DOE/RL-90-24
Revision 4
UC-630

Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels

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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 1996) 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 1996) 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 April 1997.

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DOCUMENT CONTENT

APPENDICES

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

If you know	Multiply by	To get	If you know	Multiply by	To get
	Length			**Length**	
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
	Area			**Area**	
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
	Mass (weight)			**Mass (weight)**	
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
	Volume			**Volume**	
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	cubic meters	cubic meters	1.308	cubic yards
	Temperature			**Temperature**	
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

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

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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. 4

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 C-1b C-1c	Waste In Piles Landfilled Wastes Wastes Incinerated and Wastes Used in Performance Tests	Not Applicable	Not Applicable
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 D-4 Surface Impoundments D-5 Incinerators D-6 Landfills D-7 Land Treatment	Not Applicable	Not Applicable
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 I-1e	Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment, and Miscellaneous Units Closure of Landfill Units	Not Applicable	Not Applicable
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		Chapter 11.0
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

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1.0 PART A [A]

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

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

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

The Part A, Form 3, Revision 3, was submitted in August 1995. This revision was prepared to add dangerous waste numbers D005 (barium), D010 (selenium), and WT02 (state-only, toxic, dangerous waste for light mineral oil) to process code (S05). State-only designations for existing dangerous waste numbers were revised as follows: D006 - WT01 replaced by WT02, D007 - WT01 and WT02 removed, D009 - WT01 removed, D011 - WT01 removed, Fluorothene - WT02 replaced by WT01, and WP01 removed.

The Part A, Form 3, Revision 4, was submitted in May 1996. This revision was prepared to replace reference to 40 CFR 264, Subpart X, with WAC 173-303-680. State-only dangerous waste number WC02 (carcinogenic, dangerous waste) was removed. The number of railcars presently stored in Tunnel Number 2 was updated.

The Part A, Form 3, Revision 5, included in this permit application documentation consists of five pages, three figures, and one photograph, and was prepared in support of the transition of contract responsibilities from Westinghouse Hanford Company to the new Project Hanford Management Contractor.

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Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 character/inch).

DANGEROUS WASTE PERMIT APPLICATION

1. EPA/STATE I.D. NUMBER: W A 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED *(mo., day, & yr.)*	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, or if this is a revised application, enter 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.)*

MO. 0 3 DAY 2 2 YR.* 4 3 — FOR EXISTING FACILITIES, PROVIDE THE DATE *(mo., day, & yr.)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*
*The date construction of the Hanford Facility commenced.

☐ 2. NEW FACILITY *(Complete item below)*

MO. ___ DAY ___ YR. ___ — FOR NEW FACILITIES, PROVIDE THE DATE, *(mo., day, & yr)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

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

[X] 1. FACILITY HAS AN INTERIM STATUS PERMIT

[X] 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	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D80	GALLONS OR LITERS
LANDFILL	D81	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D82	*ACRES OR HECTARES*
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

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.

LINE NUMBER	A. PROCESS CODE *(from list above)*	B. 1. AMOUNT *(specify)*	B. 2. UNIT OF MEASURE *(enter code)*	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE *(from list above)*	B. 1. AMOUNT *(specify)*	B. 2. UNIT OF MEASURE *(enter code)*	FOR OFFICIAL USE ONLY
X-1	*S 0 2*	*600*	*G*		*5*				
X-2	*T 0 3*	*20*	*E*		*6*				
3	S 0 5	24,007	C		7				

Process Code S05 is being used to designate the PUREX Storage Tunnels as a "Miscellaneous Unit" per Washington Administrative Code 173-303-680.

4					*10*				

Continued from the front.

III. PROCESSES (continued)

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPAC

S05

The PUREX Storage Tunnels, a miscellaneous unit (S05), are used for storage of mixed waste subject to the requirements of WAC 173-303-680. The two tunnels store waste from the PUREX Plant and other onsite sources. 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 Number 1 was completed in 1956. The tunnel is approximately 5.8 meters (19 feet) wide by 6.7 meters (22 feet) high by 109 meters (358 feet) long and provides storage space for eight railcars. Between June 1960 and January 1965, all eight railcar positions were filled and the tunnel subsequently was sealed. The combined volume of the equipment stored on the eight railcars presently in Tunnel Number 1 is approximately 596 cubic meters (780 cubic yards). The maximum process design capacity for storage in Tunnel Number 1 is approximately 4,129 cubic meters (5,400 cubic yards).

The construction of Tunnel Number 2 was completed in 1964. Tunnel Number 2 is approximately 5.8 meters (19 feet) wide by 6.7 meters (22 feet) high by 514 meters (1,686 feet) long and provides storage space for 40 railcars. The first railcar was placed in Tunnel Number 2 in December 1967 and as of July 1996, 28 railcars have been placed in the tunnel. The combined volume of equipment stored on the 28 railcars presently in Tunnel Number 2 is approximately 2,204 cubic meters (2,883 cubic yards). The maximum process design capacity for storage in Tunnel Number 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 waste: 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.

NO.	A. DANGEROUS WASTE NO. *(enter code)*	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*	D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2			T 0 3 D 8 0	*included with above*

CONTINUE ON PAGE 3

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

I.D. NUMBER *(entered from page 1)*

[illegible] 7 8 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 MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*				D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
1	D005	454*	K	S05				Storage - Miscellaneous
2	D006	454*	↓	↓				↓
3	WT02							
4	D007	454*						
5	D008	8,000*						
6	D009	45*						
7	D010	454*						
8	D011	680*						
9	D001							↓
10	WT02	454*	↓	↓				Included With Above

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

LINE NO.	A	B	C	D1				D2
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
25								
26								

Continued from the front.

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

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

The waste stored in the tunnels could include barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010), silver (D011), and light mineral oil (WT02, state-only, toxic, dangerous waste) contained in oil absorption material. The silver is predominately in the form of salts and is considered ignitible (D001) because of the presence of silver nitrate ($AgNO_3$). Cadmium also could be considered state-only, toxic, dangerous waste (WT02).

V. FACILITY DRAWING Refer to attached drawing(s).

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 photograph(s).

All existing facilities must include photographs *(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 drawing(s) and photograph(s).

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*

VIII. FACILITY OWNER

[x] 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)*	SIGNATURE	DATE SIGNED
John D. Wagoner, Manager U.S. Department of Energy Richland Operations Office	John D. Wagoner	9/26/96

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		

 CONTINUE ON PAGE 5

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.

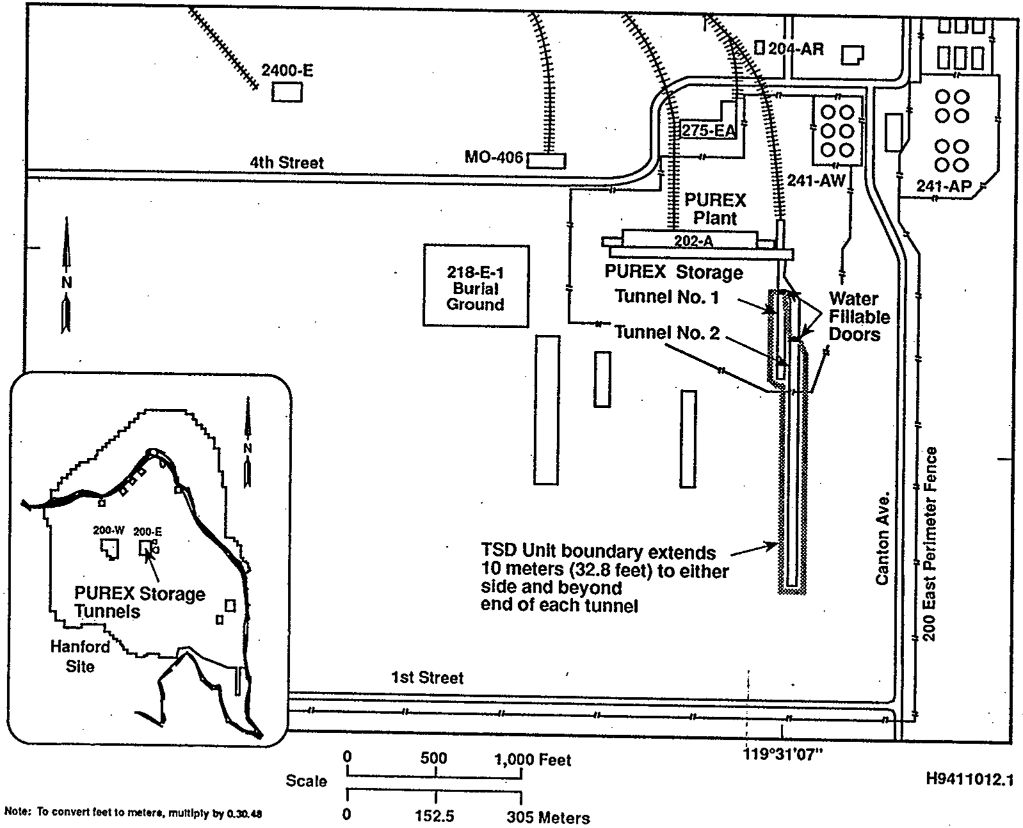
John D. Wagoner — 9/26/96

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

[signature] — 9/13/96

Co-operator — Date
H. J. Hatch,
President and Chief Executive Officer
Fluor Daniel Hanford, Inc.

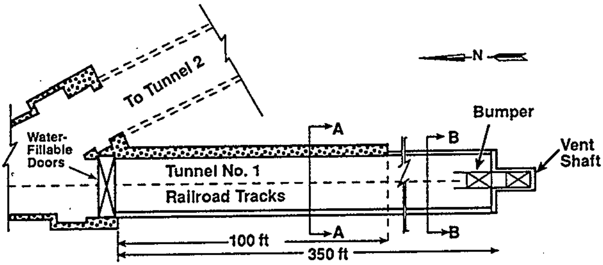
PUREX Storage Tunnels Site Plan



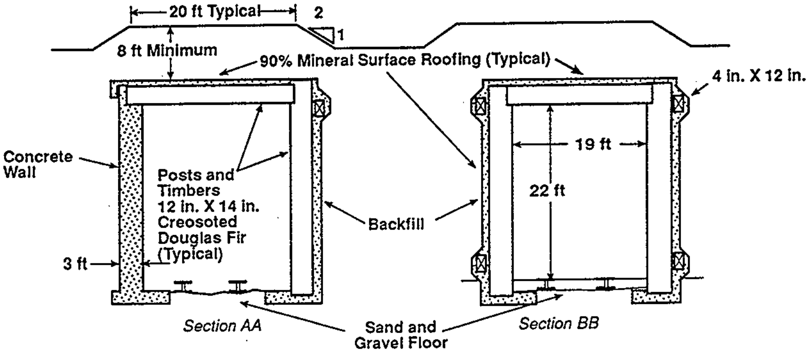
Note: To convert feet to meters, multiply by 0.30.48

WA7890008967

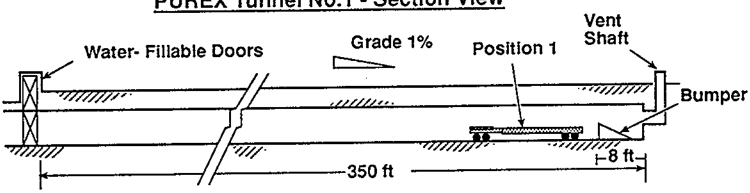
PUREX Tunnel No. 1 - Details



PUREX Tunnel No.1 - Plan View



PUREX Tunnel No.1 - Section View

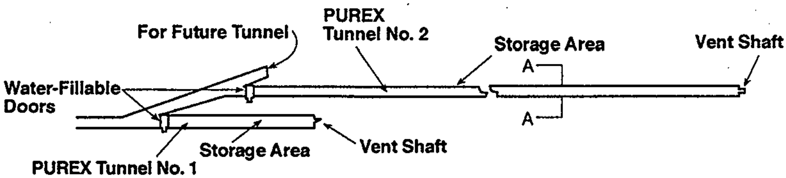


PUREX Tunnel No.1 - Elevation View

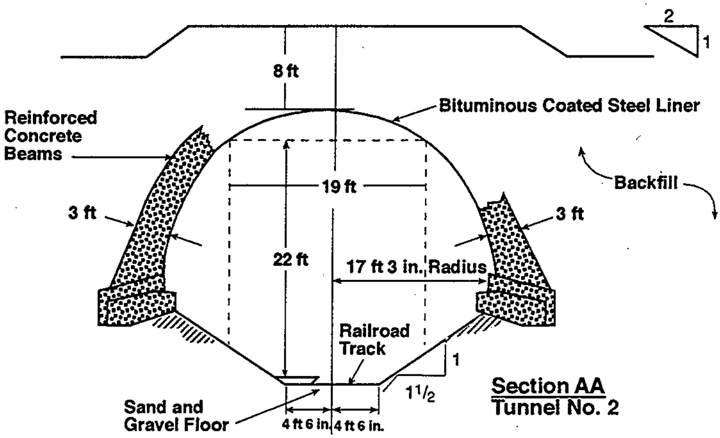
For conversion to meters, multiply feet by 0.3048.
For conversion to centimeters, multiply inches by 2.54.

H96030106.2

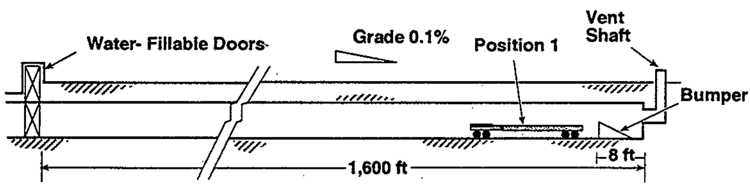
PUREX Tunnel No. 2 - Details



PUREX Tunnels - Plan View



Section AA
Tunnel No. 2

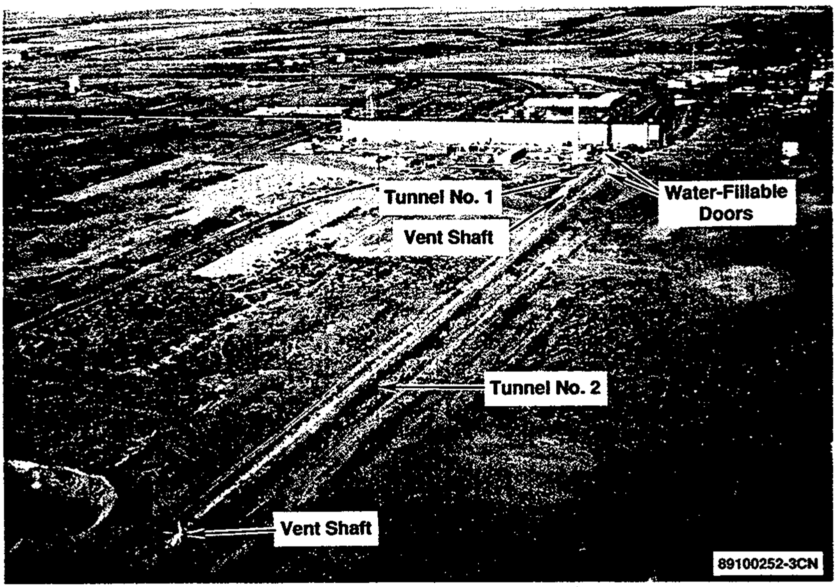


PUREX Tunnel No. 2 - Elevation View

For conversion to meters, multiply feet by 0.3048.
For conversion to centimeters, multiply inches by 2.54.

H96030106.1

PUREX STORAGE TUNNELS



46°32'47"
119°31'07"

89100252-3CN
(PHOTO TAKEN 1989)

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CONTENTS

APPENDIX

FIGURES

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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

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

- General description
- Topography
- Traffic information.

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

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

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

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

2.1 THE PUREX STORAGE TUNNELS DESCRIPTION [B-1]

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

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

Transfers into or out of the PUREX Storage Tunnels were infrequent and were not manpower-intensive operations. A more detailed description of the operation of the PUREX Storage Tunnels is provided in Chapter 4.0.

2.1.1 Tunnel Number 1 (218-E-14)

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

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

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

Beneath the water-fillable door is a sump with a 15.2-centimeter drain that connects to a railroad tunnel sump; water was pumped to the Double-Shell Tank System. The drain was sealed as part of deactivation activities.

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

The space between the ties is filled to top-of-tie with gravel ballast. The tracks are on a 1.0 percent downward slope to the south to ensure that 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 eight, 12.8-meter-long railcars.

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

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

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

A vent shaft is located at the south end of Tunnel Number 1. The shaft is approximately 1.5 meters by 1.5 meters in cross-section and is constructed of reinforced concrete. The vent stack extends approximately 0.3 meter above grade and was capped with a single-stage, high-efficiency particulate air (HEPA) filter, a 283-cubic-meter per minute exhaust fan, and a 6.1-meter tall exhaust stack. After filling Tunnel Number 1 to capacity, the tunnel was sealed. Sealing activities included de-energizing the ventilation system and blanking the ventilation system to prevent interaction of the tunnel air with external air. Deactivation of the vent system is described in Chapter 4.0, Section 4.1.6.1. A further discussion of the tunnel ventilation system is provided in Chapter 4.0.

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

2.1.2 Tunnel Number 2 (218-E-15)

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

- A combination of steel and reinforced concrete was used in the construction of the storage area for Tunnel Number 2 (Figure 2-5) rather than wood timbers, as used in Tunnel Number 1.

- Tunnel Number 2 is longer, having a storage capacity of five times that of Tunnel Number 1.

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

- The railroad tunnel approach to Tunnel Number 2 angles eastward then angles southward to parallel Tunnel Number 1 (Figure 2-4). The approach to Tunnel 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 (Figure 2-2).

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

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.

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

The vent shaft, located at the south end of Tunnel Number 2, is approximately 1.5 meters by 1.5 meters in cross-section and is constructed of reinforced concrete. The vent shaft extends approximately 0.3 meter above grade and is capped with an exhaust system consisting of a single-stage, HEPA filter, a 153-cubic meter per minute exhaust fan, and a 6.1-meter-tall exhaust stack. The ventilation system currently is inactive (Chapter 4.0, Section 4.6.1.2); however, when operating the exhaust fan normally is dampered to provide only about 100 cubic meters per minute of exhaust flow. A further discussion of the tunnel ventilation system is provided in Chapter 4.0.

The first railcar was placed in storage in December 1967. Table 1 in Appendix 3A contains current storage inventory data.

2.1.3 Other Environmental Permits

Applicable air permits have been issued and are on file. A radioactive air emissions notice of construction for the transfer of waste from the 324 Building for storage in PUREX Storage Tunnel Number 2 has been submitted.

2.2 TOPOGRAPHIC MAP [B-2]

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

- Map scale
- Date
- Prevailing wind speed and direction
- A north arrow
- Surrounding land use
- Buildings
- Access road location
- Access control
- Monitoring and sampling well locations
- TSD unit locations.

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

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

2.3.1 The PUREX Storage Tunnels Roadway Access

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

2.3.2 The PUREX Storage Tunnels Railroad Access

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

2.4 RELEASE FROM SOLID WASTE MANAGEMENT UNITS [E]

Information concerning releases from solid waste management units is discussed in the General Information Portion (DOE/RL-91-28, Appendix 2D).

200 East Area

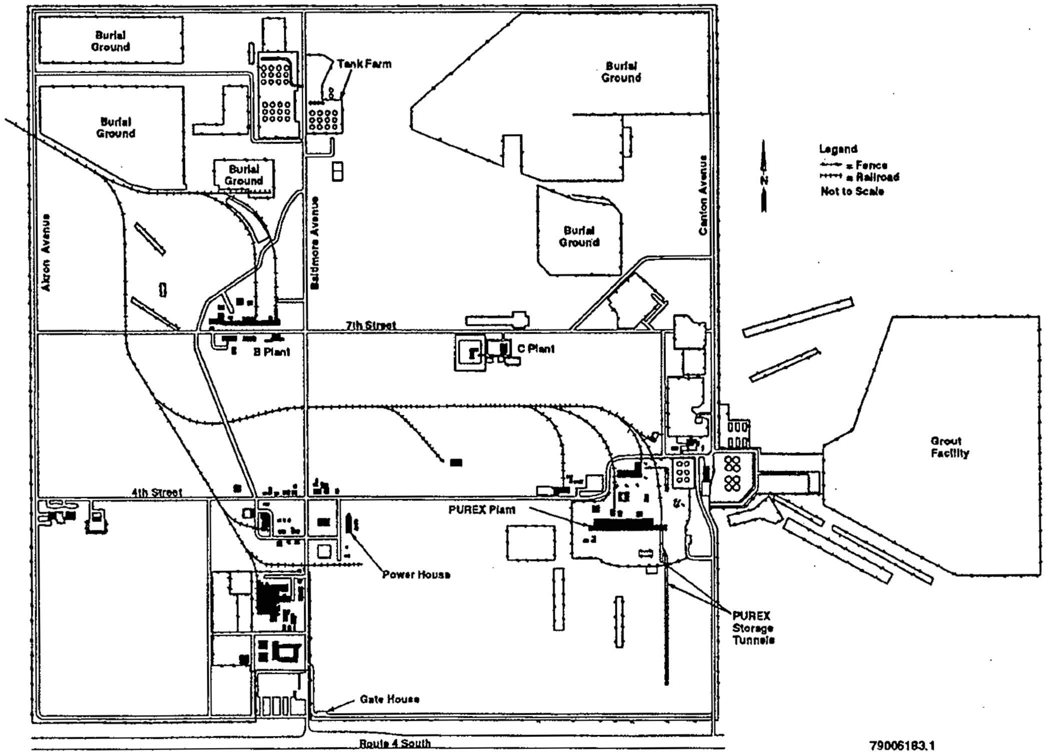

Figure 2-1. The 200 East Area.

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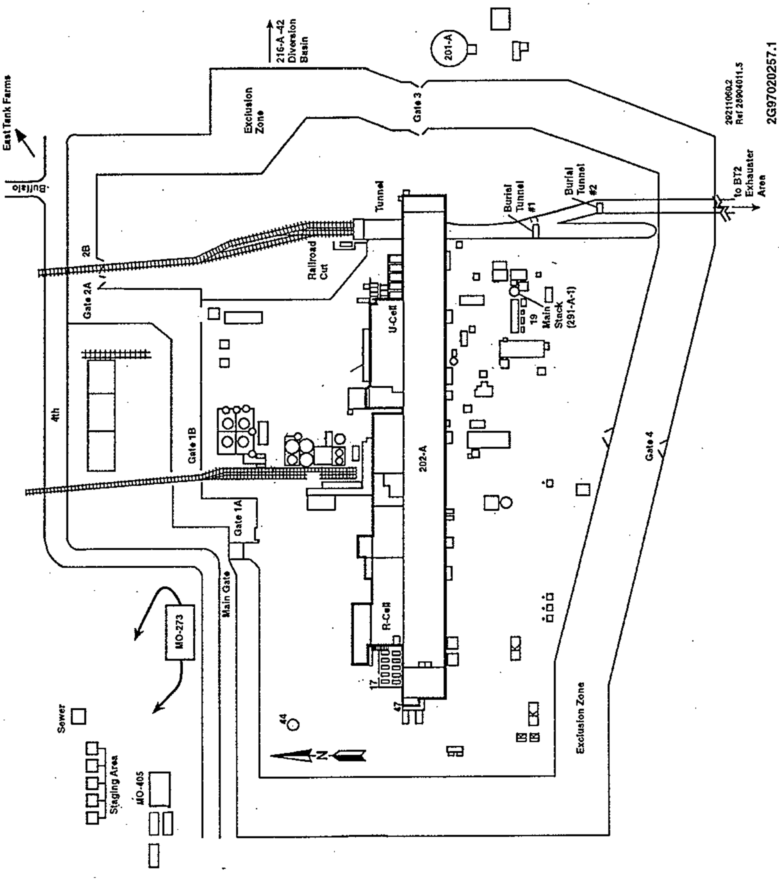

Figure 2-2. The PUREX Facility.

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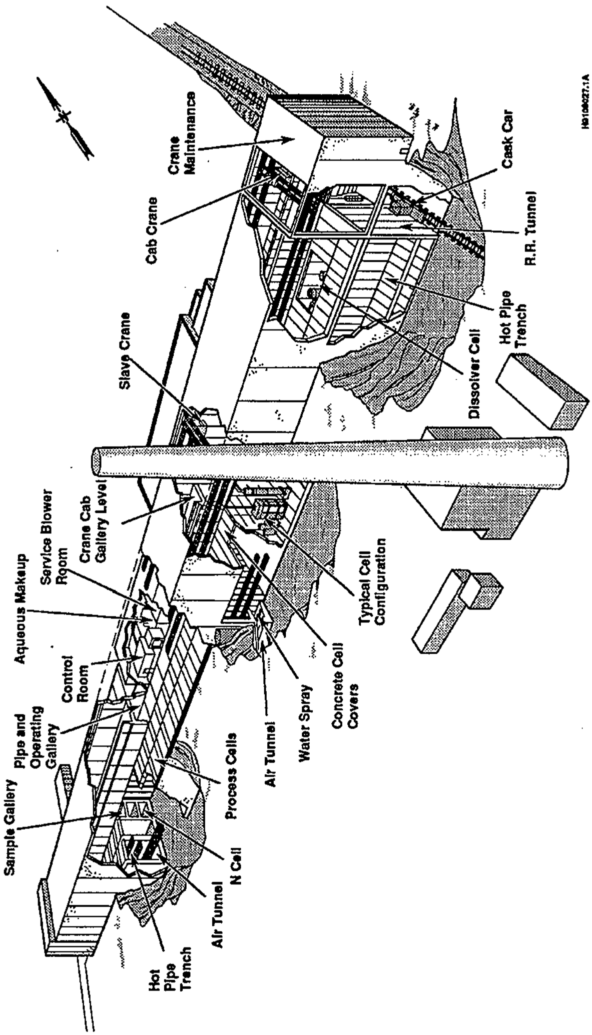

Figure 2-3. The PUREX Plant (Building 202-A).

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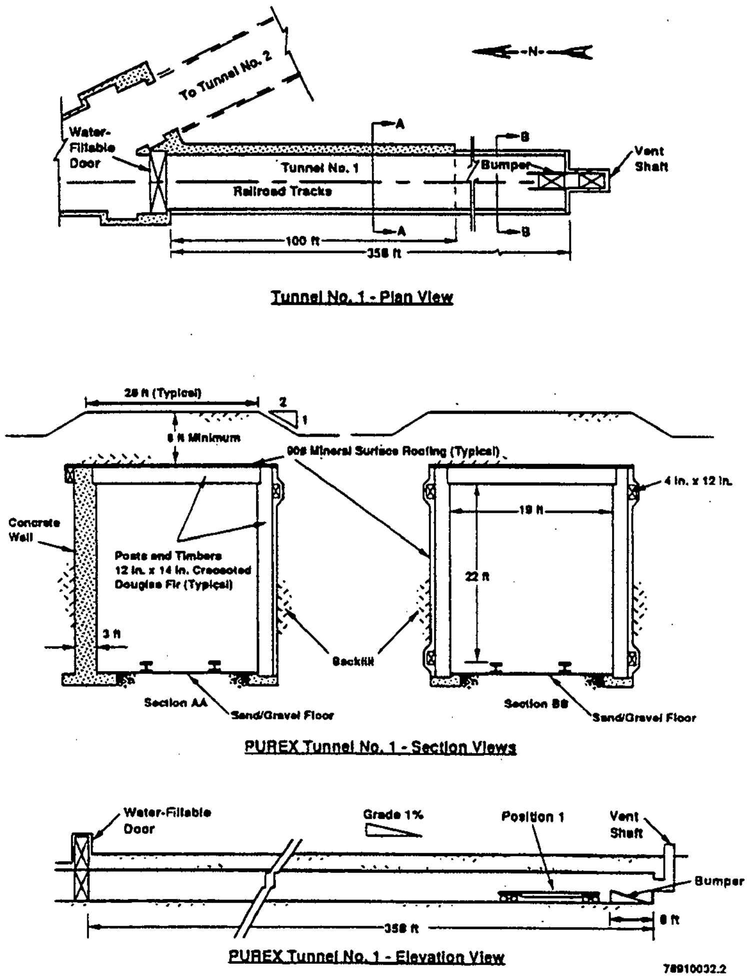

Figure 2-4. The PUREX Storage Tunnel Number 1.

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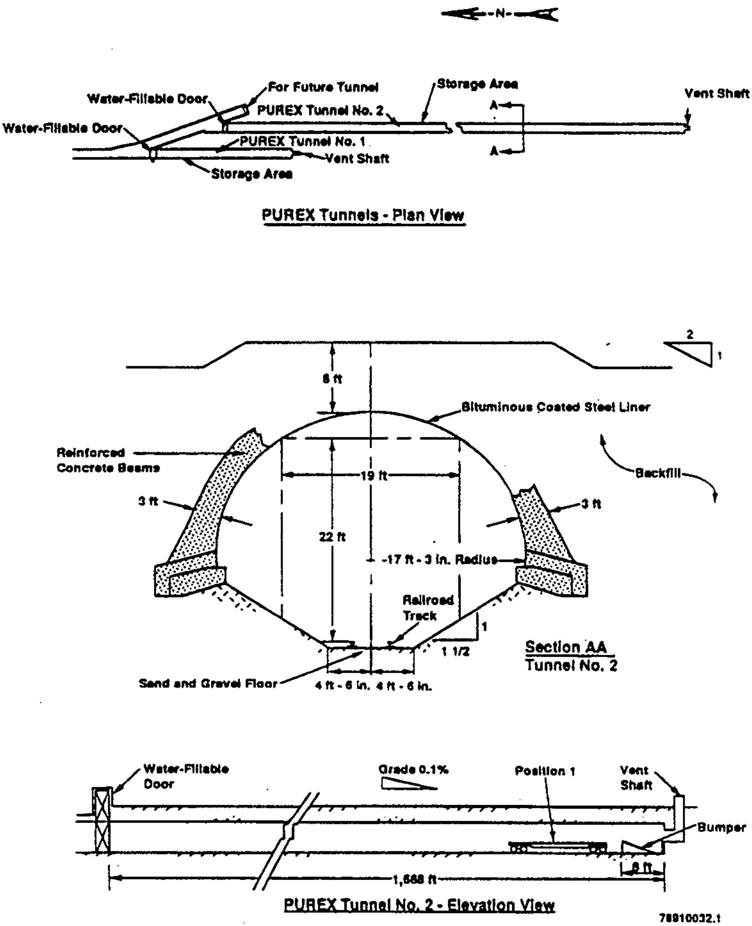

Figure 2-5. The PUREX Storage Tunnel Number 2.

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CONTENTS

APPENDIX

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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.

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

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

- Lead
- Mercury
- Silver and silver salts
- Chromium
- Cadmium
- Barium
- Mineral oil.

In general, 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 liters.

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

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

3.2 WASTE ANALYSIS PLAN [C-2]

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

3.3 TRACKING SYSTEM [C-4]

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

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

CONTENTS

APPENDIX

FIGURE

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4.0 PROCESS INFORMATION [D]

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

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

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

4.1 OPERATION OF THE PUREX STORAGE TUNNELS

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

4.1.1 Preparation for Tunnel Activities

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

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

Preparatory activities associated with the remote-controlled locomotive included the following:

- Charging the batteries for both the locomotive and the radio transmitter

- Performing operational checks

- Installing a plastic shroud over the locomotive to facilitate decontamination

- Installing an anticoupling device on the south coupler of the locomotive (storage only)

- Performing physical inspections of the railroad track within the railroad tunnel to ensure that the track switches are positioned properly and the track is clear of obstructions.

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

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

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

- The storage tunnel exhaust fan is verified to be operating.

- Labels will be attached to the railcar in accordance with WAC 173-303-395(6) and 173-303-630(3) if the material contains dangerous waste components.

4.1.2 Tunnel Storage Activities

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

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

- Length, width, and height
- Gross weight and volume
- Preferred orientation for transport and storage
- Presence of mixed waste.

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

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

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

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

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

- The water-fillable door to the storage tunnel is opened.
- The railcar is loaded as specified in the storage tunnel checklist.
- An inventory of items loaded on the railcar and a record of their location on the railcar are recorded in the storage tunnel checklist.
- A health physics technician obtains a radiation level survey of the loaded railcar at a distance commensurate with ALARA practices.
- The railcar is pushed into the storage tunnel to its storage position.
- Once the railcar is in position, the water-fillable door is closed.

4.1.3 Removal of Stored Material

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

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

- The equipment that will be used to remove material is positioned in the PUREX railroad tunnel.

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

- The water-fillable door is opened.

- The equipment that will be used to remove material is moved into the storage tunnel and connected to the railcar.

- Verification is made that the railcar is connected to the removal equipment and the railcar is extracted from the storage tunnel and positioned within the PUREX railroad tunnel.

- The water-fillable door is closed.

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

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

If radiation shielding beyond that provided by the empty water-fillable door becomes necessary, the door can be filled with water. In the past, this was accomplished by connecting a fire hose from the water hydrant to the wall stub on the exterior of the door housing (Figure 4-1). Once the fire hose was in place, the hydrant valve was opened and the door was filled with water.

The hydrant was closed by personnel when a high-level indicator light illuminated. Although attendance by an operator is required at all times during filling operations, should the door overfill, excess water is channeled through a vent/spill pipe to the door sump. A 15.2-centimeter drain is provided in each door sump. Water accumulated in the door sump was pumped out to the Double-Shell Tank System, and the sump and drain were made inoperable during PUREX Facility deactivation activities. The drain was sealed during PUREX Facility deactivation. In the future, a temporary source of water could be provided for filling the water-fillable door.

4.1.5 Poststorage Activities

The following poststorage activities would conclude the tunnel storage task.

- Decontamination activities, if required, are performed.
- Management is notified of any unusual conditions observed during the storage/retrieval activities.

4.1.6 Operation of the Tunnel Ventilation System

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

4.1.6.1 Tunnel Number 1 Ventilation. Active ventilation of Tunnel Number 1 presently is not provided. After placement of the last railcar into Tunnel Number 1, the tunnel was sealed (Chapter 2.0). As part of the sealing activities, the ventilation fan was deactivated electrically and the exhaust stack and filter were isolated from the system by installing blanks upstream and downstream of both the exhaust fan and filter and the stack was removed. In the event railcar removal activities are initiated, it is planned that the ventilation system would be reactivated. Operation of the ventilation system would be similar to that for Tunnel Number 2.

4.1.6.2 Tunnel Number 2 Ventilation. The Tunnel Number 2 ventilation system presently is inactive. As part of PUREX Facility deactivation, the water-fillable door and outer PUREX railroad tunnel door were sealed. The seal may be temporary or permanent depending on the future need for storing waste in the tunnel. The ventilation system may be operated continuously, or de-energized and reactivated during waste placement activities. During deactivation, a blank was installed on the downstream side of the filter and the stack was capped. When the determination has been made that Tunnel Number 2 will no longer receive waste, the ventilation system will be blanked and deactivated electrically similar to the Tunnel Number 1 ventilation system. While the Tunnel Number 2 ventilation system is operating and the water-fillable door is closed, the exhaust system, which discharges approximately 100 cubic meters per minute, maintains a slightly negative pressure in the tunnel. The exhaust air is replaced by infiltration around the water-fillable door and through the porosity of the tunnel structure (e.g., the rail-bed ballast). When the water-fillable door is open (during transfer activities), inward airflow is maintained through the open doorway. This inward airflow channels airborne radioactive contamination away from both the railroad tunnel and personnel following railcars (if allowed) into the storage tunnel. A HEPA filter provides filtration of all exhaust air before release to the atmosphere. When the ventilation system is operating, the HEPA filter is tested in place at least annually to ensure radioactive particulate removal efficiency. Exhausted air is sampled periodically and analyzed for airborne radionuclides.

4.2 CONTAINERS [D-1]

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

4.2.1 Containers with Free Liquids

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

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

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

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

4.2.2 Containers Without Free Liquids That Do Not Exhibit Ignitability or Reactivity

Most lead is fully contained in all-welded encasements of either carbon steel or 304L stainless steel (refer to Table 1 in Appendix 3A). The encasement serves as support, protection against mechanical damage, and protection of the lead from exposure to the environment. Also, lead has been placed in burial boxes of appropriate size. The boxes provide secondary containment for the lead in the unlikely event the primary encasement should fail. Although boxes may be open on the top, the PUREX Storage Tunnels are enclosed; therefore, the containers are protected from the elements.

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

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

4.2.3 Protection of Extremely Hazardous Waste in Containers

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

- The operation of the PUREX Storage Tunnels is passive, i.e., once a storage position is filled, the storage position remains undisturbed until closure.

- The extremely hazardous waste is compatible with its storage container and the storage environment.

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

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

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

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

Although ignitable waste storage units are required by WAC 173-303-395(1)(d) to have inspections conducted at least yearly by a fire marshall or professional fire inspector familiar with the requirements of the uniform fire code, the radiation levels within the PUREX Storage Tunnels make such inspections impractical. These inspections are not considered appropriate or necessary for the safe operation of the unit because of the nature of the ignitable waste, the means of storage, and ALARA concerns (Chapter 6.0, Section 6.2).

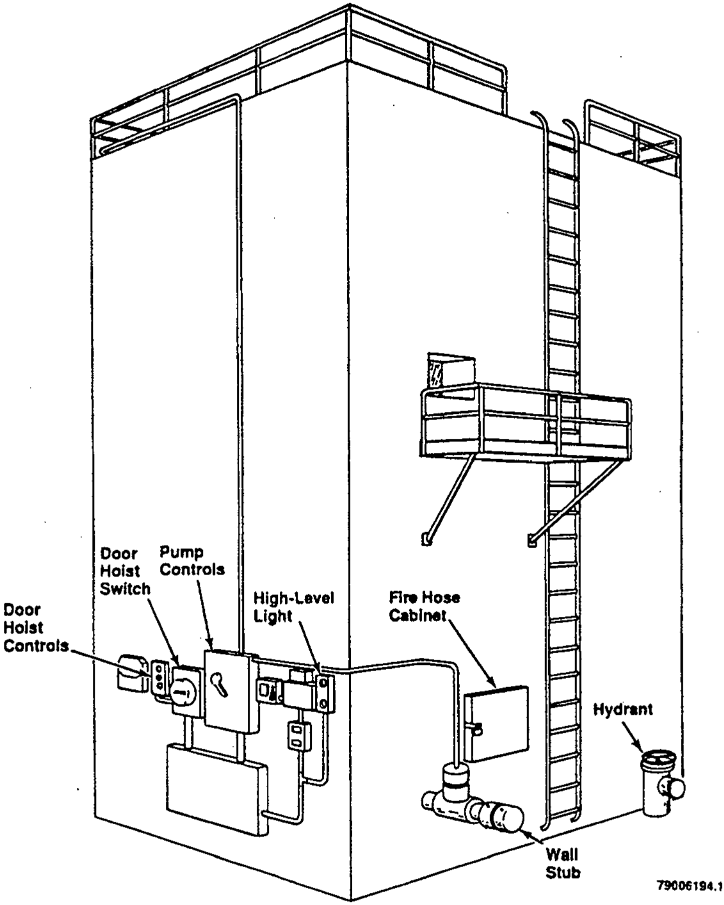

Figure 4-1. Water-Fillable Door Exterior (Tunnel Number 2).

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

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

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

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

6.1 SECURITY [F-1]

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

6.1.1 Security Procedures and Equipment [F-1a]

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

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

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

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

6.1.2 Waiver [F-1b]

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

6.2 INSPECTION PLAN [F-2]

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

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

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

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

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

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

6.3.1 Equipment Requirements [F-3a]

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

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

6.3.1.2 External Communications. External communications equipment for summoning emergency assistance from the Hanford Fire Department and/or emergency response teams are provided by two-way portable radios or other devices.

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

6.3.1.4 Water for Fire Control. The fire hazard associated with the operation of 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 (Rambosek and Foster 1972). In the event it is determined there is a fire in the storage area of the tunnels, the contingency plan will be activated. Because of the potential of the mixed waste stored within the tunnels to leach, the use of water for fire control will be avoided if possible. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system, if operating, should permit the fire to self-extinguish. Should the fire continue to propagate, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. Heavy equipment and cranes are readily available on the Hanford Facility at all times and generally are available for deployment to the scene of an emergency within 1 hour. 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 Appendix 7A. The recovery plan will take into consideration plans, if any, for retrieval of the waste stored within the tunnel(s).

6.3.2 Aisle Space Requirement [F-3b]

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

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

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

6.4.1 Unloading Operations

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

6.4.2 Run-Off

The design of the PUREX Storage Tunnels included consideration and provisions for the control of run-off and run-on. Construction of both tunnels included the application of a moisture barrier before placement of the soil overburden. On Tunnel Number 1, 40.8-kilogram mineral surface roofing was applied to the external surfaces of the structural timbers (top and sides). The roofing material was nailed in place with an overlap of approximately 10 centimeters at all joints and seams. All interior and exterior steel surfaces of Tunnel Number 2 were coated with at least a 0.9 millimeter bituminous, solvent coal tar base, coating compound. The coating was applied using a two-coat system, with each coat not less than 0.45 millimeter, ensuring a total dry film thickness of not less than 0.9 millimeter.

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

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

6.4.3 Water Supplies

Water was supplied to the PUREX Storage Tunnels from the PUREX Plant. This water was used for the sole purpose of filling the water-fillable doors should it have been determined necessary. There are no other sources or uses of water at the PUREX Storage Tunnels. The line that supplied water to the PUREX Storage Tunnels was blanked and emptied during deactivation activities. In the future, a temporary source of water would be provided for filling the water fillable door.

6.4.4 Equipment and Power Failures

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

6.4.4.1 Mitigation of the Effects of Equipment Failure. Maintaining safe storage of materials in the PUREX Storage Tunnels is not contingent on continued operation of equipment. The operable equipment associated with the PUREX Storage Tunnels were the remote-controlled locomotive or waste placement and removal equipment, the railcars, and the water-fillable door and ventilation system for both tunnels. No operable equipment is associated with either tunnel, as these tunnels have been sealed and may no longer receive dangerous waste. Backup or redundant systems are not provided for either tunnel, as failure of the equipment would not have the potential to result in a release of dangerous waste to the environment. There are no hazards associated with tunnel equipment failure.

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

6.4.5 Personnel Protection Equipment

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

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

There is no reactive or incompatible waste stored in the PUREX Storage Tunnels. The only ignitable waste stored within the tunnels is silver nitrate. The silver nitrate is present within the silver reactors (deposited on unglazed ceramic packing) stored in Tunnel Number 2.

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

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7.0 CONTINGENCY PLAN [G]

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

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8.0 PERSONNEL TRAINING [H]

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

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

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9.0 EXPOSURE INFORMATION REPORT

The PUREX Storage Tunnels do not store, treat, or dispose of hazardous 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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10.0 WASTE MINIMIZATION [D-9]

To fulfill the requirements of 40 CFR 264.73(b)(9), a certification form that the PUREX Storage Tunnels have a waste minimization/pollution prevention program in place will be entered, annually, into the PUREX Storage Tunnels operating record.

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11.0 CLOSURE AND FINANCIAL ASSURANCE [I]

Closure of the PUREX Storage Tunnels requires coordination with closure of the PUREX Plant to ensure a cost effective closure for both units. In addition, the highly radioactive nature of the mixed waste located within the PUREX Plant and PUREX Storage Tunnels precludes the determination of the type of treatment and/or disposition of the waste at this time.

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

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

Federal facilities are not required to comply with WAC 173-303-620 as is stated in the regulations and as described in Condition II.H.3. of the Dangerous Waste Portion of the Hanford Facility RCRA Permit (Ecology 1994).

11.1 IN SITU DISPOSAL OPTIONS

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

11.1.1 Backfilling the PUREX Storage Tunnels with Gravel

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

11.1.2 Injecting the PUREX Storage Tunnels with Grout

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

11.1.3 Combination of Grout Injection and Backfilling

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

11.2 RETRIEVAL/CLEAN CLOSURE OPTIONS

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

11.2.1 Retrieval and Disposal in the PUREX Plant

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

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

Retrieval of waste material stored in the tunnels could be similar to that described in the previous section. Once the waste material was transferred to the PUREX Plant canyon deck area, characterization and size reduction of waste material could proceed. An area located on the canyon deck or in a process cell could be modified to include all necessary equipment to perform characterization and size reduction activities. Size reduction could be performed through various technologies that include, but are not limited to, flame cutting, water jet cutting, sawing, or other technologies. Final disposition of the processed waste material either onsite or offsite could be in accordance with regulations and procedures in place at that time. The PUREX Storage Tunnels could be closed after submittal and implementation of a PUREX Storage Tunnels closure plan in conjunction with PUREX Plant closure documentation. The PUREX Storage Tunnels closure plan will detail verification sampling and analysis to be performed as a part of closure activities.

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

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

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12.0 REPORTING AND RECORDKEEPING

Reporting and recordkeeping requirements that could be applicable to the Hanford Facility are described in Chapter 12.0 of the General Information Portion (DOE/RL-91-28). Not all of these requirements and associated reports and records identified in Chapter 12.0 of the General Information Portion are applicable to the PUREX Storage Tunnels. Those reporting and recordkeeping requirements determined to be applicable to the PUREX Storage Tunnels are summarized as follows:

- Hanford Facility Contingency Plan and incident records (as identified in the General Information Portion):
  - Immediate reporting
  - Written reporting
  - Shipping paper discrepancy reports.
- Unit-specific Part B permit application documentation and associated plans
- Personnel training records
- Inspection records (unit)
- Onsite transportation documentation
- Land disposal restriction records
- Waste minimization and pollution prevention.

In addition, the following reports prepared for the Hanford Facility will contain input, when appropriate, from the PUREX Storage Tunnels:

- Quarterly Hanford Facility RCRA Permit modification report
- Anticipated noncompliance
- Required annual reports.

Annual reports updating projections of anticipated costs for closure and postclosure will be submitted when the PUREX Storage Tunnels closure plan is submitted with the PUREX Plant closure plan for Ecology approval (Chapter 11.0).

The PUREX Tunnels Operating Record 'records contact' is kept on file in the General Information file of the Hanford Facility Operating Record (refer to Chapter 12.0, DOE/RL-91-28).

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CONTENTS

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13.0 OTHER FEDERAL AND STATE LAWS [J]

Other federal and state laws and local requirements applicable to the PUREX Storage Tunnels (*Atomic Energy Act of 1954*, *Clean Air Act Amendments of 1990*, *Toxic Substances Control Act of 1976*, *State Environmental Policy Act of 1971*, *Federal Facilities Compliance Act of 1992*, and the *Federal Insecticide, Fungicide, and Rodenticide Act of 1975*) are discussed in Chapter 13.0 of the General Information Portion (DOE/RL-91-28).

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CONTENTS

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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 — 4/14/97

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

[signature] — 4/10/97

Co-operator — Date
H. J. Hatch,
President and Chief Executive Officer
Fluor Daniel Hanford, Inc.

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CONTENTS

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APPENDICES

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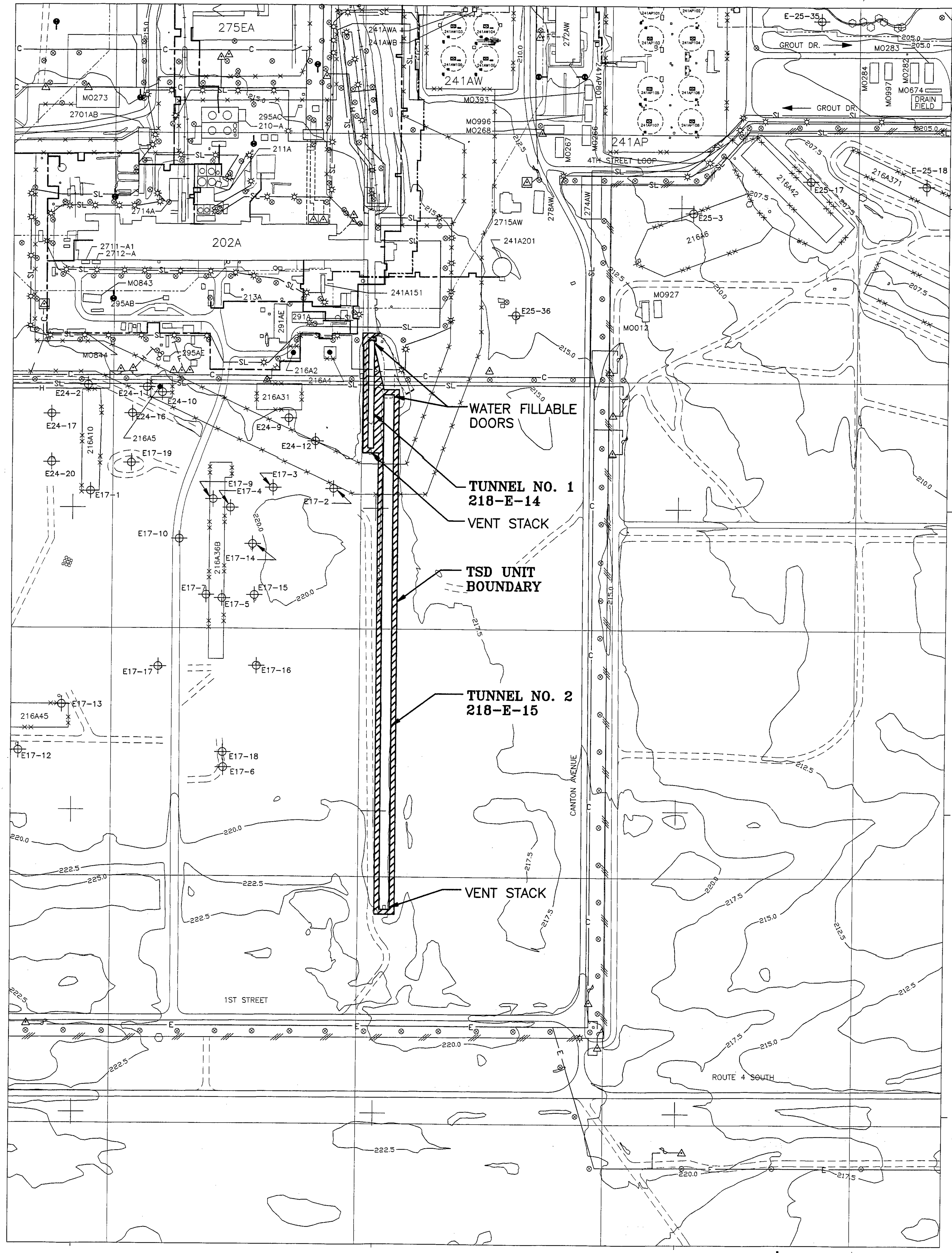
APPENDIX 2A

TOPOGRAPHIC MAP

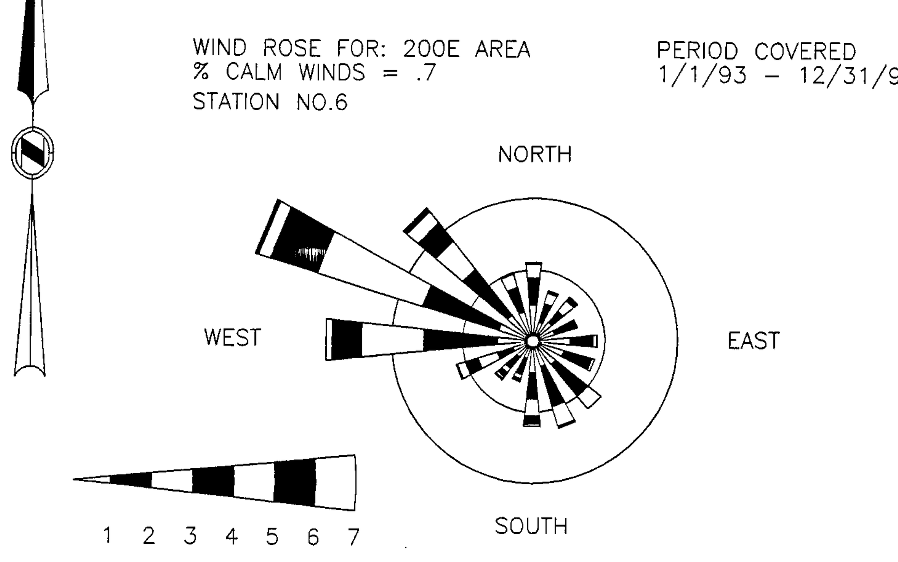
APPENDIX 2A

H-13-000264 TOPOGRAPHIC MAP PUREX STORAGE TUNNELS



WIND ROSE FOR: 200E AREA
% CALM WINDS = .7
STATION NO.6

PERIOD COVERED
1/1/93 - 12/31/93



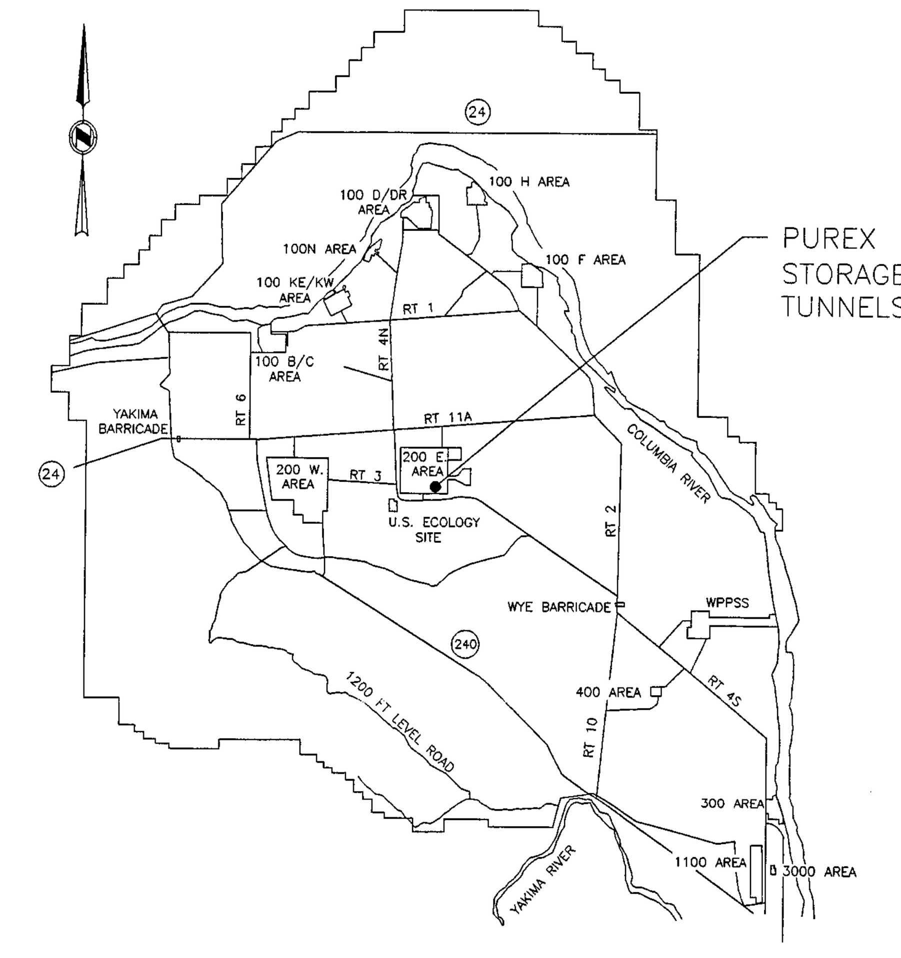
PADDLES INDICATE DIRECTION WIND IS COMING FROM.
RADIAL GRIDS REPRESENT 5.0% AND 10.0% OCCURRENCE.

WIND CLASS	MILES/HOUR
1	>1.0 - 3.0
2	4.0 - 7.0
3	8.0 - 12.0
4	13.0 - 18.0
5	19.0 - 24.0
6	25.0 - 31.0
7	32.0 +

WIND ROSE

LEGEND

- W.47,000 / N.43,000 — HANFORD PLANT COORDINATES (FEET)
- E.576,250 / N.136,000 — WASHINGTON STATE COORDINATES (METERS)
- 215.0 — INDEX CONTOUR (METERS)
- INTERMEDIATE CONTOUR
- IMPROVED ROAD
- UNIMPROVED ROAD
- DIRT ROAD
- SIDEWALKS\PARKING LOTS
- RAILROADS
- SECURITY,WARNING,MISC FENCES
- POST & CHAIN (CRIB,BURIAL GROUND FENCES)
- PERIMETER FENCES
- BUILDINGS/STRUCTURES & TOWERS
- 202A — BUILDING NUMBER
- MOBILE OFFICES
- TSD UNIT BOUNDARY
- E17-16 — WELL
- CATCH BASIN
- MANHOLE
- FIRE HYDRANT
- STEAM
- WASTE TRANSFER LINES
- SL — SERIES LIGHTING
- C — 13.8 KV ELECTRICAL DISTRIBUTION
- E — 2.4 KV ELECTRICAL DISTRIBUTION
- H — SECONDARY ELECTRICAL LINES
- F — SECONDARY ELECTRICAL LINES
- UNDERGROUND ELECTRICAL LINES
- POLE MOUNTED TRANSFORMER
- PAD MOUNTED TRANSFORMER
- SWITH
- FUSED SWITCH
- TANKS
- POWER POLE
- LIGHT POLE
- 216-A- — CRIB
- 218-E- — BURIAL GROUND/STORAGE TUNNEL



GENERAL NOTES

1. THIS MAP IS BASED ON AERIAL PHOTOGRAPHY FLOWN ON 6-24-89. THE ORIGINAL TOPOGRAPHIC MAP WAS PREPARED BY MERRICK & COMPANY AND CERTIFIED TO MEET NATIONAL MAP ACCURACY STANDARDS. OFFICIAL COPIES OF THE MERRICK MAPS THAT SHOW THE CERTIFICATE ARE LOCATED IN THE LOCKHEED MARTIN ENGINEERING FILES AS DRAWING NUMBERS H-2-79476 SHEET 1 AND H-2-79477 SHEET 1 THRU 37. NAMES OF ADDITIONAL FEATURES AND THE TITLE BLOCK WERE ADDED BY WESTINGHOUSE HANFORD COMPANY.

2. WASHINGTON STATE PLANE COORDINATE SYSTEM: THE OFFICIAL COORDINATE SYSTEM AS DEFINED BY THE REVISED CODE OF WASHINGTON (RCW). THE HANFORD SITE LIES WITHIN THE WASHINGTON COORDINATE SYSTEM, SOUTH ZONE. THIS GRID COVERS THE ENTIRE SITE AND USES X (EASTINGS) AND Y (NORTHINGS) COORDINATES.

   HORIZONTAL DATUM: NAD-83 LAMBERT PROJECTION. WASHINGTON STATE PLANE COORDINATES ARE SHOWN IN METERS.

   CONTOUR INTERVAL: 0.5 METERS.

3. HANFORD PLANT GRID: A LOCAL GRID SYSTEM WITH ITS INITIAL POINT NORTHEAST OF THE 400 AREA. IT COVERS 200 EAST AND 200 WEST AREA AS WELL AS GENERAL SITE WORK SUCH AS WELLS AND BURIAL GROUNDS. HANFORD COORDINATES ARE SHOWN IN FEET.

SITE PLAN

SCALE: 1:2000

0 20 40 80 120 160

1 cm = 20 meters

KEY PLAN

SCALE: NONE

"SUPERSEDES DRAWING H-2-79998 REV. 2, PER ECN 639095"

THIS MAP IS TO BE USED FOR REFERENCE PURPOSES ONLY.
DO NOT USE THIS MAP FOR CONSTRUCTION PURPOSES.

REF NUMBER	TITLE
H-13-000231	200 AREA TOPOGRAPHIC MAP
H-13-000223	200 AREA TOPOGRAPHIC MAP

REFERENCES

NEXT USED ON H-13-000200

REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APVD DATE	COG ENGR	OTHER	OTHER
0	PER ECN 639095						

REVISIONS

CADFILE N000264A | CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	4-4-97
CHECKED	[signature]	4-4-97
DFTG APVD	[signature]	4/04/97
COG ENGR	[signature]	4/7/97
APVD	[signature]	7APR97
APVD		
APVD		
APVD		
APVD		
APVD		

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Lockheed Martin Hanford Company

TOPOGRAPHIC MAP PUREX STORAGE TUNNELS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	218-E	0103	H-13-000264	0

SCALE SHOWN | EDT 620477 | SHEET 1 OF 1

H-13-000264 SH 1 of 1 REV 0

CHK PRINT ☐ DATE | COMMENT PRINT ☐ DATE

54-6000-027(5/89)

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APPENDIX 3A

WASTE ANALYSIS PLAN FOR PUREX STORAGE TUNNELS

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GLOSSARY

ALARA	as low as reasonably achievable
ECOLOGY	Washington State Department of Ecology
EHW	extremely hazardous waste
EPA	U.S. Environmental Protection Agency
pH	negative logarithm of the hydrogen-ion concentration
PUREX	plutonium-uranium extraction
QA/QC	quality assurance and quality control
TSD	treatment, storage, and/or disposal
WAC	Washington Administrative Code
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

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	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

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

CONTENTS

CONTENTS (cont)

TABLE

1.0 FACILITY DESCRIPTION

This waste analysis plan (WAP) has been prepared for the PUREX Storage Tunnels, located on the Hanford Facility, Richland, Washington. This WAP applies to all mixed waste (containing both radioactive and dangerous components) regulated by Washington Administrative Code (WAC) 173-303 that is transferred to and/or contained in the PUREX Storage Tunnels.

The PUREX Storage Tunnels are permitted as a miscellaneous unit under WAC 173-303-680. The bulk of the waste stored in the PUREX Storage Tunnels is not placed in a typical container; rather, this waste is placed on a portable device (railcar) that is 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. Therefore, the mixed waste normally is not exposed to the tunnel environment.

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

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

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

Construction of Tunnel Number 1 was completed in 1956 and consists of three areas: the water-fillable door, the storage area, and the vent shaft. The water-fillable door is located at the north end of Tunnel Number 1 and separates the storage tunnel from the railroad tunnel. The door is 7.5 meters high, 6.6 meters wide, and 2.1 meters thick, and is constructed of 1.3-centimeter steel plate. The door is hollow so that the door can be filled with water to act as a radiation shield when the door is in the down (closed) position. If the door is filled with water, the water must be pumped from the door before the door can be raised. Above the door is a reinforced concrete structure into which the door is raised to open the tunnel. Electric hoists used for opening and closing the door are located on the top of this concrete structure.

The storage area is that portion of the tunnel that extends southward from the water-fillable door. Inside dimensions of Tunnel Number 1 are 109.1 meters long, 6.7 meters high, and 5.9 meters wide. Ceiling and walls are 35.6-centimeters thick and constructed of 30.5- by 35.6-centimeter creosote pressure-treated Douglas fir timbers arranged side by side. The first 30.5 meters of the east wall are constructed of 0.9-meter-thick reinforced concrete. A 40.8-kilogram mineral-surface roofing material was used to cover the exterior surface of the timbers before placement of 2.4 meters of earth fill. The earth cover serves as protection from the elements and as radiation shielding. The timbers that form the walls rest on reinforced concrete footings 0.9 meter wide by 0.3 meter thick. The floor consists of a railroad track laid on a gravel bed. The space between the ties is filled to top-of-tie with gravel ballast. The tracks are on a 1.0 percent downward slope to the south to ensure that 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 eight, 12.8-meter-long railcars.

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

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

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

- Tunnel Number 2 is longer, having a storage capacity of five times that of Tunnel Number 1.

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

- The railroad tunnel approach to Tunnel Number 2 angles eastward then angles southward to parallel Tunnel Number 1. The approach to Tunnel 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 March 1997, the door is empty and there is no plan to fill the door.

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. Table 1 contains an approximate inventory of waste stored in the PUREX Storage Tunnels.

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)]. Before storage, the vessels have been flushed and in recent years the final rinsate sampled and analyzed to verify that the residual heel is not a dangerous waste.

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

1.1 PROCESS AND ACTIVITIES

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

1.2 PHYSICAL CHARACTERIZATION OF MATERIAL TO BE STORED

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

- Length, width, and height
- Gross weight and volume
- Preferred orientation for transport and storage
- Presence of dangerous waste constituents.

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

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

1.3 IDENTIFICATION/CLASSIFICATION AND QUANTITIES OF DANGEROUS WASTE MANAGED WITHIN THE PUREX STORAGE TUNNELS

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

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, including any operational compliance 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 unit's permit. This includes identifying any dangerous waste in accordance with regulatory and permit requirements and applicability of any land disposal restrictions.

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

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

- Lead
- Mercury
- Silver and silver salts
- Chromium
- Cadmium
- Barium
- Mineral oil.

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 waste contained in the PUREX Storage Tunnels.

Storage of non-PUREX Plant waste is reviewed on a case-by-case basis. Sampling, chemical analysis, process knowledge (as discussed in the following section), and/or inventory information from waste tracking forms provided from other onsite sources are required to confirm the characteristics and quantities of mixed 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.

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

Sampling and chemical analysis is not performed on lead associated with the material placed in the PUREX Storage Tunnels. Therefore, the accuracy of the estimate on the amount of lead presently stored in each tunnel is limited to the data available from process knowledge. Counterweights on equipment dunnage and lead used for shielding cannot be quantified by existing historical records and are not included in the amount of lead listed on Table 1. However, if removed from the tunnels, the material will be examined and any suspect attachments will be removed, evaluated, and disposed of in accordance with established methods.

2.1.2 Mercury

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

Depending on the specific dissolver in question, 19.1 or 45.4 kilograms of mercury (1.4 or 1.77 liters) were poured into each of the two thermowells per dissolver (38.2 or 90.8 kilograms total per dissolver) following vertical installation of the dissolvers inside the PUREX canyon and before the dissolver was installed in a process cell. The mercury served to transfer heat from the dissolver interior to the thermohm temperature sensor mounted within the thermowell. This mercury remains within the thermowells of discarded dissolvers. In preparation for storage, the thermohms were removed and the upper end of each thermowell was plugged with a 304L stainless steel nozzle plug. In storage, the discarded dissolver rests in an inclined position in a cradle on the railcar. The mercury contained in the thermowells remains in the lower portion of each thermowell and, under normal conditions, is never in contact with the mechanical closure on the nozzle end of the thermowell.

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

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

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

2.1.3 Silver

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

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

Silver salts exhibit the characteristics of toxicity as determined by the toxicity characteristics leaching procedure and are designated D011 [WAC 173-303-090(8)]. Also, silver salts exhibit the characteristic of ignitability and are designated as D001 [WAC 173-303-090(5)].

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

Provisions for taking samples of the packing were not provided in the design of the vessels. Therefore, sampling and chemical analysis are not performed for silver salts before placing a silver reactor in storage.

However, for accountability, the total silver content (Table 1) is considered to be silver nitrate, the salt that exhibits the characteristics of both ignitability and toxicity.

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

2.1.4 Chromium

Presently, chromium stored in Tunnel Number 2 is contained within a failed concentrator removed from the PUREX Plant, and within stainless steel containers received from the 324 Building. The concentrator is a vertical tube structure that was used to concentrate aqueous streams from the final uranium cycle, final plutonium cycles, final neptunium cycles, and condensate from the acid recovery system for recycle. Following service, the concentrator was inspected and found to contain silicate solids with high levels of chromium from the corrosion of stainless steel. The existence of chromium within the 324 Building waste was determined through process knowledge.

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

The potential for the chromium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the chromium is encased within stainless steel vessels and containers that are stored on railcars above the floor level of the tunnel. Therefore, exposure of the chromium stored in the tunnel to leachate is not considered a credible occurrence.

The quantity of chromium within the concentrator was estimated by calculating the volume of silicate solids and the percentage of chromium within the silicate solids. The quantity of chromium in the 324 Building waste was based on process knowledge.

2.1.5 Cadmium

Presently, cadmium stored in the PUREX Storage Tunnel Number 2 is associated with radiation shielding and with a dissolver moderator removed from the PUREX Plant, and within stainless steel containers received from the 324 Building. The cadmium was used to shield equipment from radiation and consists of sheets of the metal attached to lead, both of which could be encased in steel. The cadmium received from the 324 Building was used in waste technology research and development programs.

The dissolvers are annular vessels that are geometrically favorable for criticality safety. The dissolvers were placed over cadmium lined (neutron absorbers) moderators for additional criticality safety. The moderator is a centrally located, cylindrical, cadmium-jacketed 0.08-centimeter-thick concrete 15.2-centimeter-thick neutron absorber. The moderators are approximately 4.4 meters tall by approximately 1.5 meters outer diameter.
Cadmium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D006 [WAC 173-303-090(8)]. If exposed to a leachate, the quantity of cadmium present could produce an extract having a concentration of greater than or equal to 1 milligram per liter, but less than 100 milligrams per liter; therefore, the mixed waste is managed as a WT02 [WAC 173-303-100(5)].

The potential for the cadmium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the cadmium is stored on railcars above the floor level of the tunnel. Therefore, exposure of the cadmium stored in the tunnel to leachate is not considered a credible occurrence.

2.1.6 Barium

Presently, barium is stored in Tunnel Number 2 in stainless steel containers received from the 324 Building. The waste was generated during numerous research and development programs conducted in B-Cell of the Waste Technology Engineering Laboratory (324 Building). The existence of barium within the 324 Building waste was determined through process knowledge.

Barium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D005 [WAC 173-303-090(8)].

The potential for barium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the barium is encased in steel containers stored on a railcar above the floor level of the tunnel. Therefore, exposure of the barium stored in the tunnel to leachate is not considered a credible occurrence.

2.1.7 Mineral Oil

Presently, mineral oil is stored in Tunnel Number 2 in stainless steel containers received from the 324 Building. The mineral oil was used in the B-Cell viewing windows in the 324 Building. Oil leaking from the windows was absorbed on rags and clay absorbent material.

The material safety data sheet for the mineral oil lists a lethal dose (LD_{50}) of 2 grams per kilogram (dermal rabbit). Therefore, the oil designates as a Toxic Category A WT02 [WAC 173-303-100(5)].

The potential for the absorbed mineral oil stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the mineral oil is encased in steel containers stored on a railcar above the floor level of the tunnel. Therefore, exposure of the mineral oil stored in the tunnel to leachate is not considered a credible occurrence.

2.1.8 Identification of Incompatible Waste

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

2.1.9 Operational Considerations

Sufficient information must be available to ensure that incoming waste meets operational acceptance limits, e.g., physical size, radiation limits, and WAC 173-303 requirements. These operating specifications are limits and controls imposed on a process or operation that, if violated, could jeopardize the safety of personnel, and could damage equipment, facilities, or the environment. Operating specifications have been established from operating experience, process knowledge, and calculations.

2.2 PARAMETER AND RATIONALE SELECTION PROCESS

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

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

2.2.1 Discarded Chemical Products

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

2.2.2 Dangerous Waste Sources

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

2.2.3 Dangerous Waste Characteristics

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

- Characteristic of Ignitability--Although the solid silver nitrate has not been tested in accordance with Appendix F of 49 CFR 173, the waste is assumed to be an oxidizer as specified in 49 CFR 173.127(a). Therefore, the silver nitrate waste is assumed to exhibit the characteristic of ignitability under WAC 173-303-090(5) and is designated as D001.

- Characteristic of Corrosivity--Some of the material stored within the tunnels either has contained or has been in contact with corrosive liquids. The standard operating procedure has been to flush vessels with water to recover as much special nuclear material as practical. Also, flushing removes much of the radioactive contamination, minimizing the spread of contamination during handling. Currently, the final aqueous rinse is sampled and analyzed to confirm that the pH is greater than 2 and less than 12.5. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as corrosive waste.

- Characteristic of Reactivity--The waste stored in the tunnels does not meet any of the definitions of reactivity as defined in WAC 173-303-090(7). The waste material is not unstable, does not react violently with water, does not form explosive mixtures, or does not generate toxic gases. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as reactive waste.

- Characteristic of Toxicity--Lead, mercury, silver, chromium, barium, and cadmium are identified on the Toxicity Characteristics list. The quantity of these materials stored in the tunnels is sufficient that, should the substances come in contact with a leachate (an event considered unlikely), the concentration of the extract could be above the limits identified in the list. Therefore, this waste is designated D005, D006, D007, D008, D009, and D011.

  The PUREX Storage Tunnels also are permitted for selenium (D010). Currently, there is no waste stored in the tunnels that is designated for D010; however, there is a potential for waste with this waste number to be stored within the tunnels.

2.2.4 Dangerous Waste Criteria

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

- Toxicity Criteria--Cadmium meets the toxicity criteria in WAC 173-303-100(5) when performing a book designation. Because of the concentrations present, the waste containing these constituents is designated as dangerous waste (DW) and is assigned the dangerous waste number of WT02.

- Persistence Criteria--Currently, no waste stored in the tunnels has been designated as persistent per WAC 173-303-100(6).

2.2.5 Waste Designation Summary

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

- Lead--D008; EHW
- Mercury--D009; EHW
- Silver and silver salts--D001, D011; EHW
- Chromium--D007; EHW
- Cadmium--D006, WT02; DW
- Barium--D005; EHW
- Mineral Oil--WT02; DW.

2.3 RATIONALE FOR PARAMETER SELECTION

Refer to Section 2.2.

2.4 SPECIAL PARAMETER SELECTION

Refer to Section 2.2.

3.0 SELECTION OF SAMPLING PROCEDURES

The following sections discuss the sampling methods and procedures that will be used. Sampling usually will be in accordance with requirements contained in the pertinent sampling analysis plan, procedures, and/or other documents that specify sampling and analysis parameters.

3.1 SAMPLING STRATEGIES

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

Waste received that is not generated at the PUREX Plant could require sampling strategies associated with this waste that will be developed on a case-by-case basis.

3.1.1 Sampling Methods

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

The waste currently stored in the tunnels is lead, mercury, chromium, cadmium, barium, mineral oil, silver, and silver salts. Sampling and chemical analysis of the lead, mercury, cadmium, barium, mineral oil, or chromium to confirm their presence would not provide additional data beneficial to proper management of the waste and would not be in compliance with as low as reasonably achievable (ALARA) principles. The silver salts are dispersed over a large area on ceramic packing contained within a large stainless steel reactor vessel. Representative sampling of the ceramic packing is not considered to be practical and therefore was not performed.

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

For waste received from other Hanford Facility activities, existing sampling, chemical analysis, and/or process knowledge documentation is used to confirm the characteristics and quantities of mixed waste to be stored. Storage of non-PUREX Facility waste is reviewed on a case-by-case basis.

3.1.2 Frequency of Analyses

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

3.2 SELECTION OF SAMPLING EQUIPMENT

The only analysis presently used in support of the PUREX Storage Tunnels operation is for corrosivity on the final in-place aqueous rinse of discarded vessels before the vessels are released for storage. The pH is determined by Method 9040 or 9041 (SW-846). The RCRA sampling methods, as referenced in WAC 173-303-110, will not be performed on any waste currently stored in the PUREX Storage Tunnels.

3.3 MAINTAINING AND DECONTAMINATING FIELD EQUIPMENT

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

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

3.4 SAMPLE PRESERVATION AND STORAGE

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

3.5 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

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

Generally, quality assurance and quality control (QA/QC) requirements for sampling will be divided between paperwork requirements, such as chain-of-custody, and sampling and analysis activities. This section addresses sampling QA/QC requirements. Analytical QA/QC is discussed in Section 4.0.

A chain-of-custody procedure is required for all sampling identified by this WAP. At a minimum, the chain of custody must include the following: (1) description of waste collected, (2) names and signatures of samplers,

(3) date and time of collection and number of containers in the sample, and (4) names and signatures of persons involved in transferring the samples.

3.6 HEALTH AND SAFETY PROTOCOLS

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

4.0 LABORATORY SELECTION AND TESTING AND ANALYTICAL METHODS

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

4.1 LABORATORY SELECTION

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

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

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

4.2 TESTING AND ANALYTICAL METHODS

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

5.0 WASTE RE-EVALUATION FREQUENCIES

Re-evaluation of waste within the PUREX Storage Tunnels will not occur because of high radiation levels and the way the railcars are positioned in the tunnels. The waste is expected to remain stable.

6.0 SPECIAL PROCEDURAL REQUIREMENTS

The following sections describe special procedural requirements associated with waste in the PUREX Storage Tunnels.

6.1 PROCEDURES FOR RECEIVING WASTES GENERATED OFFSITE

The PUREX Storage Tunnels do not accept waste generated off the Hanford Site.

6.2 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTE

Presently, the only ignitable, reactive, or incompatible dangerous waste stored in the PUREX Storage Tunnels is the silver nitrate coating on the ceramic packing inside the silver reactors. This material is confined to the interior of a large stainless steel vessel (Section 2.1.3) that separates this material from all other waste material stored in the tunnel. The requirements in WAC 173-303-395(1)(a) require 'No Smoking' signs be conspicuously placed wherever there is a hazard present from ignitable or dangerous waste. 'No Smoking' signs are not considered appropriate at the PUREX Storage Tunnels because the tunnels are a designated radiation area. Smoking is not allowed in any radiation area on the Hanford Site and rules prohibiting smoking are strictly enforced. Because the posting of radiation area barriers serves to achieve the no smoking intent of WAC 173-303-395(1)(a), posting and maintaining 'No Smoking' signs are not considered appropriate.

Isolated areas within the PUREX Storage Tunnels have radiation levels in excess of 5 roentgen per hour. Personnel entry into such radiation areas to make periodic inspections [e.g., an annual fire inspection as required by 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.

6.3 PROVISIONS FOR COMPLYING WITH LAND DISPOSAL RESTRICTION REQUIREMENTS

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

6.4 DEVIATIONS FROM THE REQUIREMENTS OF THIS PLAN

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

7.0 RECORDKEEPING

Records associated with this waste analysis plan and waste verification program are maintained on the Hanford Facility. These records will be maintained until closure of the PUREX Storage Tunnels. Records associated with the waste inventory will be maintained for 5 years.

8.0 REFERENCES

DOE/RL-94-55, *Hanford Analytical Services Quality Assurance Plan*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-94-97, *Analytical Methods for Mixed Waste Analyses at the Hanford Site*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1986, *Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods*, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

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Table 1. PUREX Storage Tunnels Inventory. (sheet 1 of 4)

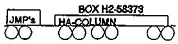
PUREX #1 STORAGE TUNNEL (218-E-14)

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

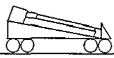
PUREX #1 Storage Tunnel is located at the southeast end of the PUREX Plant and is an extention of the railroad tunnel. The storage area is approximately 109 meters long, 6.9 meters high and 5.8 meters wide. The tracks have a one percent down-grade toward the south end of the tunnel. The capacity of the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

position

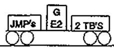
1. & 2. HA COLUMN AND MISC JUMPERS IN BOX
PLACED IN TUNNEL #1 ON 6/60
HA 4,700 CU. FT., 400 CURIES, 5 rem/hr. @ 60',
JUMPRS 2,190 CU. FT., 2,000 CURIES, Pb - ~115 Kg.



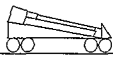
3. E-F11 #1 (1WW WASTE) CONCENTRATOR FAILED 7/24/60.
PLACED IN TUNNEL #1 ON 7/29/60, 12.5 rem/hr. @ 100',
1,900 CU. FT., 40, 000 CURIES AFTER FIFTY-FIVE MONTHS SERVICE.



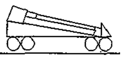
4. G-E2 CENTRIFUGE. MISC JUMPERS IN BOX AND TWO TUBE BUNDLES.
PLACED IN TUNNEL #1 ON 12/24/60 (FUG SER# 762)
2,465 CU. FT., 3,000 CURIES, Pb - ~115 Kg., 1.5 rem/hr. @ 150'.



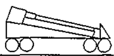
5. E-H4 (3WB) CONCENTRATOR FAILED 1/4/61.
PLACED IN TUNNEL #1 ON 1/4/61, 150 mrem/hr. @ 50',
2,336 CU. FT., 1,000 CURIES. AFTER FIVE YEARS SERVICE.



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'.

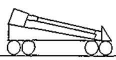


Table 1. PUREX Storage Tunnels Inventory. (sheet 2 of 4)

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.

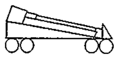
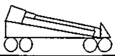
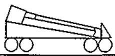
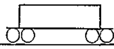
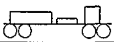
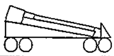
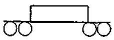
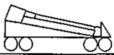
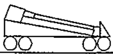
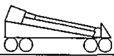
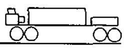
position		
1.	E-F6 # (2WW WASTE) CONCENTRATOR, TK F 15-2, ONE TUBE BUNDLE AND AGITATOR MOTORS PLACED IN TUNNEL ON 12/12/67 ON CAR 61439 2,400 CU. FT., 700 CURIES, 1.3 rem/hr. @ 100'.	
2.	E-F6 #5 (E-H4 3WB) CONCENTRATOR, TWO TUBE BUNDLES PLACED IN TUNNEL ON 3/26/69 ON CAR MILW 60883 2,400 CU. FT., 500 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 (H2-66012) 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. 2,400CU. 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, 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'.	

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Table 1. PUREX Storage Tunnels Inventory. (sheet 3 of 4)

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

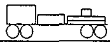
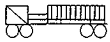
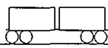
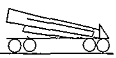
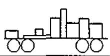
position		
13.	J5 TANK (VESSEL #30). F1 COND (VESSEL #13) AND F12-B CELL BLK. OLD FOUR-WAY DUMPER. DISS YOKE AND FLANGE PLATE, 3 rem/hr. @ 1'. PLACED IN TUNNEL ON 1/21/86 ON CAR 19806. 2,500 CU. FT., 90 CURIES.	
14.	L-1 PULSER, 2-COLUMN CARTRIDGES, 1-JUMPER CUTTER, 3-JUMPER ALIGNMENT TOOLS, 9-EXTERIOR 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), 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 1/27/95 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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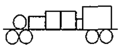
Table 1. PUREX Storage Tunnels Inventory. (sheet 4 of 4)

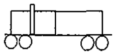
PUREX #2 STORAGE TUNNEL (218-E-15)

position

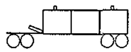
22. METAL LINER BOX (H-2-65095) CONTAINING JUMPERS AND FAILED/ OBSOLETE CANYON EQUIPMENT, F7 NEUTRON MONITOR (H-2-75825), LEAD STORAGE BOX (H-2-131629) CONTAINING JUMPER COUNTERWEIGHTS AND MISCELLANEOUS LEAD ITEMS, SCRAP HOPPER (H-2-57347) CONTAINING MISCELLANEOUS CANYON EQUIPMENT, CANISTER CAPPING STATION (H-2-821831), TEST CANISTER CONTAINING VARIOUS LENGTHS OF CARBON STEEL PIPE. PLACED IN TUNNEL 3-11-96 ON CAR #3616. ESTIMATED WEIGHT 22 TONS, 1,712 CU. FT., 15 CURIES, Pb - ~3,232 Kg., Cd - ~2 Kg., 100 mrem/hr. @ 1'.



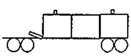
23. TWO BURIAL BOXES (H-2-100187) CONTAINING JUMPERS AND FAILED/ OBSOLETE CANYON EQUIPMENT, LIFTING YOKE (H-2-99652). PLACED IN TUNNEL 3-11-96 ON CAR #PX-31. ESTIMATED WEIGHT 21 TONS, 2,116 CU. FT., 2 CURIES, 10 mrem/hr. @ 1'.



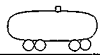
24. CONCRETE BURIAL BOX (H-1-44980) STORING 8 CONTAINERS OF 324 BUILDING, B-CELL WASTE. FOR ADDITIONAL DETAILS, SEE PUREX WORK PLAN WP-P-95-60. PLACED IN TUNNEL ON CAR #PX-29, ON APRIL 26, 1996. ESTIMATED WEIGHT 36 TONS, 1,890 CU. FT., < 244,000 CURIES, ~15 mrem/hr. @ 150'. Pb - ~1,802 kg., Cd - ~10.5 kg., absorbed oil - ~8.5 kg., Cr - ~1 kg., Ba - ~ 3 kg, ~24 g Pu.



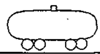
25. CONCRETE BURIAL BOX (H-1-44980) STORING 9 CONTAINERS OF 324 AND 325 BUILDING WASTE. FOR ADDITIONAL DETAILS, SEE PUREX WORK PLAN WP-P-96-015. PLACED IN TUNNEL ON CAR #10A-3619, ON JUNE 12, 1996. ESTIMATED WEIGHT 46.5 TONS, 1,890 CU. FT., < 1.75 M CURIES, ~200 mrem/hr. @ 150'. Ba - ~4 g., Cd - <1 g., Cr - ~ 2 g., Pb - < 1 g, ~43 g Pu.



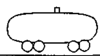
26. 20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18580, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 5 CURIES, 100 mrem/hr. @ 3', ~53 g Pu.



27. 20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18579, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 9 CURIES, 300 mrem/hr. @ 3', ~131 g Pu.



28. 20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18582, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 23 CURIES, 650 mrem/hr. @ 3', ~11 g Pu.



APPENDIX 4A

ENGINEERING DRAWINGS

APPENDIX 4A

ENGINEERING DRAWINGS

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-2-55590	Door and Hoist Details
H-2-55591	Door and Hoist Details
H-2-55592	Door and Hoist Details
H-2-55593	Electrical Details
H-2-55594	Shielding Door Fill and Drain Lines Arrangement: Disposal Facility for Failed Equipment, Rev. 2
H-2-55599	Electrical Door Control Plan, Elementary Diagram and Miscellaneous Details: Disposal Facility for Failed PUREX Equipment, Rev. 2
H-2-58134	Ventilation Details (sheets 1 and 2)
H-2-58175	PUREX Tunnel: As Built, May 1962, Rev. 2
H-2-58193	Sump Details
H-2-58194	Sump Details
H-2-58195	Structural Sections and Details: Equipment Disposal - PUREX, Rev. 1
H-2-58206	Sump Details
H-2-58208	Fan Details
H-2-94756	Filter Details

Note: These drawings are under revision to reflect current configuration. Revised drawings will be submitted through a Class 1 Modification.

APPENDIX 7A

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

APPENDIX 7A

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

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

Prepared by: [signature] 4-2-97

C.N. Villalobos, Engineer — Date
PUREX Facility Stabilization Project

Approved by: [signature] 4/2/97

R.W. Bailey, Manager — Date
PUREX Facility Stabilization Project

Approved by: [signature] 3 APR '97

G.J. LeBaron, Officer — Date
PUREX Regulatory Compliance Officer

CONTENTS

1.0 GENERAL INFORMATION (G-1)

The PUREX Storage Tunnels are located in the 200 East Area of the 1,450-square kilometer U.S. Department of Energy, Richland Operations Office (DOE-RL) operated Hanford Site in southeastern Washington State. This unit-specific contingency plan describes the basic responses to upset and/or emergency conditions for the Plutonium-Uranium Extraction (PUREX) 218-E-14 and 218-E-15 Storage Tunnels. This plan in conjunction DOE/RL-93-75, *Hanford Facility Contingency Plan* meet the requirements of contingency planning as required by WAC 173-303.

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 CO-OPERATOR: Fluor Daniel Hanford, Inc.
P.O. Box 1000
Richland, WA 99352-1000

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 may continue to receive mixed waste from the PUREX Plant and other onsite sources 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/EVACUATION ROUTE

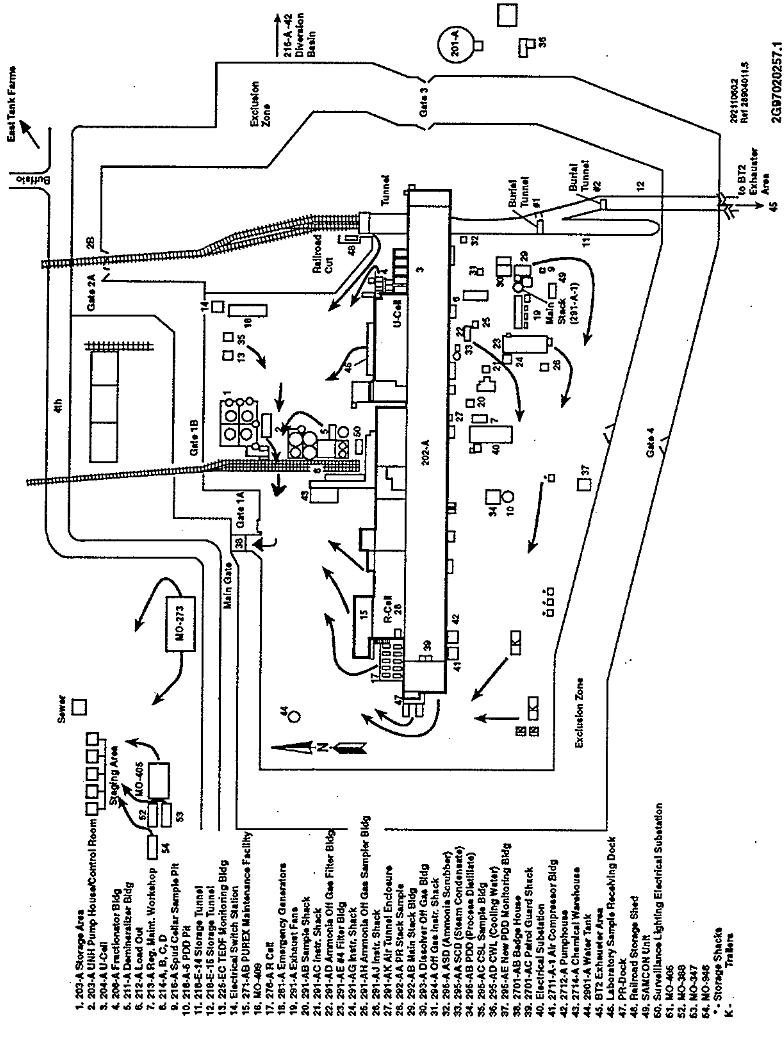
The PUREX Storage Tunnels Site Plan and evacuation route are shown in Figure 1. During an emergency, personnel that enter the storage tunnels during material placement, operations will evacuate via the north end of the railroad tunnel, through the pedestrian door.

2.0 EMERGENCY COORDINATORS (G-2)

Emergency coordinator[a]			
Designation	Job title	Work location	Work phone
Primary	PUREX Project Manager	MO-273	373-4999
Alternate	Team Leader	MO-273	373-4134
Alternate	Team Leader	MO-273	373-1781

[a]The names and home phone numbers of all Emergency Coordinators are maintained at the single point-of-contact (the Hanford Patrol Operations Center) telephone number 373-3800 in accordance with the Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4.

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



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. Each incident will be classified for both DOE Order and RCRA purposes. The RCRA classification will be accomplished in accordance with DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 5.1.5.

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 DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 5.0.

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 for 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, if operating, 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.

Depending on the magnitude of a natural phenomena event, fire, or explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. In the event of such an occurrence, a recovery plan will be developed in accordance with DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 6.0. The recovery plan will take into consideration methods, if any, for retrieval of the waste stored within the tunnels.

Additional emergency responses for fires and explosions can be found in DOE/RL 93-75, *Hanford Facility Contingency Plan*, Section 5.4.

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 DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 5.0.

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*, Section 5.0.

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. For emergerncy responses, refer to Section 3.2 of this plan for explosions.

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*, Section 5.8.

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.

4.1 NOTIFICATION (G-4a)

Procedures and methods for immediate notification following an imminent or actual emergency are found in DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 9.0.

4.2 IDENTIFICATION OF RELEASED/SPILLED MATERIALS

Methods for identifying the character, source, amount, and a real 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*, Section 5.1.4.

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, as outlined in DOE/RL-93-75, *Hanford Facility Contingency Plan*, Section 6.1. 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. Also, for such operations, work plans are followed and pre-job safety meetings conducted.

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*, Section 8.0.

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*, Section 9.0.

9.0 REFERENCES

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

Loretta K. Young — 4/4/97

Prepared by: Loretta K. Young — Date
TRAC Team Leader

Ronald W. Bailey — 4/4/97

Approved by: Ronald W. Bailey — Date
Director PUREX Transition Project

G. J. LeBaron — 4 APR '97

Approved by: Gregory J. LeBaron — Date
PUREX Environmental Compliance Officer
PUREX Regulatory Compliance

1.0 INTRODUCTION

The PUREX Facility consists of two separate treatment, storage, and/or disposal (TSD) units, the PUREX Plant and the PUREX Storage Tunnels. The PUREX Plant is permitted for storage and treatment of dangerous and/or mixed waste. The PUREX Storage Tunnels are permitted as a miscellaneous unit for the storage of dangerous and/or mixed waste.

This PUREX Facility Training Plan in conjunction with Chapter 8.0 of the *Hanford Facility Dangerous Waste Permit Application, General Information Portion, (DOE/RL-91-28)*, complies with the requirements of Washington Administrative Code (WAC), Chapter 173-303, "Dangerous Waste Regulations." Training records associated with personnel identified in this plan are maintained in the PUREX Regulatory file.

This training plan describes general requirements, worker categories, and provides course descriptions for operation of the two TSD units and the less than 90-day accumulation areas.

2.0 TRAINING PROGRAM

Centralized training organizations are responsible for developing the overall Hanford Facility training program of classroom instruction and maintaining training records. The project 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 the PUREX Facility.

3.1 Job Title, Job Description, and Names of Employees

Personnel who are associated with dangerous waste management at the PUREX Facility are maintained in this training plan 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/or mixed waste at the PUREX Facility. 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 the PUREX Facility, these personnel are not maintained 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 B&W Hanford Co. Human Resources Department.

Personnel assigned duties as a Dangerous Waste Worker will be removed from that assignment if their training goes delinquent. Upon requalification, the person could 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 Facility 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, or prepares containers of dangerous waste for movement including proper marking and labeling of containers. Performs inspections and operates the TSD unit. Samples containers of dangerous waste or prepares samples for delivery to a laboratory. Contingency plan duties include responding to small spills in accordance with procedures.	Operators
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 or Team Leader of Advanced General Worker Environmental Compliance Officer

WORKER CATEGORIES	GENERATOR JOB DUTIES	PERSONNEL JOB TITLES[1]
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 and/or mixed waste management and/or transportation activities. Authorized individual for signing offsite waste manifests and onsite waste movement documentation.	Hazardous Material Specialist

[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 the PUREX Facility who are categorized as Advanced General Workers, General Managers, and General Shippers.

3.1.1 PUREX Facility Advanced General Workers

3.1.1.1 PUREX Facility Operators

Responsibilities of Operators may 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 Facility Container Management Operators may 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.

3.1.2 PUREX Facility General Managers and Team Leaders

3.1.2.1 PUREX Facility Emergency Coordinator/Alternates

Responsibilities and duties of the Emergency Coordinator and the alternates may 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 TSD units' Contingency Plan, operations, activities, location and properties of all wastes handled, location of all records, and the layout of the TSD unit.

3.1.2.2 PUREX Facility Environmental Compliance Officer

Responsibilities may include the following:

- Provide support to management to ensure compliance with the applicable environmental compliance requirements, environmental permits, and compliance orders
- Ensure that management is aware of the TSD units' environmental compliance status and environmental compliance activities.
- Understand and be able to explain the environmental compliance status of the TSD units with all applicable environmental requirements

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

3.1.3 PUREX Facility General Shipper

3.1.3.1 Hazardous Material Specialist

- Provide technical direction for handling, storage, transportation, and disposal of hazardous materials dangerous and/or mixed waste.

- Sign waste manifests and other waste movement documentation

- Perform weekly inspections of 90-day and satellite accumulation areas

- 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 and/or mixed 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. The following courses may be assigned as a requirement by worker category, to help ensure the correct course is assigned. The course descriptions contain additional information concerning the course. Courses applicable to all personnel categorized as Advanced General Workers, General Managers, and General Shippers are listed in Appendix A.

3.2.1 Worker Category Courses

<u>All Employees</u>

- Hanford General Employee Training (HGET) - 000001
  Retraining: 12 Months
  PUREX Complex Orientation - 250701
  Retraining: 12 Months

<u>General Workers</u>

- 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

<u>Advanced General Workers</u>, <u>General Managers</u>, <u>General Shippers</u>

- 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 Facility 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 TSD 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 TSD 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	N	Y	N
Key parameters for automatic waste feed cut-off systems	N	N	N	N
Communications or alarm systems	Y	N	Y	Y
Response to fires or explosions	Y	N	Y	Y
Response to groundwater contamination incidents	N	N	N	N
Shutdown of operations	N	N	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 Facility operators is based upon Dangerous and/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 one is applicable to this plan, and is Course 250020, PUREX Solid Waste Management. Areas such as systems surveillance, alarm emergency response, spill control, 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 the PUREX Facility 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

A current list by name, job title, and job description for the PUREX Facility will be issued quarterly. The list will be maintained on the Hanford Facility to satisfy the requirements of WAC 173-303-330. 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 courses are driven by the requirements of the WAC 173-303, Dangerous Waste Regulations. 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 in the unit specific file.

COURSE NUMBERS	COURSE TITLES
000001	Hanford General Employee Training
02006G	Waste Management Awareness
02028B	Building Emergency Director Training
03E024	Unit/Building-specific contingency plan training - PUREX Facility
035010	Waste Designation
035020	Facility Waste Sampling and Analysis
035120	Waste Management Administrative - Initial
035130	Waste Management Administrative - Requalification
037510	Building Emergency Director Requalification
250020	PUREX Solid Waste Management
250701	PUREX Complex 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)	WAC 173-303-330
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

Title	02006G 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

Title	02028B 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 Requalification)

Title	03E024 Unit/building-Specific Contingency Plan Training- PUREX Facility
Description	Course consists of a review of specific hazards associated with the TSD 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 TSD 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 TSD 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

Title	035010 Waste Designation
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, corrosivity, 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	One Time Only

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	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)	WAC 173-303-330
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 Requalification
Description	Refresher for Building Emergency Director Training
Target Audience	Building Emergency Directors and alternates
Delivery	Classroom
Evaluation	Not Applicable
Length	2 hours
Frequency	Annual

Title	250020 PUREX Facility Solid Waste Management
Description	Course elements include Operators specific responsibilities with regards to the safe and compliant packaging, storage, and shipment of Dangerous and/or Mixed Waste at the PUREX Facility. 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/or 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	250701 PUREX Complex 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 Facility Advanced Waste Workers, General Shippers and General Managers.
Delivery	Computer Based Training
Length	1 hour
Frequency	Every other year

PUREX Facility Gen Mgrs

Example Name	HGET 000001-M 12 Months	WST MGMT AWR 02006G-M N/A	BLDG EMER DIR TRNG INI 02028B-P 12 Months	BED REQUAL 037510-P 12 Months	PUREX BLDG EMER PLAN 03E024-M 12 Months	PUREX FCLTY ORIENT 250701-R 24 Months
Employee 1	06/21/97	Complete	Complete	02/24/98	01/29/98	06/19/97
Employee 2	04/26/97	Complete	Complete	02/24/98	01/31/98	04/28/97
Employee 3	10/30/97	Complete	N/A	N/A	01/30/98	11/03/97

PUREX Facility Ad Wst WK

Example Name	HGET 000001-M 12 Months	WST MGMT AWR 02006G-M N/A	PUREX BLDG EMER PLAN 03E024-M 12 Months	PUREX FCLTY WST MGMT 250020-P 24 Months	PUREX CMPLX ORIENT 250701-R 24 Months
Employee 4	05/31/97	Complete	01/16/98	11/30/98	09/24/98
Employee 5	09/24/97	Complete	04/19/97	11/30/98	09/13/97
Employee 6	07/29/97	Complete	12/12/97	11/30/98	08/01/97

PUREX Facility Gen Ships

Example Name	HGET 000001-M 12 Months	WST MGMT AWR 02006G-M N/A	WASTE DESIGNAT ION 035010-M N/A	FCLTY WST SAMPLE & ANLYS 035020-M N/A	WASTE MGMT ADMIN INI 035120-M 12 Months	WASTE MGMT ADMIN REQUAL 035130-M 12 Months	PUREX BLDG EMER PLAN 03E024-M 12 Months	PUREX CMPLX ORIENT 250701-R 24 Months
Employee 7	05/31/97	Complete	Complete	Complete	Complete	09/30/97	01/22/98	05/25/97
Employee 8	07/22/97	Complete	Complete	Complete	Complete	04/07/98	01/22/98	08/28/97

Keys:

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* * The employee has been scheduled to attend this course.

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