,
31 dangerous waste) and WP01 (state-only, persistent, extremely hazardous waste)
32 were removed.

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Please print or type in the unshaded areas only.
Fill-in areas are spaced for elite type, i.e., 12 characters/inch.

FORM **DANGEROUS WASTE PERMIT APPLICATION**

1. EPA/STATE I.D. NUMBER

WA 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (mo. day & yr.)
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number in Section I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

1. EXISTING FACILITY (See instructions for definition of "existing" facility.
Complete item below.)

2. NEW FACILITY (Complete item below)

MO.	DAY	YR.
0 6	1 5	5 6

FOR EXISTING FACILITIES, PROVIDE THE DATE (mo. day, & yr.)
OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED
(use the boxes to the left)

MO.	DAY	YR.

FOR NEW FACILITIES,
PROVIDE THE DATE OF
OPERATION BEGAN OR IS
EXPECTED TO BEGIN

B. REVISED APPLICATION (place an "X" below and complete Section I above)

1. FACILITY HAS AN INTERIM STATUS PERMIT

2. FACILITY HAS A FINAL PERMIT

III. PROCESSES - CODES AND CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the (Section III-C).

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.

1. AMOUNT - Enter the amount.

2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PRO- CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO- CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:					
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONNES PER HOUR OR MILLION CUBIC FEET PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS			
Disposal:					
INJECTION WELL	D80	GALLONS OR LITERS	Treatment:		
LANDFILL	D81	ACRE-FEET (the volume that would cover an acre to a depth of one foot)	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
		OR HECTARE-METER	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
LAND APPLICATION	D82	ACRES OR HECTARES	INCINERATOR	T03	TONNES PER HOUR OR MILLION CUBIC FEET PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS			
Other:					
			OTHER (Use for physical, chemical, biological treatment processes not occurring in tanks, surface impoundments or incin- erators. Describe the processes in the space provided; Section III-C.)	TO4	GALLONS PER DAY OR LITERS PER DAY
UNIT OF MEASURE					
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	W	HECTARE-METER	B
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	C
CUBIC METERS	C	GALLONS PER HOUR	H	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR			

EXAMPLE FOR COMPLETING SECTION III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

N U M B E R	A P P R O X I C E C O D E C O D E (from list above)	B. PROCESS DESIGN CAPACITY			FOR OFFICIAL USE ONLY	N U M B E R	A P P R O X I C E C O D E C O D E (from list above)	B. PROCESS DESIGN CAPACITY			FOR OFFICIAL USE ONLY	
		1. AMOUNT (specify)	2. UNIT OF MEA- SURE (enter code)	FOR OFFICIAL USE ONLY				1. AMOUNT (specify)	2. UNIT OF MEA- SURE (enter code)	FOR OFFICIAL USE ONLY		
X-1	S 0 2	600	G			5						
X-2	T 0 3	20	E			6						
	S 0 5	24,007	C			7						

* Process Code S05 is being used to designate the PUREX Storage Tunnels as a "Miscellaneous Unit" per 40 CFR 264, Subpart X.

Continued from the front.

III. PROCESSES (continued)

NOTE: FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"), FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

S05

The PUREX Storage Tunnels are a miscellaneous unit (S05) used for storage of mixed waste subject to the requirements of 40 CFR 264, Subpart X. The two tunnels are designed to store discarded equipment. Since being placed into service, mixed waste has been stored in the tunnels on railcars. Not all material stored in the tunnels contains mixed waste.

The construction of Tunnel 1 was completed in 1956. The tunnel is approximately 5.8 meters (19 feet) wide by 6.7 meters (22 feet) high by 107 meters (350 feet) long and provides storage space for eight railcars. Between June 1980 and January 1985, all eight railcar positions were filled and the tunnel was subsequently sealed. The combined volume of the equipment stored in Tunnel 1 is approximately 596 cubic meters (780 cubic yards). The maximum process design capacity for storage in Tunnel 1 is approximately 4,129 cubic meters (5,400 cubic yards).

The construction of Tunnel 2 was completed in 1964. Tunnel 2 is approximately 5.8 meters (19 feet) wide by 6.7 meters (22 feet) high by 512 meters (1,680 feet) long and provides storage space for 40 railcars. The first railcar was placed in Tunnel 2 in December 1987 and as of June 1995, 21 railcars have been placed in the tunnel. The combined volume of equipment stored on the 21 railcars presently in Tunnel 2 is approximately 1,797 cubic meters (2,350 cubic yards). The maximum process design capacity for storage in Tunnel 2 is approximately 19,878 cubic meters (26,000 cubic yards).

IV. DESCRIPTION OF DANGEROUS WASTES

A. DANGEROUS WASTE NUMBER - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.

B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed dangerous wastes: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

1. Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

EXAMPLE FOR COMPLETING SECTION IV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

L I N E -	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEA- SURE (enter code)	1. PROCESS CODES (enter)				D. PROCESSES				
				T	0	3	D	8	0	1	1	1
X-1	K 0 0 4	900	P	T	0	3	D	8	0	1	1	1
X-2	D 0 0 2	400	P	T	0	3	D	8	0	1	1	1
X-3	D 0 0 1	100	P	T	0	3	D	8	0	1	1	1
X-4	D 0 0 2			T	0	3	D	8	0	1	1	1
												included with above

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

NUMBER (entered from page 1)

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

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEA- SURE (enter code)	D. PROCESSES								
				1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D1a)				
1	D 0 0 5	454*	K	S05								Storage - Miscellaneous
2	D 0 0 6	454*										
3	W C 0 2											
4	W T 0 2											
5	D 0 0 7	454*										
6	D 0 0 8	2,722*										
7	D 0 0 9	45*										
8	D 0 1 0	454*										
9	D 0 1 1	680*										
	D 0 0 1											
11	W T 0 2	454*	▼	▼								Included With Above
12												

* The estimated annual quantity of waste listed above represent the maximum quantity of waste placed in either tunnel in a given year.

15												
16												
17												
18												
19												
20												
21												
22												
23												
25												
26												

Continued from the front.

V. DESCRIPTION OF DANGEROUS WASTES (continued)

SEE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION D(1) ON PAGE 3.

The waste stored in the tunnels includes barium (D005), chromium (D007), cadmium (D006), lead (D008), mercury (D009), selenium (D010), silver (D011), and light mineral oil contained in oil absorption material (WT02). The silver is predominately in the form of salts and are considered ignitable (D001) because of the presence of silver nitrate ($AgNO_3$). The dangerous waste may be considered toxic, dangerous waste (WT02) and/or carcinogenic, dangerous waste (WC02).

VI. FACILITY DRAWING Refer to attached drawing.

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS Refer to attached photographs.

All existing facilities must include photographic (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

VII. FACILITY GEOGRAPHIC LOCATION This information is provided on the attached drawings and photos.

LATITUDE (degrees, minutes, & seconds)

LONGITUDE (degrees, minutes, & seconds)

VIII. FACILITY OWNER

A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER

2. PHONE NO. (area code & no.)

3. STREET OR P.O. BOX

4. CITY OR TOWN

5. ST.

6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)

John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

SIGNATURE

DATE SIGNED

8/21/95

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)

SIGNATURE

DATE SIGNED

SEE ATTACHMENT

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John D. Wagoner
Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

8/21/95
Date

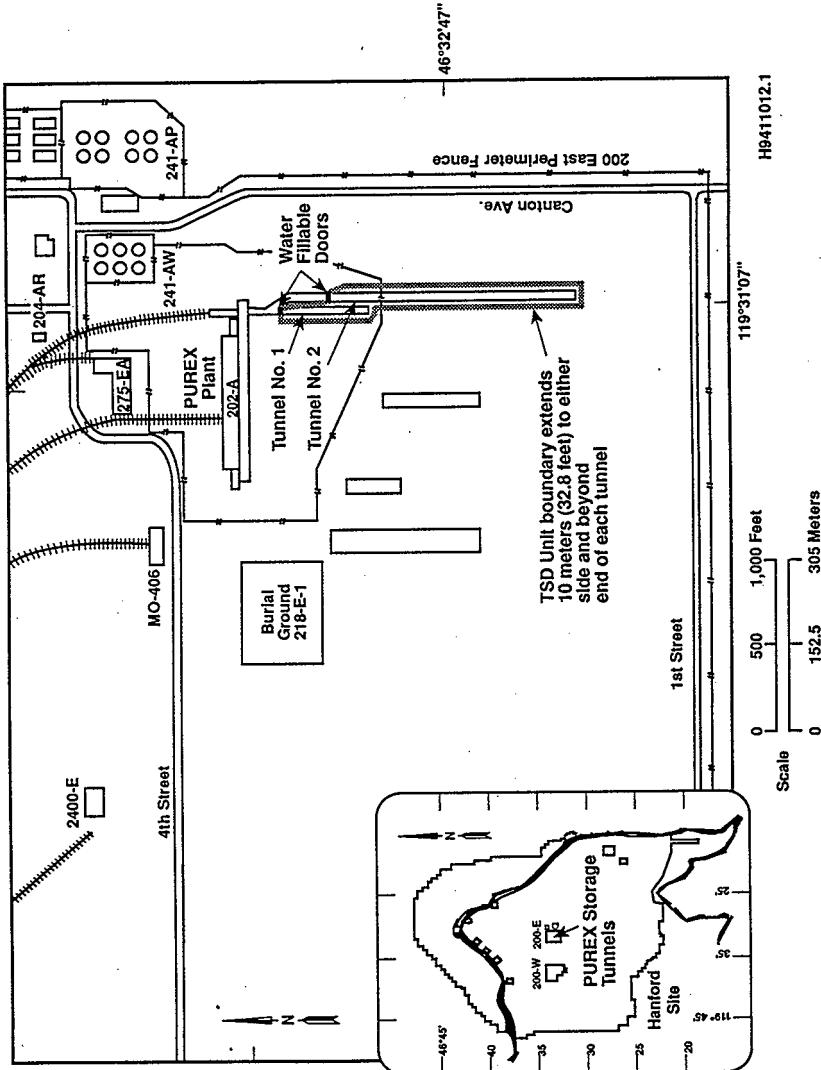
A. LaMar Trego
Co-operator
A. LaMar Trego, President
Westinghouse Hanford Company

7/19/95
Date

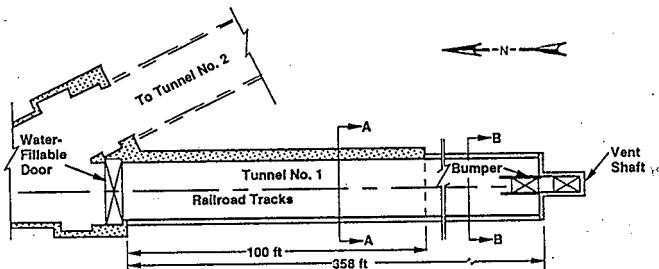
PUREX Storage Tunnels

Site Plan

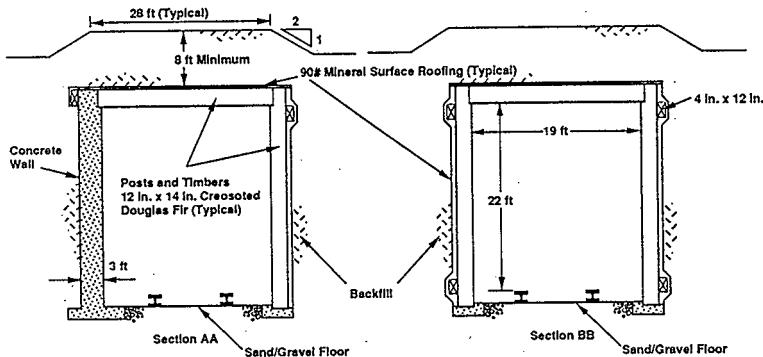
PUREX Storage Tunnels
Rev. 3, 08/21/95, Page 6 of 9



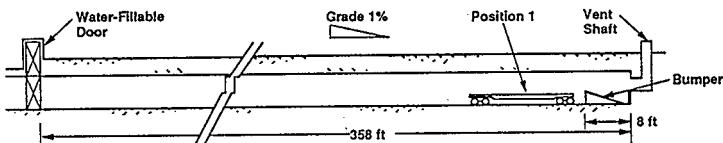
PUREX TUNNEL NO. 1 - DETAILS



Tunnel No. 1 - Plan View



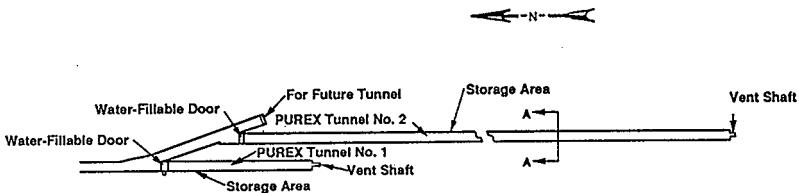
PUREX Tunnel No. 1 - Section Views



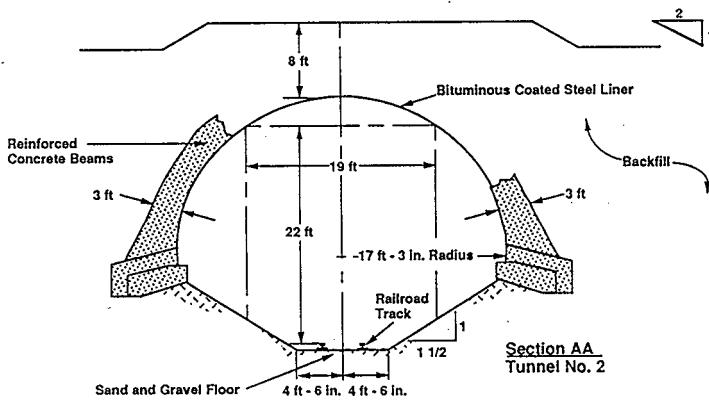
PUREX Tunnel No. 1 - Elevation View

78910032.2

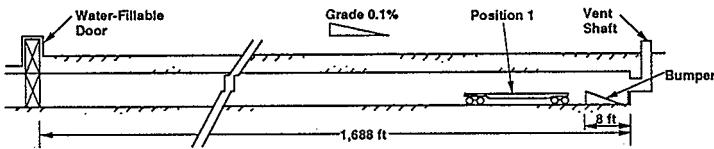
PUREX TUNNEL NO. 2 - DETAILS



PUREX Tunnels - Plan View



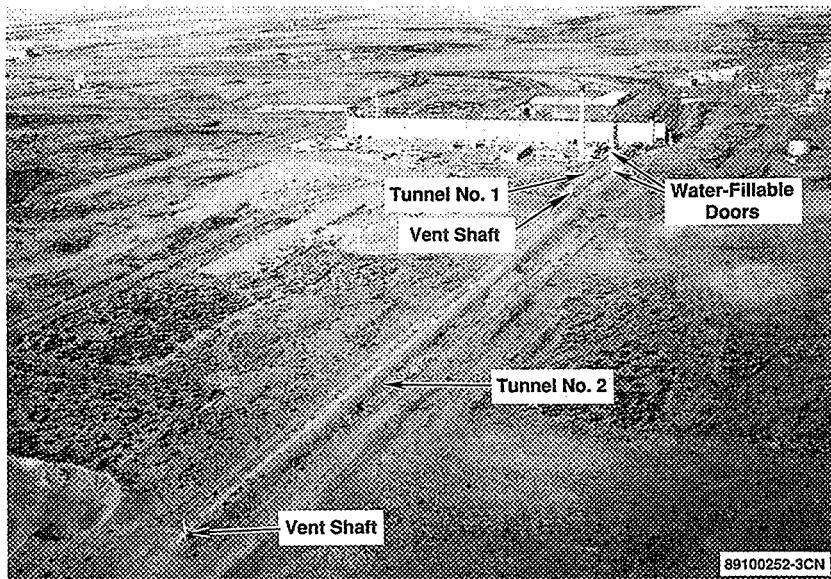
Section AA
Tunnel No. 2



PUREX Tunnel No. 2 - Elevation View

78910032.1

PUREX STORAGE TUNNELS



46°32'47"
119°31'07"

89100252-3CN
(PHOTO TAKEN 1989)

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APPENDIX

2A TOPOGRAPHIC MAP APP 2A-i

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1
2
3
4
5

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1 2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

2 3 This chapter briefly describes the PUREX Storage Tunnels location and
4 operational information, including the following:

5 6 • General description
7 • Topography
8 • Traffic information.

9 10 A more detailed discussion of the waste types, known characteristics, and
11 operating methods of the PUREX Storage Tunnels is provided in Chapters 3.0
12 and 4.0, respectively. Because dangerous waste is not considered by the
13 DOE-RL to include the source, special nuclear, and by-product material
14 components of mixed waste, radionuclides are not within the scope of this
15 permit application documentation. The information on radionuclides is
16 provided only for general knowledge.

17 18 The PUREX Facility, located in the 200 East Area (Figures 2-1 and 2-2),
19 consists of two separate treatment, storage, and/or disposal (TSD) units, the
20 PUREX Plant (202-A Building) and the PUREX Storage Tunnels.

21 22 In 1991, the PUREX Plant ceased operations and was placed in a standby
23 mode. In December 1992, the U.S. Department of Energy notified the
24 U.S. Department of Energy, Richland Operations Office (DOE-RL) that the PUREX
25 Plant would no longer operate and directed the PUREX Plant to transition into
26 deactivation. The PUREX Storage Tunnels provide direct support to transition
27 activities by accepting PUREX Plant waste material for storage. On a case-by-
28 case basis, the PUREX Storage Tunnels could accept waste generated from other
29 sources on the Hanford Facility.

30 31 Access to the PUREX Storage Tunnels is by means of the railroad tunnel.
32 The reinforced concrete walls and roof of the railroad tunnel that extend
33 southward have been deleted from Figure 2-3 to show the cask car and the
34 extended railroad track.

35 36 2.1 THE PUREX STORAGE TUNNELS DESCRIPTION [B-1]

37 38 The PUREX Storage Tunnels branch off from the railroad tunnel and extend
39 40 southward from the east end of the PUREX Plant (Figure 2-2). The tunnels are
41 42 used for storage of mixed waste from the PUREX Plant and from other onsite
43 44 sources. Each storage tunnel is isolated from the railroad tunnel by a
45 46 water-fillable shielding door. There are no electrical utilities, water
47 48 lines, drains, fire detection or suppression systems, radiation monitoring, or
49 50 communication systems provided inside the PUREX Storage Tunnels.

51 52 Material selected for storage is loaded on railcars modified to serve as
53 54 both transport and storage platforms. Normally, a remote-controlled,
55 56 battery-powered locomotive is used to position the railcar in the storage
57 58 tunnel. In the past and possibly in the future, other remote movers, e.g.,
59 60 standard locomotive with a string of railcar spacers, power winch, etc., have

1 or could be used to position a railcar into the tunnel or to withdraw a car
2 from the tunnel. The railcar storage positions are numbered sequentially,
3 commencing with Position 1 that abuts the railstop bumper at the south end of
4 each tunnel. Position 2 is the location of the railcar that abuts the railcar
5 in Position 1 and so forth. The railcars and material remain in the storage
6 tunnel until retrieval is required. Each railcar is retrievable; however,
7 because the railcars are stored on a single, dead-end railroad track, the
8 railcars can be removed only in reverse order (i.e., last in, first out).
9

10 Transfers into or out of the PUREX Storage Tunnels are infrequent and are
11 not manpower-intensive operations. A more detailed description of the
12 operation of the PUREX Storage Tunnels is provided in Chapter 4.0.
13
14

15 2.1.1 Tunnel Number 1 (218-E-14)

16 Construction of Tunnel Number 1 was completed in 1956 and consists of
17 three areas: the water-fillable door, the storage area, and the vent shaft
18 (Figure 2-4). The water-fillable door is located at the north end of Tunnel
19 Number 1 and separates the storage tunnel from the PUREX railroad tunnel. The
20 door is 7.5 meters high, 6.6 meters wide, and 2.1 meters thick, and is
21 constructed of 1.3 centimeter steel plate. The door is hollow so that the
22 door can be filled with water to act as a radiation shield when the door is in
23 the down (closed) position. If the door is filled with water, the water must
24 be pumped from the door before the door can be raised.
25

26 Above the door is a reinforced concrete structure into which the door is
27 raised to open the tunnel. Electric hoists used for opening and closing the
28 door are located on the top of this concrete structure.
29

30 Pumps and valves used for filling and draining the door are located in a
31 room northwest of the door closure. Operational controls are located in the
32 PUREX Plant on the north wall at the east end of the pipe and operating
33 gallery.
34

35 Beneath the water-fillable door is a sump with a 15.2-centimeter drain
36 that connects to a railroad tunnel sump that can be pumped out to the 200 Area
37 Treated Effluent Disposal Facility. This sump will be capped as part of
38 deactivation activities.
39

40 The storage area is that portion of the tunnel that extends southward
41 from the water-fillable door. Inside dimensions of Tunnel Number 1 are
42 109.1 meters long, 6.7 meters high, and 5.9 meters wide. Ceiling and walls
43 are 35.6 centimeters thick and constructed of 30.5- by 35.6-centimeter
44 creosote pressure-treated Douglas fir timbers arranged side by side. The
45 first 30.5 meters of the east wall are constructed of 0.9-meter-thick
46 reinforced concrete (Section AA of Figure 2-4). A 40.8-kilogram-
47 mineral-surface roofing material was used to cover the exterior surface of the
48 timbers before placement of 2.4 meters of earth fill. The earth cover serves
49 as protection from the elements and as radiation shielding. The timbers that
50 form the walls rest on reinforced concrete footings 0.9 meter wide by
51 0.3 meter thick. The floor consists of a railroad track laid on a gravel bed.
52

1 The space between the ties is filled to top-of-tie with gravel ballast. The
2 tracks are on a 1.0 percent downward slope to the south to ensure that the
3 railcars remain in their storage position. A railcar bumper is located
4 2.4 meters from the south end of the tracks to act as a stop. The capacity of
5 the storage area is eight, 12.8-meter-long railcars.
6

7 From 1962 through 1980, nine pipe risers were installed through the roof
8 of Tunnel Number 1. Seven of the nine risers were used for wood sampling of
9 the tunnel ceiling timbers. The other two risers were used to obtain air
10 samples and temperature data of the internal environment of the tunnel.
11 Currently, all risers are capped.
12

13 The results of the wood strength survey (conducted in 1980) concluded
14 that the wood beams in Tunnel Number 1 were within standards for present day
15 wood. Design calculations performed at the time also found the tunnel to be
16 "within safe limits" (Silvan 1980). Air sampling conducted in Tunnel Number 1
17 did not identify the presence of any combustible gases and found oxygen levels
18 to be at about 21 percent with carbon dioxide at about 0.3 percent. The
19 reported temperature in Tunnel Number 1 remains consistent at 15.6 °C
20 (Rambosek and Foster 1972).
21

22 An independent evaluation of the 1980 data collected by Silvan was
23 conducted in 1991 to further evaluate the structural integrity of PUREX
24 Storage Tunnel Number 1 (Hand and Stevens 1991). This study concluded that
25 any degradation of the treated timbers because of decay or insect attack
26 should be minimal and found that the tunnel timbers structurally should be
27 sound. This study also confirmed the reasonableness of the values used and
28 agreed with the findings of the Silvan study. In addition, the study
29 concluded that the methods used by Silvan to calculate the loss of timber
30 strength were sufficiently conservative to accurately determine the soundness
31 of the timbers. The exposure of the timbers to the high gamma radiation field
32 emitted by the material stored within the tunnel was factored into the
33 evaluation.
34

35 A vent shaft is located at the south end of Tunnel Number 1. The shaft
36 is approximately 1.5 meters by 1.5 meters in cross-section and is constructed
37 of reinforced concrete. The vent stack extends approximately 0.3 meter above
38 grade and was capped with a single-stage, high-efficiency particulate air
39 (HEPA) filter, a 283-cubic-meter per minute exhaust fan, and a 6.1-meter tall
40 exhaust stack. After filling Tunnel Number 1 to capacity, the tunnel was
41 sealed. Sealing activities included de-energizing the ventilation system and
42 blanking the ventilation system upstream of the air filters to prevent
43 interaction of the tunnel air with external air. A further discussion of the
44 tunnel ventilation system is provided in Chapter 4.0.
45

46 In June 1960, the first two railcars were loaded with a single,
47 approximately 12.5-meter-long, failed separation column and placed in Tunnel
48 Number 1. Between June 1960 and January 1965, six more railcars were placed
49 in Tunnel Number 1, filling the tunnel. After the last car was placed in the
50 northern-most storage position (Position 8), the water-fillable door was
51 closed, filled with water, and deactivated electrically. The Tunnel Number 1
52 door will be drained as part of PUREX Facility transition activities.
53

1
2 2.1.2 Tunnel Number 2 (218-E-15)
3

4 Construction of Tunnel Number 2 was started and completed in 1964. Like
5 Tunnel Number 1, Tunnel Number 2 consists of three functional areas: the
6 water-fillable door, the storage area, and the vent shaft. Construction of
7 Tunnel Number 2 differs from that of Tunnel Number 1 as follows.
8

- 9 • A combination of steel and reinforced concrete was used in the
10 construction of the storage area for Tunnel Number 2 (Figure 2-5)
11 rather than wood timbers, as used in Tunnel Number 1.
12
- 13 • Tunnel Number 2 is longer, having a storage capacity of five times
14 that of Tunnel Number 1.
15
- 16 • The floor of Tunnel Number 2, outboard of the railroad ties, slopes
17 upward to a height of approximately 1.8 meters above the railroad bed,
18 whereas the floor in Tunnel Number 1 remains flat all the way out to
19 the side walls.
20
- 21 • The railroad tunnel approach to Tunnel Number 2 angles eastward then
22 angles southward to parallel Tunnel Number 1 (Figure 2-4). The
23 approach to Tunnel Number 1 is a straight extension southward from the
24 PUREX Plant. Center-line to center-line distance between the two
25 tunnels is approximately 18.3 meters.
26

27 The physical structure of the water-fillable door at the north end of
28 Tunnel Number 2 essentially is identical to the water-fillable door for Tunnel
29 Number 1. The water-fillable door for Tunnel Number 2 is approximately
30 57.9 meters south and 18.3 meters east of the water-fillable door for Tunnel
31 Number 1 (Figure 2-2).
32

33 Controls for operation of the water-fillable door are located above the
34 tunnel on the east exterior wall of the door enclosure (Chapter 4.0,
35 Figure 4-1). Chapter 4.0 provides additional operational information on the
36 Tunnel Number 2 water-fillable door. As of February 9, 1995, the door is
37 empty and there are no plans to fill it. Procedures for filling and draining
38 the door are presented in Chapter 4.0.
39

40 The storage area of Tunnel Number 2 is that portion of the tunnel
41 extending southward from the water-fillable door. Construction of this
42 portion of Tunnel Number 2 consists of a 10.4-meter diameter, steel
43 (0.5 centimeter plate), semicircular-shaped roof, supported by internal I-beam
44 wales attached to external, reinforced concrete arches. The concrete arches
45 are 0.4-meter thick and vary in width from 0.4 to 1.8 meters. The arches are
46 spaced on 4.8-meter centers. This semicircular structure is supported on
47 reinforced concrete grade beams approximately 1.8 meters wide by 1.2 meters
48 thick (one on each side) that run the full length of Tunnel Number 2. The
49 interior and exterior surfaces of the steel roof are coated with a bituminous
50 coating compound to inhibit corrosion. The entire storage area is covered
51 with 2.4 meters of earth fill to serve as radiation shielding.
52

1 The nominal inside dimensions of Tunnel Number 2 are 514.5 meters long,
2 7.9 meters high, and 10.4 meters wide. However, because of the arch-shaped
3 cross-section of Tunnel Number 2 and entry clearance at the water-fillable
4 door, the usable storage area (width and height above top-of-rail) is
5 6.7 meters high and 5.8 meters wide, the same dimensions as for Tunnel
6 Number 1. The floor consists of a railroad track laid on a gravel bed. The
7 space between ties is filled to top-of-tie with gravel ballast. Commencing at
8 the ends of the 2.4-meter-long ties, the earth floor is sloped upward on a
9 1 (vertical) to 1 1/2 (horizontal) grade. The tracks are on a 1/10 of
10 1 percent downgrade slope to the south to ensure the railcars remain in their
11 storage position. A railcar bumper is located 2.4 meters from the south end
12 of the tracks to act as a stop. The capacity of the storage area is 40,
13 12.8-meter-long railcars.
14

15 There are 17 tunnel ports located along the ridge of the tunnel roof (for
16 details, refer to Drawing H-2-58195 in Appendix 4A). The ports are on
17 29.3-meter centers. A 7.6-centimeter diameter bar plug is located in the
18 center of each tunnel port and is secured in place with a length of chain and
19 a padlock. The PUREX Plant operations administers access control of these
20 tunnel ports.
21

22 The vent shaft, located at the south end of Tunnel Number 2, is
23 approximately 1.5 meters by 1.5 meters in cross-section and is constructed of
24 reinforced concrete. The vent shaft extends approximately 0.3 meter above
25 grade and is capped with an exhaust system consisting of a single-stage, HEPA
26 filter, a 153-cubic meter per minute exhaust fan, and a 6.1-meter-tall exhaust
27 stack. The ventilation system currently is active; however, the exhaust fan
28 has been damped to provide only about 100 cubic meters per minute of exhaust
29 flow. A further discussion of the tunnel ventilation system is provided in
30 Chapter 4.0.
31

32 The first railcar was placed in storage in December 1967. As of
33 October 1995, 21 railcars have been placed in Tunnel Number 2.
34

35 2.1.3 Other Environmental Permits 36

37 Federal and state laws and local requirements applicable to the PUREX
38 Storage Tunnels are listed in Chapter 13.0 and discussed in Chapter 13.0 of
39 the General Information Portion (DOE/RL-91-28).
40

41 2.2 TOPOGRAPHIC MAP [B-2] 42

43 A topographic map (Drawing H-2-79998), showing a distance of at least
44 305 meters around the PUREX Storage Tunnels, is located in Appendix 2A. This
45 map is at a scale of 1 unit equals 2,000 units. The contour interval clearly
46 shows the pattern of surface water flow in the vicinity of each storage
47 tunnel. The map contains the following information:
48

49 51 • Map scale
50 52 • Date

- 1 • Prevailing wind speed and direction
- 2 • A north arrow
- 3 • Surrounding land use
- 4 • Buildings
- 5 • Access road location
- 6 • Access control
- 7 • Monitoring and sampling well locations
- 8 • TSD unit locations.

10 **2.3 TRAFFIC INFORMATION FOR THE PUREX STORAGE TUNNELS [B-4]**

11 General traffic information for the Hanford Facility is presented in the
12 General Information Portion (DOE/RL-91-28).

13 **2.3.1 The PUREX Storage Tunnels Roadway Access**

14 The paved roads providing access to the 200 East Area and the PUREX
15 Facility also provide adequate all-weather access to the external portions of
16 the PUREX Storage Tunnels (Figure 2-1). A paved parking area is provided
17 northwest of the main gate.

18 **2.3.2 The PUREX Storage Tunnels Railroad Access**

19 Railroad access to the PUREX Storage Tunnels is by an extension of the
20 railroad spur that services the PUREX Plant (Figure 2-2).

21 **2.4 RELEASE FROM SOLID WASTE MANAGEMENT UNITS [E]**

22 Information concerning releases from solid waste management units is
23 discussed in the General Information Portion (DOE/RL-91-28).

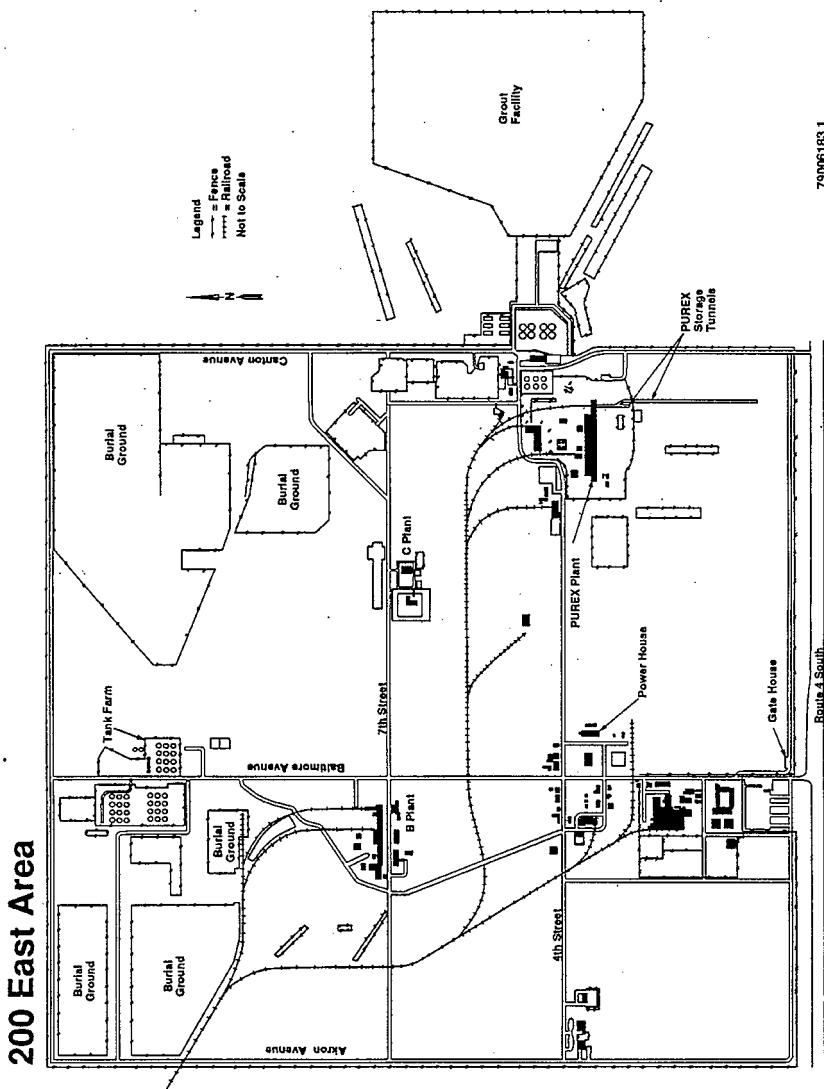


Figure 2-1. The 200 East Area.

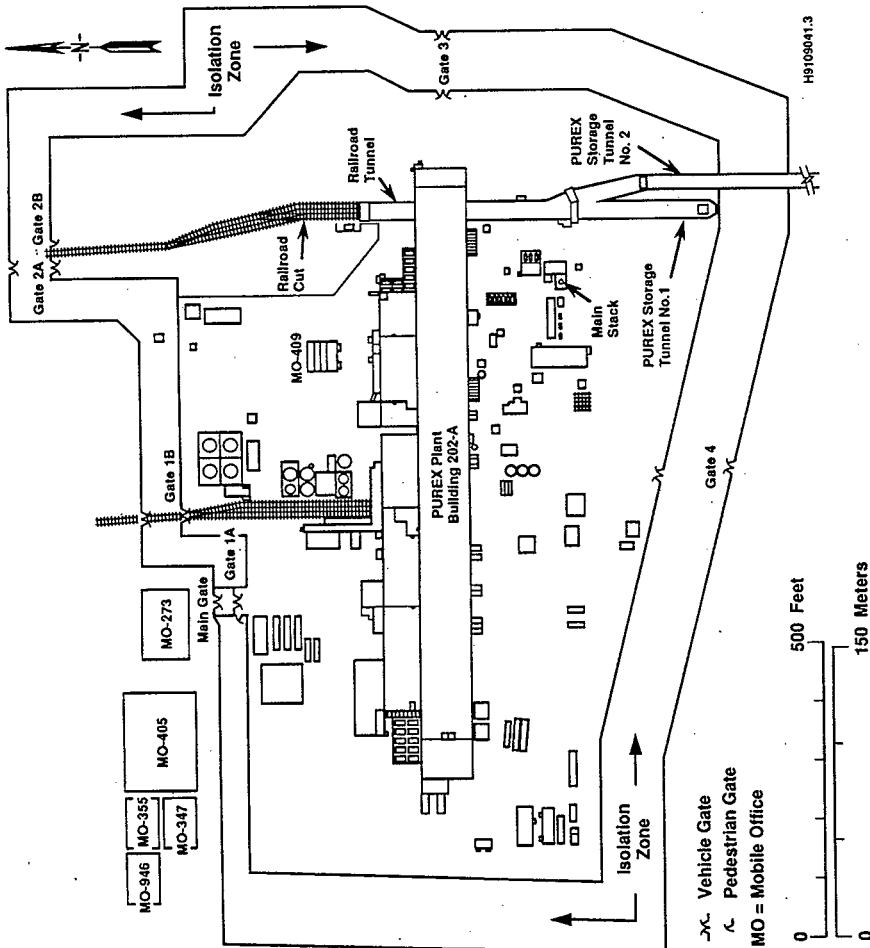


Figure 2-2. The PUREX Facility.

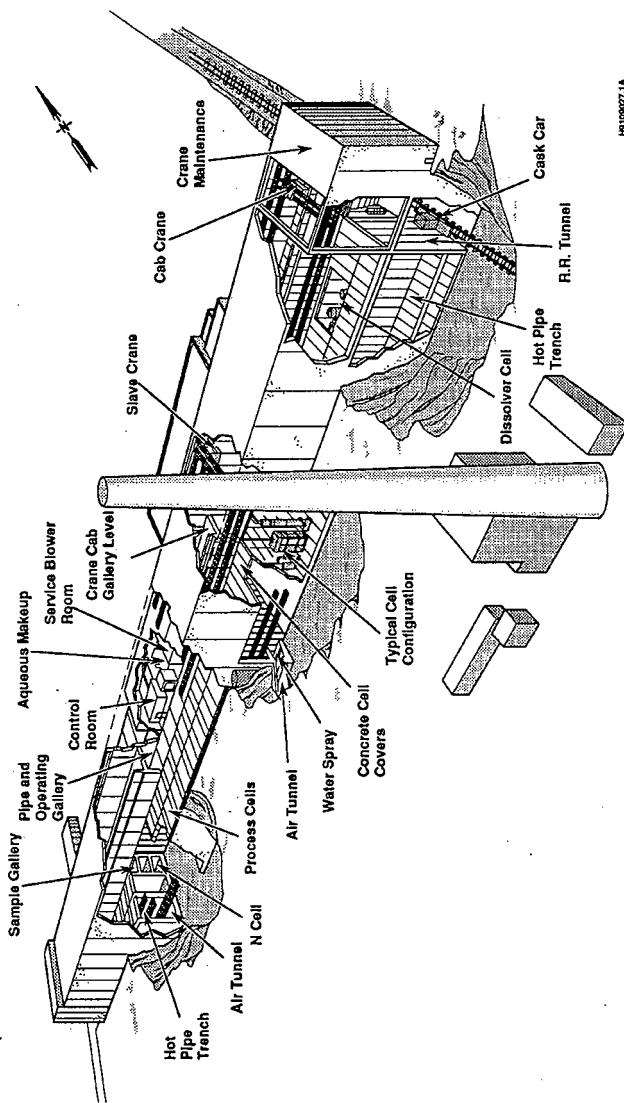
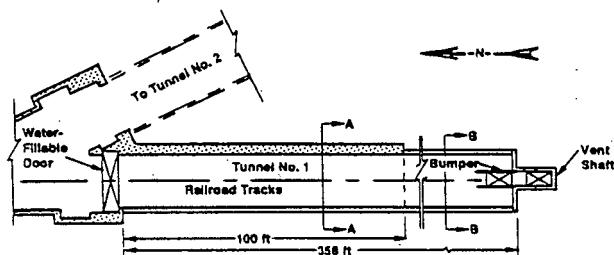
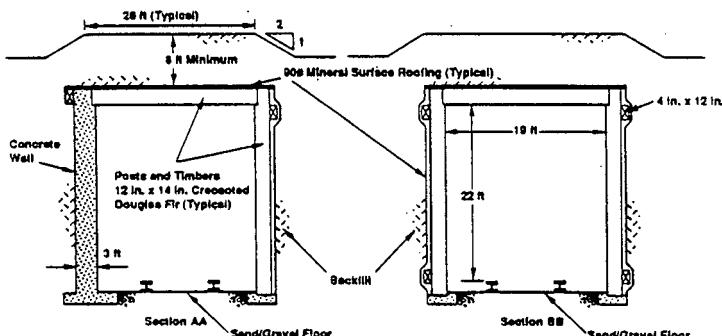


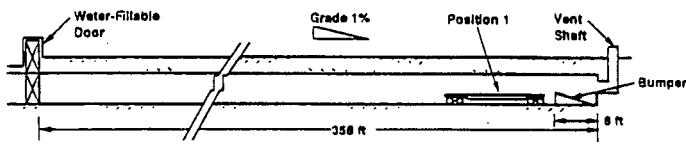
Figure 2-3. The PUREX Plant (Building 202-A).



Tunnel No. 1 - Plan View



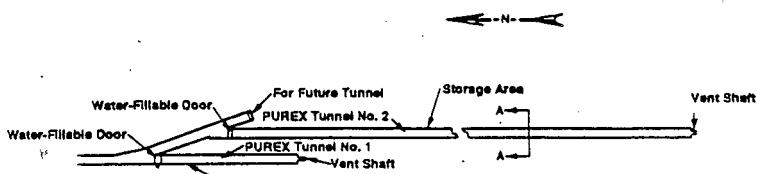
PUREX Tunnel No. 1 - Section Views



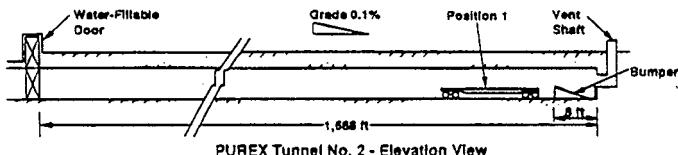
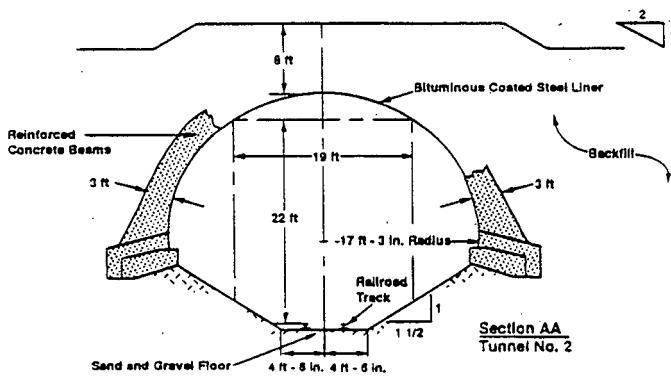
PUREX Tunnel No. 1 - Elevation View

78610052.2

Figure 2-4. The PUREX Storage Tunnel Number 1.



PUREX Tunnels - Plan View



78910032.1

Figure 2-5. The PUREX Storage Tunnel Number 2.

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6	3.3 TRACKING SYSTEM [C-4]	3-2

APPENDIX

15
16 3A WASTE ANALYSIS PLAN FOR PUREX STORAGE TUNNELS APP 3A-i
17
18
19
20
21

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3.0 WASTE ANALYSIS [C]

This chapter provides information on the chemical, biological, and physical characteristics of the dangerous waste stored in the PUREX Storage Tunnels. A waste analysis plan (Appendix 3A) describes the methodology used in the characterization of the stored waste. Knowledge of the characteristics of the dangerous waste to be stored is used to ensure that the waste is managed properly.

Waste stored in the tunnels is mixed waste as a result of radioactive contamination. Because the dangerous waste is an integral part of radioactively contaminated material, this waste is managed as a mixed waste. The PUREX Storage Tunnels provide the necessary shielding for the protection of employees and the environment. Presently, one-third of the railcars in the PUREX Storage Tunnels store material that contains dangerous waste components (mixed waste).

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSES [C-1]

Presently, material stored in the PUREX Storage Tunnels contains the following dangerous waste:

- Lead
- Mercury
- Silver and silver salts
- Chromium
- Cadmium.

Dangerous waste is either attached to, contained within, or actually is material removed from the PUREX Plant and other onsite sources. Changes in the amount of dangerous waste stored will be updated annually in the annual dangerous waste report submitted to Ecology. Future storage of barium and selenium may occur in Tunnel Number 2. Further discussion of waste types is included in the waste analysis plan (Appendix 3A).

The PUREX Storage Tunnels are being permitted as a miscellaneous unit under WAC 173-303-680 because the tunnels are not a typical containerized storage unit. That is, the bulk of the material stored in the tunnels is not placed in a container; rather, this material is placed on a portable device (railcar) used as a storage platform. In general, the mixed waste stored in the PUREX Storage Tunnels is encased or contained within carbon or stainless steel plate, pipe or vessels that meets the WAC 173-303-040 definition of container. Therefore, the mixed waste normally is not exposed to the tunnel environment.

The only free-liquid dangerous waste stored in the tunnels is elemental mercury. The mercury is contained within thick-walled (0.8-centimeter) thermowells. The amount of mercury per thermowell is less than 1.7 liter.

1 Other liquid containers, such as large discarded process tanks, are
2 stored in the PUREX Storage Tunnels. These containers are 'empty'
3 [per WAC 173-303-160(2)(a)]. In the future containers will be flushed and the
4 final rinsate sampled and analyzed to verify that the residual heel is not a
5 dangerous waste.

6 The only stored mixed waste that is designated as either reactive or
7 ignitable (D001) is silver nitrate in the silver reactors
8 [WAC 173-303-090(5)]. There is no mixed waste designated as reactive (D003).
9 The potential for ignition from this source is considered to be negligible
10 because this material is dispersed on ceramic packing and is physically
11 isolated from contact with any combustible material or ignition source.

12 **3.2 WASTE ANALYSIS PLAN [C-2]**

13 The *Waste Analysis Plan for the PUREX Storage Tunnels* is provided in
14 Appendix 3A.

15 **3.3 TRACKING SYSTEM [C-4]**

16 Specific waste tracking forms for the movement of waste destined for the
17 PUREX Storage Tunnels are used. These waste tracking forms effectively track
18 waste inventories from generation through storage.

19 The waste tracking forms and other supporting documentation will be
20 maintained at the Hanford Facility for a minimum of 5 years following closure
21 of the PUREX Storage Tunnels.

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30 **FIGURE**

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1 4.0 PROCESS INFORMATION [D]

2
3
4 This chapter discusses the processes involved in the operation of the
5 PUREX Storage Tunnels. The PUREX Storage Tunnels are used for the storage of
6 mixed waste from the PUREX Plant and other onsite sources.

7
8 The PUREX Storage Tunnels were designed and constructed to provide a
9 means of protecting personnel and the environment from radiation associated
10 with stored material. This design also serves to protect personnel and the
11 environment from the dangerous waste component of the mixed waste stored
12 inside the tunnels. A physical description of the PUREX Storage Tunnels is
13 provided in Chapter 2.0.

14
15 The PUREX Storage Tunnels are being permitted as a miscellaneous unit
16 under WAC 173-303-680. The WAC regulations require that miscellaneous unit
17 permit terms and provisions address appropriate requirements provided for
18 other TSD units. Because the operation and construction of the PUREX Storage
19 Tunnels most closely resemble that of a container storage unit, the
20 appropriate requirements prescribed for a container storage unit are addressed
21 in this chapter.

22
23
24 4.1 OPERATION OF THE PUREX STORAGE TUNNELS

25
26 This section describes the selection, characterization, preparation,
27 placement, and removal activities associated with storage of mixed waste in
28 the PUREX Storage Tunnels. Except as noted, these activities also apply to
29 the storage of radioactive waste placed in the PUREX Storage Tunnels.

30
31 4.1.1 Preparation for Tunnel Activities

32
33 Management, with the concurrence of an appropriate cognizant engineer,
34 determines when material is to be removed and transported to the PUREX Storage
35 Tunnels. A job specific work plan describing the overall transfer activities
36 is prepared.

37
38 4.1.1.1 Storage/Removal Equipment Preparation. A remotely controlled,
39 battery-powered locomotive normally is used to move railcars into and out of
40 the PUREX Storage Tunnels. Other mechanical means such as a standard
41 locomotive or a winch also can be used independently or in combination with
42 the remote locomotive should the need arise. Methods for use of the remote
43 locomotive are described in this chapter as this represents the normal
44 placement and removal of railcars at the PUREX Storage Tunnels. Should
45 storage activities require the use of a mechanical means other than the remote
46 locomotive to place or withdraw a railcar, methods for that application will
47 be developed.

48
49
50 Preparatory activities associated with the remote-controlled locomotive
51 include the following:

- 1 • Charging the batteries for both the locomotive and the radio
2 transmitter
- 3 • Performing operational checks
- 4 • Installing a plastic shroud over the locomotive to facilitate
5 decontamination
- 6 • Installing an anticoupling device on the south coupler of the
7 locomotive (storage only)
- 8 • Performing physical inspections of the railroad track within the
9 railroad tunnel to ensure that the track switches are positioned
10 properly and the track is clear of obstructions.

11 4.1.1.2 **Water-Fillable Door Preparation.** Each PUREX Storage Tunnel has a
12 water-fillable door that isolates the storage area from the PUREX railroad
13 tunnel. (Chapter 2.0 provides a description of the door.)

14 Currently, the water-fillable door to Tunnel Number 2 is empty and is not
15 expected to be filled. Operational checks are performed on the door hoists.
16 Before performing operational checks on the water-fillable door, the operator
17 confirms with a dispatcher that the railroad tunnel area is clear of
18 personnel.

19 4.1.1.3 **Other Preparation Tasks.** Before material storage, the following
20 preparatory tasks are completed.

- 21 • The storage tunnel exhaust fan is verified to be operating.
- 22 • Labels will be attached to the railcar in accordance with
23 WAC 173-303-395(6) and 173-303-630(3) if the material contains
24 dangerous waste components.

35 4.1.2 **Tunnel Storage Activities**

36 This section describes the placement of material within the PUREX Storage
37 Tunnels.

38 4.1.2.1 **Physical Characterization of Material to be Stored.** Physical
39 characterization includes an evaluation of the following physical properties:

- 40 • Length, width, and height
- 41 • Gross weight and volume
- 42 • Preferred orientation for transport and storage
- 43 • Presence of mixed waste.

44 Information sources used in physical characterization include equipment
45 fabrication and installation drawings, operational records, and process
46 knowledge. Physical characterization provides information necessary to

1 appropriately describe the mixed waste materials. Such information also is
2 used to design and fabricate, if required, supports on the railcar.
3

4 Specific material known to contain constituents that would cause the
5 equipment to be designated as mixed waste is discussed in the waste analysis
6 plan (Appendix 3A). The material includes but is not limited to dissolvers
7 that contain elemental mercury; silver reactors that contain silver salts;
8 jumpers and other equipment that have elemental lead counterweights; a
9 concentrator that contains chromium; neutron absorbing equipment containing
10 cadmium. Characteristics of these materials when stored as mixed waste are
11 described in Chapter 3.0. Waste transferred to the PUREX Storage Tunnels from
12 other than PUREX Plant also would be physically characterized.
13

14 4.1.2.2 Material Flushing. Before removal from service, the material from
15 the PUREX Plant will be flushed to minimize loss of products, to reduce
16 radioactive contamination, and to reduce to nonregulatory levels the
17 concentration of any dangerous chemicals present in a residual heel. In the
18 future the analysis of the rinsate will be used to determine when these goals
19 have been achieved. The analysis of the final flush will be retained as part
20 of the PUREX Storage Tunnel records. Material removed from other onsite units
21 will be prepared for transfer to the tunnels in accordance with this dangerous
22 waste permit application.
23

24 4.1.2.3 Railcar Preparation. Railcars are modified to serve as dedicated
25 storage platforms and transporters for material placed in the PUREX Storage
26 Tunnels. The wooden decking on the railcars is removed to minimize the amount
27 of combustible material placed in the PUREX Storage Tunnels. The south
28 coupler is disabled or removed to prevent the railcar from coupling to the
29 railcar stored ahead. Brakes are disabled to ensure free wheeling of the
30 railcar. Steel decking, catch pans filled with absorbent, and equipment
31 cradles are provided as needed to modify the railcar for its specific task.
32

33 4.1.2.4 Placement of Material into Storage Position. With all preparations
34 complete and with the approval of cognizant management, transferring material
35 to the PUREX Storage Tunnels proceeds as follows.
36

- 37 • The water-fillable door to the storage tunnel is opened.
38
- 39 • The railcar is loaded as specified in the storage tunnel checklist.
40
- 41 • An inventory of items loaded on the railcar and a record of their
42 location on the railcar are recorded in the storage tunnel checklist.
43
- 44 • A health physics technician obtains a radiation level survey of the
45 loaded railcar at a distance commensurate with ALARA practices.
46
- 47 • The railcar is pushed into the storage tunnel to its storage position.
48
- 49 • Once the railcar is in position, the water-fillable door is closed.
50
- 51

1 4.1.3 Removal of Stored Material

2 Removal of material stored within the PUREX Storage Tunnels is not
3 conducted routinely. It is planned that the material will remain in storage
4 until a means to accommodate processing and repackaging of the material for
5 disposal or further storage or until another final disposition option becomes
6 available. Removal of material from storage within the PUREX Storage Tunnels
7 would proceed after the preparation activities identified in Section 4.1.1.

8
9 With all preparations complete and approval of management, removal of
10 material from the storage area of the PUREX Storage Tunnels would proceed as
11 follows.

12
13 • The equipment that will be used to remove material is positioned in
14 the PUREX railroad tunnel.

15 • Verification is made that the PUREX railroad tunnel is configured
16 properly to proceed with entrance into the PUREX Storage Tunnels
17 (i.e., tunnel ventilation system is operating, the overhead door is
18 closed and the health physics technician has performed a radiation
19 survey of the area).

20
21 • The water-fillable door is opened.

22
23 • The equipment that will be used to remove material is moved into the
24 storage tunnel and connected to the railcar.

25
26 • Verification is made that the railcar is connected to the removal
27 equipment and the railcar is extracted from the storage tunnel and
28 positioned within the PUREX railroad tunnel.

29
30 • The water-fillable door is closed.

31
32 The loaded railcar retrieved from the tunnel would be remotely viewed and
33 radiation measurements may be obtained to determine the possibility of mixed
34 waste containment failure during storage in the PUREX Storage Tunnels. If
35 evidence of containment failure is detected, the specific details (i.e.,
36 material, location on railcar, storage position) would be documented and
37 attached to the waste tracking form. This information would be maintained in
38 the files and would be used to establish sampling locations within the tunnels
39 at closure. After remote viewing and radiation surveys, the railcar and
40 associated material may be prepared as required for transfer to an appropriate
41 onsite TSD unit for treatment or further storage.

42
43 4.1.4 Filling the Water-Fillable Door (Tunnel Number 2)

44
45 If radiation shielding beyond that provided by the empty water-fillable
46 door becomes necessary, the door can be filled with water. This is
47 accomplished by connecting a fire hose from the water hydrant to the wall stub
48 on the exterior of the door housing (Figure 4-1). Once the fire hose is in
49 place, the hydrant valve is opened and the door is filled with water. The

1 hydrant is closed by personnel when a high-level indicator light illuminates.
2 Although attendance by an operator is required at all times during filling
3 operations, should the door overfill, excess water is channeled through a
4 vent/spill pipe to the door sump. A 15.2-centimeter drain is provided in each
5 door sump. Water accumulated in the door sump flows to the 200 Area Treated
6 Effluent Disposal Facility. The door sump will be sealed during PUREX
7 Facility deactivation.
8
9

10 **4.1.5 Poststorage Activities**

11 The following poststorage activities would conclude the tunnel storage
12 task.

13 • Decontamination activities, if required, are performed.
14
15 • Management is notified of any unusual conditions observed during the
16 storage/retrieval activities.

17 **4.1.6 Operation of the Tunnel Ventilation System**

18 The ventilation systems for Tunnel Number 1 and Tunnel Number 2 were
19 designed to ventilate air from within the tunnels so the airborne radioactive
20 contamination is vented through a HEPA filtered exhaust system.

21 **4.1.6.1 Tunnel Number 1 Ventilation.** Active ventilation of Tunnel Number 1
22 presently is not provided. After placement of the last railcar into Tunnel
23 Number 1, the tunnel was sealed (Chapter 2.0). As part of the sealing
24 activities, the ventilation fan was deactivated electrically and the exhaust
25 stack and filter were isolated from the system by installing a blank in the
26 tunnel exhaust duct upstream of the filters. In the event railcar removal
27 activities are initiated, it is planned that the ventilation system would be
28 reactivated. Operation of the ventilation system would be similar to that for
29 Tunnel Number 2.

30 **4.1.6.2 Tunnel Number 2 Ventilation.** The Tunnel Number 2 ventilation system
31 presently is operated continuously. As part of PUREX Facility deactivation,
32 the water-fillable door and outer PUREX railroad tunnel door will be
33 temporarily or permanently sealed depending on the future need for storing
34 waste in the tunnel. The ventilation system may be operated continuously, or
35 de-energized and reactivated during waste placement activities. When the
36 determination has been made that Tunnel Number 2 will no longer receive waste,
37 the ventilation system will be blanked and deactivated electrically similar to
38 the Tunnel Number 1 ventilation system. While the Tunnel Number 2 ventilation
39 system is operating and the water-fillable door is closed, the exhaust system,
40 which discharges approximately 100 cubic meters per minute, maintains a
41 slightly negative pressure in the tunnel. The exhaust air is replaced by
42 infiltration around the water-fillable door and through the porosity of the
43 tunnel structure (e.g., the rail-bed ballast). When the water-fillable door
44 is open (during transfer activities), inward airflow is maintained through the
45 open doorway. This inward airflow channels airborne radioactive contamination

1 away from both the railroad tunnel and personnel following railcars (if
2 allowed) into the storage tunnel. A HEPA filter provides filtration of all
3 exhaust air before release to the atmosphere. The HEPA filter is tested in
4 place at least annually to ensure radioactive particulate removal efficiency.
5 Exhausted air is sampled periodically and analyzed for airborne radionuclides.
6
7

8 **4.2 CONTAINERS [D-1]**

9
10 This section describes the various types of containment used to isolate
11 mixed waste stored in the PUREX Storage Tunnels. The PUREX Storage Tunnels
12 are considered to be a miscellaneous unit most closely resembling that of a
13 container storage unit. The mixed waste stored in the PUREX Storage Tunnels
14 is contained and is not considered a risk to human health or to the
15 environment.
16
17

18 **4.2.1 Containers with Free Liquids**

19
20 The only mixed waste stored as a free liquid is elemental mercury.
21 A small quantity, less than 1.7 liters, of mercury is contained in each of the
22 two thermowells attached to and contained within each dissolver (Chapter 3.0).
23 Primary containment of the mercury is provided by the all-welded construction
24 of the thermowell itself, which is fabricated from 7.6-centimeter,
25 Schedule 80, 304L stainless steel pipe. The open upper end of the thermowell
26 was plugged with a 304L stainless steel nozzle plug in preparation for
27 storage. The dissolver rests on a cradle on its railcar in an inclined
28 position. This ensures that the mercury remains in the lower portion of the
29 thermowell and is not in contact with the mechanical closure on the nozzle end
30 of the thermowell.
31

32 A secondary containment barrier for mercury, should it leak from the
33 thermowell, is provided by the dissolver itself. The dissolver is a
34 304L stainless steel process vessel constructed from 1-centimeter-thick plate
35 and is approximately 2.7 meters in diameter. The dissolver is of all-welded
36 construction and contains no drains or nozzle outlets in the bottom several
37 feet of its lower section, which contains both thermowells.
38

39 The 304L stainless steel used to contain the elemental mercury is both
40 compatible with the waste itself and the storage environment. The potential
41 for significant deterioration of either the primary or secondary containment
42 barrier material before closure is considered to be negligible.
43

44 The dissolvers stored within the PUREX Storage Tunnels are not labeled
45 as containing characteristic toxic mercury (D009) [WAC 173-303-090(8)(c)].
46 Procedures for labeling were not in place at the time of storage. Personnel
47 access into the storage area for purposes such as labeling is not feasible
48 because of the radiation levels and cannot be justified under ALARA
49 guidelines. Based on ALARA, mixed waste presently within the PUREX Storage
50 Tunnels will remain unlabeled. However, during future transfers of mixed
51 waste into the PUREX Storage Tunnels the railcars will be labeled as specified
52 by WAC 173-303-395(6) and WAC 173-303-630(3).
53

1 2 **4.2.2 Containers Without Free Liquids That Do Not Exhibit Ignitability**
2 3 or Reactivity
3 4

5 The total amount of lead in Tunnel Number 1 is approximately
6 230 kilograms. The total amount of lead present in Tunnel Number 2 at this
7 time, through position 21, is approximately 4,684 kilograms. Most lead is
8 fully contained in all-welded encasements of either carbon steel or
9 304L stainless steel. The encasement serves as support, protection against
10 mechanical damage, and protection of the lead from exposure to the
11 environment.

12 Stored lead has been placed in burial boxes of appropriate size. The
13 boxes provide secondary containment for the lead in the unlikely event the
14 primary encasement should fail. Although boxes may be open on the top, the
15 PUREX Storage Tunnels are enclosed; therefore, the containers are protected
16 from the elements.

17 Both carbon steel and 304L stainless steel used to encase the lead are
18 compatible with the waste and the storage environment. Significant
19 deterioration of either the primary or secondary containment barrier materials
20 before closure is not considered to be credible.

21 In the past, material that contains lead or that has encased lead
22 attached was not labeled as containing characteristic toxic lead
23 (D008) [WAC 173-303-090(8)], because the requirements were not yet on line.
24 As stated in Section 4.2.1, personnel entry into the tunnel storage area for
25 purposes of labeling would be inconsistent with ALARA guidelines. However,
26 during future storage of material containing lead the railcars will be labeled
27 in accordance with WAC 173-303-395(6) and WAC 173-303-630(3).

28 32 **4.2.3 Protection of Extremely Hazardous Waste in Containers**
29

30 The present amount of mixed waste stored in the PUREX Storage Tunnels is
31 sufficient to characterize this material as extremely hazardous waste.
32 Because the PUREX Storage Tunnels are enclosed totally, protective covering
33 from the elements and from run-on is provided for the storage of extremely
34 hazardous waste. Periodic inspection of the equipment stored in the PUREX
35 Storage Tunnels is not feasible because of radiation levels in excess of
36 5 roentgen per hour. Safe management of this waste is based on the following
37 considerations.

38 43

- The operation of the PUREX Storage Tunnels is passive, i.e., once a
39 storage position is filled, the storage position remains undisturbed
40 until closure.
- The extremely hazardous waste is compatible with its storage container
41 and the storage environment.

1 4.2.4 Prevention of Reaction of Ignitable, Reactive, and Incompatible
2 Waste in Containers
3

4 There is no reactive or incompatible waste known to be stored in the
5 PUREX Storage Tunnels. The only mixed waste stored in the PUREX Storage
6 Tunnels considered an ignitable waste is the silver nitrate in Tunnel
7 Number 2. The silver nitrate fraction of the silver salts, within the silver
8 reactors, exhibits the characteristic of ignitability as defined in
9 49 CFR 173.127(a). Therefore, the silver salts are managed as an ignitable
10 dangerous waste in accordance with WAC 173-303-395.

11 The risk of fire associated with the storage of silver nitrate in the
12 PUREX Storage Tunnels is considered to be extremely low. This conclusion is
13 based on the following considerations.

- 16 • The operation of the PUREX Storage Tunnels is passive; i.e., once a
17 storage position is filled, the storage position remains undisturbed
18 until closure.
- 20 • The silver nitrate is contained within large, heavy-walled stainless
21 steel vessels that isolate the silver nitrate from contact with any
22 combustibles that might be in the tunnels.
- 24 • The silver nitrate is dispersed over a large surface area on a ceramic
25 packing substrate and is not conducive to build-up of heat that
26 could lead to spontaneous combustion.
- 28 • Personnel access to the occupied areas of the tunnels is not
29 permitted, thereby precluding activities that could present a fire
30 hazard (e.g., smoking, flame cutting, welding, grinding, and other
31 electrical activities).

32 Although ignitable waste storage units are required by
33 WAC 173-303-395(1)(d) to have inspections conducted at least yearly by a fire
34 marshall or professional fire inspector familiar with the requirements of the
35 uniform fire code, the radiation levels within the PUREX Storage Tunnels make
36 such inspections impractical. These inspections are not considered
37 appropriate or necessary for the safe operation of the unit because of the
38 nature of the ignitable waste and the means of storage. The rationale for
39 operations associated with the PUREX Storage Tunnels is addressed further in a
40 petition for rulemaking submitted to Ecology and the EPA (Freeberg 1989) in
41 fulfillment of Hanford Federal Facility Agreement and Consent Order (Tri-Party
42 Agreement) Milestone M-22-01 (Ecology et al. 1995).

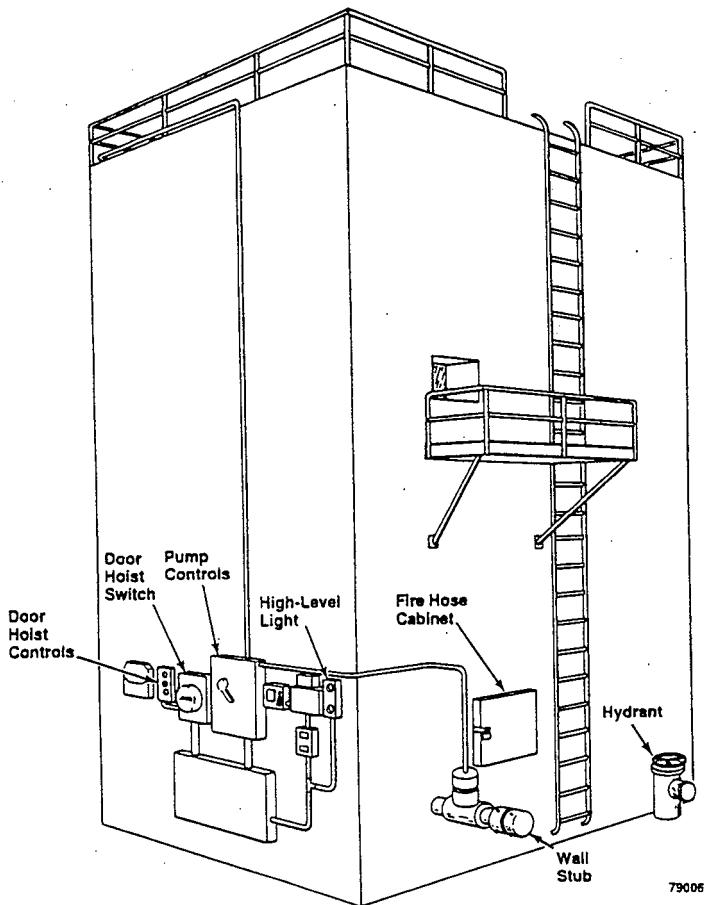


Figure 4-1. Water-Fillable Door Exterior (Tunnel Number 2).

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4 5.0 GROUNDWATER MONITORING FOR LAND-BASED UNITS [D-10] 5-1

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1 **5.0 GROUNDWATER MONITORING FOR LAND-BASED UNITS [D-10]**

2
3
4 The PUREX Storage Tunnels are not operated as a dangerous waste surface
5 impoundment, waste pile, land treatment unit, or a landfill as defined in
6 WAC 173-303-645(1)(a). Therefore, groundwater monitoring is not required.

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1 **6.0 PROCEDURES TO PREVENT HAZARDS [F]**

2
3
4 This chapter discusses security; inspection schedules; preparedness and
5 prevention requirements; preventative procedures, structures and equipment;
6 and prevention of reaction of ignitable, reactive, and incompatible waste
7 stored in the PUREX Storage Tunnels.

8
9 **6.1 SECURITY [F-1]**

10
11 The following sections describe the security measures, equipment, and
12 warning signs used to control entry into the PUREX Storage Tunnels. Hanford
13 Facility security measures are discussed in the General Information Portion
14 (DOE/RL-91-28).

15
16 **6.1.1 Security Procedures and Equipment [F-1a]**

17
18 The following sections describe the 24-hour surveillance system, barrier,
19 and warning signs used to provide security and control access to the PUREX
20 Storage Tunnels.

21 **6.1.1.1 24-Hour Surveillance System.** The entire Hanford Facility is a
22 controlled access area. For surveillance information refer to the General
23 Information Portion (DOE/RL-91-28).

24
25 **6.1.1.2 Barrier and Means to Control Entry.** The PUREX Storage Tunnels are
26 protected by the 200 East Area fence and building structures to enhance
27 physical security. Visitors are required to be escorted. Personnel wishing
28 to enter either storage tunnel must be qualified radiation zone workers and
29 must obtain appropriate approval on a need-to-enter basis. Entry into either
30 storage tunnel is made from the PUREX Plant compound or from outside the
31 railroad tunnel. Actual access into the active portion, the storage area, of
32 the storage tunnels can be made only through the north entry after the
33 massive, water-fillable doors are raised. The water-fillable doors normally
34 are closed and require PUREX Plant operations approval, as well as mechanical
35 assistance, to open.

36
37 **6.1.1.3 Warning Signs.** Points of access to the PUREX Storage Tunnels are
38 posted with a sign, printed in English, reading "DANGER-UNAUTHORIZED PERSONNEL
39 KEEP OUT," or an equivalent legend, in black and red letters on a white
40 background, in accordance with requirements of WAC 173-303-310(2)(a). In
41 addition to these signs, the 200 East Area fence is posted with signs warning
42 against unauthorized entry. The signs also are visible from all angles of
43 approach, from a distance of at least 7.6 meters.

1 6.1.2 Waiver [F-1b]

2
3 A waiver of the security procedures and equipment requirements for the
4 PUREX Storage Tunnels is not requested. Therefore, the requirements of
5 WAC 173-303-310(1)(a) and (b) are not applicable to the PUREX Storage Tunnels.

6
7 6.2 INSPECTION PLAN [F-2]

8
9 Because waste within the PUREX Storage Tunnels is inaccessible because of
10 the levels of radiation present (levels that exceed 5 roentgen per hour in
11 certain areas of the tunnels), inspection of the tunnel interior will not be
12 performed. External inspections of the tunnels only will be performed
13 annually. The inspection schedules and inspection reports will be maintained
14 with the tunnel storage records. Inspection records will be maintained for a
15 minimum of 5 years.

16
17 Information from inspections is recorded on inspection reports. The
18 report forms are used to initiate corrective action if necessary. The
19 following identifies types of inspections that occur at the PUREX Storage
20 Tunnels.

21
22 • External surfaces of the PUREX Storage Tunnels are observed for
23 evidence of structural deterioration. Tunnel subsidence, erosion of
24 the earth cover, and vent stack damage are of primary concern.
25 Abnormal conditions are recorded, evaluated, and corrective action
26 initiated as necessary.

27
28 • The points of access to the PUREX Storage Tunnels are inspected to
29 ensure warning signs (Section 6.1.1.3) are in place, visible, and
30 legible. Abnormal conditions are recorded, evaluated, and corrective
31 action will be initiated as necessary.

32
33 6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

34
35 The following sections document the preparedness and prevention
36 measures taken at the PUREX Storage Tunnels.

37
38 6.3.1 Equipment Requirements [F-3a]

39
40 The following sections describe the internal and external communications
41 systems and emergency equipment required.

42
43 6.3.1.1 Internal Communications. The PUREX Storage Tunnels are not occupied
44 and personnel entry is allowed only on a very limited basis and under close
45 supervision. Normal and emergency communications equipment (portable two-way
46 radios) is available for use.

47
48 6.3.1.2 External Communications. External communications equipment for
49 summoning emergency assistance from the Hanford Fire Department and/or

1 emergency response teams are provided by two-way portable radios or other
2 devices.

3
4 6.3.1.3 Emergency Equipment. Equipment included in the emergency plan for
5 the PUREX Storage Tunnels is provided in Appendix 7A.

6
7 6.3.1.4 Water for Fire Control. The fire hazard associated with the
8 operation of the PUREX Storage Tunnels is considered to be very low because of
9 the minimal amount of combustibles stored within the tunnels and the lack of
10 an ignition source (Rambousek and Foster 1972). In the event of a fire in the
11 storage area of the tunnels, the contingency plan will be activated. Because
12 of the potential of the mixed waste stored within the tunnels to leach, the
13 use of water for fire control will be avoided if possible. Reduction of the
14 air supply to the storage area by isolation of the tunnel exhaust system
15 should permit the fire to self-extinguish. Should the fire continue to
16 propagate, heavy equipment and cranes will be called to the scene to cover
17 areas of the tunnels that might collapse. Heavy equipment and cranes are
18 readily available on the Hanford Facility at all times and generally are
19 available for deployment to the scene of an emergency within 1 hour. In the
20 event that a fire resulted in the collapse of the tunnels, a recovery plan
21 will be developed in accordance with emergency response procedures included in
22 Appendix 7A. The recovery plan will take into consideration plans, if any,
23 for retrieval of the waste stored within the tunnel(s).

24
25 6.3.2 Aisle Space Requirement [F-3b]

26 Requirements for aisle space are not considered appropriate for the safe
27 operation of the PUREX Storage Tunnels and were not included in design
28 documents.

29
30 6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [F-4]

31
32 The following sections describe preventive procedures, structures, and
33 equipment.

34
35 6.4.1 Unloading Operations

36 Operation of the PUREX Storage Tunnels does not involve the loading or
37 unloading of dangerous waste. All loading and unloading operations are
38 conducted at the PUREX Facility or other onsite units. Therefore, the
39 requirements of WAC 173-303-806(4)(a)(viii)(A) are not applicable to the PUREX
40 Storage Tunnels.

41
42 6.4.2 Run-Off

43 The design of the PUREX Storage Tunnels included consideration and
44 provisions for the control of run-off and run-on. Construction of both
45 tunnels included the application of a moisture barrier before placement of the

1 soil overburden. On Tunnel Number 1, 40.8-kilogram mineral surface roofing
2 was applied to the external surfaces of the structural timbers (top and
3 sides). The roofing material was nailed in place with an overlap of
4 approximately 10 centimeters at all joints and seams. All interior and
5 exterior steel surfaces of Tunnel Number 2 were coated with at least a
6 0.9 millimeter bituminous, solvent coal tar base, coating compound. The
7 coating was applied using a two-coat system, with each coat not less than
8 0.45 millimeter, ensuring a total dry film thickness of not less than
9 0.9 millimeter.

10
11 The soil overburden covering the PUREX Storage Tunnels also is contoured
12 to provide a sideslope of 2 (horizontal) to 1 (vertical). This construction
13 serves to divert any seasonal or unanticipated run-on away from the storage
14 area of the PUREX Storage Tunnels. For potential situations where a natural
15 catastrophic event occurs, inspections of the tunnel sideslopes are conducted
16 to ensure the contours remain in a condition that ensures proper run-off and
17 continues to divert run-on away from the tunnel storage areas. Further
18 discussion of the design of the PUREX Storage Tunnels is provided in
19 Chapter 2.0.

20
21 Run-on at the PUREX Storage Tunnels is controlled by the design features
22 of the exterior of the tunnels that serve to divert run-on away from the
23 interior of the tunnels. Additionally, all waste within the tunnels is stored
24 well above the floor level on railcars. The control of run-on combined with
25 the storage of all waste above the floor elevation provides adequate assurance
26 that run-off will not occur at the PUREX Storage Tunnels.

27
28
29 **6.4.3 Water Supplies**

30
31 Water is supplied to the PUREX Storage Tunnels from the PUREX Plant.
32 This water is used for the sole purpose of filling the water-fillable doors
33 should it be determined necessary. There are no other sources or uses of
34 water at the PUREX Storage Tunnels. The line that supplies water to the PUREX
35 Storage Tunnels will be blanked and emptied during deactivation activities.

36
37
38 **6.4.4 Equipment and Power Failures**

39
40 The procedures, structures, and equipment used to mitigate the effects of
41 equipment failure and power outage are described in the following sections.

42
43 **6.4.4.1 Mitigation of the Effects of Equipment Failure.** Maintaining safe
44 storage of materials in the PUREX Storage Tunnels is not contingent on
45 continued operation of equipment. The operable equipment associated with the
46 PUREX Storage Tunnels are the remote-controlled locomotive, the railcars, and
47 the water-fillable door and ventilation system for Tunnel Number 2. No
48 operable equipment is associated with Tunnel Number 1, as this tunnel has been
49 sealed and no longer receives dangerous waste. Backup or redundant systems
50 are not provided for Tunnel Number 2, as failure of the equipment would not
51 have the potential to result in a release of dangerous waste to the
52 environment. There are no hazards associated with tunnel equipment failure.

1 6.4.4.2 Mitigation of the Effects of Power Failure. Maintaining safe storage
2 of materials in the PUREX Storage Tunnels is not contingent on continued
3 supply of electrical power. Electrical power is required to operate the
4 water-fillable door and the ventilation fan in Tunnel Number 2. Back-up or
5 redundant ventilation systems are not provided as the system is operated only
6 to maintain air balance and provide secondary control of radioactive airborne
7 particulate. Power failure to Tunnel Number 2 would not have the potential to
8 result in the release of dangerous waste or radioactive material to the
9 environment. There are no hazards associated with the shutdown of the tunnel
10 ventilation system due to loss of electrical power.

11

12

13 6.4.5 Personnel Protection Equipment

14

15 Personnel entering the PUREX Storage Tunnels are required to wear special
16 protective clothing and respiratory protection at all times because of the
17 radioactive material stored in the PUREX Storage Tunnels. Protective clothing
18 and full-face respirators with filters are considered to be sufficient
19 protection from the dangerous waste stored within the PUREX Storage Tunnels.
20 Personnel are trained and qualified in using the protective equipment and are
21 checked routinely for mask fit.

22

23

24 6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE 25 WASTE [F-5]

26

27 There is no reactive or incompatible waste stored in the PUREX Storage
28 Tunnels. The only ignitable waste stored within the tunnels is silver
29 nitrate. The silver nitrate is present within the silver reactors (deposited
30 on unglazed ceramic packing) stored in Tunnel Number 2 (Chapter 3.0,
31 Table 3-1).

32

33 Although silver nitrate exhibits the characteristic of ignitability, it
34 is contained within stainless steel vessels, stored on railcars above the
35 floor level, and isolated from combustible materials and other dangerous
36 waste. Additional measures to prevent reaction of the ignitable waste are not
37 considered necessary.

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12		218-E-15 STORAGE TUNNELS	APP 7A-1

APPENDIX

10
11 7A UNIT-SPECIFIC CONTINGENCY PLAN FOR THE 218-E-14 AND
12 218-E-15 STORAGE TUNNELS APP 7A-i

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1 **7.0 CONTINGENCY PLAN [G]**

2
3
4 The WAC 173-303 requirements for contingency plans are satisfied in the
5 following documents: the *Unit-Specific Contingency Plan for the 218-E-14 and*
6 *218-E-15 Storage Tunnels* (Appendix 7A) and the *Hanford Facility Contingency*
7 *Plan* [Attachment 4 of the Hanford Facility RCRA Permit (Dangerous Waste
8 Portion)].

9
10 The unit-specific contingency plan document also serves to satisfy a
11 broad range of other requirements [e.g., Occupational Safety and Health
12 Administration standards (29 CFR 1910) and U.S. Department of Energy Orders].
13 Therefore, revisions made to portions of this contingency plan document that
14 are not governed by the requirements of WAC 173-303 will not be considered a
15 modification subject to review or approval by Ecology.

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1 **CONTENTS**

2 4 8.0 PERSONNEL TRAINING [H] 8-1

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7

8 **APPENDIX**

9

10 10 8A DANGEROUS WASTE TRAINING PLAN FOR THE PUREX FACILITY APP 8A-i

11

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1 **8.0 PERSONNEL TRAINING [H]**

2
3
4 The training plan provided in Appendix 8A discusses training requirements
5 pertaining to the PUREX Storage Tunnels.

6
7 The training program is designed to be compliant with all applicable
8 federal, state, and DOE-RL training requirements. The training program
9 complies with requirements contained within WAC 173-303-330 for the
10 development of a written dangerous waste training program. The training
11 program is designed to prepare personnel to manage and maintain TSD units in a
12 safe, effective, efficient, and environmentally sound manner. In addition to
13 preparing employees to manage and maintain TSD units under normal conditions,
14 the training program ensures that employees are prepared to respond in a
15 prompt and effective manner should abnormal or emergency conditions occur.

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4 **CONTENTS**

9.0 EXPOSURE INFORMATION REPORT 9-1

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1 9.0 EXPOSURE INFORMATION REPORT
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5 The PUREX Storage Tunnels do not store, treat, or dispose of hazardous
6 waste in a surface impoundment or a landfill as defined in 40 CFR 270.10 and
 RCRA, Section 3019. Therefore, exposure information is not required.

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1 10.0 WASTE MINIMIZATION [D-9]
2
3
4 To fulfill the requirements of 40 CFR 264.73(b)(9), a certification form
5 that the PUREX Storage Tunnels have a waste minimization/pollution prevention
6 program in place will be entered, annually, into the PUREX Storage Tunnels
7 operating record.

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1 11.0 CLOSURE AND FINANCIAL ASSURANCE [I]
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5 Closure of the PUREX Storage Tunnels requires coordination with closure
6 of the PUREX Plant to ensure a cost effective closure for both units. In
7 addition, the highly radioactive nature of the mixed waste located within the
8 PUREX Plant and PUREX Storage Tunnels precludes the determination of the type
9 of treatment and/or disposition of the waste at this time.

10 The PUREX Storage Tunnels will be managed as a RCRA storage unit until
11 closure can be coordinated with the final closure plan for the PUREX Plant.
12 The PUREX Storage Tunnels closure plan will be submitted after any required
13 *National Environmental Policy Act of 1969* documentation and land usage
14 agreements, which initiate disposition and aid in identifying or developing
15 necessary disposition activities, have been adopted.

16 The PUREX Storage Tunnels closure plan will be written to meet the
17 requirements of WAC 173-303-140 and WAC 173-303-610. This closure plan might
18 consider but will not be limited to the following options for either in situ
19 disposal or retrieval/clean closure of this unit.

21 22 23 11.1 IN SITU DISPOSAL OPTIONS
24

25 This closure plan might consider but will not be limited to the following
26 options for in situ disposal of waste in this unit.

27 28 29 11.1.1 Backfilling the Tunnels with Gravel
30

31 This option could involve backfilling the tunnels with gravel to
32 eliminate void space and prevent ground subsidence. A modified commercially
33 available centrifugal rock throwing device could be placed in newly
34 constructed risers evenly spaced along each tunnel roof. Fill material could
35 be supplied and dispersed into the tunnels by automated controls. Following
36 the fill process, all equipment could be removed from the tunnel roofs and all
37 means of access to the tunnels could be permanently sealed. Final activities
38 could involve the construction of a final surface barrier that meets RCRA
39 landfill cover requirements to prevent water from leaching mixed waste
40 contained in the tunnels.

41 42 43 11.1.2 Injecting the Tunnels with Grout
44

45 This option could involve the injection of grout material into each
46 tunnel to stabilize and immobilize contained materials and prevent ground
47 subsidence. A grout injector could be alternately placed in newly constructed
48 risers evenly spaced along each tunnel roof. Grout material could be supplied
49 and dispersed into the tunnels by automated controls. The grout material
50 could be injected in lifts to accommodate curing and heat dissipation normally
51 associated with the use of this type of material. Final activities could
52 involve the construction of a final surface barrier that meets RCRA landfill

1 cover requirements to prevent water from leaching mixed waste contained in the
2 tunnels.
3
4

5 11.1.3 Combination of Grout Injection and Backfilling

6 This options combines grout injection with gravel backfilling similar to
7 the processes discussed previously. Grout could be injected first to fill
8 void spaces under the railcars and provide a basal structure. Gravel could be
9 dispersed to fill remaining void space and prevent ground subsidence. Final
10 activities could involve the construction of a final surface barrier that
11 meets RCRA landfill cover requirements to prevent water from leaching mixed
12 waste contained in the tunnels.
13
14

15 11.2 RETRIEVAL/CLEAN CLOSURE OPTIONS

16 This closure plan might consider but will not be limited to the following
17 options for retrieval/clean closure of this unit.
18
19

20 11.2.1 Retrieval and Disposal in the PUREX Plant

21 Railcars stored in both tunnels could be remotely retrieved one at a time
22 and moved beneath the horizontal door of the railroad tunnel extension for
23 remote viewing, and if possible, characterization. Transfer procedures could
24 be initiated to move waste material from the railcars to the PUREX Plant
25 canyon deck area. Following transfer of the waste material, the railcars
26 could be decontaminated and removed for final disposition at other onsite
27 units. Final disposition of the waste transferred to the canyon deck area
28 could be in accordance with PUREX Plant closure documentation. The PUREX
29 Storage Tunnels could be closed after submittal and implementation of a PUREX
30 Storage Tunnels closure plan in conjunction with PUREX Plant closure
31 documentation. The PUREX Storage Tunnels closure plan will detail
32 verification sampling and analysis to be performed as a part of closure
33 activities.
34
35

36 11.2.2 Retrieval and Physical Processing (size reduction) in the 37 PUREX Plant and Subsequent Disposal

38 Retrieval of waste material stored in the tunnels could be similar to
39 that described in the previous section. Once the waste material was
40 transferred to the PUREX Plant canyon deck area, characterization and size
41 reduction of waste material could proceed. An area located on the canyon deck
42 or in a process cell could be modified to include all necessary equipment to
43 perform characterization and size reduction activities. Size reduction could
44 be performed through various technologies that include, but are not limited
45 to, flame cutting, water jet cutting, sawing, or other technologies. Final
46 disposition of the processed waste material either onsite or offsite could be
47 in accordance with regulations and procedures in place at that time. The
48 PUREX Storage Tunnels could be closed after submittal and implementation of a
49
50
51
52

1 PUREX Storage Tunnels closure plan in conjunction with PUREX Plant closure
2 documentation. The PUREX Storage Tunnels closure plan will detail
3 verification sampling and analysis to be performed as a part of closure
4 activities.
5
6

7 **11.2.3 Construction of a New Facility for Retrieval, Processing, and**
8 **Treatment of Equipment for Disposal**

9 This option involves the construction of a new unit that is either mobile
10 or stationary to excavate, retrieve, and treat waste material stored in the
11 tunnels. The unit could be constructed in a manner consistent with the
12 retrieval and handling requirements for large, contaminated waste material.
13 Following retrieval, the waste material could be treated in accordance with
14 final onsite or offsite disposition requirements identified at such time. The
15 excavated tunnels could have a temporary surface barrier placed in position
16 until verification and sampling analysis could be performed as a part of
17 closure activities to be performed in conjunction with PUREX Plant closure.
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1 **12.0 REPORTING AND RECORDKEEPING**

2 Reports and records applicable to the PUREX Storage Tunnels are
3 summarized in Chapter 12.0, Table 12-1, of the General Information Portion
4 (DOE/RL-91-28).

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1 13.0 OTHER FEDERAL AND STATE LAWS [J]
2
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4

5 Other federal and state laws and local requirements applicable to the
6 PUREX Storage Tunnels (Atomic Energy Act of 1954, Clean Air Act of 1977, Toxic
7 Substances Control Act of 1976, and the Federal Insecticide, Fungicide, and
8 Rodenticide Act of 1975) are discussed in Chapter 13.0 of the General
Information Portion (DOE/RL-91-28).

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14.0 PART B CERTIFICATION [K]

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.

John D. Wagoner

21 Owner/Operator
22 John D. Wagoner, Manager
23 U.S. Department of Energy
24 Richland Operations Office

11/22/95

Date

R. J. Bliss

30 Co-operator
31 R. J. Bliss, Vice President and Manager
32 Transition Projects
33 Westinghouse Hanford Company

11/21/95

Date

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15.0 REFERENCES

4 AASHTO, 1983, *Standard Specification for Highway Bridges*, AASHTO-HS-20-44
5 American Association of State Highway Transportation Officials,
6 Washington, D.C.

7 Conway, R. A., 1982, *Environmental Risk Analysis for Chemicals*, Van Nostrand
8 Reinhold Environmental Engineering Series, Van Nostrand Reinhold Company,
9 New York, New York.

10 DOE-RL, 1988, *Hanford Facility Dangerous Waste Part A Permit Application*,
11 Volumes 1 through 3, DOE/RL 88-21, U.S. Department of Energy, Richland
12 Operations Office, Richland, Washington, updated periodically.

13 DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General*
14 *Information Portion*, Revision 1, U.S. Department of Energy, Richland
15 Operations Office, Richland, Washington.

16 Ecology, 1995, *State of Washington Part B Permit Application Requirements*,
17 Washington State Department of Ecology, Olympia, Washington.

18 Ecology, EPA, and DOE, 1995, *Hanford Federal Facility Agreement and Consent*
19 *Order*, Washington State Department of Ecology, U.S. Environmental
20 Protection Agency, and U.S. Department of Energy, Olympia, Washington.

21 Freeberg, R. D., 1989, *Proposed Petitions for Rulemaking Changes for Interim*
22 *Milestone M-22-01*, Correspondence dated September 27, 1989,
23 Number 8955715, U.S. Department of Energy, Richland Operations Office,
24 Richland, Washington.

25 Hand, F. R. and V. J. Stephens, 1991, *An Evaluation of the Structural*
26 *Integrity of PUREX Storage Tunnel #1*, Los Alamos Technical Associates,
27 Inc., Los Alamos, New Mexico.

28 Rambosek, A. J. and R. K. Foster, 1972, *Fire and Explosion Hazard Evaluation*
29 *Waste Storage Facility AEC Hanford Operations*, Mining Enforcement and
30 Safety Administration, Denver Technical Support Center, Denver, Colorado.

31 Silvan, G. R., 1980, *Structural Evaluation of the PUREX No. 1 Burial Tunnel*,
32 RHO-CD-1076, Rockwell Hanford Operations, Richland, Washington.

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APPENDIX 2A

TOPOGRAPHIC MAP

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APPENDIX 2A

H-2-79998 TOPOGRAPHIC MAP PUREX STORAGE TUNNELS

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APPENDIX 3A

WASTE ANALYSIS PLAN FOR PUREX STORAGE TUNNELS

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GLOSSARY

1	
2	
3	
4	ALARA as low as reasonably achievable
5	
6	ECOLOGY Washington State Department of Ecology
7	EHW extremely hazardous waste
8	EPA U.S. Environmental Protection Agency
9	
10	pH negative logarithm of the hydrogen-ion concentration
11	
12	PUREX plutonium-uranium extraction
13	
14	QA/QC quality assurance and quality control
15	
16	TSD treatment, storage, and/or disposal
17	
18	WAC Washington Administrative Code
19	WAP waste analysis plan

METRIC CONVERSION CHART

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

Into metric units

Out of metric units

10	If you know	Multiply by	To get	If you know	Multiply by	To get
Length						
12	inches	25.40	millimeters	millimeters	0.0393	inches
13	inches	2.54	centimeters	centimeters	0.393	inches
14	feet	0.3048	meters	meters	3.2808	feet
15	yards	0.914	meters	meters	1.09	yards
16	miles	1.609	kilometers	kilometers	0.62	miles
Area						
18	square inches	6.4516	square centimeters	square centimeters	0.155	square inches
19	square feet	0.092	square meters	square meters	10.7639	square feet
20	square yards	0.836	square meters	square meters	1.20	square yards
21	square miles	2.59	square kilometers	square kilometers	0.39	square miles
22	acres	0.404	hectares	hectares	2.471	acres
Mass (weight)						
27	ounces	28.35	grams	grams	0.0352	ounces
28	pounds	0.453	kilograms	kilograms	2.2046	pounds
29	short ton	0.907	metric ton	metric ton	1.10	short ton
Volume						
31	fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
32	quarts	0.95	liters	liters	1.057	quarts
33	gallons	3.79	liters	liters	0.26	gallons
34	cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
35	cubic yards	0.76	cubic meters	cubic meters	1.308	cubic yards
Temperature						
38	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.

1.0 FACILITY DESCRIPTION

1
2
3
4 This waste analysis plan (WAP) has been prepared for the Hanford
5 Facility, PUREX Storage Tunnels, Richland, Washington, for the management of
6 mixed waste. This WAP applies to all mixed waste (containing both radioactive
7 and dangerous components) regulated by Washington Administrative Code
8 (WAC) 173-303 that is transferred to and/or contained in the PUREX Storage
9 Tunnels.

10
11 The PUREX Storage Tunnels are permitted as a miscellaneous unit under
12 WAC 173-303-680. The bulk of the waste stored in the PUREX Storage Tunnels is
13 not placed in a typical container; rather, this waste is placed on a portable
14 device (railcar) that is used as a storage platform. In general, the
15 dangerous waste stored in the PUREX Storage Tunnels is encased or contained
16 within carbon or stainless steel plate, pipe, or vessels. Therefore, the
17 mixed waste normally is not exposed to the tunnel environment.

18
19 The PUREX Facility, located in the 200 East Area, consists of two
20 separate treatment, storage, and/or disposal (TSD) units, the PUREX Plant
21 (202-A Building) and the PUREX Storage Tunnels. Access to the PUREX Storage
22 Tunnels is by means of the railroad tunnel.

23
24 The PUREX Storage Tunnels branch off from the railroad tunnel and extend
25 southward from the east end of the PUREX Plant. The tunnels are used for
26 storage of mixed waste from the PUREX Plant and from other onsite sources.
27 Each storage tunnel is isolated from the railroad tunnel by a water-fillable
28 shielding door. There are no electrical utilities, water lines, drains, fire
29 detection or suppression systems, radiation monitoring, or communication
30 systems provided inside the PUREX Storage Tunnels.

31
32 Material selected for storage is loaded on railcars modified to serve as
33 both transport and storage platforms. Normally, a remote-controlled,
34 battery-powered locomotive is used to position the railcar in the storage
35 tunnel. In the past and possibly in the future, other remote movers, e.g.,
36 standard locomotive with a string of railcar spacers, power winch, etc., have
37 or could be used to position a railcar into the tunnel or to withdraw a car
38 from the tunnel. The railcar storage positions are numbered sequentially,
39 commencing with Position 1 that abuts the railstop bumper at the south end of
40 each tunnel. Position 2 is the location of the railcar that abuts the railcar
41 in Position 1 and so forth. The railcars and material remain in the storage
42 tunnel until retrieval is required. Each railcar is retrievable; however,
43 because the railcars are stored on a single, dead-end railroad track, the
44 railcars can be removed only in reverse order (i.e., last in, first out).

45
46 Construction of Tunnel Number 1 was completed in 1956 and consists of
47 three areas: the water-fillable door, the storage area, and the vent shaft.
48 The water-fillable door is located at the north end of Tunnel Number 1 and
49 separates the storage tunnel from the PUREX railroad tunnel. The door is
50 7.5 meters high, 6.6 meters wide, and 2.1 meters thick, and is constructed of
51 1.3 centimeter steel plate. The door is hollow so that the door can be filled
52 with water to act as a radiation shield when the door is in the down (closed)

1 position. If the door is filled with water, the water must be pumped from the
2 door before the door can be raised.

3 Above the door is a reinforced concrete structure into which the door is
4 raised to open the tunnel. Electric hoists used for opening and closing the
5 door are located on the top of this concrete structure.

6
7 The storage area is that portion of the tunnel that extends southward
8 from the water-fillable door. Inside dimensions of Tunnel Number 1 are
9 109.1 meters long, 6.7 meters high, and 5.9 meters wide. Ceiling and walls
10 are 35.6 centimeters thick and constructed of 30.5- by 35.6-centimeter
11 creosote pressure-treated Douglas fir timbers arranged side by side. The
12 first 30.5 meters of the east wall are constructed of 0.9-meter-thick
13 reinforced concrete. A 40.8-kilogram mineral-surface roofing material was
14 used to cover the exterior surface of the timbers before placement of
15 2.4 meters of earth fill. The earth cover serves as protection from the
16 elements and as radiation shielding. The timbers that form the walls rest on
17 reinforced concrete footings 0.9 meter wide by 0.3 meter thick. The floor
18 consists of a railroad track laid on a gravel bed. The space between the ties
19 is filled to top-of-tie with gravel ballast. The tracks are on a 1.0 percent
20 downward slope to the south to ensure that the railcars remain in their
21 storage position. A railcar bumper is located 2.4 meters from the south end
22 of the tracks to act as a stop. The capacity of the storage area is eight,
23 12.8-meter-long railcars.

24
25 In June 1960, the first two railcars were loaded with a single,
26 approximately 12.5-meter-long, failed separation column and placed in Tunnel
27 Number 1. Between June 1960 and January 1965, six more railcars were placed
28 in Tunnel Number 1, filling the tunnel. After the last car was placed in the
29 northern-most storage position (Position 8), the water-fillable door was
30 closed, filled with water, and deactivated electrically.

31
32 Construction of Tunnel Number 2 was started and completed in 1964. Like
33 Tunnel Number 1, Tunnel Number 2 consists of three functional areas: the
34 water-fillable door, the storage area, and the vent shaft. Construction of
35 Tunnel Number 2 differs from that of Tunnel Number 1 as follows.

36
37 • A combination of steel and reinforced concrete was used in the
38 construction of the storage area for Tunnel Number 2 rather than wood
39 timbers, as used in Tunnel Number 1.

40
41 • Tunnel Number 2 is longer, having a storage capacity of five times
42 that of Tunnel Number 1.

43
44 • The floor of Tunnel Number 2, outboard of the railroad ties, slopes
45 upward to a height of approximately 1.8 meters above the railroad bed,
46 whereas the floor in Tunnel Number 1 remains flat all the way out to
47 the side walls.

48
49 • The railroad tunnel approach to Tunnel Number 2 angles eastward then
50 angles southward to parallel Tunnel Number 1. The approach to Tunnel
51 Number 1 is a straight extension southward from the PUREX Plant.

Center-line to center-line distance between the two tunnels is approximately 18.3 meters.

The physical structure of the water-fillable door at the north end of Tunnel Number 2 essentially is identical to the water-fillable door for Tunnel Number 1. The water-fillable door for Tunnel Number 2 is approximately 57.9 meters south and 18.3 meters east of the water-fillable door for Tunnel Number 1. As of February 1995, the door is empty and there are no plans to fill it.

The storage area of Tunnel Number 2 is that portion of the tunnel extending southward from the water-fillable door. Construction of this portion of Tunnel Number 2 consists of a 10.4-meter diameter, steel (0.5 centimeter plate), semicircular-shaped roof, supported by internal I-beam wales attached to external, reinforced concrete arches. The concrete arches are 0.4 meter thick and vary in width from 0.4 to 1.8 meters. The arches are spaced on 4.8-meter centers. This semicircular structure is supported on reinforced concrete grade beams approximately 1.8 meters wide by 1.2 meters thick (one on each side) that run the full length of Tunnel Number 2. The interior and exterior surfaces of the steel roof are coated with a bituminous coating compound to inhibit corrosion. The entire storage area is covered with 2.4 meters of earth fill to serve as radiation shielding.

The nominal inside dimensions of Tunnel Number 2 are 514.5 meters long, 7.9 meters high, and 10.4 meters wide. However, because of the arch-shaped cross-section of Tunnel Number 2 and entry clearance at the water-fillable door, the usable storage area (width and height above top-of-rail) is 6.7 meters high and 5.8 meters wide, the same dimensions as for Tunnel Number 1. The floor consists of a railroad track laid on a gravel bed. The space between ties is filled to top-of-tie with gravel ballast. Commencing at the ends of the 2.4-meter-long ties, the earth floor is sloped upward on a 1 (vertical) to 1 1/2 (horizontal) grade. The tracks are on a 1/10 of 1 percent downgrade slope to the south to ensure the railcars remain in their storage position. A railcar bumper is located 2.4 meters from the south end of the tracks to act as a stop. The capacity of the storage area is 40, 12.8-meter-long railcars.

The first railcar was placed in storage in December 1967. As of February 1995, 21 railcars have been placed in Tunnel Number 2.

The only free-liquid dangerous waste stored in the tunnels is mercury. The mercury is contained within thick-walled 0.8 centimeter thermowells constructed from 7.6 centimeter Schedule 80, 304L stainless steel pipe. The top of the thermowell is closed with a 304L stainless steel nozzle plug with a metal-to-metal seal. The amount of mercury per thermowell is less than 1.7 liters.

Other liquid containers, such as large discarded process tanks or vessels, are stored in the PUREX Storage Tunnels. The containers in storage are empty [per WAC 173-303-160(2)(a)]. Prior to storage, vessels will be flushed and the final rinsate sampled and analyzed to verify that the residual heel is not a dangerous waste.

1 The only stored dangerous waste that is either reactive or ignitable is
2 silver nitrate in the silver reactors, which is designated as ignitable (D001)
3 [WAC 173-303-090(5)]. The potential for ignition is considered to be
4 negligible because this material is dispersed on ceramic packing and is
5 physically isolated from contact with any combustible material or ignition
6 source.

7

8

9 **1.1 PROCESS AND ACTIVITIES**

10 The function of the PUREX Tunnels is to store mixed waste until the waste
11 can be processed for final disposal. When waste is to be placed in the
12 storage tunnels, a work plan, describing the overall transfer activities and a
13 storage tunnel checklist are prepared. The work plan and storage tunnel
14 checklist are routed for review and concurrence by key personnel and forwarded
15 to management for approval.

16

17

18

19 **1.2 PHYSICAL CHARACTERIZATION OF MATERIAL TO BE STORED**

20

21 Physical characterization of waste includes an evaluation of the
22 following physical properties:

23

24 • Length, width, and height
25 • Gross weight and volume
26 • Preferred orientation for transport and storage
27 • Presence of dangerous waste constituents.

28 Information sources used in physical characterization include equipment
29 fabrication and installation drawings, operational records, and process
30 knowledge. Physical characterization provides information necessary to
31 appropriately describe the waste material. Such information also is used to
32 design and fabricate, if required, supports on the railcar.

33

34 Before removal from service, the equipment could be flushed to minimize
35 loss of products, to reduce radioactive contamination, and to reduce dangerous
36 waste constituents present in a residual heel to nonregulated levels. If
37 equipment is flushed, analysis of the rinsate is used to determine when these
38 goals have been achieved.

39

40

41

42 **1.3 IDENTIFICATION/CLASSIFICATION AND QUANTITIES OF HAZARDOUS**
43 **WASTE MANAGED WITHIN THE PUREX STORAGE TUNNELS**

44

45 Because the dangerous waste is an integral part of radioactively
46 contaminated material, the dangerous waste is managed as mixed waste.
47 Table 1 contains an inventory of waste stored within the PUREX Storage
48 Tunnels, as of February 1995.

2.0 WASTE ANALYSIS PARAMETERS

Analytical requirements were selected on the basis of knowledge required for the safe handling and storage of the waste within the PUREX Storage Tunnels for operational compliance, including any operational issues.

2.1 WASTE IDENTIFICATION

A prerequisite step in proper waste management is to adequately address whether waste being considered for management within the PUREX Storage Tunnels falls within the scope of this facility's permit. This includes identifying any hazardous waste in accordance with regulatory and permit requirements and applicability of any land disposal restricted waste.

This chapter provides information on how the chemical and physical characteristics of the mixed waste currently stored in the PUREX Storage Tunnels were determined so the dangerous waste is stored and managed properly.

Material presently stored in the PUREX Storage Tunnels contains the following dangerous waste:

- Lead
- Mercury
- Silver and Silver Salts
- Chromium
- Cadmium.

Dangerous waste generally is either attached to or contained within some materials in the storage tunnels. Because the dangerous waste is an integral part of radioactively contaminated material, this material is managed as a mixed waste. Table 1 provides an approximation of the total amount of dangerous waste contained in the PUREX Storage Tunnels as of February 1995.

Storage of non-PUREX waste is reviewed on a case-by-case basis. Sampling, chemical analysis, and/or process knowledge (as discussed in the following section) are required to confirm the characteristics and quantities of dangerous waste to be stored. Future waste and dangerous constituents might not be in the same configuration or form as described in the following sections.

2.1.1 Lead

Lead stored was used in various capacities during past Hanford Facility operations. Primary functions of lead included use as weights, counterweights, and radiation shielding. Often the lead is encased in steel (carbon or stainless) to facilitate its attachment to various types of equipment.

1 Lead exhibits the characteristic of toxicity as determined by the
2 toxicity characteristics leaching procedure and is designated D008.
3 [WAC 173-303-090(8)]. The quantity of lead present could produce an extract
4 greater than 500 milligrams per liter should the lead be exposed to a
5 leachate. However, because the bulk of the lead is encased in steel, is
6 stored inside a weather-tight structure, and is elevated above floor level on
7 railcars that isolate the lead from other materials stored, the potential for
8 exposure of bare lead to a leachate is considered to be negligible.
9

10 Sampling and chemical analysis is not performed on lead associated with
11 the material placed in the PUREX Storage Tunnels. The quantity of lead is
12 determined from a review of the fabrication drawings for material removed from
13 the PUREX Plant, or from manifests and/or sample analyses provided from onsite
14 sources before receipt of waste. Therefore, the accuracy of the estimate of
15 the amount of lead presently stored in each tunnel is limited to the data
16 available from existing fabrication drawings. The estimated quantity of lead
17 (Table 1) accounts only for the lead that has been removed from the PUREX
18 Plant. Counterweights on equipment dunnage and lead used for shielding cannot
19 be quantified by existing historical records and are not included in the
20 amount of lead listed. However, following removal, the material will be
21 examined and any suspect attachments will be removed, evaluated, and disposed
22 of in accordance with established procedures.
23
24

25 2.1.2 Mercury

26
27 Mercury is contained within thermowells that are an integral part of
28 irradiated reactor fuel dissolvers used at the PUREX Plant. The dissolvers
29 are large 304L stainless steel process vessels that are approximately
30 2.7 meters in diameter, 7.3 meters tall, and weigh approximately
31 26,309 kilograms. The outer shell is constructed of a 1-centimeter-thick
32 plate. The dissolvers were used in decladding and dissolving irradiated
33 reactor fuel in the PUREX Plant.
34

35 Depending on the specific dissolver in question, 19.1 or 45.4 kilograms
36 of mercury (1.4 or 1.77 liters) were poured into each of the two thermowells
37 per dissolver (38.1 or 45.4 kilograms total per dissolver) following vertical
38 installation of the dissolvers inside the PUREX canyon and before it was
39 installed in a process cell. The mercury served to transfer heat from the
40 dissolver interior to the thermohm temperature sensor mounted within the
41 thermowell. This mercury remains within the thermowells of discarded
42 dissolvers. In preparation for storage, the thermohms were removed and the
43 upper end of each thermowell was plugged with a 304L stainless steel nozzle
44 plug. In storage, the discarded dissolver rests in an inclined position in a
45 cradle on the railcar. The mercury contained in the thermowells remains in
46 the lower portion of each thermowell and, under normal conditions, is never in
47 contact with the mechanical closure on the nozzle end of the thermowell.
48

49 Mercury exhibits the characteristic of toxicity as determined by the
50 toxicity characteristics leaching procedure and is designated D009
51 [WAC 173-303-090(8)].
52

1 The potential for mercury to become exposed to leachate is considered
2 negligible. The PUREX Storage Tunnels are designed and constructed as
3 weather-tight structures. Further, the mercury is encased in a stainless
4 steel pipe within a stainless steel vessel that is stored on a railcar above
5 the floor level of the tunnels. Therefore, exposure of the mercury stored in
6 the tunnels to leachate is not considered a credible occurrence.

7 Sampling and chemical analysis is not performed on mercury associated
8 with the dissolvers stored in Tunnel Number 2. The quantity of mercury
9 present in each thermowell is documented on Table 1.

10 2.1.3 Silver

11 Silver, mostly in the form of silver salts deposited on unglazed ceramic
12 packing, is contained within the discarded silver reactors stored in Tunnel
13 Number 2. The silver reactors were used to remove radioactive iodine from the
14 offgas streams of the irradiated reactor fuel dissolvers. The reactor vessel
15 is approximately 1.4 meters in diameter by 4.1 meters tall and is constructed
16 of 1-centimeter 304L stainless steel. The vessel contains two 1.2-meter-deep
17 beds of packing. Each bed consists of a 30.5-centimeter depth of
18 2.5-centimeter unglazed ceramic saddles topped with a 0.6-meter depth of
19 1.3-centimeter unglazed ceramic saddles. The two beds are separated
20 vertically by a distance of about 0.6 meter, and each bed rests on a support
21 made of stainless steel angles and coarse screen. The packing was coated
22 initially with 113.4 kilograms of silver nitrate used for iodine retention.
23 Nozzles on the top of the reactor were provided to allow flushing and/or
24 regeneration of the packing with silver nitrate solution as the need arose.

25 Because of competing reactions, which include conversion of silver
26 nitrate to silver iodide, reduction of silver nitrate to metallic silver, and
27 formation of silver chloride, the packing of a stored silver reactor contains
28 a mixture of silver nitrate, silver halides, and silver fines.

29 Silver salts exhibit the characteristics of toxicity as determined by the
30 toxicity characteristics Leaching procedure and are designated D011
31 [WAC 173-303-090(8)]. In addition, nitrates exhibit the characteristic of
32 ignitability and also are designated as D001 [WAC 173-303-090(5)].

33 The potential of silver, including silver salts, stored in the PUREX
34 Storage Tunnels to become exposed to leachate is considered negligible.
35 Silver is contained within a stainless steel vessel, stored inside a
36 weather-tight structure, and elevated above floor level on a railcar.
37 Therefore, exposure of the silver stored in the tunnels to leachate is not
38 considered to be a credible occurrence. Also, the contained silver is
39 isolated from contact with any combustibles; therefore, the possibility of
40 ignition is considered to be extremely remote.

41 Provisions for taking samples of the packing were not provided in the
42 design of the vessels. Therefore, sampling and chemical analysis is not
43 performed for silver salts before placing a silver reactor in storage.
44 However, for accountability purposes, the total silver content (Table 1) is

1 considered to be silver nitrate, the salt that exhibits the characteristics of
2 both ignitability and toxicity.

3
4 The quantity of silver salts contained within a discarded silver reactor
5 is a function of silver nitrate regeneration history. Operating records
6 (process knowledge) of regenerations and flushes are used to estimate the
7 total accumulation of silver within each reactor.

8
9
10 2.1.4 Chromium

11
12 Presently, chromium stored in Tunnel Number 2 is contained within a
13 failed concentrator. The concentrator is a vertical tube structure that was
14 used to concentrate aqueous streams from the final uranium cycle, final
15 plutonium cycles, final neptunium cycles, and condensate from the acid
16 recovery system for recycle. Following service, the concentrator was
17 inspected and found to contain silicate solids with high levels of chromium
18 from the corrosion of stainless steel.

19
20 Chromium exhibits the characteristic of toxicity as determined by the
21 toxicity characteristics leaching procedure and is designated D007
22 [WAC 173-303-090(8)].

23
24 The potential for the chromium stored in Tunnel Number 2 to become
25 exposed to leachate is considered negligible. Tunnel Number 2 is designed and
26 constructed to be weather-tight. Further, the chromium is encased within a
27 304L stainless steel vessel that is stored on a railcar above the floor level
28 of the tunnel. Therefore, exposure of the chromium stored in the tunnel to
29 leachate is not considered to be a credible occurrence.

30
31 The quantity of chromium within the concentrator was estimated by
32 calculating the volume of silicate solids and the percentage of chromium
33 within the silicate solids.

34
35
36 2.1.5 Cadmium

37
38 Presently, cadmium stored in the PUREX Storage Tunnel Number 2 is
39 associated with radiation shielding and with a dissolver moderator. The
40 cadmium was used to shield equipment from radiation and consists of sheets of
41 the metal attached to lead, both of which could be encased in steel.

42 The dissolvers are annular vessels that are geometrically favorable for
43 criticality safety. The dissolvers were placed over cadmium lined (neutron
44 absorbers) moderators for additional criticality safety. The moderator is a
45 centrally located, cylindrical, cadmium-jacketed 0.08-centimeter-thick
46 concrete 15.2-centimeter-thick neutron absorber. The moderators are
47 approximately 4.4 meters tall by approximately 1.5 meters outer diameter.

48
49 Cadmium exhibits the characteristic of toxicity as determined by the
50 toxicity characteristics leaching procedure and is designated D006
51 [WAC 173-303-090(8)]. If exposed to a leachate, the quantity of cadmium
52 present could produce an extract having a concentration of greater than or

1 equal to 1 milligram per liter, but less than 100 milligrams per liter;
2 therefore, the mixed waste is managed as a WT02 [WAC 173-303-100(5)],
3 dangerous waste, and is designated further as WC02 [WAC 173-303-100(7)].

4
5 The potential for the cadmium stored in Tunnel Number 2 to become exposed
6 to leachate is considered negligible. Tunnel Number 2 is designed and
7 constructed to be weather-tight. Further, the cadmium is stored on a railcar
8 above the floor level of the tunnel.

9
10 The quantity of cadmium is determined from a review of the fabrication
11 drawings for material removed from the PUREX Plant. The estimated quantity of
12 cadmium (Table 1) accounts only for the cadmium removed from PUREX Plant.

13
14
15 **2.1.6 Identification of Incompatible Waste**

16
17 The next step was to ensure that sufficient information has been provided
18 concerning the waste so the waste can be managed properly. This included
19 identifying incompatible waste. These safety issues primarily are related to
20 prevention of unwanted chemical reactions that could create a catastrophic
21 situation, such as a fire, an explosion, or a large chemical release.

22
23
24 **2.1.7 Operational Considerations**

25
26 Sufficient information must be available to ensure that incoming waste
27 meets operational acceptance limits, e.g., physical size, radiation limits and
28 permit conditions. These operating specifications are limits and controls
29 imposed on a process or operation that, if violated, could jeopardize the
30 safety of personnel, and could damage equipment, facilities, or the
31 environment. Operating specifications have been established from operating
32 experience, process knowledge and calculations.

33
34
35 **2.2 PARAMETER AND RATIONALE SELECTION PROCESS**

36
37 This WAP describes the process to ensure that the dangerous waste
38 components of the material stored in the tunnels are properly characterized
39 and designated so that dangerous and mixed waste is managed properly.

40
41 The parameters considered for waste designation under WAC 173-303-070(3)
42 and the rationale for their application are discussed in the following
43 sections.

44
45
46 **2.2.1 Discarded Chemical Products**

47
48 The first category of dangerous waste designation is "Discarded Chemical
49 Products" (WAC 173-303-081). The waste stored in the tunnels does not fit the
50 definitions in WAC 173-303-081 for a discarded chemical product. Therefore,
51 the dangerous waste stored in the PUREX Storage Tunnels is not designated as a
52 discarded chemical product.

1
2 **2.2.2 Dangerous Waste Sources**

3
4 The second category of dangerous waste designation is "Dangerous Waste
5 Sources" (WAC 173-303-082). The waste stored in the tunnels is not listed on
6 the "Dangerous Waste Sources List" (WAC 173-303-9904). Therefore, the
7 dangerous waste stored in the PUREX Storage Tunnels is not designated as a
8 dangerous waste source.
9

10
11 **2.2.3 Dangerous Waste Characteristics**

12
13 The third category of dangerous waste designation is "Dangerous Waste
14 Characteristics" (WAC 173-303-090). The characteristics are as follows.
15

16
17 • Characteristic of Ignitability--Although the solid silver nitrate has
18 not been tested in accordance with Appendix F of 49 CFR 173, the waste
19 is assumed to be an oxidizer as specified in 49 CFR 173.127(a).
20 Therefore, the silver nitrate waste is assumed to exhibit the
21 characteristic of ignitability under WAC 173-303-090(5) and is
22 designated as D001.
23
24 • Characteristic of Corrosivity--Some of the material stored within the
25 tunnels either has contained or has been in contact with corrosive
26 liquids. The standard operating procedure has been to flush vessels
27 with water to recover as much special nuclear material as practical.
28 Also, flushing removes much of the radioactive contamination,
29 minimizing the spread of contamination during handling. Currently,
30 the final aqueous rinse is sampled and analyzed to confirm that the pH
31 is greater than 2 and less than 12.5. Therefore, the waste stored in
32 the PUREX Storage Tunnels is not designated as corrosive waste.
33
34 • Characteristic of Reactivity--The waste stored in the tunnels does not
35 meet any of the definitions of reactivity as defined in
36 WAC 173-303-090(7). The waste material is not unstable, does not
37 react violently with water, does not form explosive mixtures, or does
38 not generate toxic gases. Therefore, the waste stored in the PUREX
39 Storage Tunnels is not designated as reactive waste.
40
41 • Characteristic of Toxicity--Lead, mercury, silver, chromium, and
42 cadmium are identified on the Toxicity Characteristics list. The
43 quantity of these materials stored in the tunnels is sufficient that,
44 should the substances come in contact with a leachate (an event
45 considered unlikely), the concentration of the extract could be above
46 the limits identified in the list. Therefore, this waste is
47 designated D006, D007, D008, D009, and D011.

48
49 The PUREX Storage Tunnels also are permitted for barium (D005), and
50 selenium (D010). Currently, there is no waste stored in the tunnels
51 that is designated for D005 or D010; however, there is a potential for
52 waste with these waste numbers to be stored within the tunnels.

1 2.2.4 Dangerous Waste Criteria

2 The fourth category of dangerous waste designation is "Dangerous Waste
3 Criteria" (WAC 173-303-100). The criteria are as follows:

- 6 • Toxicity Criteria--Cadmium meets the toxicity criteria in
7 WAC 173-303-100(5) when performing a book designation. Because of the
8 concentrations present, the waste containing these constituents is
9 designated as dangerous waste (DW) and is assigned the dangerous waste
10 number of WT02.
- 11 • Persistence Criteria--Currently, no waste stored in the tunnels has
12 been designated as persistent per WAC 173-303-100(6).
- 13 • Carcinogenic Criteria--Cadmium meets the carcinogenic criteria in
14 WAC 173-303-100(7) when performing a book designation. Because of the
15 concentration, waste containing cadmium is designated as a dangerous
16 waste and is assigned the dangerous waste number WC02.

20 2.2.5 Waste Designation Summary

21 The mixed waste currently stored in the PUREX Storage Tunnels is
22 designated as follows:

- 26 • Lead--D008; EHW
- 27 • Mercury--D009; EHW
- 28 • Silver and Silver Salts--D001, D011; EHW
- 29 • Chromium--D007; EHW
- 30 • Cadmium--D006, WT02, WC02; DW.

32 2.3 RATIONALE FOR PARAMETER SELECTION

34 Refer to Section 2.2.

39 2.4 SPECIAL PARAMETER SELECTION

41 Refer to Section 2.2.

45 3.0 SELECTION OF SAMPLING PROCEDURES

48 The following sections discuss the sampling methods and procedures that
49 will be used. Sampling usually will be in accordance with requirements
50 contained in the pertinent sampling analysis plan, data quality objectives,
51 procedures, and/or other documents that specify sampling and analysis
52 parameters.

1 **3.1 SAMPLING STRATEGIES**

4 The only analysis presently used in support of the PUREX Storage Tunnels
5 operation is a corrosivity check on the final in-place aqueous rinse of
6 discarded vessels before the vessels are released for storage. The pH is
7 determined by a pH meter using U.S. Environmental Protection Agency (EPA) Test
8 Method 9040 or 9041 in *Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods* (EPA 1986). RCRA sampling will not be performed on
9 any waste currently stored in the PUREX Storage Tunnels.

10 There is a potential for the PUREX Storage Tunnels to receive waste that
11 is not generated at the PUREX Facility. Any required sampling strategies
12 associated with this waste will be developed on a case-by-case basis.

13 **3.1.1 Sampling Methods**

14 Process knowledge of the characteristics and the quantities of the
15 dangerous waste to be stored in the PUREX Storage Tunnels is considered
16 sufficient to properly designate and manage the stored waste.

17 The waste currently stored in the tunnels is lead, mercury, chromium,
18 cadmium, and silver. Sampling and chemical analysis of the lead, mercury,
19 cadmium, or chromium to confirm their presence would not provide additional
20 data beneficial to proper management of the waste and would not be in
21 compliance with as low as reasonably achievable (ALARA) principles. The
22 silver salts are nonuniformly distributed on ceramic packing contained within
23 a large stainless steel reactor vessel. Representative sampling of the
24 packing in place is not considered to be practical and therefore is not
25 performed.

26 If RCRA sampling is required for operation of the PUREX Storage Tunnels,
27 representative sampling methods listed in WAC 173-303-110 or some other method
28 approved by the Washington State Department of Ecology (Ecology) will be used.

29 In the event the PUREX Storage Tunnels receive waste from other Hanford
30 Facility activities, sampling, chemical analysis, and/or process knowledge
31 will be required to confirm the characteristics and quantities of mixed waste
32 to be stored. Storage of non-PUREX Facility waste will be reviewed on a case-
33 by-case basis.

34 **3.1.2 Frequency of Analyses**

35 Because the dangerous waste components of mixed waste stored in the PUREX
36 Storage Tunnels are stable and will remain undisturbed for a long time, the
37 waste designations and quantities present will remain the same as assigned at
38 the time of storage. Therefore, repeated analysis is not considered necessary
39 to ensure that waste designation data are representative.

1 In the event the PUREX Storage Tunnels receive waste from other Hanford
2 Facility activities, this waste also will remain undisturbed and the
3 designations and quantities will be consistent with those at the time of
4 storage, making repeated analysis unnecessary.

5 **3.2 SELECTION OF SAMPLING EQUIPMENT**

6 The only analysis presently used in support of the PUREX Storage Tunnels
7 operation is for corrosivity on the final in-place aqueous rinse of discarded
8 vessels before the vessels are released for storage. The pH is determined by
9 Method 9040 or 9041 (SW-846). RCRA sampling will not be performed on any
10 waste currently stored in the PUREX Storage Tunnels.

11 **3.3 MAINTAINING AND DECONTAMINATING FIELD EQUIPMENT**

12 All RCRA sampling equipment used to collect and transport samples must be
13 free of contamination that could alter test results. Equipment used to
14 obtain and contain samples must be clean. Acceptable cleaning procedures for
15 sample bottles and equipment include, but are not limited to, washing with
16 soap or solvent, and steam cleaning. After cleaning, cleaning residues must
17 be removed from all equipment that could come into contact with the waste.
18 One method to remove these residues would be a solvent (acetone or other
19 suitable solvent) rinse followed by a final rinse with deionized water.
20 Equipment must be cleaned before use for another sampling event.

21 After completion of sampling, equipment should be cleaned as indicated
22 previously. If decontamination of the equipment is not feasible, the sampling
23 equipment should be disposed of properly.

24 **3.4 SAMPLE PRESERVATION AND STORAGE**

25 Following RCRA sampling, sample preservation follows those procedures set
26 forth for the specific analysis identified. Preservation will be in
27 accordance with the methods stated in SW-846 or any of the test methods
28 adopted by the Hanford Facility that meet WAC 173-303 requirements. No
29 preservation method will be used when there are ALARA concerns.

30 **3.5 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES**

31 The only test method presently used in support of the PUREX Storage
32 Tunnels operation is a corrosivity check on the final in-place aqueous rinse
33 of discarded vessels before the vessels are released for storage. RCRA
34 sampling will not be performed on any waste currently stored in the PUREX
35 Storage Tunnels. Field duplicates, field blanks, trip blanks, and equipment
36 blanks will not be taken. Split samples could be taken at the request of the
37 EPA or Ecology.

38 Generally, quality assurance and quality control (QA/QC) requirements for
39 sampling will be divided between paperwork requirements, such as chain-of-

1 custody, and sampling and analysis activities. This section addresses
2 sampling QA/QC requirements. Analytical QA/QC is discussed in Section 4.0.
3

4 A chain-of-custody procedure is required for all sampling identified by
5 this WAP. At a minimum, the chain of custody must include the following:
6 (1) description of waste collected, (2) names and signatures of samplers,
7 (3) date and time of collection and number of containers in the sample, and
8 (4) names and signatures of persons involved in transferring the samples.
9

10 **3.6 HEALTH AND SAFETY PROTOCOLS**

11 The safety and health protocol requirements established for the Hanford
12 Site must be followed for all RCRA sampling activities required by this WAP.
13

14 **4.0 LABORATORY SELECTION AND TESTING AND ANALYTICAL METHODS**

15 This section discusses laboratory selection and the types of acceptable
16 analytical methods for RCRA samples.
17

18 **4.1 LABORATORY SELECTION**

19 Laboratory selection is limited as only a few laboratories are equipped
20 to handle mixed waste because of the special equipment and procedures that
21 must be used to minimize personnel exposure. Laboratory selection will depend
22 on laboratory capability, nature of the sample, timing requirements, and cost.
23 At a minimum, the selected laboratory must have the following:
24

25

- 26 • A comprehensive QA/QC program (both qualitative and quantitative)
- 27 • Technical analytical expertise
- 28 • An effective information management system.

29 These requirements will be met if the selected laboratory follows the
30 pertinent requirements contained in the *Hanford Analytical Services Quality*
31 *Assurance Plan* (DOE/RL-94-55). The selected laboratory also can meet these
32 requirements by having some other type of QA/QC program as long as equivalent
33 data quality is achieved.
34

35 **4.2 TESTING AND ANALYTICAL METHODS**

36 The testing and analytical methods for corrosivity used by the various
37 onsite analytical laboratories are outlined in SW-846. These methods will in
38 some cases deviate from SW-846 and American Society for Testing and Materials-
39 accepted specifications for holding times, sample preservation, and other
40 specific analytical procedures. These deviations are discussed in *Analytical*
41 *Methods for Mixed Waste Analyses at the Hanford Site* (DOE/RL-94-97).
42

7
8
9
10 **5.0 WASTE RE-EVALUATION FREQUENCIES**
11
1213 Re-evaluation of waste within the PUREX Tunnels will not occur because of
14 high radiation levels and the way the railcars are positioned in the tunnels.
15 The waste is expected to remain stable.
16
1718
19 **6.0 SPECIAL PROCEDURAL REQUIREMENTS**
20
2122 The following sections describe special procedural requirements
23 associated with waste in the PUREX Storage Tunnels.
2425 **6.1 PROCEDURES FOR RECEIVING WASTES GENERATED OFFSITE**
26
2728 The PUREX Storage Tunnels do not accept waste generated off the Hanford
29 Site.
3031 **6.2 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTE**
32
3334 Presently, the only ignitable, reactive, or incompatible dangerous waste
35 stored in the PUREX Storage Tunnels is the silver nitrate coating on the
36 ceramic packing inside the silver reactors. This material is confined to the
37 interior of a large stainless steel vessel (Section 2.1.3) that separates this
38 material from all other waste material stored in the tunnel. The requirements
39 in WAC 173-303-395(1)(a) require 'No Smoking' signs be conspicuously placed
40 wherever there is a hazard present from ignitable or dangerous waste. 'No
41 Smoking' signs are not considered appropriate at the PUREX Storage Tunnels
42 because the tunnels are a designated radiation area. Smoking is not allowed
43 in any radiation area on the Hanford Site and rules prohibiting smoking are
44 strictly enforced. Because the posting of radiation area barriers serves to
45 achieve the no smoking intent of WAC 173-303-395(1)(a), posting and
46 maintaining 'No Smoking' signs are not considered appropriate.
4748 Isolated areas within the PUREX Storage Tunnels have radiation levels in
49 excess of 5 roentgen per hour. Personnel entry into such radiation areas to
50 make periodic inspections [e.g., an annual fire inspection as required by
51 WAC 173-303-395(1)(d) for storage areas containing ignitable waste] would
be inconsistent with ALARA guidelines of the *Atomic Energy Act of 1954*.
Therefore, such inspections are not performed. The rationale for operations
associated with the PUREX Storage Tunnels are addressed further in a petition
for rulemaking submitted to Ecology (Freeberg 1989), in fulfillment of a
Tri-Party Agreement milestone (Milestone M-22-01) (Ecology et al. 1994).
52
5354 **6.3 PROVISIONS FOR COMPLYING WITH LAND DISPOSAL RESTRICTION REQUIREMENTS**
55
56

1 Operation of the PUREX Storage Tunnels does not involve land disposal or
2 treatment of dangerous waste. The information provided by the generating unit
3 regarding land disposal restrictions of dangerous waste is sufficient to
4 operate the PUREX Storage Tunnels in compliance with land disposal restriction
5 requirements. When final disposition of the waste occurs, this information
6 will be passed on for final treatment or disposal of the waste.
7

8

9 **6.4 DEVIATIONS FROM THE REQUIREMENTS OF THIS PLAN**

10

11 Management may approve deviations from this plan if special circumstances
12 arise that make this prudent. These deviations must be documented in writing
13 with a copy to be retained by the management.

14

15

16

17 **7.0 RECORDKEEPING**

18

19

20 Records associated with this waste analysis plan and waste verification
21 program are maintained by PUREX Regulatory Compliance personnel. These
22 records will be maintained until closure of the PUREX Storage Tunnels.
23 Records associated with the waste inventory will be maintained for 5 years.

1 8.0 REFERENCES
2
3
4 DOE/RL-94-55, *Hanford Analytical Services Quality Assurance Plan*, Rev. 2,
5 U.S. Department of Energy, Richland Operations Office, Richland,
6 Washington.
7
8 DOE/RL-94-97, *Analytical Methods for Mixed Waste Analyses at the Hanford Site*,
9 Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland,
10 Washington.
11
12 Ecology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent
13 Order*, Vols. 1 and 2, Washington State Department of Ecology,
14 U.S. Environmental Protection Agency, U.S. Department of Energy,
15 Olympia, Washington.
16
17 EPA, 1986, *Test Methods for the Evaluation of Solid Waste: Physical/Chemical
18 Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency,
19 Washington, D.C.
20
21 Freeberg, R. D., 1989, *Proposed Petitions for Rulemaking Changes for Interim
22 Milestone M-22-01*, Correspondence dated September 27, 1989,
23 Number 8955715, U.S. Department of Energy-Richland Operations Office,
24 Richland, Washington.

1
2
3
4
5

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Table 1. PUREX Storage Tunnels Inventory. (sheet 1 of 3)

PUREX #1 STORAGE TUNNEL (218-E-14)

TUNNEL IS AT ITS CAPACITY AS OF 1/22/65

PUREX #1 Storage Tunnel is located at the southeast end of the PUREX Plant and is an extention of the railroad tunnel. The storage area is approximately 109 meters long, 6.9 meters high and 5.8 meters wide. The tracks have a one percent down-grade toward the south end of the tunnel. The capacity of the Storage Tunnel is eight modified railroad cars, 12.8 meters long.

position

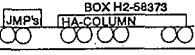
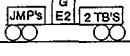
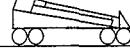
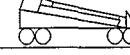
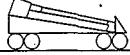
1. & 2.	HA COLUMN AND MISC JUMPERS IN BOX PLACED IN TUNNEL #1 ON 6/60 HA 4,700 CU. FT., 400 CURIES, 5 rem/hr. @ 60', JUMPRS 2,190 CU. FT., 2,000 CURIES, Pb - 115 Kg.	
3.	E-F11 #1 (1WW WASTE) CONCENTRATOR FAILED 7/24/60. PLACED IN TUNNEL #1 ON 7/29/60, 12.5 rem/hr. @ 100', 1,900 CU. FT., 40, 000 CURIES AFTER FIFTY-FIVE MONTHS SERVICE.	
4.	G-E2 CENTRIFUGE, MISC JUMPERS IN BOX AND TWO TUBE BUNDLES. PLACED IN TUNNEL #1 ON 12/24/60 (FUG SER# 762) 2,465 CU. FT., 3,000 CURIES, Pb - 115 Kg., 1.5 rem/hr. @ 150'.	
5.	E-H4 (3WB) CONCENTRATOR FAILED 1/4/61. PLACED IN TUNNEL #1 ON 1/4/61, 150 mrem/hr. @ 50', 2,336 CU. FT., 1,000 CURIES. AFTER FIVE YEARS SERVICE.	
6.	E-F6 (2WW WASTE) ORIGINAL CONCENTRATOR FAILED 4/21/61. PLACED IN TUNNEL #1 ON 4/21/61, 5 rem/hr. @ 20', 2,336 CU. FT., 700 CURIES. AFTER FIVE YEARS FOUR MONTHS SERVICE.	
7.	E-F11 (1WW WASTE) #2 CONCENTRATOR FAILED 2/1/62. PLACED IN TUNNEL #1 ON 2/8/62, 25 rem/hr. @ 150', 2,336 CU. FT., 40,000 CURIES. AFTER EIGHTEEN MONTHS SERVICE.	
8.	E-F6 (2WW WASTE) #3 SPARE CONCENTRATOR FAILED 5/23/64. PLACED IN TUNNEL #1 ON 1/22/65 FLAT CAR 3621. 2,400 CU. FT., 700 CURIES, 5 rem/hr. @ 20'.	

Table 1. PUREX Storage Tunnels Inventory. (sheet 2 of 3)

PUREX #2 STORAGE TUNNEL (218-E-15)

PUREX #2 Storage Tunnel is located at the southeast end of the PUREX Plant and is an extention of the railroad tunnel. The storage area is approximately 514.5 meters long, 7.9 meters high and 10.4 meters wide. The tracks have a one percent down-grade toward the south end of the tunnel. The capacity of the Storage Tunnel is 38-40 modified railroad cars, 12.8 meters long. The Tunnel contains 21 cars as of 2/95.

position

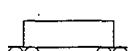
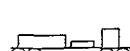
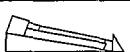
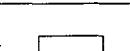
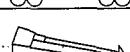
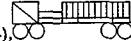
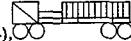
1.	E-F6 # (2WW WASTE) CONCENTRATOR, TK F 15-2, ONE TUBE BUNDLE AND AGITATOR MOTORS PLACED IN TUNNEL ON 12/12/67 ON CAR 61439 2,400 CU. FT., 700 CURIES, 1.3 rem/hr. @ 100'.	
2.	E-F6 #5 (E-H4 3WB) CONCENTRATOR, TWO TUBE BUNDLES PLACED IN TUNNEL ON 3/26/69 ON CAR MILW 60883 2,400 CU. FT., 500 CURIES, 800 mrem/hr. @ 2'.	
3.	E-F6 #6 (2WW WASTE) CONCENTRATOR, TWO TUBE BUNDLES FAILED PLACED IN TUNNEL ON 3/19/70 ON CAR 3612. 2,400 CU. FT., 700 CURIES, 500 rem/hr. @ 2'.	
4.	L CELL PACKAGE IN A SEALED STEEL BOX (H-66012) PLACED IN TUNNEL ON 12/30/70 ON CAR MILW 60033 2,400 CU. FT., 500 GRMS PU, 200 mrem/hr. @ CONTACT.	
5.	F2 SILVER REACTOR, F6 DEMISTER, VESSEL VENT LINE STEEL CAT-WALK AND GUARD RAILS. PLACED IN TUNNEL ON 2/26/71 ON GONDOLA CAR 4610. 2,400 CU. FT., 20 CURIES, Ag - ~625 Kg, 2 rem/hr. @ CONTACT.	
6.	MODIFIED A3-1 TOWER, SCRUBBER, LID AND VAPOR LINE PLACED IN TUNNEL ON 12/12/71 ON GONDOLA CAR 4611. 2,400 CU. FT., 10 CURIES, 1 rem/hr. @ CONTACT.	
7.	A3 DISSOLVER PLACED IN TUNNEL ON 12/22/71 ON NINE FT. SHORTENED CAR B58 2,400 CU. FT., 50 CURIES, Hg - ~45 Kg, 5 rem/hr. @ 5'.	
8.	A1W1 FUEL ENDS IN STEEL LINER BOX AND NPR FUEL HANDLING EQUIPT. USED WITH THE SUSPECTED CANISTERS, ON CAR 19808 PLACED IN TUNNEL ON 8/29/72. 800 CU. FT., 17,500 CURIES, 10 rem/hr. @ 150'.	
9.	C3 DISSOLVER PLACED IN TUNNEL ON 9/30/72 ON CAR 19811 1590 CU. FT., 50 CURIES, Hg - ~45 Kg., 5 rem/hr. @ 5'.	
10.	E-H4 (3WB) CONCENTRATOR, #61 TUBE BUNDLE, PROTOTYPE COOLING COIL AND A F-F1 FILTER TANK. PLACED IN TUNNEL 8/30/83 ON CAR CDX-1. 2,400 CU. FT., 500 CURIES, Hg - ~40 Kg., Cd - ~43 Kg., 800 mrem/hr. @ 2'.	
11.	A3 DISSOLVER (VESSEL #10 AND HEATER VESSEL #6) PLACED IN TUNNEL ON 1/18/86 ON CAR 3613 3,960 CU. FT., 0.81 CURIES, Hg - ~40 Kg., Cd - ~43 Kg., 3 mrem/hr. @ 3'.	
12.	WHITE BOX (H2-58456) CONTAINING EIGHT TUBE BUNDLES #S 57, 60, 62, 64, 67, 68, 74, AND 76 PULSER #5 AND OLD HEATER DISS LID OLD STYLE DUMPING TRUNNIONS (9), PLACED IN TUNNEL ON 1/20/86 ON CAR 3611. 5,438 CU. FT., 540 CURIES, 2 rem/hr. @ 3'.	

Table 1. PUREX Storage Tunnels Inventory. (sheet 3 of 3)

PUREX #2 STORAGE TUNNEL (218-E-15)

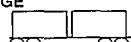
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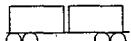
13. J5 TANK (VESSEL #30), F1 COND (VESSEL #13) AND F12-B CELL BLK. OLD FOUR-WAY DUMPER, DISS YOKE AND FLANGE PLATE, 3 rem/hr. @ 1'. PLACED IN TUNNEL ON 1/21/86 ON CAR 19806. 2,500 CU. FT., 90 CURIES. 

14. L-1 PULSER, 2-COLUMN CARTRIDGES, 1-JUMPER CUTTER, 3-JUMPER ALIGNMENT TOOLS, 9-EXTERIOR DUMPING TRUNNIONS, 10-PUMPS, 3-AGITATORS, 4-TUBE BUNDLES, 2-VENT JUMPERS AND 7-YOKES. PLACED IN TUNNEL ON 11/18/87 ON CAR PX-10 (10A-19380) & RACK H2-96629.50. 50 TONS, 3,600 CU. FT., 33,740 CURIES (REF: LETTER 12110-88-074),  FLUOROTHENE - ~180 Kg., Pb - ~2540 Kg., 5 rem/hr. @ 15'. 

15. SILVER REACTOR, E-F2 STEAM HEATER AND STORAGE LINER (H2-65095) FULL OF CUT UP JUMPERS PLACED IN TUNNEL ON 5/13/88 ON CAR PX-9 (10A-19809) & S/R CRADLE SK-GLR-11-2-87. 20 TONS, 2,775 CU. FT., 240 CURIES (REF: LETTER 12110-88-074), Cd - ~13 Kg., Ag - ~115 Kg., Pb - ~230 Kg., 20 mrem/hr. @ 20'. 

16. E-J8-1 UNITIZED CONCENTRATOR VESS #1 H2-52477, FAILED 3/11/89 PLACED ON STORAGE CAR H2-99608, PX-6 (10A-19028) AND INTO #2 TUNNEL 4/6/89 GRAVEYARDS. EST. 42 TONS, 6,000 CU. FT. 1.5 CURIES (REF: LETTER 12113-89-027), 0.5 mrem/hr. @ 10'. 

17. NORTH STORAGE LINER H2-65095 CONTAINING SIX PUMPS, ONE AGITATOR AND CUT UP JUMPER (14 TONS). SOUTH STORAGE LINER H2-65095 CONTAINING ONE PUMP, ONE #15 YOKE AND CUT UP JUMPERS (11.5 TONS). PLACED ON STORAGE CAR PX-19 (10A-19030) AND INTO #2 TUNNEL 8/5/89 DAYS. EST 25.5 TONS, 2,574 CU. FT. 3.0 CURIES (REF: LETTER 12113-89-051), 80 mrem/hr. @ 1'. 

18. T-F5 ACID ABSORBER, ID#1-T-F5/F-168713, H2-52535 AND H2-52487/488. PLACED ON STORAGE CAR PX-2 AND INTO #2 TUNNEL 4/8/94. EST 22 TONS, 835 CU. FT., 185 CURIES, 90 mrem/hr. @ CONTACT. 

19. FOUR METAL LINER STORAGE BOXES H-2-65095-3/H-2-100187-0 CONTAINING FAILED JUMPERS AND MISCELLANEOUS OBSOLETE CANYON EQUIPMENT ITEMS. PLACED ON STORAGE CAR PX-23 AND INTO #2 TUNNEL 9/16/94. EST 60 TONS, 4032 CU. FT., 927 CURIES, 30 mrem/hr. @ 2'. 

20. E-H4-1 UNITIZED CONCENTRATOR (H-2-52477/56213)/(E-H4-1). PLACED IN TUNNEL ON 1/27/93 ON CAR PX-28. EST 40 TONS, 5,760 CU. FT., 3,070 CURIES, Cr - ~8 Kg., 1000 mrem/hr. @ 5'. 

21. TANK E-5 (H-2-52453)/(F-166955), LEAD STORAGE BOX ASSEMBLY (H-2-131629)/(H-2-131629-1), H4 CONCENTRATOR TOWER (H-2-58102)/(F-223017-CBT-4), HOT SHOP COVER PLATE (H-2-52222)/(Q*), TUBE BUNDLE WASH CAPSULE (H-2-58647), DISSOLVER CHARGING INSERT (H-2-75875)/(H-2-75875-1), LIFTING YOKE #7A (H-2-96837), LIFTING YOKE #9 (H-2-52458). PLACED IN TUNNEL ON 2/8/95 ON CAR PX-3609. EST 44 TONS, 3,457 CU. FT., 26,000 CURIES, Pb - ~1930 Kg., 1000 mrem/hr. @ 4'. 

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APPENDIX 4A

ENGINEERING DRAWINGS

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7 ENGINEERING DRAWINGS
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As-built drawings (aperture cards) for the PUREX Storage Tunnels:

H-2-55587 218-E-14 Structural Floor Plan and Section, Rev. 7
H-2-55588 Structural Sections and Details: Disposal Facility for Failed Equipment, Rev. 7
H-2-55589 Structural Sections and Details: Disposal Facility for Failed Equipment, Rev. 2
H-2-55594 Shielding Door Fill and Drain Lines Arrangement: Disposal Facility for Failed Equipment, Rev. 2
H-2-55597 Steam and Air Lines Relocation Layout: Disposal Facility for Failed Equipment, Rev. 1
H-2-55599 Electrical Door Control Plan, Elementary Diagram and Miscellaneous Details: Disposal Facility for Failed PUREX Equipment, Rev. 2
H-2-58175 PUREX Tunnel: As Built, May 1962, Rev. 2
H-2-58195 Structural Sections and Details: Equipment Disposal - PUREX, Rev. 1

H 020055587 001	R07	0202A	0900	11/80	*
H 020055588 001	R01	0202A	0901	02/55	*
H 020055589 001	R03	0202A	0901	03/82	*
H 020055594 001	R02	0202A	0903	06/56	*
H 020055597 001	R01	0202A	0300	02/56	*
H 020055599 001	R02	0202A	7502	10/56	*
H 020058175 001	R002	0202A	0501	07/62	*
H 020058195 001	R01	0202A	0901	04/65	*

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APPENDIX 7A

UNIT-SPECIFIC CONTINGENCY PLAN FOR THE 218-E-14 AND 218-E-15 STORAGE TUNNELS

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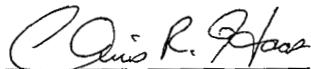
The building unit-specific contingency plan is updated annually. Future
updates will reflect terminology consistent with the permit application.

UNIT-SPECIFIC CONTINGENCY PLAN FOR
THE 218-E-14 AND 218-E-15 STORAGE
TUNNELS

Document WHC-IP-0603-218-E-14/15
Page 1 of ii
Issue Date October 13, 1995

Document Title: UNIT-SPECIFIC CONTINGENCY PLAN FOR THE 218-E-14 and
218-E-15 STORAGE TUNNELS

Prepared by:


C.R. Haas
PUREX Regulatory Compliance

10-13-95

Date

Approved by:


D.G. Hamrick, Director
PUREX Transition Project

10/13/95

Date

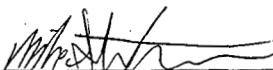
Approved by:


G.J. LeBaron, Manager
PUREX Regulatory Compliance

10/13/95

Date

Approved by:


M.J. Stephenson
RCRA Compliance Support

10/13/95

Date

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1.0 GENERAL INFORMATION (G-1)

The PUREX (plutonium-uranium extraction) Storage Tunnels are located in the 200 East Area of the 1,450-square kilometer U.S. Department of Energy (DOE) operated Hanford Site in southeastern Washington State. This unit-specific contingency plan in conjunction with those portions of WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*, WHC-CM-4-43, *Emergency Management Procedures* and DOE/RL-93-75, *Hanford Facility Contingency Plan* that apply to the PUREX Storage Tunnels meet the requirements of this section.

1.1 FACILITY NAME: U.S. Department of Energy Hanford Site
PUREX Storage Tunnels.

1.2 FACILITY LOCATION: Benton County, Washington; within the 200 East Area.
Structures covered by this plan are:

218-E-14 Tunnel Number 1
218-E-15 Tunnel Number 2

1.3 OPERATOR: U.S. Department of Energy
Richland Operations Office
825 Jadwin Avenue
Richland, Washington 99352

1.4 FACILITY CO-OPERATOR: Westinghouse Hanford Company
P. O. Box 1970
Richland, Washington 99352

1.5 DESCRIPTION OF FACILITY OPERATIONS

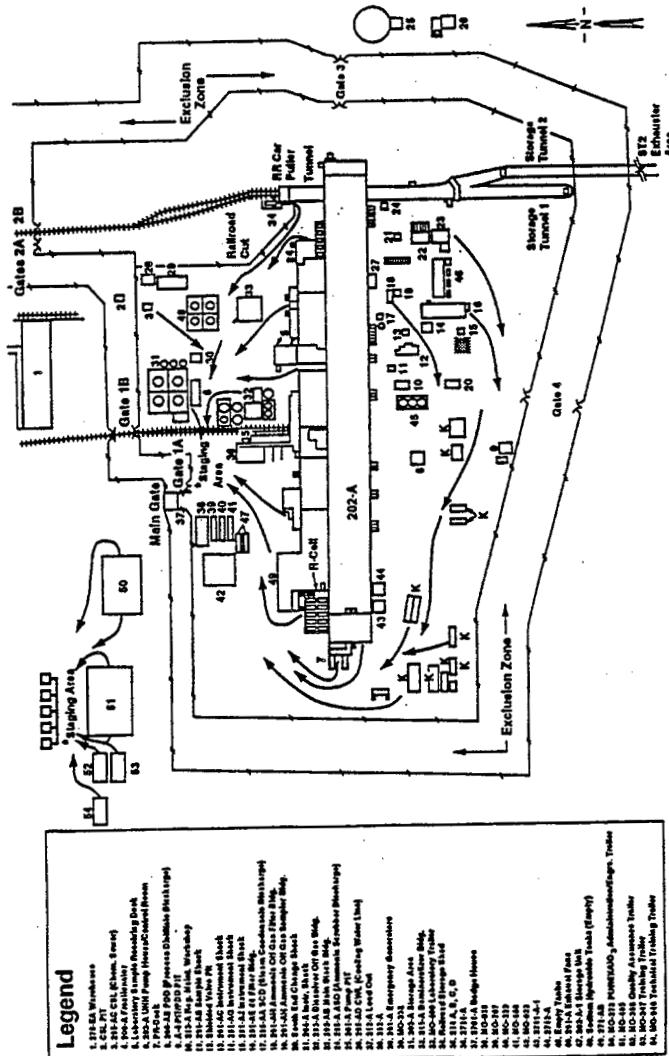
The PUREX Storage Tunnels consist of two structures, 218-E-14 (Tunnel Number 1) and 218-E-15 (Tunnel Number 2). The tunnels are used for the storage of material from the PUREX Plant and from other onsite sources. The material stored in the tunnels contains dangerous waste and varying amounts of radioactive contamination; therefore, the stored material is managed as mixed waste. Tunnel Number 1 is filled to capacity. Tunnel Number 2 currently has storage positions available and continues to receive mixed waste from the PUREX Plant and from other onsite activities until the tunnel is either filled to capacity or a determination is made that waste will no longer be received.

Mixed waste is stored in the PUREX Storage Tunnels on railcars that are modified to serve as both transporter and storage platforms. Each railcar is retrievable. However, because the railcars are stored on a single, dead-end railroad spur inside each storage tunnel, the railcars can be removed only in reverse order (i.e., last in, first out).

1.6 SITE PLAN

The PUREX Storage Tunnels Site Plan and evacuation route are shown in Figure 1.

Figure 1. PUREX Storage Tunnels Site Plan and Evacuation Route.



2.0 EMERGENCY COORDINATORS (G-2)

Emergency organization names, positions, work locations, and telephone numbers for the 218-E-14 and 218-E-15 Storage Tunnels are maintained in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*. Copies are distributed, at a minimum, to appropriate facility locations and to emergency preparedness personnel.

Qualifications for those designated with the duties of the emergency coordinator are outlined in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

3.0 IMPLEMENTATION OF THE PLAN (G-3)

Potential emergency conditions could include any of the following three basic categories:

- (1) Operational (e.g., damaged waste shipment)
- (2) Natural phenomena (e.g., earthquakes)
- (3) Security contingencies (e.g., bomb threat).

Any of these conditions could lead to an emergency situation and require the implementation of this plan.

3.1 DANGEROUS AND/OR MIXED WASTE RELEASE

A seismic event, explosion, tornado, or an aircraft crash could cause damage to the storage tunnels and could involve environmental exposure to mixed waste.

Emergency responses for dangerous and/or mixed waste releases can be found in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

For classification of mixed waste release events, refer to the facility specific recognition and classification procedure in WHC-CM-4-43, *Emergency Management Procedures*. If the event does not meet emergency classification criteria, continue following facility-specific response and reporting procedures.

3.2 FIRE OR EXPLOSION

The fire hazard associated with the PUREX Storage Tunnels is considered to be very low because of the minimal amount of combustibles stored within the tunnels and the lack of an ignition source.

Because of the extremely remote potential of mixed waste to leach, water is not the preferred choice for fire control. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system should permit a fire to self-extinguish. Should the fire continue to spread, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. In the event that a fire resulted in the collapse of the tunnels, a recovery plan will be developed in accordance with emergency response procedures included in WHC-IP-0263-202A, *Emergency Plan for PUREX*.

Facility. The recovery plan will take into consideration plans, if any, for retrieval of the waste stored within the tunnels.

Depending on the magnitude of a natural phenomena event or an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste.

Additional emergency responses for fires and explosions can be found in DOE/RL-93-75, *Hanford Facility Contingency Plan* or in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

For classification of fires and/or explosions, refer to the facility specific recognition and classification procedure in WHC-CM-4-43, *Emergency Management Procedures*. If the event does not meet emergency classification criteria, continue following facility-specific response and reporting procedures.

3.3 SEISMIC EVENT

Depending on the magnitude of the seismic event, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste.

Emergency responses for seismic events can be found in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

For classification of seismic events, refer to the facility-specific recognition and classification procedure in WHC-CM-4-43, *Emergency Management Procedures*. If the event does not meet emergency classification criteria, continue following facility specific response and reporting procedures.

3.4 AIRCRAFT CRASH

In addition to the potential for serious injuries or fatalities involved with an aircraft crash, damage to the storage tunnels is possible, which could result in a fire, explosion, or a mixed waste release.

Emergency responses for fires, explosions, and dangerous and/or mixed waste releases can be found in DOE/RL-93-75, *Hanford Facility Contingency Plan* or in WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

For classification of fire, explosion, and dangerous and/or mixed waste release events, refer to the facility specific recognition and classification procedure in WHC-CM-4-43, *Emergency Management Procedures*. If the event does not meet emergency classification criteria, continue following facility-specific response and reporting procedures.

3.5 BOMB THREAT/EXPLOSIVE DEVICE

Depending on the magnitude of an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. Refer to Section 3.2 for emergency responses for explosions.

For classification of bomb threat situations, explosions, and mixed waste release events, refer to the facility specific recognition and classification procedure in WHC-CM-4-43, *Emergency Management Procedures*. If the event does not meet emergency classification criteria, continue following facility-specific response and reporting procedures.

3.6 DAMAGED DANGEROUS AND/OR MIXED WASTE SHIPMENT

In the event that a mixed waste shipment is damaged or otherwise presents a hazard to the public health and the environment, the damaged shipment should not be moved. Emergency responses for damaged waste shipments can be found in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

4.0 UNIT/BUILDING EMERGENCY RESPONSE PROCEDURES

The initial response to any emergency is to immediately protect the health and safety of persons in the area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment are secondary responses.

The preceding sections describe the process for implementing basic protective actions as well as descriptions of response actions for events.

The credible emergency events associated with the storage tunnels are listed in the event recognition and classification procedure for the PUREX Facility in WHC-CM-4-43, *Emergency Management Procedures*.

4.1 NOTIFICATION (G-4a)

Procedures and methods for immediate notification following an imminent or actual emergency are found in the WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*.

4.2 IDENTIFICATION OF RELEASED/SPILLED MATERIALS

Methods for identifying the character, source, amount, and areal extent of any materials when there has been a release or spill to the environment, a fire, or an explosion is outlined in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

4.3 HAZARD ASSESSMENT AND REPORT

The Building Emergency Director (BED) will assess the possible hazards to human health and the environment that might result from a fire, a release, a spill, or an explosion, considering direct, indirect, immediate, and long-term effects as outlined in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

Procedures and methods for immediate notification following an emergency are found in Section 4.1.

4.4 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, RELEASES

The BED, in coordination with emergency response organizations, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

- Isolate the area of the initial incident by shutting off power, closing off ventilation systems, if still operating, etc., to minimize the spread of a release and/or the potential for a fire or explosion
- Inspect surface of the tunnels for leaks, cracks, or other damage
- Contain and isolate residual mixed waste material
- Cover or otherwise stabilize areas where residual released mixed waste remains to prevent migration or spread from wind or precipitation run-off
- Install new structures, systems, or equipment to enable better management of mixed waste
- Reactivate adjacent operations in affected areas only after cleanup of residual mixed waste is achieved.

4.5 POST-EMERGENCY ACTIONS (G-4f)

It is a function of the BED (Emergency Coordinator) to declare the termination of an event. However, in an event where additional emergency centers are activated only the highest activated level of the emergency organization, in conjunction with the BED, will declare that an event has ended.

5.0 EMERGENCY EQUIPMENT (G-5)

Because personnel only enter the storage tunnels during material placement operations, no permanent emergency equipment, communications equipment, warning systems, personal protective equipment, or spill control and containment supplies are located in the tunnels.

During storage tunnel operations, personnel use portable emergency equipment such as two-way radios, flashlights, and personnel protective equipment. Also, for such operations, work plans are written and followed and pre-job safety meetings take place.

6.0 COORDINATION AGREEMENTS (G-6)

The DOE-RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

7.0 EVACUATION (G-7)

Personnel that enter the storage tunnels during material placement operations will evacuate via the north end of the railroad tunnel, through the pedestrian door (Figure 1).

8.0 REQUIRED REPORTS (G-8)

Three types of written post-incident reports are required for incidents on the Hanford Site. The reports are summarized in DOE/RL-93-75, *Hanford Facility Contingency Plan*.

9.0 REFERENCES

DOE/RL-93-75, *Hanford Facility Contingency Plan*, U.S. Department of Energy, Richland, Washington.

WHC-CM-4-43, *Emergency Management Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-IP-0263-202A, *Emergency Plan for PUREX Facility*, Westinghouse Hanford Company, Richland, Washington.

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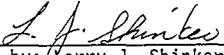
APPENDIX 8A

DANGEROUS WASTE TRAINING PLAN FOR THE PUREX FACILITY

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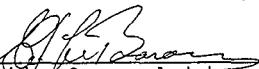
DANGEROUS WASTE TRAINING PLAN
for the
PUREX FACILITY


Prepared by: Larry J. Shinker
Manager PUREX Training

10/30/95
Date


Approved by: Douglas G. Hamrick
Director PUREX Transition Project

10/31/95
Date


Approved by: Gregory J. Lebaron
PUREX Environmental Compliance Officer
PUREX Regulatory Compliance

10/31/95
Date

1.0 INTRODUCTION

In accordance with Washington Administrative Code (WAC), Chapter 173-303, "Dangerous Waste Regulations," a written training plan is required for many types of RCRA Waste Management Units. PUREX manages RCRA Waste Management Units regulated as generator units under WAC 173-303-200, and interim status units regulated under WAC 173-303-400. RCRA Waste Management Units covered by this plan include:

- Less than 90 day Accumulation Areas
- Waste Treatment and Storage Vessels
- Containment Building
- Storage Tunnels

WAC 173-303-200, and -400 require compliance with WAC 173-303-330, Personnel Training. This training plan complies with WAC 173-303-330. This training plan may be given to a regulatory agency inspector upon request provided this plan is cleared for public release. Training records associated with personnel identified in this plan and maintained in the PUREX Regulatory file may be provided to an outside regulatory agency inspector as a result of the Federal Register Notice released on April 11, 1994 (59 FR 17091).

2.0 TRAINING PROGRAM

A dangerous or mixed waste generator and the owner/operator of active interim status units shall provide personnel training as directed by WAC 173-303-330. Centralized training organizations are responsible for developing the overall Hanford Facility training program of classroom instruction and maintaining training records. The plant manager is responsible for developing a program for unit/building-specific training supplementing the general Hanford Facility classroom program. General requirements of a training program include:

- a. Instructing personnel to perform duties in compliance with the Dangerous Waste Regulations, WAC 173-303.
- b. Instruction by a person knowledgeable of dangerous waste management procedures that includes training relevant to the employee's position.
- c. A unit/building-specific program that includes instruction to familiarize personnel with applicable procedures (inspection plans, operating procedures, etc.), container management practices, spill response, and emergency procedures. Refresher training must be given annually to personnel. An annual review of the contingency plan and the emergency procedures maintained at the unit/building will satisfy the spill response and emergency procedures review.
- d. New employees must receive training within 6 months of employment or transfer, and must be supervised until completion of training.

e. Employees must receive appropriate annual refresher training.

3.0 TRAINING PLAN CONTENT REQUIREMENTS

In accordance with the requirements in WAC 173-303-330(2), a training plan must contain the following:

1. For each position related to dangerous waste management at the facility, the job title, the job description, and the name of the employee filling each job. The job description must include the requisite skills, education, other qualifications, and duties for each position.
2. A written description of the type and amount of both introductory and continuing training required for each position.
3. Records documenting that facility personnel have received and completed the training required by this section.

The following three sections describe how these requirements are met for PUREX.

3.1 Job Title, Job Description, and Names of Employees

Personnel who are associated with dangerous waste management at PUREX are maintained in this training plan by name in Appendix A. Personnel are placed into the following five general worker categories to properly assign the correct training that is commensurate with their duties and responsibilities. Personnel duties and responsibilities may overlap between categories. When overlaps occur, personnel will complete appropriate training pertaining to courses applicable from each category. The determining factor for placing specific personnel within any of the worker categories is the corresponding job duties. The five worker categories are as follows:

1. All Employees
2. General Worker
3. Advanced General Worker
4. General Manager
5. General Shipper

The duties corresponding to these categories are contained in Table 1. The descriptions of job duties for each category are general in nature. However, the descriptions do provide adequate specifics that can be matched to individual job titles or job positions commonly found at the Hanford Facility. The responsibilities for personnel categorized as Advanced General Worker, General Manager, and General Shipper are provided since these categories are directly associated with the safe and compliant management of dangerous and mixed waste at PUREX. Since

personnel categorized as All Employees and General Workers are not directly related to the safe and compliant management of dangerous and mixed waste at PUREX, these personnel are not maintained by name in Appendix A

All personnel are assigned a job title (from the salaried nonexempt or bargaining unit classifications) or position (from the exempt classifications). The job or position descriptions include applicable requisite skills, work experience, education, and other qualifications, and a brief list of duties and/or responsibilities for each job title or position. Information regarding work experience, education, and other qualifications required for each position is maintained by Westinghouse Hanford Human Resources Department.

Personnel Assigned duties as a Dangerous Waste Worker will be removed from that assignment if their training goes delinquent. Upon requalification they may resume previously assigned duties.

Table 1. Worker Categories

WORKER CATEGORIES	GENERATOR JOB DUTIES	PERSONNEL JOB TITLES ¹
ALL EMPLOYEES	Is not categorized as a General Worker, Advanced General Worker, General Manager, or General Shipper.	Administrative personnel Touring visitors Oversight personnel
GENERAL WORKER	Generates dangerous waste and places waste into appropriate containers. Waste management activities are overseen by person-in-charge or other PUREX personnel. Contingency plan duties are to immediately evacuate incident area and report incident to appropriate personnel. Duties and responsibilities would not exceed those stated above.	Maintenance personnel Health physics technicians Contractor crafts Truck drivers Power Operators
ADVANCED GENERAL WORKER	Duties include the management of dangerous waste in tanks, containers, containment buildings, and storage tunnels. Selects, packages, and prepares containers of dangerous waste for movement including proper marking and labeling of containers. Performs inspections and operates the RCRA Unit. Samples containers of dangerous waste and prepares samples for delivery to a laboratory. Contingency plan duties include responding to small spills in accordance with procedures within plans.	Operators Laboratory Technicians
GENERAL MANAGER	Environmental Compliance Officer, Someone who can act as the Building Emergency Director, or someone who directs Advanced General Workers in accumulation of dangerous waste. Responsible for the accountability and directing of employees during dangerous waste emergency events.	Building Emergency Director Manager of Advanced General Worker Environmental Compliance Officer
GENERAL SHIPPER	Duties include the preparation and shipment of dangerous or mixed waste containers in compliance with applicable requirements. Directs General and Advanced General Workers in dangerous waste management and/or transportation activities. Authorized individual for signing offsite waste manifests and onsite waste movement documentation.	Hazardous Material Specialist Waste Cognizant Engineer

¹ Duties and responsibilities of personnel must be compared to the table.

In general, all personnel require a high school diploma or General Equivalent Diploma. Personnel filling exempt management or engineering positions may require a college degree with 2 or more years of industry experience. Many prerequisites exist for these positions. In some cases, a college degree may be waived as a prerequisite requirement. An equivalent combination of education and experience also may be accepted. Additional information on specific prerequisites can be provided upon request. The following sections describe within the appropriate worker category, the job titles and a brief position description of personnel at PUREX who are categorized as Advanced General Workers, General Managers, and General Shippers.

3.1.1 PUREX Advance General Workers

3.1.1.1 PUREX Operators

Responsibilities of Operators include the following:

- Perform work activities in accordance with current operating procedures
- Perform sampling as required by procedure
- Conduct routine surveillance of waste treatment and storage vessels, containment buildings and storage tunnels
- Respond to alarms, dangerous waste leaks or spills
- Respond to off-normal and/or emergency conditions according to established procedures

Responsibilities of PUREX Container Management Operators include the following:

- Receive, segregate, sort, inventory, store, and stage dangerous waste
- Provide surveillance of less than 90-day accumulation areas for off-normal conditions.
- Assist truck drivers in loading and unloading
- Ensure that trucks transporting dangerous waste are properly placarded
- Respond to dangerous waste leaks or spills
- Ensure that the waste has been properly secured in the transportation vehicle.

3.1.1.2 Laboratory Technicians

- Receive, segregate, sort, inventory, store, and stage dangerous waste
- Provide surveillance of less than 90-day accumulation areas for off-normal conditions.
- Assist truck drivers in loading and unloading
- Ensure that trucks transporting dangerous waste are properly placarded
- Ensure that the waste has been properly secured in the transportation vehicle.

3.1.2 PUREX General Managers

3.1.2.1 PUREX Emergency Coordinator/Alternates

Responsibilities and duties of the Emergency Coordinator and the alternates include the following:

- Function as the Emergency Coordinator as defined in WAC 173-303-360.
- Determine if a RCRA contingency plan has been implemented during the course of an incident or process upset.
- Ensure all reports to Ecology have been made after an incident or process upset has occurred.
- Become thoroughly familiar with the RCRA Waste Management Units Contingency Plan, operations, activities, location and properties of all wastes handled, location of all records, and the layout of the RCRA Waste Management Units

3.1.2.2 PUREX Environmental Compliance Officer.

Responsibilities include the following:

- Provide support management to ensure compliance with the applicable environmental compliance requirements, environmental permits, and compliance orders
- Ensure that management is aware of the RCRA Waste Management Units's environmental compliance status and environmental compliance activities
- Understand and be able to explain the environmental compliance status of the RCRA Waste Management Units with all applicable environmental requirements

- Advise management of new environmental requirements and policies, the associated impacts, and recommended implementation mechanisms to ensure compliance

3.1.3 PUREX General Shipper

3.1.3.1 Hazardous Material Specialist

- Responsible to provide technical direction for handling, storage, transportation, and disposal of hazardous materials/wastes
- Direct general and advanced general workers in dangerous waste management and/or transportation activities
- Signing waste manifests and other waste movement documentation
- Perform weekly inspections of 90-day and satellite accumulation areas
- Oversee RCRA sampling of contaminated waste

3.1.3.2 Waste Cognizant Engineer:

- Lead responsibility to provide technical direction, for handling, storage hazardous materials/waste
- Direct general and advanced waste worker activities
- Direct/Coordinate RCRA sampling for containerized waste
- Write/Implement plant operation procedures for the proper handling, storage, and disposal of solid waste
- Provide direction for response to dangerous waste leaks or spills

3.2 Written Description of the Type and Amount of Training

Based on the categorization of personnel to the worker categories, the appropriate courses are chosen. Below is a list of available courses that may be assigned as a requirement by worker category. To help ensure the correct course is assigned. The list provides the course descriptions containing additional information about the course. Courses applicable to all personnel categorized as Advanced General Workers, General Managers, and General Shippers are listed in Appendix A for each employee by name.

3.2.1 Worker Category Courses

- All Employees
 - Hanford Site Orientation (HSO) - .02006A
Retraining: Hanford General Employee Training (HGET) - 000001 Visitor/Vendor 01010 000090
- General Workers
 - Hazard Communication and Waste Management Awareness - 02006G
Retraining: N/A - one time only
 - Unit/building-specific contingency plan training (training waived when escorted by qualified PUREX personnel) - 03E024
Retraining: 12 Months
- Advanced General Workers, General Managers, General Shippers
 - Courses are identified in Appendix A.

3.2.2 Emergency Response Training

Federal and state regulations require that personnel be able to respond effectively to emergencies. In accordance with WAC 173-303-330(1)(d), personnel are trained on emergency equipment, systems, and procedures. PUREX operations involve the management of dangerous waste within containers, tanks, containment building, and storage tunnels. Table 2 indicates requirements from WAC 173-303-330(1)(d) that are applicable to each RCRA Unit operation. Specific topics required by federal and state dangerous waste regulations are included in courses taught at the Hanford Facility. The courses cover a wide spectrum of target audiences. For example, some courses address the level appropriate for All Employees. At the other end of the spectrum, some of these courses concern responsibilities of General Managers who function as the emergency coordinator as defined in WAC 173-303-360.

Table 2. Applicability of WAC 173-303-330(1)(d) to
RCRA Waste Management Units

	Less than 90 DAY Accumulation Areas	TANK SYSTEMS	CONTAINMENT BUILDINGS	STORAGE TUNNELS
Procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment	Y	Y	Y	Y
Key parameters for automatic waste feed cut-off systems	N	Y	N	N
Communications or alarm systems	Y	Y	Y	Y
Response to fires or explosions	Y	Y	Y	Y
Response to groundwater contamination incidents	N	Y	N	N
Shutdown of operations	N	Y	Y	N

3.2.3 Operator Certification Packages

To ensure personnel are properly trained in PUREX Facility Deactivation and Operation, certifications for specific work assignments have been created. Not every certification offered for PUREX operators is based upon Dangerous or Mixed Waste Management. Only the certifications that are based on Dangerous and Mixed Waste Management are included in this training plan. Of the five certification packages developed, only two are applicable to this plan, and include Course 250050, Deactivation Operations, and Course 250020, PUREX Solid Waste Management. Areas such as systems surveillance, alarm emergency response, spill control, waste tank system operations and equipment are addressed to meet the requirements of Section 3.2.2, Emergency Response Training.

3.3 Training Records

3.3.1 Location of Training Records

Training records, as described in WAC 173-303-330, consist of documentation that shows training has been completed. Hanford Facility training records include both electronic data storage and hard copies. The electronic data storage information is the training record initially presented to demonstrate that personnel have been trained. After a course is completed, the electronic data storage record is created on the Training Record Information (TRI) system.

The electronic data storage record will contain the course number, course title, date of attendance, and any refresher dates. Hard copies of training records that are sent to the training record organization for entry on the TRI System are initially maintained in Richland, Washington. Original hard copy training records are transferred quarterly to the Records Holding Facility in Richland, Washington. After approximately 1 year, the original hard copy training records are archived at the permanent record storage center in Renton, Washington. Electronic data storage and hard copy training records of former employees are kept for at least 3 years from the date the employee last worked at PUREX.

3.3.2 Access of Training Records

When a training record is requested during an inspection, an electronic data storage record will initially be provided. When the electronic data storage record does not satisfy the inspection concern, a hard copy training record will be provided. Training records of former employees may not be available through computers at PUREX and may require a representative from the Training Records organization to access the TRI System for this information.

3.3.3 Determining Current Training Status

After an electronic data storage training record is obtained, it will be compared to information in this plan. This plan can be used to determine the RCRA training status of all personnel in relation to all worker categories identified in this plan. The electronic data storage training record coupled with this training plan will give any inspector the ability to quickly determine the training status of personnel in the field.

4.0 UPDATING THE TRAINING PLAN

When new courses become available, this training plan will be revised. When personnel are no longer working at PUREX, Attachment A to this Training Plan will be updated to indicate new personnel and to remove those workers which are transferred to other areas. PUREX Training will update the Appendix A on a quarterly basis. When the Emergency Coordinators change (i.e., BED), Emergency Preparedness will also be contacted to ensure the list of Emergency Coordinators is properly maintained.

5.0 RCRA COURSE DESCRIPTIONS

The following list of courses are driven by the requirements of the Washington Administrative Code 173-303; Dangerous Waste Regulations and WA7890008967, Hanford Facility RCRA Permit. Appendix A includes personnel in the applicable worker categories, (3, 4, or 5) and the training courses applicable for their responsibilities. This attachment is updated quarterly.

COURSE NUMBERS	COURSE TITLES
000001	Hanford General Employee Training
000090	Visitor/Vendor 01010
02006A	Hanford Site Orientation
02006G	Hazard Communication and Waste Management Awareness
02028B	Building Emergency Director Training
03E024	Unit/Building-specific contingency plan training - PUREX Facility
035010	Waste Designation Support
035020	Facility Waste Sampling and Analysis
035040	Environmental Regulations at Hanford
035050	Environmental Compliance at Hanford
035100	Core Waste Management Training - Initial
035110	Core Waste Management Training - Requalification
035120	Waste Management Administrative - Initial
035130	Waste Management Administrative - Requalification
037510	Building Emergency Director Requalification
250020	PUREX Solid Waste Management
250050	PUREX Deactivation Operations
250700	PUREX Facility Orientation

Title	000001 Hanford General Employee Training
Description	Course covers DOE Orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazard communications, dangerous waste, fire prevention, personal protective equipment, safety requirements, certain unit/building orientation refresher training, emergency preparedness, accident reporting, and avenues for addressing safety concerns.
Mandating Document(s)	Hanford Facility RCRA Permit, General Conditions II.C.4
Target Audience	All Hanford Facility personnel
Delivery	Computer-based training with interactive video
Evaluation	Computer generated questions
Length	Average = 2 to 6 hours
Frequency	Annual

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Title	000090 Visitor/Vendor Video
Description	Course is designed to acquaint and familiarize visitors and subcontractors with safety, security, and emergency preparedness requirements and their responsibilities to notify Hanford Facility personnel when situations arise. In addition, this orientation identifies the need to obey signs and labels that may be encountered regarding radiological areas, hazardous materials, and dangerous waste.
Mandating Document(s)	Hanford Facility RCRA Permit WA7890008967, General conditions II.C.4
Target Audience	Visitors/vendors/subcontractors
Delivery	Video tape
Evaluation	Not Applicable
Length	15 minutes
Frequency	Annual

Title	02006A Hanford Site Orientation
Description	Course covers DOE Orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazardous waste, fire prevention, personal protective equipment, safety requirements, accident reporting, and avenues for addressing safety concerns.
Mandating Document(s)	Hanford Facility RCRA Permit, General Condition II.C.4
Target Audience	All Hanford Facility personnel
Delivery	Classroom
Evaluation	Not applicable
Length	3 hours
Frequency	Initial (Retrained annually by 000001 HGET)

Title	02006G Hazard Communication and Waste Management Awareness
Description	Course introduces workers to federal laws governing chemical safety in the work place. The course provides the hazardous material/waste worker with the basic fundamentals for safe use and disposal of hazardous material. Course defines hazard communication and hazardous material, reviews labeling requirements, and introduces material safety data sheets and key terms used in chemical safety. The course also introduces methods for waste minimization.
Mandating Document(s)	WAC 173-303-200(2)
Target Audience	Hanford Facility personnel categorized as a General Worker, Advanced General Worker, General Manager, and General Shipper
Delivery	Classroom
Evaluation	Written examination - 80% passing grade
Length	4 hours
Frequency	N/A - One Time Only

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Title	020288 Building Emergency Director Training
Description	Course provides an overview of the responsibilities of the building emergency director, identifies the building emergency organizations, actions required during an event, implementing the contingency plan, and discusses drill and exercise requirements.
Mandating Document(s)	WAC 173-303-340, -350, and -360
Target Audience	Building Emergency Directors and their alternates who can function as the Emergency Coordinator
Delivery	Classroom
Evaluation	Not Applicable
Length	2 hours
Frequency	Initial (Retrained annually by 037510 Building Emergency Director/Warden Qualification)

Title	03E024 Unit/building-Specific Contingency Plan Training- PUREX Facility
Description	Course consists of a review of specific hazards associated with the RCRA Waste Management Units, as covered by the contingency plan (WHC-IP-0263-202A). The training is completed by the supervisor, manager, or a designated individual using a checklist. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The checklist acts as a guide to ensure consistent coverage of necessary topics.
Mandating Document(s)	WAC 173-303-330(1)(d), -340, and -350
Target Audience	All Hanford Facility personnel categorized as Advanced General Workers, General Managers, and General Shippers assigned to RCRA Waste Management Units. All General Workers may take this course, or equivalent training may be given during the pre-job safety meeting the General Worker may be escorted by qualified RCRA Waste Management Units personnel.
Delivery	One-on-one or as a group with supervisor, manager or designated individual
Evaluation	Training checklist documentation
Length	1 hour
Frequency	Annual

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Title	035010 Waste Designation Support
Description	Course teaches dangerous waste designation according to WAC 173-303. Class content includes section-by-section lecture on the regulations, with examples following each section. Students complete examples using a waste designation flow chart. Examples addressed include: federal listed waste, discarded chemical products, dangerous waste source, Washington State criteria: toxicity, persistence, carcinogenic, and federal characteristics: ignitability, corrositivity, reactivity, and toxicity.
Mandating Document(s)	WAC 173-303-070, and -080 through -100
Target Audience	General Shippers
Delivery	Classroom
Evaluation	Written Exam - 80% passing grade
Length	12 Hours
Frequency	Annual

Title	035020 Facility Waste Sampling and Analysis
Description	Course presents waste sampling methodologies according to EPA Protocols SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods. This course also covers documentation requirements in a sampling plan, field and laboratory quality control/assurance, and use of actual sampling equipment. One-time training is required because the General Shipper, in most cases, will utilize resources on the Hanford Facility to acquire samples. This training provides an overview of information to ensure that sampling efforts are properly set up.
Mandating Document(s)	WAC 173-303-110 and -070
Target Audience	General Shippers
Delivery	Classroom presentation, exercises, demonstration and discussion
Evaluation	Written Examination
Length	12 hours
Frequency	One time only

Title	035040 Environmental Regulations at Hanford
Description	This course provides an overview of environmental regulations as they apply to the Hanford Facility. This course helps enable participants to make informed decisions relating to environmental compliance issues. It includes information on potential legal liabilities, applicable federal and state regulations, various reporting requirements, inspections/audits and record keeping. Information is presented using Hanford Facility examples.
Mandating Document(s)	WAC 173-303-145 and general overview of certain WAC 173-303 sections Training covers disciplines from RCRA, NEPA, air regulations, EPCRA, TSCA, spill reporting, and inspection considerations
Target Audience	Level I, II, and III Managers
Delivery	Classroom
Evaluation	Written Examination - 80% passing grade
Length	8 Hours
Frequency	One Time Only

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Title	035050 Environmental Compliance at Hanford
Description	Provides an overview of environmental regulations and focuses on the use of environmental compliance manuals to address compliance issues. Information is presented through Hanford Facility examples.
Mandating Document(s)	WAC 173-303-145 and general overview of certain WAC 173-303 sections. Training covers disciplines from RCRA, NEPA, air regulations, EPCRA, TSCA, spill reporting, and inspection considerations
Target Audience	Environmental Compliance Officers, General Managers who are level 4, 5, and 6 managers
Delivery	Classroom
Evaluation	Workbook
Length	8 Hours
Frequency	One Time Only

Title	035100 Core Waste Management - Initial
Description	Course covers basic requirements of waste management, incorporating 40 CFR, WAC 173-303, DOE Orders, and company policy. Includes three practical exercises for hands-on experience with satellite and 90-day accumulation area requirements, labpacks for dangerous waste and mixed waste, and preparation of packages for final destination. This course is intended to discuss requirements for on site management practices of containerized dangerous waste. This course is not intended to be a RCRA related course for General Shippers who conduct off site waste shipments as defined by WAC 173-303-040.
Mandating Document(s)	WAC 173-303-630, -200 and Waste Minimization
Target Audience	Advanced General Workers and General Managers of Advanced General Workers who manage containers of dangerous waste. 90-day tank systems are not discussed in this course. This course is recommended for General Shippers who ship dangerous waste on site.
Delivery	Classroom
Evaluation	Written Examination - 80% passing grade
Length	16 Hours
Frequency	Initial (retrained annually by 035110 Core Waste Management Training - Refresher)

Title	035110 Core Waste Management - Refresher
Description	Refreshes Course 035100
Target Audience	Advanced General Workers and General Managers of Advanced General Workers
Delivery	Classroom
Evaluation	Written Examination - 80% passing grade
Length	4 Hours
Frequency	Annual

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Title	035120 Waste Management Administration - Initial
Description	Course is designed for personnel preparing to become authorized shippers of dangerous and/or mixed waste. This course covers regulatory and company policies, forms, reports, forecasts, and plans. Topics also covered include: waste characterization, waste storage disposal request, low level waste storage/disposal record, transuranic waste storage/disposal record, and radioactive mixed waste attachment sheet. In addition, students will learn how these forms are used to complete shipping papers.
Mandating Document(s)	Hanford Facility RCRA Permit, Part II, condition II.Q
Target Audience	General Shippers
Delivery	Classroom
Evaluation	Written Examination - 80% passing grade
Length	8 Hours
Frequency	Initial (Retrained annually by 035130 Waste Management Administration - Refresher)

Title	035130 Waste Management Administration - Refresher
Description	Refreshes course 035120
Target Audience	General Shippers
Delivery	Classroom
Evaluation	Written Examination - 80% passing grade
Length	4 Hours
Frequency	Annual

Title	037510 Building Emergency Director Recalification
Description	Refresher for Building Emergency Director Training
Target Audience	Building Emergency Directors and alternates
Delivery	Classroom
Evaluation	Not Applicable
Length	2 hours
Frequency	Annual

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Title	250020 PUREX Solid Waste Management
Description	Course elements include Operator's specific responsibilities with regards to the safe and compliant packaging, storage, and shipment of Dangerous and Mixed Waste at PUREX. Information includes all applicable information covering administration and use of Satellite Accumulation Areas and <90 Day Accumulation Areas. Course also includes elements of compliance with all Federal, State, Local, and DOE and WHC regulations governing the packaging and storage of Dangerous and Mixed Wastes.
Mandating Document(s)	WAC 173-303-330
Target Audience	Advanced General Workers (Operators and immediate Managers)
Delivery	Classroom
Evaluation	Written examination - Operators-70% passing grade, OJT, Job Performance Measures/Managers Exam only, 80% passing grade.
Length	3 days
Frequency	Every other year

Title	250050 PUREX Deactivation Operations
Description	Course elements include Operators specific responsibilities with regards to the safe and compliant deactivation of PUREX Operating and Emergency/Monitoring/Alarm Systems.
Mandating Document(s)	WAC 173-303-330
Target Audience	Operators and Operations Managers
Delivery	N/A - Self Study - Manual, OJT, Examination, Job Performance Measures (Operational Instruction.
Evaluation	Written examination - Operators-70% passing grade/Managers 80%
Length	N/A
Frequency	Every other year

Title	250700 PUREX Facility Orientation
Description	Course describes the general layout of the PUREX Facility, as well as, some of the general hazards employees may encounter at various locations within the Facility.
Mandating Document(s)	WAC 173-303-330
Target Audience	All PUREX Advanced Waste Workers, General Shippers and General Managers.
Delivery	Computer Based Training
Length	1 hour
Frequency	Biennial

PUREX Ad Wst WK

Example	HGET	HAZ	CORE WASTE	CORE WASTE	PUREX BLDG	PUREX/UO3	PUREX	PUREX
		COMMUN/WST	MGMT INI	MGMT REQUAL	EMER PLAN	WASTE	DEACTV OPS	FCLTY
NAME	000001-M	02006G-M	035100-M	035110-M	03E024-M	250020-P	250050-P	ORIENT
	<u>12 MONTHS</u>	<u>N/A</u>	<u>12 Months</u>	<u>12 Months</u>	<u>12 Months</u>	<u>24 Months</u>	<u>24 Months</u>	<u>24 Months</u>

Employee 1	07/10/96	Complete	Complete	02/17/97	10/14/95	02/17/97	N/A	07/10/97
Employee 2	05/05/96	Complete	Complete	05/11/96	06/29/96	N/A	01/14/96	05/23/97
Employee 3	05/26/96	Complete	Complete	10/07/96	07/14/96	10/07/96	11/02/96	05/26/97

PUREX Gen Ships

Example	HGET	HAZ	WASTE	FCLTY WST	WASTE MGMT	WASTE MGMT	PUREX BLDG	PUREX
		COMMUN/WST	DESIGNATION	SAMPLE &	ADMIN	ADMIN	EMER PLAN	FCLTY
NAME	000001-M	02006G-M	SUPPORT	ANLYS	INI	REQUAL	03E024-M	ORIENT
	<u>12 MONTHS</u>	<u>N/A</u>	<u>12 Months</u>	<u>N/A</u>	<u>12 Months</u>	<u>12 Months</u>	<u>12 Months</u>	<u>24 Months</u>
Employee 4	05/25/96	Complete	03/20/96	Complete	Complete	12/07/95	07/12/96	05/25/97
Employee 5	05/25/96	Complete	04/08/96	Complete	Complete	06/30/96	06/13/96	06/13/97
Employee 6	08/28/96	Complete	11/14/95	Complete	Complete	02/16/96	07/12/96	08/28/97

PUREX Gen Mgrs

Example	HGET	HAZ	ENVIRON-	ENVIRON-	PUREX BLDG	PUREX
		COMMUN/WST	BLDG EMER	MENTAL	MENTAL	FCLTY
NAME	000001-M	02006G-M	DIR TRNG	REGS	COMPLIANCE	ORIENT
	<u>12 MONTHS</u>	<u>N/A</u>	<u>12 Months</u>	<u>N/A</u>	<u>12 Months</u>	<u>12 Months</u>
Employee 7	06/19/96	Complete	Complete	Complete	Complete	06/19/96
Employee 8	05/31/96	Complete	N/A	Complete	N/A	09/27/96
Employee 9	10/26/96	Complete	Complete	N/A	Complete	10/26/96

PUREX Ad Wst Wk

Example	HGET	HAZ	PUREX BLDG	PUREX
		COMMUN/WST	EMER PLAN	FCLTY
Name	000001-M	02006G-M	03E024-M	ORIENT
	<u>12 Months</u>	<u>N/A</u>	<u>12 Months</u>	<u>24 Months</u>
Employee 10	08/13/96	Complete	Complete	10/26/96
Employee 11	08/02/96	Complete	03/28/96	09/27/96
Employee 12	02/15/96	Complete	Complete	02/17/96

Keys:

<< >> An expired certification date.

Blank The course has never been obtained.

* The employee has been scheduled to attend this course.

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STATE ENVIRONMENTAL POLICY ACT
ENVIRONMENTAL CHECKLIST FORMS

FOR THE
PUREX STORAGE TUNNELS

SUPPLEMENT 1

NOVEMBER 1995

WASHINGTON ADMINISTRATIVE CODE
ENVIRONMENTAL CHECKLIST FORMS
[WAC 197-11-960]

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SEPA Environmental Checklist
PUREX Storage Tunnels
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A. BACKGROUND

1. Name of proposed project:

Permitting of the Plutonium-Uranium Extraction (PUREX) Storage Tunnels. Information contained in this checklist pertains only to the PUREX Storage Tunnels [Tunnel Number 1 (218-E-14) and Tunnel Number 2 (218-E-15)]. In the context of the checklist, 'site' refers only to those areas that are immediately underlain by the underground storage tunnels.

2. Name of applicants:

U.S. Department of Energy-Richland Operations, and Westinghouse Hanford Company.

3. Address and phone number of applicant and contact person:

U.S. Department of Energy Westinghouse Hanford Company
Richland Operations Office P.O. Box 1970
P.O. Box 550 Richland, Washington 99352
Richland, Washington 99352

Contact Persons:

J. E. Rasmussen, Director D. G. Hamrick, Director
Office of Environmental Assurance, PUREX Transition Project
Permits, and Policy Division Westinghouse Hanford Company
(509) 376-5441 (509) 373-4999

4. Date checklist prepared:

November 1995

5. Agency requesting the checklist:

Washington State
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504

6. Proposed timing or schedule (including phasing, if applicable):

The PUREX Storage Tunnels are two parallel branches of a railroad tunnel that extend southward from the east end of the PUREX Plant. Construction of Tunnel Number 1 was completed in 1956. Tunnel Number 1 was first used for storage of PUREX Plant process equipment in June 1960 and was filled to capacity in January 1965. Construction of Tunnel Number 2 was completed in 1964. Tunnel Number 2 was first used for storage in December 1967 and presently has storage positions available.

SEPA Environmental Checklist
PUREX Storage Tunnels
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1 Closure of the PUREX Storage Tunnels as a dangerous waste treatment,
2 storage, and/or disposal unit will take place in conjunction with the
3 final disposition of the PUREX Plant.

4
5 7. Do you have any plans for future additions, expansion, or further
6 activity related to or connected with this proposal? If yes, explain.

7
8 The PUREX Storage Tunnels will operate under the Hanford Facility RCRA
9 Dangerous Waste Permit No. WA7890008967 until a determination is made
10 that the tunnels are to be deactivated and closed.

11
12 8. List any environmental information you know about that has been prepared,
13 or will be prepared, directly related to this proposal.

14
15 • This SEPA Environmental Checklist is being submitted as a part of the
16 *Hanford Facility Dangerous Waste Permit Application, PUREX Storage*
17 *Tunnels* (DOE/RL-90-24, Revision 2).

18
19 • A RCRA Part A Dangerous Waste Permit Application, Form 3, for PUREX
20 Storage Tunnels was submitted to the Washington State Department of
21 Ecology (Ecology) in August, 1995.

22
23 • The PUREX Storage Tunnels are discussed in the following National
24 Environmental Policy Act documentation: *Environmental Impact*
25 *Statement, Operation of PUREX and Uranium Oxide Plant Facilities*,
26 DOE/EIS-0089 (U.S. Department of Energy, 1983, Washington, D.C.).

27
28 • Tunnel Number 2 has an operating stack (296-A-10), which is registered
29 with the Washington State Department of Health (DOH) for radionuclide
30 emissions (*Radionuclide Air Emissions Report for the Hanford Site*,
31 DOE/RL-95-49, U.S. Department of Energy, 1995, Richland, Washington).
32 Tunnel Number 1 stack is not in operation and has been sealed. It is,
33 therefore, not registered under the *Clean Air Act of 1977*.
34 Supplemental information on all registered PUREX Plant stacks was
35 submitted to the DOH in *State of Washington Department of Health*,
36 *Radioactive Air Emissions Permit FF01 Supplemental Information*,
37 DOE/RL-90-34 (U.S. Department of Energy, 1990, Richland, Washington).

38
39 Additional environmental information regarding the 200 Area plateau and
40 the Hanford Site, in general, can be found in the following references:
41

42
43 • *Final Environmental Impact Statement Disposal of Hanford Defense*
44 *High-Level, Transuranic and Tank Wastes*, DOE/EIS-0113 (U.S. Department
45 of Energy, 1987, Richland, Washington)

46
47 • *Hanford Site National Environmental Policy Act (NEPA)*
48 *Characterization*, Revision 7, PNL-6415 (Pacific Northwest Laboratory,
49 1995, Richland, Washington)

1 • *Draft Environmental Impact Statement Decommissioning of Eight Surplus*
2 *Production Reactors at the Hanford Site, Richland, Washington,*
3 *DOE/EIS-0119D (U.S. Department of Energy, 1989, Washington, D.C.)*

4

5 • *Archaeological Survey of the 200 East and 200 West Areas, Hanford*
6 *Site, Washington, PNL-7264 (Pacific Northwest Laboratory, 1990,*
7 *Richland, Washington).*

8 9. Do you know whether applications are pending for government approvals of
10 other proposals directly affecting property covered by your proposal? If
11 yes, explain.

12

13 No applications are known to be pending for government approval of other
14 proposals that would directly affect property covered by this proposal.

15

16 10. List any government approvals or permits that will be needed for your
17 proposal, if known.

19 Ecology, the Washington State Department of Health, and the
20 U.S. Environmental Protection Agency are the only agencies authorized to
21 approve and/or permit operation of the PUREX Storage Tunnels under
22 requirements authorized by RCRA, the Clean Air Act (42 USC 7401 et seq.),
23 WAC 173-303, WAC 246-247, and WAC 173-401.

25 11. Give a brief complete description of your proposal, including the
26 proposed uses and the size of the project and site.

28 The PUREX Storage Tunnels are used for storage of mixed waste from the
29 PUREX Plant and from other onsite sources. Some of this material could
30 contain varying amounts of dangerous waste that includes lead, mercury,
31 silver and silver salts, barium, selenium, cadmium, and chromium.

33 The PUREX Storage Tunnels are an extension of the rail spur on which
34 irradiated reactor fuels were delivered to the PUREX Plant for chemical
35 reprocessing. Each storage tunnel is isolated from the PUREX Plant
36 railroad tunnel by a water-fillable shielding door. Material selected
37 for storage in the tunnels is loaded onto modified railcars that serve as
38 transport and storage platforms. Normally, a remote-controlled,
39 battery-powered locomotive is used to position the railcar into the
40 storage tunnel. In the past and possibly in the future, other remote
41 movers, e.g., standard locomotive with a string of railcar spacers, power
42 winch, etc., have been or could be used to position a railcar into the
43 tunnel or withdraw a car from the tunnel.

45 Tunnel Number 1 is filled to capacity and contains eight railcars,
46 positioned end to end along the length of the tunnel. The inside
47 dimensions of Tunnel Number 1 are 109.1 meters long, 6.7 meters high, and
48 5.9 meters wide.

50 Tunnel Number 2 contains 21 railcars (as of August 1, 1995) and has the
51 capacity to contain 40 railcars, end to end. The inside dimensions of

1 Tunnel Number 2 are 514.5 meters long, 7.9 meters high, and 10.4 meters
2 wide.
3

4 A vent shaft is located at the south end of each tunnel. Each shaft is
5 approximately 1.5 meters by 1.5 meters square in cross section, extends
6 approximately 0.3 meter above grade, and is capped with a 6.1-meter-tall
7 exhaust stack. Tunnel Number 1 exhaust fan has been blanked and
8 electrically deactivated. Tunnel Number 2 exhaust fan could be operated
9 continuously, or de-energized and reactivated during waste placement
10 activities.
11

12 At the time of construction, 2.4 meters of earth fill was placed over the
13 roof of each storage area to serve as radiation shielding. The earth
14 fill was gently sloped and uniformly contoured to provide side slopes of
15 2 (horizontal) to 1 (vertical) for stability.
16

17 12. Give the location of the proposal. Give sufficient information for a
18 person to understand the precise location of the proposed project,
19 including a street address, if any, and section, township, and range, if
20 known. If a proposal would occur over a range of area, provide the range
21 or boundaries of the site(s). Provide a legal description, site plan,
22 vicinity map, and topographic map, if reasonably available.
23

24 The PUREX Storage Tunnels extend southward from the east end of the PUREX
25 Plant, in the southeast quarter of the Hanford Site 200 East Area, on the
26 200 Area Plateau. Maps and plans of the area are contained in the RCRA
27 Part B Permit Application (DOE/RL-90-24) for which this SEPA
28 Environmental Checklist was prepared. The PUREX Plant is located in the
29 SE 1/4 of Section 2, T22N, R26E, and the PUREX Storage Tunnels extend
30 southward into the NE 1/4 of Section 11, T12N, R26E of the Willamette
31 Base and Meridian.
32

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34 B. ENVIRONMENTAL ELEMENTS

35 1. Earth.

36 a. General description of the site:

37 Gently sloping.
38

39 b. What is the steepest slope on the site
40 (approximate percent slope)?
41

42 During construction, the soil overburden
43 covering the PUREX Storage Tunnels was
44 contoured to provide side slopes of 2
45 (horizontal) to 1 (vertical) (or 50 percent)
46 for stability. The approximate slope of the
51

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1 land adjacent to the PUREX Storage Tunnels
2 site is less than two percent.
3
4 c. What general types of soils are found on the
5 site (for example, clay, sand, gravel, peat,
6 muck)? If you know the classification of
7 agricultural soils, specify them and note any
8 prime farmland.
9
10 The soil at the site is coarse sand and
11 gravel. No farming is allowed on the site.
12
13 d. Are there surface indications or history of
14 unstable soils in the immediate vicinity? If
15 so, describe.
16
17 No.
18
19 e. Describe the purpose, type, and approximate
20 quantities of any filling or grading proposed.
21 Indicate the source of the fill.
22
23 Does not apply.
24
25 f. Could erosion occur as a result of clearing,
26 construction, or use? If so, describe.
27
28 No.
29
30 g. Approximately what percentage of the site will
31 be covered with impervious surfaces after
32 project construction (for example, asphalt or
33 buildings)?
34
35 Does not apply.
36
37 h. Proposed measures to reduce or control
38 erosion, or other impacts to the earth, if
39 there are any?
40
41 Following construction, the soil overburden
42 that covers the PUREX Storage Tunnels was
43 contoured to a 2 to 1 slope for stability.
44 Natural vegetation has been allowed to cover
45 the tunnel mounds to minimize both wind and
46 water erosion.
47

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1 2. Air

3 a. What types of emissions to the air would
4 result from the proposal (i.e., dust,
5 automobile, odors, industrial wood smoke)
6 during construction and when the project is
7 completed? If any, generally describe and
8 give approximate quantities if known.

9
10 In *Radionuclide Air Emissions Report for the*
11 *Hanford Site, DOE/RL 95-49* (U.S. Department of
12 Energy, 1995, Richland, Washington), the
13 Tunnel Number 2 vent shaft stack (296-A-10) is
14 reported to have discharged no detectable
15 gross alpha or gross beta emitting
16 radionuclides in calendar year 1994.

17 b. Are there any off-site sources of emissions or
18 odors that may affect your proposal? If so,
19 generally describe.

20
21 No.

22 c. Proposed measures to reduce or control
23 emissions or other impacts to the air, if any?

24
25 The PUREX Storage Tunnel Number 1 exhaust
26 system was deactivated in January 1985 when
27 the tunnel was filled to capacity. Presently,
28 no ventilation is provided to Tunnel Number 1
29 as the exhaust vent has been blanked ahead of
30 the filter housing.

31
32 Presently, PUREX Storage Tunnel Number 2 has
33 an operating stack (296-A-10) registered and
34 permitted for radionuclide emissions with the
35 DOH. Tunnel Number 2 stack could be operated
36 continuously, or de-energized and reactivated
37 during waste placement activities. The
38 exhaust air from the tunnel stack is sampled
39 periodically in accordance with established
40 controls for radioactive airborne emissions.
41 Collected particulates are analyzed for total
42 alpha and total beta activity. The air
43 sampler is inspected daily when operating.

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1 3. Water

2 a. Surface:

3 5) Is there any surface water body on or in
6 the immediate vicinity of the site
7 (including year-round and seasonal
8 streams, saltwater, lakes, ponds,
9 wetlands)? If yes, describe type and
10 provide names. If appropriate, state what
11 stream or river it flows into.

12 No.

13 15) Will the project require any work over,
16 in, or adjacent to (within 200 feet of)
17 the described waters? If yes, please
18 describe and attach available plans.

19 No.

20 22) Estimate the amount of fill and dredge
21 material that would be placed in or
23 removed from surface water or wetlands and
24 indicate the area of the site that would
25 be affected. Indicate the source of fill
26 material.

27 None.

28 31) Will the proposal require surface water
29 withdrawals or diversions? Give general
30 description, purpose, and approximate
31 quantities if known.

32 No.

33 38) Does the proposal lie within a 100-year
34 floodplain? If so, note location on the
35 site plan.

36 No.

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1 6) Does the proposal involve any discharges
2 of waste materials to surface waters? If
3 so, describe the type of waste and
4 anticipated volume of discharge.

5 No
6
7

8 b. Ground:

9 10) Will ground water be withdrawn, or will
11 water be discharged to ground water? Give
12 general description, purpose, and
13 approximate quantities, if known.

14 Approximately 90,850 liters of water in
15 the water-fillable shielding door for
16 Tunnel No. 1 will be discharged via
17 pipeline to the 200 Area Treated Effluent
18 Disposal Facility and treated to
19 acceptable contaminant levels. There are
20 no other sources of water associated with
21 the operation of the storage tunnels.

22 23) Describe waste materials that will be
24 discharged into the ground from septic
25 waste tanks or other sources, if any (for
26 example: domestic sewage; industrial,
27 containing the following chemicals...;
28 agricultural; etc.). Describe the general
29 size of the system, the number of such
30 systems, the number of houses to be served
31 (if applicable), or the number of animals
32 or humans the system(s) are expected to
33 serve.

34 35) None.

36 c. Water Run-off (including storm water):

37 40) Describe the source of run-off (including
38 storm water) and methods of collection and
39 disposal, if any (include quantities, if
40 known). Where will this water flow? Will
41 this water flow into other waters? If so,
42 describe.

43 47) The Hanford Site receives 15 to 20
44 centimeters of precipitation annually.

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Storm water run-off is diverted away from the storage area of the PUREX Storage Tunnels by the sloped soil overburden and eventually infiltrates into the porous soils in the general vicinity.

2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

d. Proposed measures to reduce or control surface, ground, and run-off water impacts, if any:

The storage area of each tunnel has a roof and wall system designed to prevent infiltration of run-off into the PUREX Storage Tunnels. The external surfaces of the roof and the wall timbers of Tunnel Number 1 are covered with 40.8-kilogram-mineral-surface roofing material. For Tunnel Number 2, the semicircular shaped, bituminous-coated steel roof construction provides infiltration protection. In addition, the 2.4-meter soil overburden and surrounding surface area have been contoured to alleviate ponding and to divert surface water away from the PUREX Storage Tunnels.

Other potential impacts include the water contained in the water-fillable doors (Tunnel Number 1 door is presently filled; Tunnel Number 2 door is presently empty and there are no plans to fill the door) and nonregulated liquid heels remaining in some of the equipment stored in the tunnels. To mitigate spills of the equipment heels during transport, catch pans are attached on the railcars under the equipment where such leakage could occur. A sump with a drain is present beneath each water-fillable door to prevent water from overfilling and/or leakage from entering the tunnel storage area. As part of PUREX Facility deactivation, any water remaining in the doors will be removed and the drains will be capped.

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1 The potential for leakage from the equipment
2 heels or from the water-fillable doors coming
3 into contact with mixed waste stored in the
4 tunnels is not considered to be a credible
5 occurrence. However, should any liquid from
6 either the equipment or the water-fillable
7 door leak, the generation of a mixed waste
8 leachate is not considered likely because all
9 mixed waste is stored above the floor level on
10 railcars and is either encased within or
11 stored in a storage container.

13 The only liquid dangerous waste stored in
14 either tunnel is the elemental mercury stored
15 in Tunnel Number 2. The mercury is sealed in
16 stainless steel thermowells within stainless
17 steel vessels that are stored above the floor
18 level on railcars. A spill or leak of mercury
19 is not considered to be a probable occurrence.

21 4. Plants

23 a. Check the types of vegetation found on the
24 site:

26 deciduous tree: alder, maple, aspen,
27 other
28 evergreen tree: fir, cedar, pine, other
29 X shrubs
30 X grass pasture
31 crop or grain wet soil plants: cattail,
32 buttercup, bulrush, skunk cabbage,
33 other
34 water plants: water lily, eelgrass,
35 millfoil, other
36 X other types of vegetation

38 Natural vegetation has been allowed to cover
39 the tunnel mounds to minimize both wind and
40 water erosion. The vegetation consists of
41 sagebrush, grasses, and other common central
42 Washington desert plant species.

44 b. What kind and amount of vegetation will be
45 removed or altered?

47 The original vegetation at the site was
48 disturbed during construction, although this

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1 natural vegetation has regrown to cover the
2 site.

3
4 c. List threatened or endangered species known to
5 be on or near the site.

6
7 None. However, additional information
8 concerning endangered and threatened plants on
9 the Hanford Site can be found in the
10 environmental documents referred to in the
11 answer to Checklist Question A.8.

12
13 d. Proposed landscaping, use of native plants, or
14 other measures to preserve or enhance
15 vegetation on the site, if any:

16
17 As mentioned previously, native plants have
18 been allowed to cover the site of the PUREX
19 Storage Tunnels. The site can be revegetated
20 if disturbed.

21
22 5. Animals

23
24 a. Circle any birds and animals which have been
25 observed on or near the site or are known to
26 be on or near the site:

27
28 birds: hawk, heron, eagle, songbirds, other
29 mammals: deer, bear, elk, beaver, other fish:
30 bass, salmon, trout, herring, shellfish, other

31
32 A variety of insects, birds, and small mammals
33 common to the Hanford Site, including pigeons,
34 songbirds, rodents, and hares, have been
35 observed at or near the PUREX Storage Tunnels
36 site. Larger mammals commonly seen in the
37 vicinity include deer and coyote. Additional
38 information on birds and animals on the
39 Hanford Site can be found in the environmental
40 documents referred to in the answer to
41 Checklist Question A.8.

42
43 b. List any threatened or endangered species
44 known to be on or near the site.

45
46 None. However, additional information
47 concerning endangered and threatened species
48 on the Hanford Site can be found in the

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1 environmental documents referred to in the
2 answer to Checklist Question A.8.

3
4 c. Is the site part of a migration route?
5 If so, explain.

6
7 The site is located within the region-wide
8 Pacific flyway for waterfowl.

9
10 d. Proposed measures to preserve or enhance
11 wildlife, if any:

12
13 The PUREX Storage Tunnels are covered with a
14 minimum of 2.4 meters of soil to isolate their
15 contents from local fauna.

16
17 6. Energy and Natural Resources

18
19 a. What kinds of energy (electric, natural gas,
20 oil, wood stove, solar) will be used to meet
21 the completed project's energy needs?
22 Describe whether it will be used for heating,
23 manufacturing, etc.

24
25 Currently, electricity is used to power the
26 PUREX Storage Tunnels water-fillable shielding
27 doors and the Tunnel Number 2 ventilation
28 system. The locomotive normally used to
29 position each loaded railcar into a storage
30 tunnel is battery operated. If necessary,
31 diesel fuel, gasoline, and oil will be used to
32 operate equipment during final disposition.

33
34 b. Would your project affect the potential use of
35 solar energy by adjacent properties? If so,
36 generally describe.

37
38 No.

39
40 c. What kinds of energy conservation features are
41 included in the plans of this proposal? List
42 other proposed measures to reduce or control
43 energy impacts, if any:

44
45 Does not apply.

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1 7. Environmental Health.

2
3 a. Are there any environmental health hazards,
4 including exposure to toxic chemicals, risk of
5 fire and explosion, spill, or hazardous waste,
6 that could occur as a result of this proposal?
7 If so, describe.

8
9 Dangerous waste that could be stored in the
10 PUREX Storage Tunnels includes elemental
11 mercury, lead, silver, silver salts, cadmium,
12 chromium, barium, and selenium. None of this
13 waste presents a risk to personnel, the
14 public, or the environment.

15
16 The silver nitrate fraction of the mixture of
17 silver salts exhibits the characteristic of
18 ignitability as defined in WAC 173-303-095(5).
19 However, this material is contained within
20 stainless steel vessels, and ignition of the
21 material is not considered to be a credible
22 event. The risk of fire associated with the
23 storage of silver nitrate is considered to be
24 extremely low.

25
26 1) Describe special emergency services that
27 might be required.

28
29 Hanford Patrol, fire response, and
30 ambulance services are on call 24-hours a
31 day in the event of an onsite emergency.

32
33 2) Proposed measures to reduce or control
34 environmental health hazards, if any:

35
36 The PUREX Storage Tunnels are located
37 approximately 37 kilometers from Richland,
38 Washington, the nearest population center.
39 This isolation, coupled with multiple
40 security barriers, prevents unauthorized
41 access to the PUREX Storage Tunnels.
42 Approval for each entry is evaluated on a
43 case-by-case basis. Access to the PUREX
44 Storage Tunnels by employees is restricted
45 only to personnel having proper training
46 and management approval.

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1 The management practice of keeping
2 personnel radiological exposures to as low
3 as reasonably achievable (ALARA) levels is
4 adhered to strictly. Personnel entering
5 the PUREX Storage Tunnels are required to
6 wear special protective clothing and
7 respirators. Operations at the PUREX
8 Storage Tunnels are carefully managed to
9 ensure that all activities are conducted
10 in a safe and environmentally sound
11 manner.

12 b. Noise

13 1) What type of noise exists in the area
14 which may affect your project (for
15 example: traffic, equipment, operation,
16 other)?

17 None.

18 2) What types and levels of noise would be
19 created by or associated with the project
20 on a short-term or a long-term basis (for
21 example: traffic, construction,
22 operation, other)? Indicate what hours
23 noise would come from the site.

24 Operation of the PUREX Storage Tunnels
25 requires infrequent use of a
26 battery-powered locomotive to push
27 railcars into position. This operation
28 does not generate excessive noise.

29 3) Proposed measures to reduce or control
30 noise impacts, if any:

31 Does not apply.

32 8. Land and Shoreline Use

33 a. What is the current use of the site and
34 adjacent properties?

35 The PUREX Storage Tunnels are located within
36 the 200 East Area of the Hanford Site. The
37 Hanford Site is owned by the U.S. Government
38 and is currently undergoing environmental

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1 restoration associated with the past
2 production of special nuclear materials.
3
4
5

6 b. Has the site been used for agriculture? If
7 so, describe.
8
9

10 No portion of the Hanford Site, including the
11 site of the PUREX Storage Tunnels, has been
12 used for agricultural purposes since 1943.
13
14

15 c. Describe any structures on the site.
16
17

18 Construction details of the PUREX Storage
19 Tunnels are provided in Chapter 2.0 of the
20 accompanying RCRA Part B Permit Application
21 documentation. Each storage tunnel consists
22 of three areas: a water-fillable door, a
23 storage area, and a vent shaft. The
24 water-fillable doors are approximately
25 7.5 meters high, 6.6 meters wide, and
26 2.1 meters thick. Electric hoists for raising
27 (opening) and lowering (closing) the doors are
28 located on top of the concrete door
29 enclosures.
30
31

32 Tunnel Number 1 is constructed primarily of
33 treated Douglas Fir timbers, covered with a
34 40.8-kilogram-mineral-surface roofing
35 material. The 2.4 meters of earth fill placed
36 over the roof timbers serve as radiation
37 shielding. The floor consists of a railroad
38 track laid on a gravel bed that slopes on a
39 1.0 percent grade southward.
40
41

42 A combination of steel and reinforced concrete
43 was used to construct the storage area of
44 Tunnel Number 2. Tunnel Number 2 has a
45 10.4-meter diameter, nearly semicircular,
46 steel roof supported by internal I-beam wales
47 attached to external, reinforced concrete
48 arches. The structure is supported on
 reinforced concrete-grade beams that run the
 full length of the tunnel. The interior and
 exterior surfaces of the steel roof are coated
 with a bituminous coating compound to inhibit
 corrosion, and the entire storage area is
 covered with 2.4 meters of earth fill that
 serves as radiation shielding. The floor

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1 consists of a railroad track laid on a gravel
2 bed that slopes on a one-tenth of 1 percent
3 grade southward.

4
5 A vent shaft is located at the south end of
6 each tunnel. The shafts are constructed of
7 reinforced concrete. Each shaft extends
8 approximately 0.3 meter above grade and is
9 capped with a single high-efficiency
10 particulate air filter, a 153-cubic-meter per
11 minute exhaust fan, and a 6.1-meter-tall
12 exhaust stack. The exhaust fan on Tunnel
13 Number 1 has been deactivated, and the fan on
14 Tunnel Number 2 has been damped to provide
15 only about 100-cubic meters per minute exhaust
16 flow.

17
18 d. Will any structures be demolished? If so,
19 what?

20
21 No structures will be demolished as a part of
22 this proposal.

23
24 e. What is the current zoning classification of
25 the site?

26
27 The Hanford Site is zoned by Benton County as
28 an Unclassified Use (U) district.

29
30 f. What is the current comprehensive plan
31 designation of the site?

32
33 The 1985 Benton County Comprehensive Land Use
34 Plan designates the Hanford Site as the
35 "Hanford Reservation". Under this
36 designation, land on the Hanford Site may be
37 used for "activities nuclear in nature".
38 Non-nuclear activities are authorized "if and
39 when DOE approval for such activities is
40 obtained".

41
42 g. If applicable, what is the current shoreline
43 master program designation of the site?

44
45 Does not apply.

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1 h. Has any part of the site been classified as an
2 "environmentally sensitive" area? If so,
3 specify.

4 No.

5 i. Approximately how many people would reside or
6 work in the completed project?

7 None.

8 j. Approximately how many people would the
9 completed project displace?

10 None.

11 k. Proposed measures to avoid or reduce
12 displacement impacts, if any:

13 Does not apply.

14 l. Proposed measures to ensure the proposal is
15 compatible with existing and projected land
16 uses and plans, if any:

17 Does not apply. (Refer to answer to Checklist
18 Question B.8.f.)

19 9. Housing

20 a. Approximately how many units would be
21 provided, if any? Indicate whether high-,
22 middle-, or low-income housing.

23 None.

24 b. Approximately how many units, if any, would be
25 eliminated? Indicate whether high-, middle-,
26 or low-income housing.

27 None.

28 c. Proposed measures to reduce or control housing
29 impacts, if any:

30 Does not apply.

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1 10. Aesthetics

2
3 a. What is the tallest height of any proposed
4 structure(s), not including antennas; what is
5 the principal exterior building material(s)
6 proposed?

7 The tallest aboveground structures associated
8 with the PUREX Storage Tunnels are the
9 existing water-fillable doors, which are
10 approximately 7.5 meters high. Electric
11 hoists for raising (opening) and lowering
12 (closing) the doors and steel handrails are
13 located on top of the concrete door
14 enclosures.

15
16 b. What views in the immediate vicinity would be
17 altered or obstructed?

18 None.

19
20 c. Proposed measures to reduce or control
21 aesthetic impacts, if any:

22 Does not apply.

23 11. Light and Glare

24
25 a. What type of light or glare will the proposal
26 produce? What time of day would it mainly
27 occur?

28 None.

29
30 b. Could light or glare from the finished project
31 be a safety hazard or interfere with views?

32 No.

33
34 c. What existing off-site sources of light or
35 glare may affect your proposal?

36 None.

37
38 d. Proposed measures to reduce or control light
39 and glare impacts, if any:

40 Does not apply.

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1 12. Recreation

2 a. What designated and informal recreational
3 opportunities are in the immediate vicinity?

4 None.

5 b. Would the proposed project displace any
6 existing recreational uses? If so, describe.

7 Does not apply.

8 c. Proposed measures to reduce or control impacts
9 on recreation, including recreation
10 opportunities to be provided by the project or
11 applicant, if any?

12 Does not apply.

13 13. Historic and Cultural Preservation

14 a. Are there any places or objects listed on, or
15 proposed for, national, state, or local
16 preservation registers known to be on or next
17 to the site? If so, generally describe. No
18 places or objects listed on, or proposed for,
19 national, state, or local preservation
20 registers are known to be on or next to the
21 site.

22 The PUREX Storage Tunnels are located in an
23 area that was disturbed extensively during
24 construction of the PUREX Facility.
25 Additional information on the Hanford Site
26 environment can be found in the environmental
27 documents referred to in the answer to
28 Checklist Question A.8.

29 b. Generally describe any landmarks or evidence
30 of historic, archaeological, scientific, or
31 cultural importance known to be on or next to
32 the site.

33 There are no known archaeological, historical,
34 or native American religious sites at or next
35 to the PUREX Storage Tunnels. Additional
36 information on the Hanford Site environment
37 can be found in the environmental documents

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referred to in the answer to Checklist Question A.8.

c. Proposed measures to reduce or control impacts, if any:

As appropriate, detailed cultural resource reviews will provide the vehicle for necessary approvals required under the *National Historic Preservation Act*.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Does not apply.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

The site is not publicly accessible, and, therefore, is not served by public transportation.

c. How many parking spaces would the completed project have? How many would the project eliminate?

None.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The PUREX Storage Tunnels are an extension of the rail spur on which irradiated reactor

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EVALUATIONS FOR
AGENCY USE ONLY

1 fuels were delivered to the PUREX Plant for
2 chemical reprocessing. Material to be stored
3 in the tunnels is loaded on modified railcars
4 that serve as transport and storage platforms.
5 Normally, a remote-controlled, battery-powered
6 locomotive is used to position each loaded
7 railcar into a storage tunnel, however, other
8 remote movers have been or could be used to
9 position a railcar in the tunnel or to
10 withdraw a car from the tunnel.

11 f. How many vehicular trips per day would be
12 generated by the completed project? If known,
13 indicate when peak volumes would occur.

14 None.

15 g. Proposed measures to reduce or control
16 transportation impacts, if any:

17 Does not apply.

18 15. Public Services

19 a. Would the project result in an increased need
20 for public services (for example: fire
21 protection, police protection, health care,
22 schools, other)? If so, generally describe.

23 No.

24 b. Proposed measures to reduce or control direct
25 impacts on public services, if any:

26 Does not apply.

27 16. Utilities

28 a. List utilities currently available at the site
29 (electricity, natural gas, water, refuse
30 service, telephone, sanitary sewer, septic
31 system, other):

32 There are no electrical utilities, water
33 supply systems, drains, fire detection
34 systems, or communications systems provided
35 inside the storage area of the PUREX Storage
36 Tunnels. All electricity, water supply lines,

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EVALUATIONS FOR
AGENCY USE ONLY

1 and drain lines used in the operation of the
2 PUREX Storage Tunnels are external.
3 Electricity, communications systems, and other
4 utilities will be available within the PUREX
5 Plant until deactivation is complete. In the
6 event the PUREX Storage Tunnels receive waste
7 after PUREX Plant deactivation, necessary
8 utilities will have to be brought in from
9 outside the PUREX Facility.

10
11 b. Describe the utilities that are proposed for
12 the project, the utility providing the
13 service, and the general construction
14 activities on the site or in the immediate
15 vicinity which might be needed.

16 No additional utilities are proposed.
17
18
19

1 SIGNATURES
2

3 The above answers are true and complete to the best of my knowledge. We
4 understand that the lead agency is relying on them to make its decision.
5
6
7
8
9

Jane E. Rasmussen

10 James E. Rasmussen, Director
11 Office of Environmental Assurance,
12 Permits, and Policy Division
13 U.S. Department of Energy
14 Richland Operations Office
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11/21/95

Date

J. Hamrick

23 D. G. Hamrick, Director
24 PUREX Transition Project
25 Westinghouse Hanford Company
26
27

11/8/95

Date

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